



# Model Rocket Safety Code

- 1. Materials.** I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.
- 2. Motors.** I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.
- 3. Ignition System.** I will launch my rockets with an electrical launch system and electrical motor igniters. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.
- 4. Misfires.** If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.
- 5. Launch Safety.** I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with D motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them away to a safe distance.
- 6. Launcher.** I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or will cap the end of the rod when it is not in use.
- 7. Size.** My model rocket will not weigh more than 1,500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse. If my model rocket weighs more than one pound (453 grams) at liftoff or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration regulations before flying.
- 8. Flight Safety.** I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.
- 9. Launch Site.** I will launch my rocket outdoors, in an open area at least as large as shown in the accompanying table, and in safe weather conditions with wind speeds no greater than 20 miles per hour. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.
- 10. Recovery System.** I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.
- 11. Recovery Safety.** I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

## LAUNCH SITE DIMENSIONS

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00 — 1.25	1/4A	50
1.26 — 2.50	A	100
2.51 — 5.00	B	200
5.01 — 10.00	C	400
10.01 — 20.00	D	500
20.01 — 40.00	E	1000
40.01 — 80.00	F	1000
80.01 — 160.00	G	1000
160.01 — 320.00	2 Gs	1500



# OSO

**PAYLOAD SECTION**

**EJECTION BAFFLE**

**EASY TO BUILD**





**FLYING  
MODEL  
ROCKET KIT**




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

**OsO™**  
**Kit No. KV-62**

	Specifications	Engine	Approx. Altitude
Body Diameter	1.17" (3.0 cm)	A8-3	175'
Length	30.6" (77.7 cm)	B6-4	400'
Fin Span	6.4" (16.3 cm)	C6-5	950'
Net Weight	1.5 oz. (42.6 g)		

Parachute Recovery

## What is a Retro-Repro™ ?

A Retro-Repro is a retro reproduction of an out-of-production model rocket kit. It is a close approximation of a full scale model of an early historically significant model rocket kit from one of the many companies that pioneered the hobby over the past half century. A Retro-Repro is not a true clone or identical copy of the original. It incorporates improvements using modern technology, while keeping the flavor and build appeal of the early kits.

---

### About Flight Systems, Inc.

In early 1967, George Roos formed Flight Systems, Inc., "FSI", as a subsidiary of PyroChem Company, Inc. in Louisville, Colorado. For years he was the chief engine designer and manufacturer of innovative model rocket engines for FSI. Sometime between 1971 and 1974, FSI moved to Raytown, Missouri and while there Lonnie Reese served as president of the company until his death in 1984. FSI continued in business until around 1994.

Their kits were known for heavy-duty pre-cut plywood fins and hardwood nose cones. Early models used non-standard engine sizes of 21mm and 27mm with greater impulse than most of the existing model rocket engines. Their F7 and F100 engines achieved legendary status even though they were overrated and tended to have more failures than the smaller engines available.

In 1990, 18mm engines and kits were introduced along with engine mount conversions for many of their kits. FSI was for many years one of the largest model rocket companies, but went out of business, leaving thousands of faithful fans hoping still today to see some of their innovative designs and engines again.

---

May 27, 2007

Copyright © 2007 Semroc Astronautics Corporation  
Box 1271 Knightdale, NC 27545 (919) 266-1977

## LIMITATION OF LIABILITY

Model rockets are not toys, but are functional rockets made of lightweight materials and are launched with NAR or Tripoli safety certified model rocket motors, electrically ignited and flown in accordance with the NAR Model Rocket Safety Code. If misused, model rockets can cause serious injury and property damage. Semroc certifies that it has exercised reasonable diligence in the design and manufacture of its products. Semroc cannot assume any liability for the storage, transportation, or usage of its products. Semroc shall not be held responsible for any personal injury or property damage whatsoever arising out of the handling, storage, use, or misuse of our products. The buyer assumes all risks and liabilities therefrom and accepts and uses Semroc products on these conditions.

Your purchase and use of any Semroc products is construed as your agreement to and acceptance of these terms. If you do not agree to these terms and conditions, you must return the product, unused, for refund or credit.

## 100% SATISFACTION GUARANTEE

If you are not 100% satisfied with your Semroc product, we will make it right by providing whatever you consider fair, from refund to replacement.

