

SEMROC

LITTLE JOE II

1/70 Scale Model
Kit Includes Apollo
Capsule

1968 Retro
Reproduction

Laser Cut Parts

Embossed
Wraps for
Realistic
Texture

Water Slide
Decals

12"
Parachute
Recovery



FLYING
MODEL
ROCKET KIT

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

LITTLE JOE II Kit No. KS-3

	Specifications	Engine	Approx. Altitude
Body Diameter	2.217" (5.6 cm)	A8-3	150'
Length	14.6" (37.1 cm)	B6-4	350'
Fin Span	4.9" (12.4 cm)	C6-5	700'
Net Weight	1.5 oz. (42.5 g)		

Skill Level 4

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 Estes Industries, Inc.

In July 1958, G. Harry Stine of Model Missiles, Inc. in Denver, Colorado approached Vern Estes about making model rocket engines for them. On January 15, 1959, Vern's automated model rocket engine fabricating machine, "Mabel", produced the first of many millions of Estes model rocket engines. In 1960, Estes was producing more engines than Model Missiles could sell. Vern and his wife Gleda opened a mail order rocket company and introduced the Astron Scout and Astron Mark.

In 1961, a catalog was mimeographed and hand stitched on Gleda's sewing machine. Later that year, Estes Industries had outgrown the confined space in Denver. In December 1961, the entire operation was moved to an old farm in Penrose, Colorado quickly establishing the small town as the "Model Rocket Capital of the World."

Estes Industries was sold to Damon in September 1969. The name Estes is synonymous with model rocketry. Almost everyone remembers growing up launching Estes rockets or knowing someone that did. Estes Industries has introduced millions of youngsters of all ages to model rocketry for over half a century.

October 4,2006, November 5,2015

About the Little Joe II

The Estes Little Joe II was released in 1968 as a companion to the Saturn 1B. It shared the same 1/70 scale Apollo Capsule. The Little Joe II was Estes #K-30 and was introduced with a price of \$2.75.

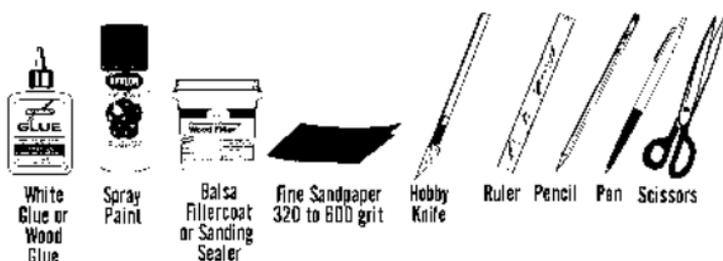
The Retro-Repro™ Little Joe II is a faithful reproduction of the original. It uses laser-cut balsa fin ribs and smooth finished balsa parts for ease of construction. Heavy embossed wraps are included like the original with a paint-ready glossy surface. Two 12" two-color parachutes are supplied along with a Kevlar® shock cord mount.

There were five actual Little Joe II launches. This model is closest in paint scheme to A-001, the second flight, that was launched at White Sands, NM on May 13, 1964.

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 Little Joe II together quickly and efficiently. Check off each step as you complete it and enjoy putting this kit together.

ENGINE MOUNT

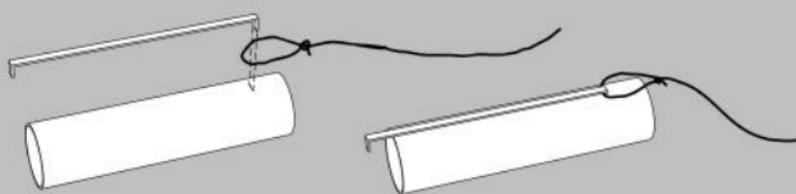
- 2.** Tie a loop in one end of the yellow Kevlar® cord using an overhand knot.



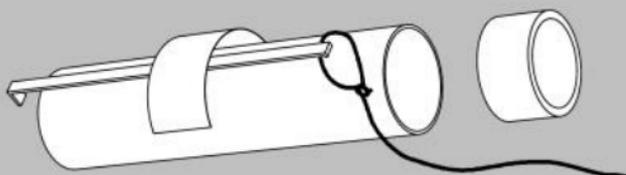
- 3.** Bend the engine hook slightly so it forms a slight bow in the direction shown.



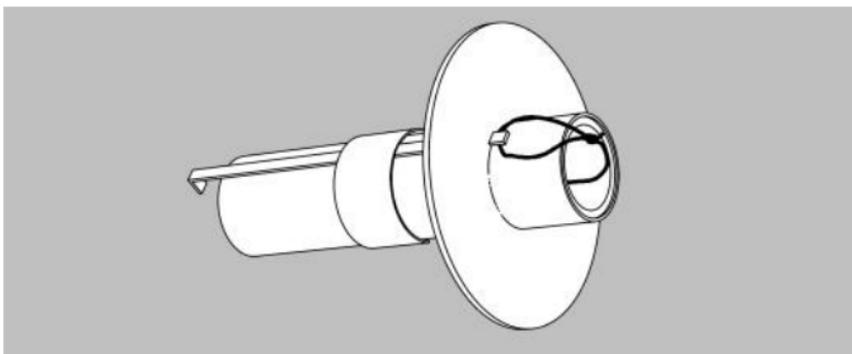
- 4.** Insert one end of the engine hook through the loop in the yellow Kevlar® cord and into the pre-punched engine tube slot.