Contact us at:

Semroc Astronautics Corporation  
Customer Service Department  
P.O. Box 1271  
Knightdale, North Carolina 27545

## JOIN THE NAR!

Sign up online at [www.nar.org](http://www.nar.org) to join the premier model rocketry organization. Semroc fully supports the National Association of Rocketry and recognizes it as the sport's official voice. The NAR is the oldest and largest sport rocketry organization in the world. Since 1957 over 80,000 serious sport rocket modelers have joined the NAR to take advantage of the fun and excitement of organized rocketry. It is always more fun if you fly with friends. The *Sport Rocketry* magazine is one of the best ways to keep informed of new developments in the hobby. Check online at [www.semroc.com/nar](http://www.semroc.com/nar) for promotions just for NAR members.



# NOTES:

## About the Oso™

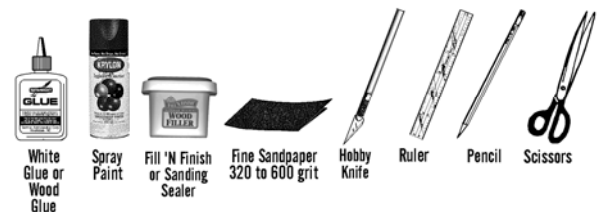
The FSI Oso was released in 1967 as their fifth kit. It evolved over the years into the model that provided the inspiration for the Semroc Oso. Originally, it had plywood fins shaped more like the Penetrator, their first, smaller kit. It originally had a hardwood ogive nose cone and shorter payload section. The final version had more swept fins, longer (8") payload, balsa nose cone, and decals. The Oso was introduced as Catalog #MRK-V and had an introductory price of \$4.00.

The Retro-Repro Oso™ is a faithful reproduction of the last FSI version that used a balsa nose cone and tube coupler. The Semroc Oso™ uses laser-cut hard balsa fins for ease of construction. The engine mount is included for existing 18mm engines. An engine hook is also provided that was not on the original model. An ejection baffle is provided to reduce the need for recovery wadding.

### BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List in the center of 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 in the center of these instructions. 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

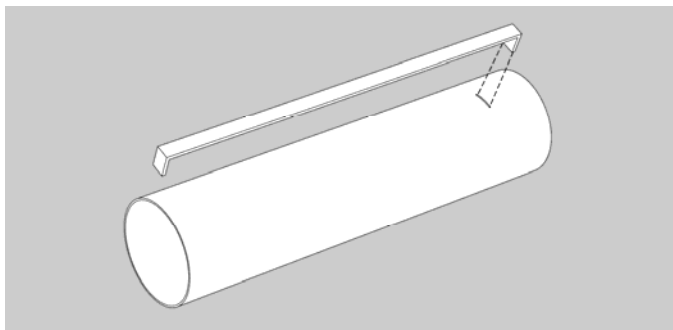
❑ **1.** These instructions are presented in a logical order to help you put your Oso™ together quickly and efficiently. Check off each step as you complete it and enjoy putting this kit together.

## ENGINE MOUNT

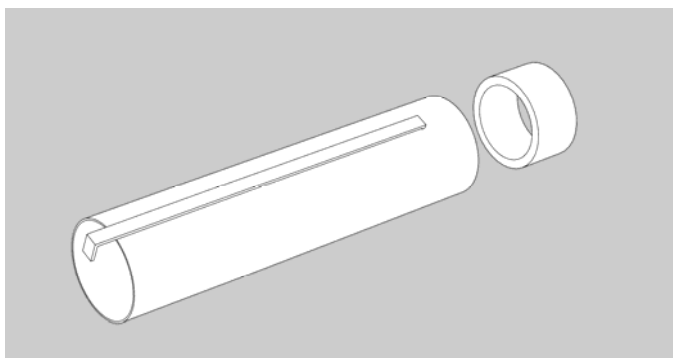
❑ **2.** Bend the engine hook slightly so it forms a slight bow in the direction shown.



❑ **3.** Insert one end of the engine hook into the pre-punched engine tube slot.



❑ **4.** Apply a bead of glue inside the top end of the engine tube and glue the thrust ring in place on top of the engine hook as shown. Make sure the thrust ring rests against the top of the engine hook.



## FLIGHT PREPPING

❑ **33.** 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.

❑ **34.** The Oso™ has an ejection baffle to reduce the need for recovery wadding. If you do add recovery wadding, pack it from the top of the body tube. Use a sufficient quantity to protect the parachute, but too much will not leave enough room for the chute.

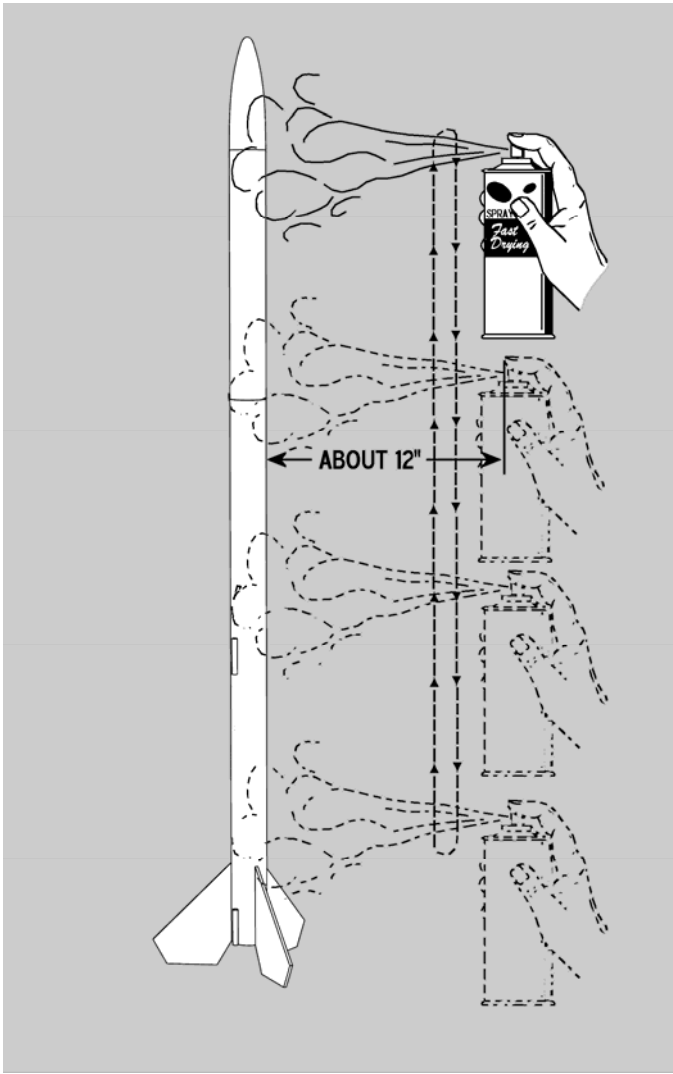
❑ **35.** Fold the parachute and pack it and the elastic shock cord on top of the recovery wadding. Slide the payload section into place, making sure it does not pinch the shock cord or parachute.

❑ **36.** 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.

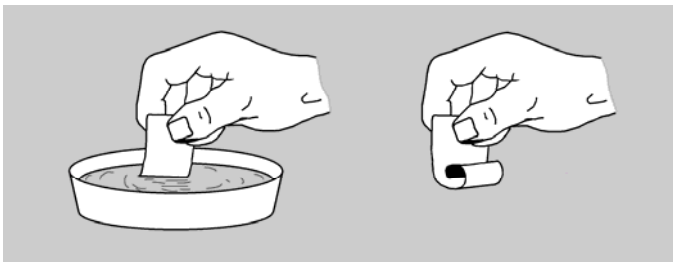
❑ **37.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the Oso™ from a 1/8" diameter by 36" long launch rod.

Look for more models from fSI that are planned for future releases!

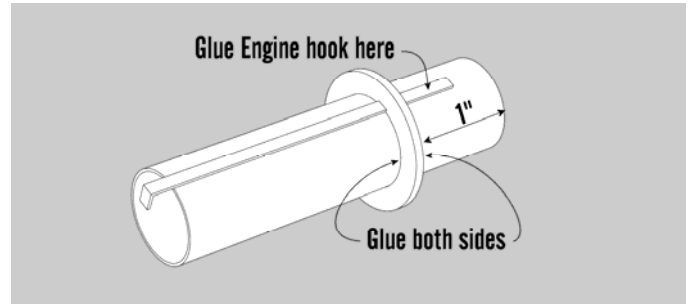
Many fSI parts are now available at  
[www.semroc.com](http://www.semroc.com)



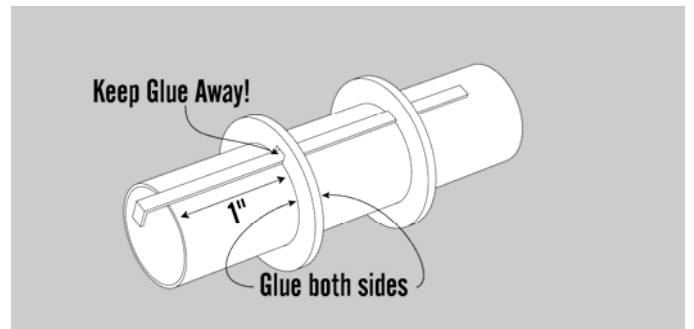
❑ **32.** After the paint has dried, decals should be applied. The decals supplied with the Oso™ are waterslide decals. Refer to the photo for classic decal placement. Apply each decal before starting the next. Check for fit before wetting the decal. A drop of detergent in the water will allow for more movement before the decal sets.