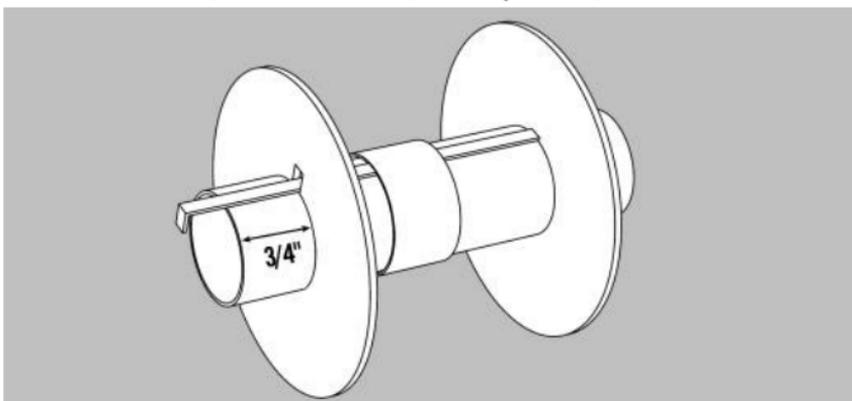
- 5.** Wrap a piece of masking tape around the center of the engine mount. Apply a bead of glue on the engine hook between the tape and the Kevlar loop. Glue the thrust ring in place inside the tube and against the engine hook as shown.



- ❑ **6.** Slide the top centering ring (without a notch) onto the engine tube just even with the end of the engine hook as shown. Apply a bead of glue around both sides of the ring. Pull the Kevlar cord back into the engine mount tube to keep it out of the way in future steps.

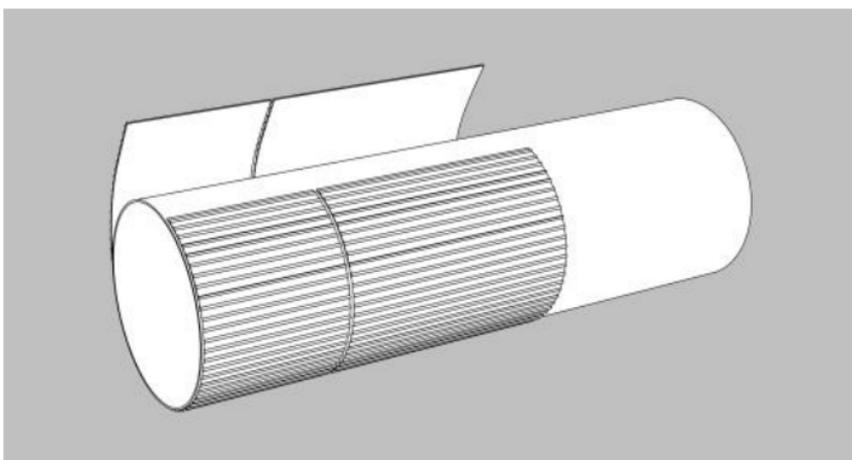


- ❑ **7.** Slide the bottom centering ring onto the engine tube with the notch centered over the engine hook and $3/4$ " from the end of the tube. Apply a bead of glue around both sides of the ring keeping glue away from the engine hook. Continue turning the assembly until the glue does not run. Set the assembly aside to dry completely.



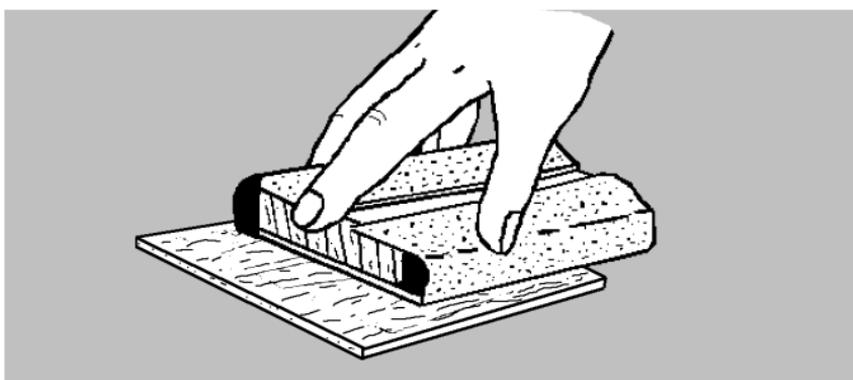
APPLY WRAPS

- ❑ **8.** Roll the smaller wrap around the main body tube even with one end. Draw a faint pencil line around the top of the ring. Remove the wrap and apply a thin film of glue around the tube between the line and the end of the tube. Roll the wrap back in place on the tube. Clean up any excess glue before it dries. Repeat for the upper wrap making sure the edges of the wraps are close together and the joints are aligned. Allow to dry.

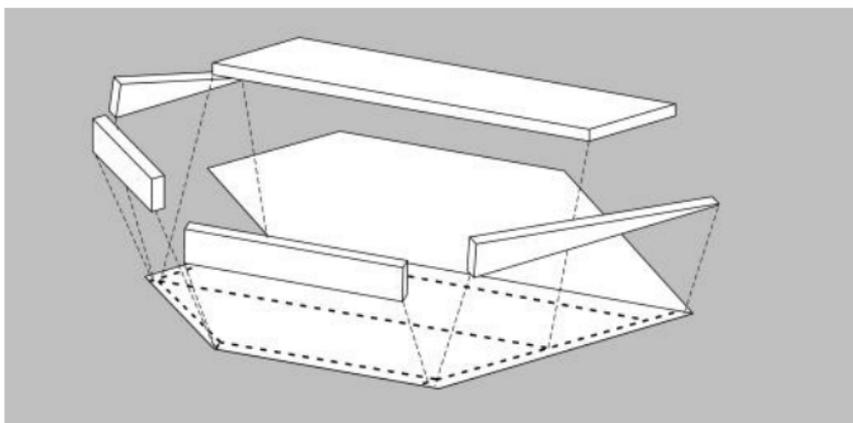


FIN PREPARATION

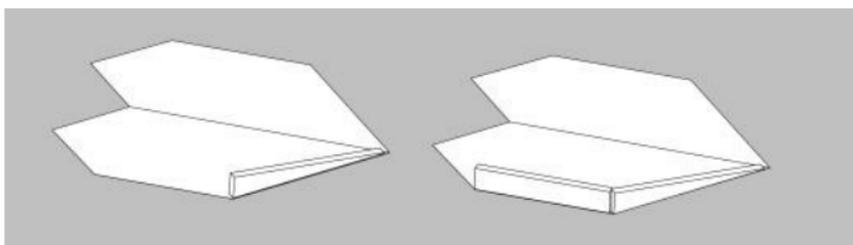
9. The fins for the Little Joe II are made up of card stock covers and balsa ribbing. They require patience to assemble them correctly. Cut the fin covers out of the paper sheet. Crease the mid-line with a ball point pen or stylus on the FOLD line. Fold the fin cover in half with the printing to the inside. Make sure the edges are even. Sand the fin sheet and remove all the fin pieces.



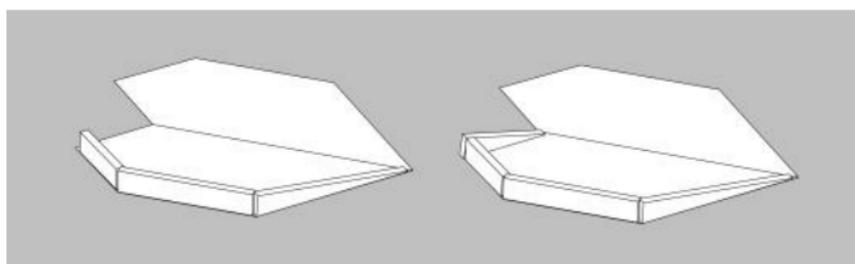
10. Use the drawing below for a guide to place the different pieces.



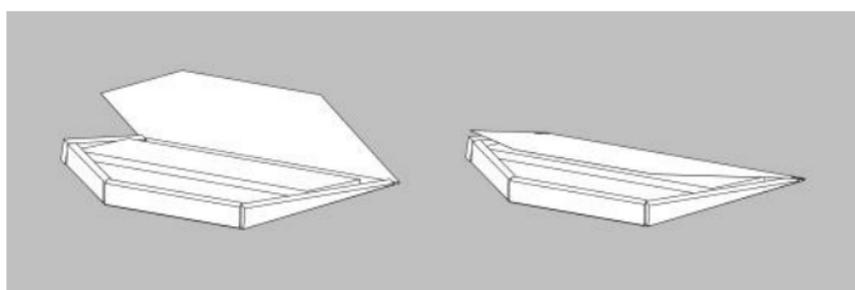
11. Test fit all the pieces on the fin cover inside the dotted lines. When all the pieces are sanded to fit properly, start with the longest wedge shaped piece and apply a small bead of glue to the fin cover on the area it will be placed. Align the wedge piece on the glue. While the glue is drying, add the second piece as shown. It will have to be tilted toward the center crease just slightly. Allow these two pieces to set, but not completely dry.



12. Add the third rib as shown, even with the edge. Apply glue on the final wedge piece and set it into place. Allow these four pieces to set.