❑ **5.** Slide the top centering ring (with the smaller notch) onto the engine tube 1" from the top end aligning the notch over the engine hook. Apply a bead of glue around both sides of the centering ring. Apply a bead of glue on the top end of the engine hook.

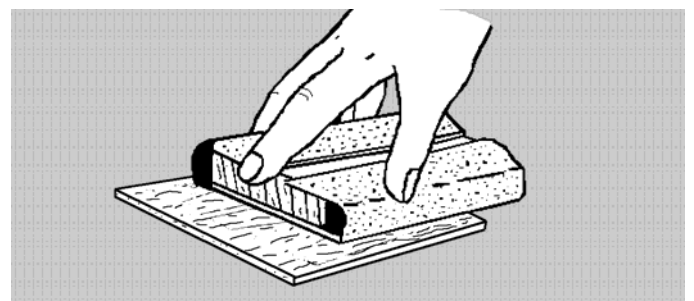


❑ **6.** Slide the bottom centering ring 1" from the bottom of the engine tube and aligned over the engine hook. Apply a bead of glue around both sides of the centering ring keeping glue away from the large notch. Set the assembly aside to dry, checking occasionally for runs. Keep glue off the outside edge of the ring.

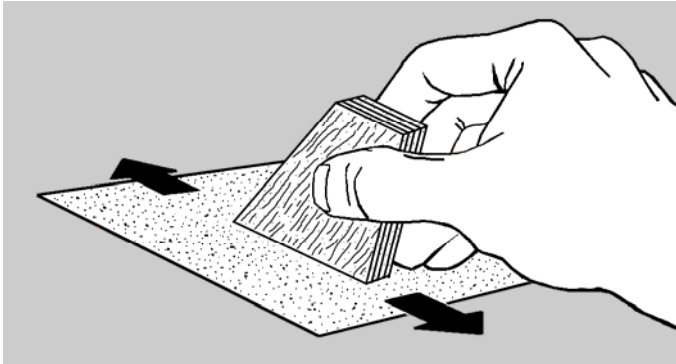


## PREPARE THE FINS

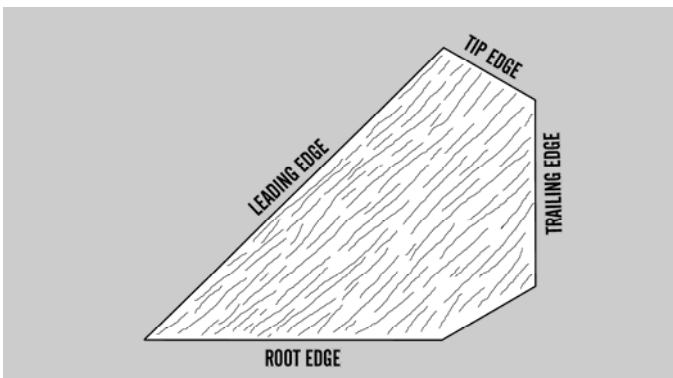
❑ **7.** Lightly sand each side of the laser-cut fins. Carefully push the laser-cut fins from their sheet. Start at one point on each fin and slowly and gently work around the fin.



- ❑ **8.** Stack all three fins together. Line them up squarely and sand the fins back and forth over some fine sandpaper to get rid of the hold-in tabs as shown below.

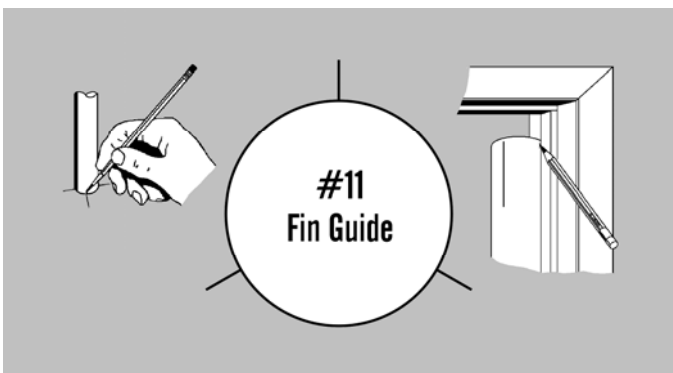


- ❑ **9.** Round all edges except the root edges (which will be glued to the body tube). For minimum aerodynamic drag, taper the tip and trailing edges.