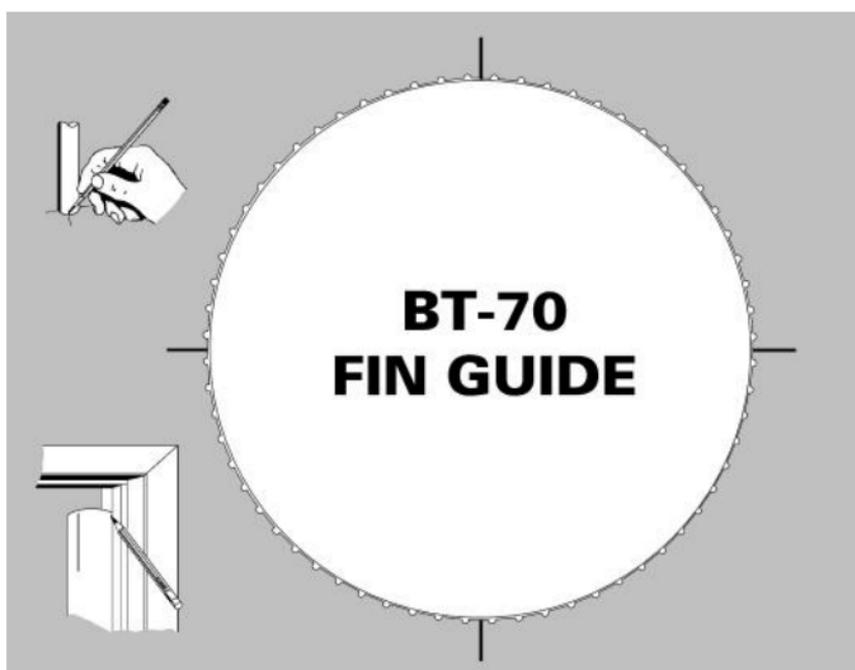


❑ **13.** Apply glue to the large center rib and set it into place. The edge closest to the fold line will need to be sanded slightly for proper fit. When all the joints are set, apply a bead of glue around the top edge of each. Fold the cover in place over the glue and hold in place until set. Repeat for the other three fins. When they are completely dry, fill in the cracks and sand the balsa edges smooth. Repeat for the remaining three fins.



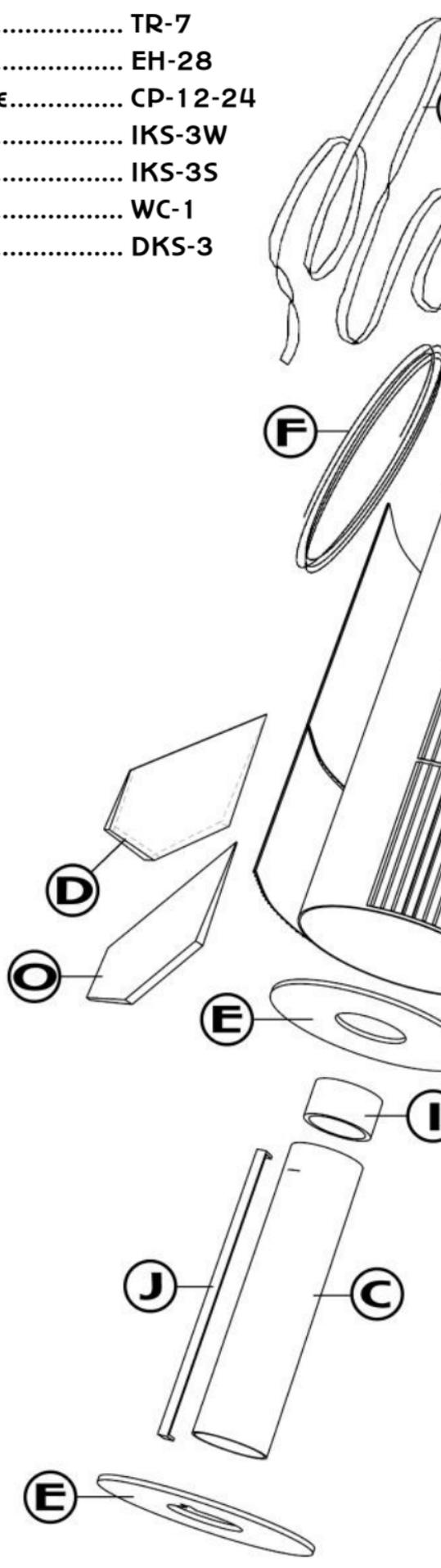
MARK THE TUBE

❑ **14.** Stand the body tube on the fin guide below with the ribs pointing down. Mark the four fin positions on the side of the tube in between two of the corrugations in the wrap. 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 bottom wrap to provide lines for aligning the fins.

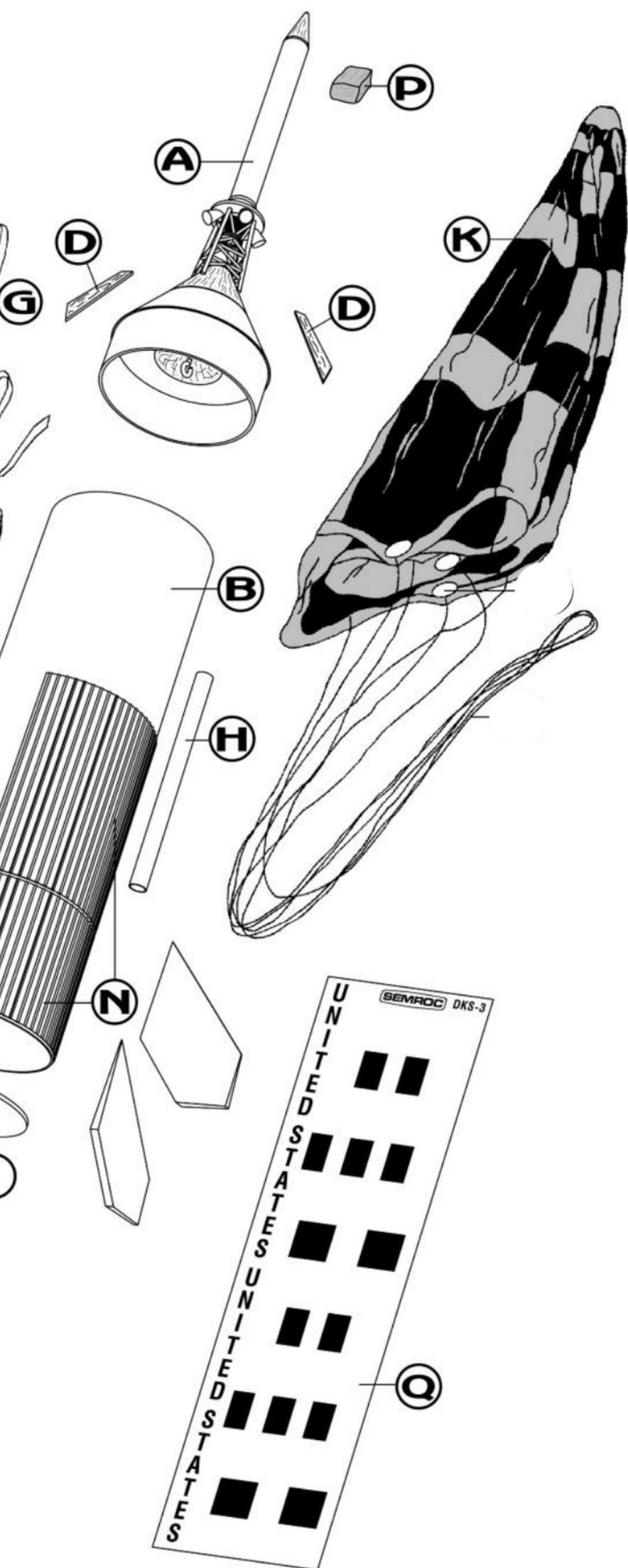


Parts List

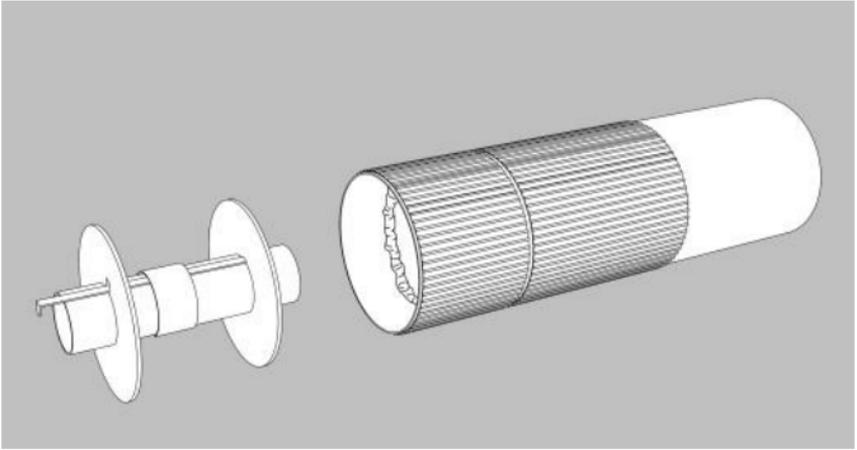
- A 1 Apollo Capsule KS-2
- B 1 Body Tube BT-70H
- C 1 Body Tube ST-730E
- D 1 Laser Cut Fins FS-3
- E 1 Centering Ring Set CR-KS-3
- F 1 Kevlar Thread SCK-24
- G 1 Elastic Cord EC-124
- H 1 Launch Lug LL-122
- I 1 Thrust Ring TR-7
- J 1 Engine Hook EH-28
- K 1 Plastic Parachute CP-12-24
- N 1 Body Wrap Set IKS-3W
- O 1 Fin Cover Sheet IKS-3S
- P 1 Clay Weight WC-1
- Q 1 Decal DKS-3