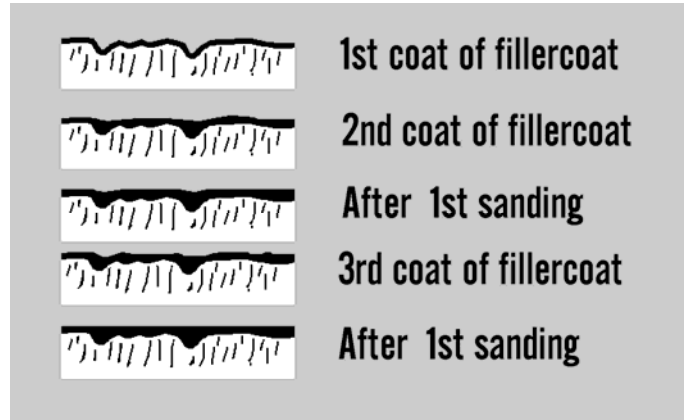
## MARK THE TUBE

- ❑ **10.** Stand the longest body tube (ST-11180) on the fin guide below. Mark the three fin positions. 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 marks the length of the tube to provide lines for aligning the fins.



## FINISHING

- ❑ **28.** 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.



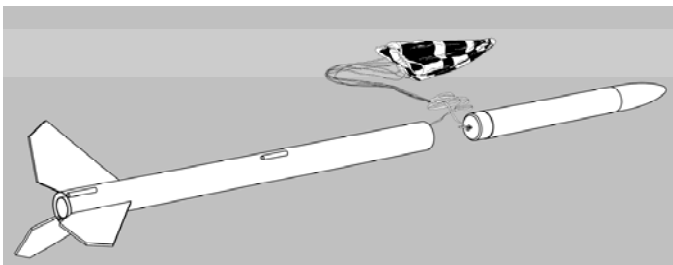
- ❑ **29.** After all balsa surfaces have been prepared, wipe off all balsa dust with a dry cloth. First spray the model with an enamel primer, then spray a base color of gloss white.

- ❑ **30.** The Oso™ can now be painted with its final colors. Give the entire rocket a white base coat. The nose cone can be painted red or left white. Leave the fins white so the decals will show up better.

- ❑ **31.** 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.

## FINAL ASSEMBLY

- ❑ **26.** Assemble the parachute using the instructions printed on the canopy.
- ❑ **27.** Prepare the shock cord as follows. Shake the elastic shock cord free and pull it out from the top of the main body tube. Tie the loose end of the elastic cord to the screw eye on the payload section. Attach the parachute to the elastic cord about 12" from the screw eye.

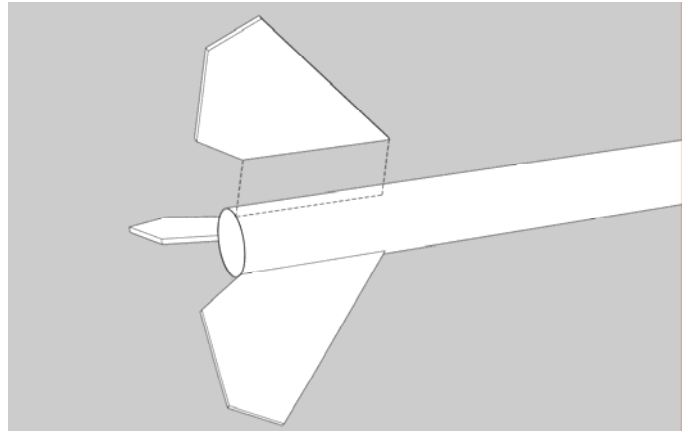


This completes the assembly of your

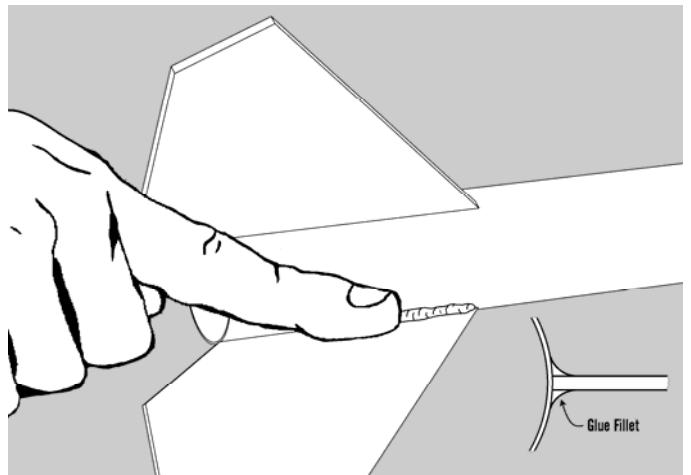
**SEMROC**  
**OSO**

## APPLY THE FINS

- ❑ **11.** 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 body tube and even with the bottom of the tube. Remove, allow to almost dry, apply additional glue, and reposition. Repeat for the other two fins.