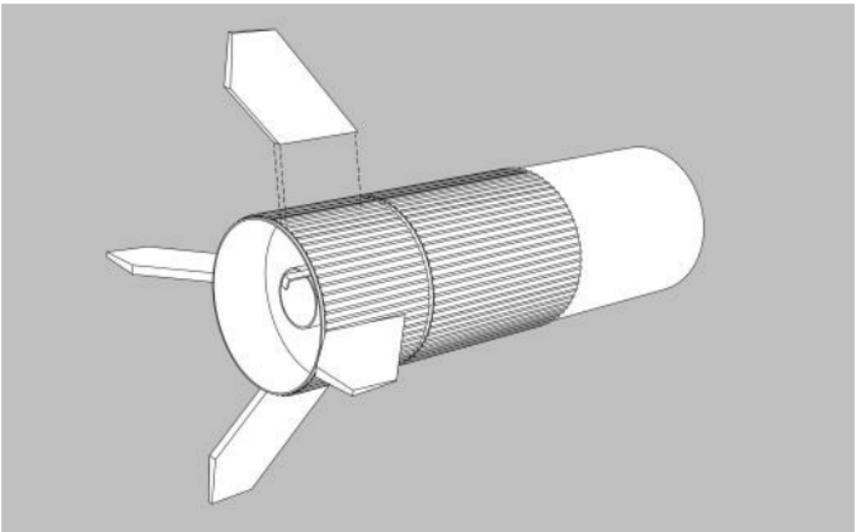
EXPLODED VIEW



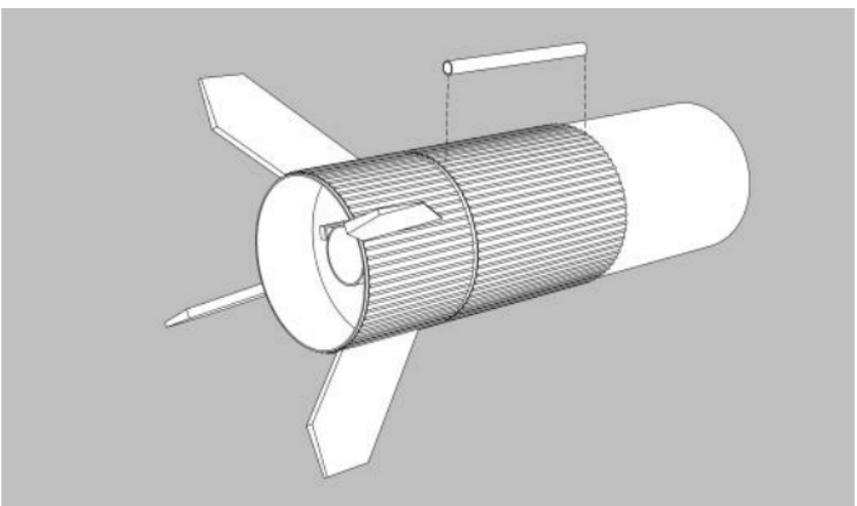
15. Apply a bead of glue inside the end of the main tube with the wraps. Slide the completed engine mount assembly through the main body tube until the bottom ring is recessed 1" from the end of the main tube. Apply a good fillet of glue around the forward and rear joints. Allow to dry completely.



16. Apply glue to the root edge of a fin and position it along one of the lines drawn on the side of the bottom wrap. Remove, allow to dry, apply additional glue, and reposition. Repeat for the other three fins.



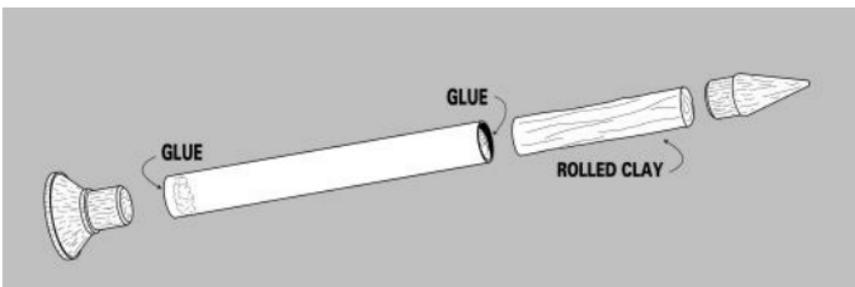
17. Glue the launch lug into position between two corrugations on the upper wrap and centered between two fins.