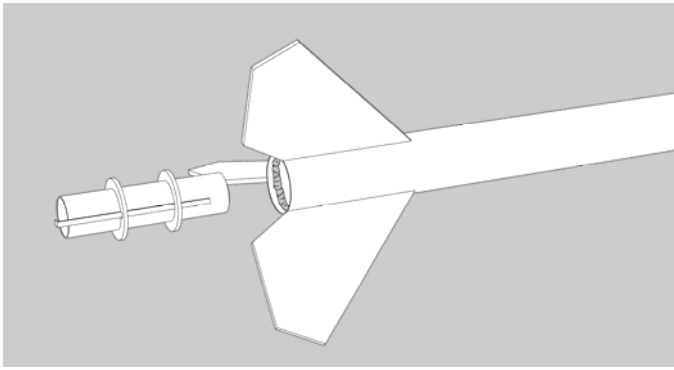
- ❑ **12.** Apply a fillet of glue along each fin and body tube joint. Use your finger to smooth the glue to the shape as shown. This adds much strength to the joints.



## ENGINE MOUNT

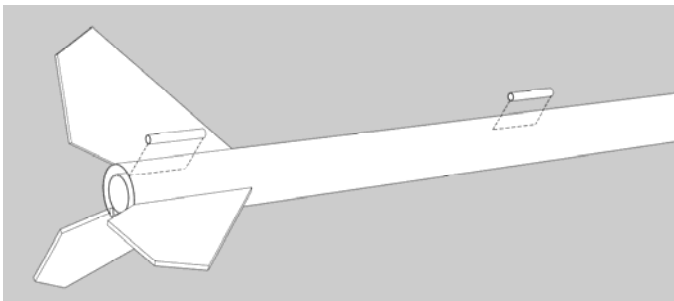
- ❑ **13.** Apply a bead of glue inside the bottom end of the body tube. Insert the engine mount sliding it into position with the end of the engine tube even with the end of the body tube. Leave in an upright position while the glue sets. Then turn the assembly upside down and apply a bead of glue around the bottom joint.





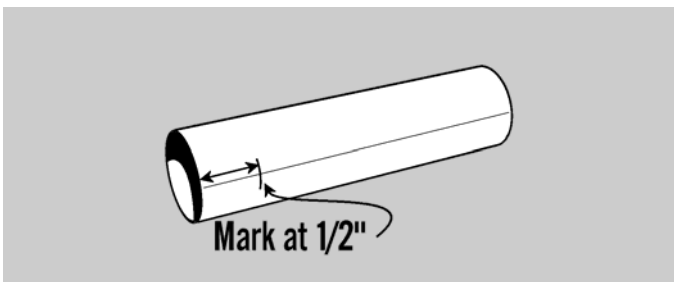
## ADD LAUNCH LUGS

- ❑ **14.** Glue one of the launch lugs into position between two fins even with the bottom of the main body tube. Glue the second launch lug 8" above the lower launch lug and in line with it. Sight from the top to ensure that they are properly aligned.



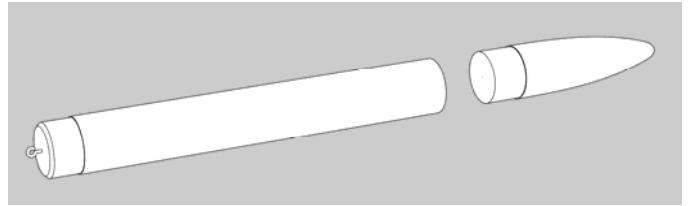
## EJECTION BAFFLE

- ❑ **15.** Using a ruler, straight edge, or door jam, place a straight line on one of the two small baffle tubes (ST-525). Place a mark on the line 1/2" from the end as shown.



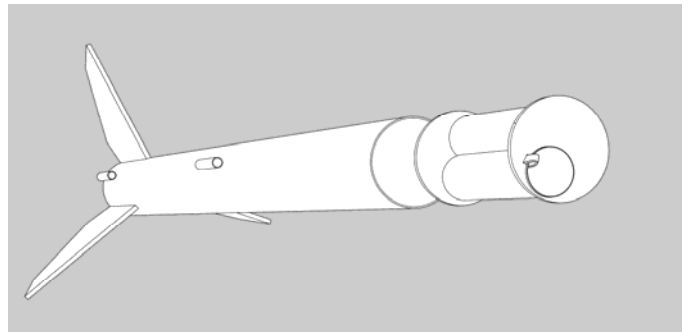
- ❑ **16.** Apply a bead of glue along the marked line from the 1/2" mark to the far end. With both tubes on a flat surface, slide the second tube against the bead of glue and hold in place until the glue sets.

- ❑ **23.** If you plan on using the top section for payloads, friction fit the nose cone with masking tape. Otherwise, glue the nose cone in place.

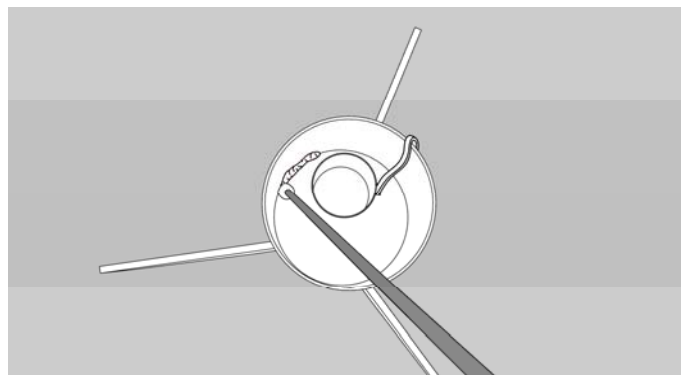


## ADD EJECTION BAFFLE

- ❑ **24.** Test fit the ejection baffle in the main tube. Sand the edges so it will slide freely in the main body tube. Apply a bead of glue about 5" inside the top of the main tube. Orient the baffle assembly so the elastic cord is at the top end. Slide the ejection baffle in the tube past the bead of glue until the top of the baffle is about 4-5" from the top of the tube. Rotate the main tube as the glue is drying so it does not pool in one place. Allow to dry completely.

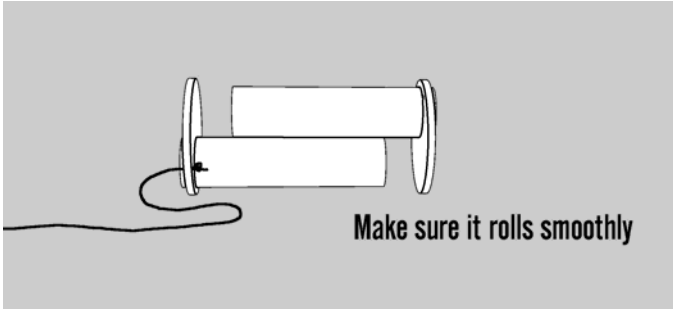


- ❑ **25.** Apply a generous bead of glue around the top ring of the ejection baffle using the glue applicator. Keep glue away from the elastic cord. Allow to dry.



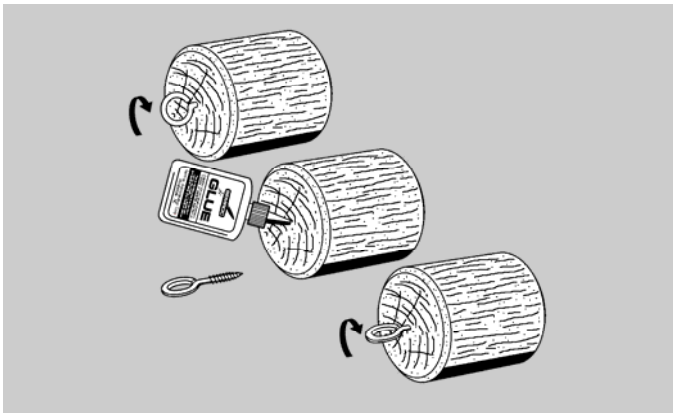


❑ **20.** Align the two rings so the assembly is symmetrical and rolls smoothly over a flat surface. When the assembly is aligned, apply fillets of glue over both sides of each ring along the tube joints. Keep glue off the outside surface of each ring. Roll up the cord and place it inside the top tube so it is out of the way later. Set this assembly aside to dry.