APOLLO CAPSULE

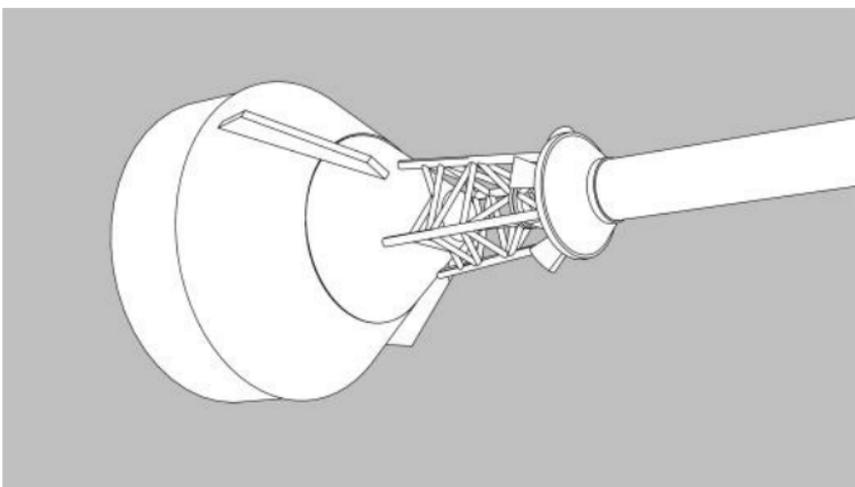
❑ **18.** The included Apollo Capsule and escape tower should now be assembled using the instructions supplied with the kit, with the **following exceptions**:

❑ **18A.** In the Apollo Capsule instructions **Step 2**, a clay weight must be added to the top of the escape tower tube (BT-3H). Roll the clay weight into a cylinder that will fit loosely in the escape tower tube. Apply a bead of glue inside the top of the tube and insert the weight. Push it into place with the nose cone until the nose cone shoulder seats against the end of the tube. Remove the nose cone and apply another thin bead of glue. Reseat the nose cone. Allow to dry in an upside down position so the glue will run against the clay to keep it in place.



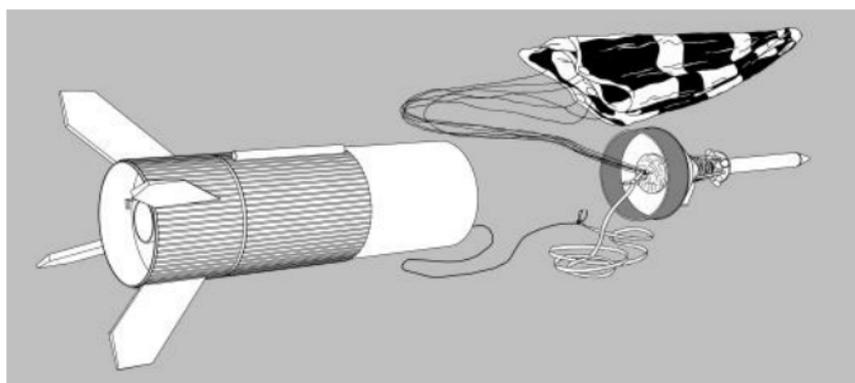
❑ **18B.** In the Apollo Capsule instructions **Step 3**, form the shroud so the printing is on the inside. The original Little Joe II launched “boilerplate” capsules that were used to simulate the shape and weight of the final capsule. Only the last Little Joe II used an actual Apollo spacecraft.

❑ **18C.** In the Apollo Capsule instructions **Step 20**, omit the umbilical assembly which was not on the Little Joe II. Instead, apply the balsa stabilizing plates on opposite sides as shown below. The small end goes toward the top of the capsule and between two tower legs.



FINAL ASSEMBLY

- ❑ **19.** Assemble the 12" Chute using the instructions on chute. Tie one end of the elastic cord to the screw eye. Put a drop of glue on the knot to keep it from untying. Tie the remaining end to the free end of the yellow Kevlar cord using an overhand knot. Attach the chute to the screw eye on the capsule.



This completes the assembly of your

SEMROC

LITTLE JOE II

FINISHING

- ❑ **20.** 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.



1st coat of fillercoat



2nd coat of fillercoat



After 1st sanding



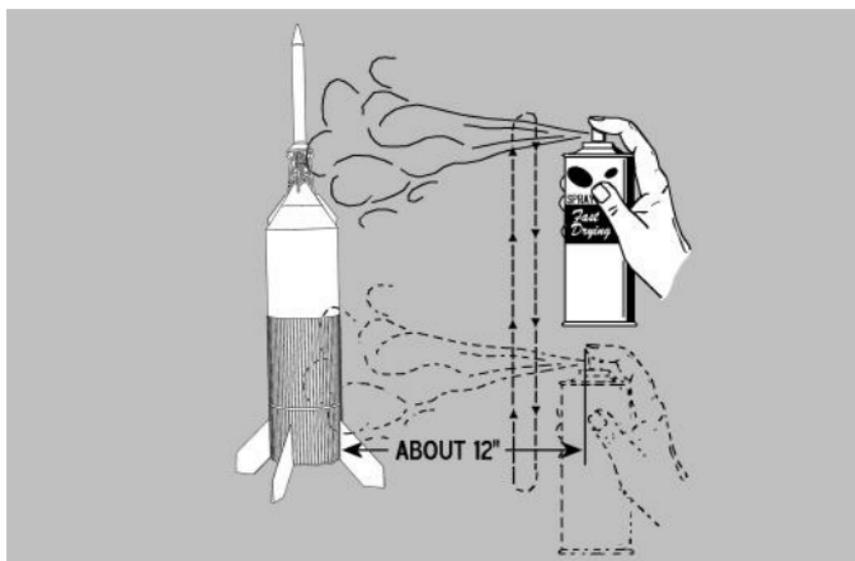
3rd coat of fillercoat



After 1st sanding

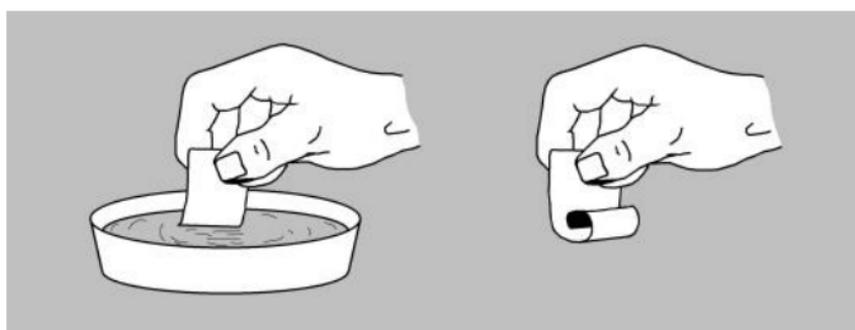
❑ **21.** After all balsa surfaces have been prepared, wipe off all balsa dust with a dry cloth. First spray the model with an enamel primer, then spray a base color of gloss white.

❑ **22.** 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.



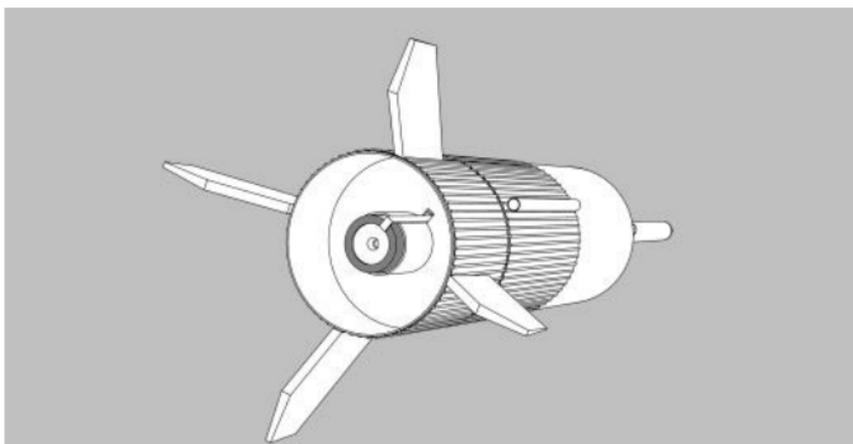
❑ **23.** The Little Joe II can now be painted with its final colors. The entire body, wraps, fins, and capsule are silver. Mask off the escape tower and spray silver or use a brush. The capsule can be removed and the entire bottom section can then be sprayed silver. The nozzle skirt on the escape tower is painted black. A black band $\frac{5}{16}$ " wide should be painted at the bottom of the main tube and a $\frac{5}{32}$ " band is painted at the joint between the two wraps.

❑ **24.** After the paint has dried, decals should be applied. The decals supplied with the Little Joe II are waterslide decals. Keep the roll pattern as one piece and wrap around the body tube. The two "United States" decals are placed down opposite sides over the corrugation. Apply each decal before starting the next. Check for fit before wetting the decal. Refer to the photo on the front for placement of the decals.



FLIGHT PREPPING

- ❑ **25.** 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.



- ❑ **26.** Pack the recovery wadding from the top of the body tube. Use a sufficient quantity to protect the parachute, but not too much that there is no room left.

- ❑ **27.** Fold the parachute and pack it and the shock cord on top of the recovery wadding. Slide the Apollo Capsule into place, making sure it does not pinch the shock cord or parachute.

- ❑ **28.** 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.

- ❑ **29.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the Little Joe II from a 1/8" diameter by 36" long launch rod. **Since the stability of the Little Joe II is marginal, always launch vertically and in calm winds.**

Little Joe II

The Little Joe II was designed and manufactured for NASA by General Dynamics. It was specifically designed to launch simulated Apollo spacecraft into a suborbital trajectory of about 30,000 feet to test the Launch Escape System (LES) by simulating stresses that would be encountered in the actual Saturn launches. The Little Joe II used Algol and Recruit solid rocket engines to lift the capsule at up to 5.5 G's. Five Little Joe II flights occurred from 1963 to 1966 proving the safety and effectiveness of the LES.

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.

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Semroc

www.semroc.com

JOIN THE NAR!

Sign up online at 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 100,000 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.





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