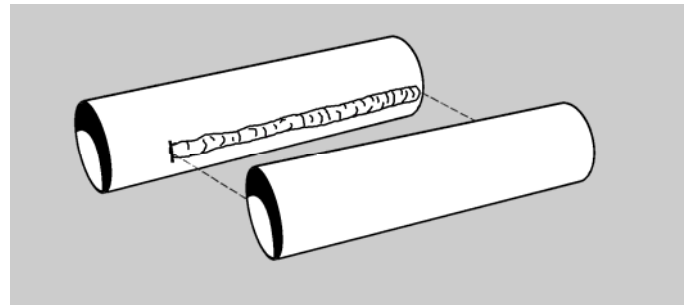
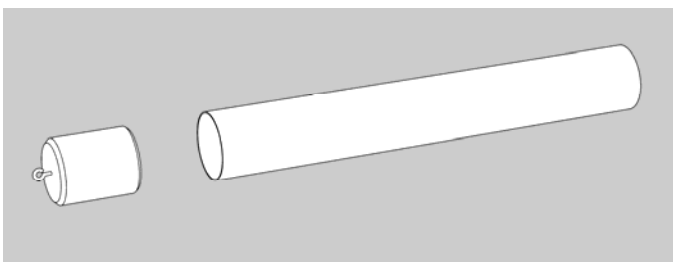


## PAYLOAD SECTION

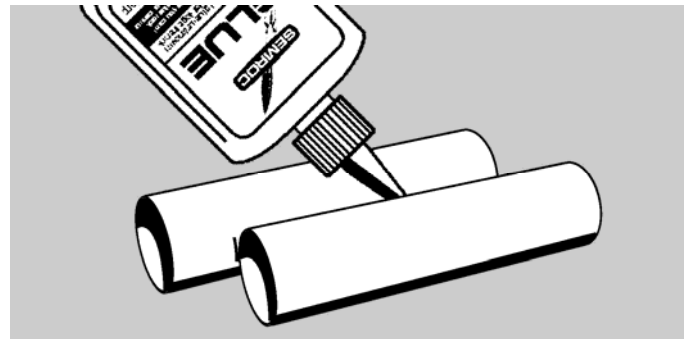
❑ **21.** Twist the screw eye into the center of the balsa tube coupler. Unscrew it and squirt glue into the hole. Reinstall the screw eye and wipe off any excess glue.



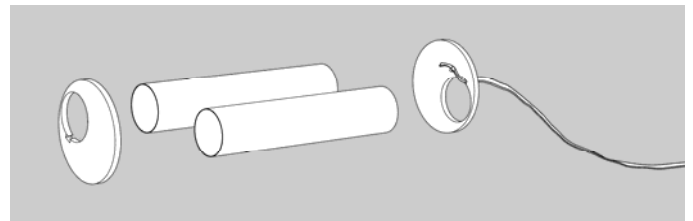
❑ **22.** Place a small bead of glue inside one end of the remaining body tube (BT-1180). Insert the balsa tube coupler (BTC-11) until it is half way into the body tube.



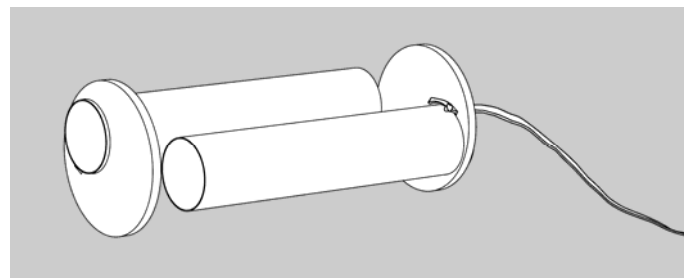
❑ **17.** After the glue is dry, apply additional fillets along both sides of the tube joints for strength. Since these tubes will absorb much of the heat of the ejection gases, apply a generous coating to the inside and outside of both tubes. Allow this assembly to dry.



❑ **18.** Tie a large knot in one end of the elastic cord. Thread it in the small notch in one of the baffle rings as shown.



❑ **19.** Slide the ring with the elastic cord over one end of the baffle tube leaving about 1/16" showing. Make sure the elastic cord is captured. **Do not glue yet!** Slide the second ring over the opposite end of the assembly leaving 1/16" overlap.



## Parts List

A	1	Nose Cone.....	BC-1135
B	1	Body Tube .....	ST-1180
C	1	Balsa Tube Coupler.....	BTC-11
D	1	Body Tube .....	ST-11180
E	1	Laser Cut Fins.....	FV-62
F	1	Body Tube .....	ST-730E
G	1	Thrust Ring .....	TR-7
H	1	Engine Hook.....	EH-28
I	1	Centering Ring Set.....	CR-KV-62
J	2	Launch Lug.....	LL-2A
K	1	Elastic Cord.....	EC-124
L	2	Body Tubes.....	ST-525
M	1	Screw Eye .....	SE-10
N	1	Plastic Parachute .....	RC-12
O	1	Tape Discs.....	TD-6
P	1	Shroud Line.....	SLT-6
Q	1	Glue Applicator.....	GA-2
R	1	Decal.....	DKV-62

## EXPLODED VIEW

