

SEMROC

CENTURION™



**1970 Retro
Reproduction**

**Precision Turned
Balsa Nose Cone**

**Laser Cut
Balsa Fins**

Ejection Baffle

**Color Water
Slide Decals**

**Parachute
Recovery**



FLYING
MODEL
ROCKET KIT

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

CENTURION™ Kit No. KV-40

	Specifications	Engines	Approx. Altitude
Body Diameter	1.64" (4.2 cm)	A8-3	100'
Length	25.7" (65.3 cm)	B6-4	325'
Fin Span	6.3" (16.0 cm)	C6-5	650'
Net Weight	2.1 oz. (59.6 g)		

Skill Level 1

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 Centuri Engineering Company

Centuri Engineering Company was started in 1961 by Leroy (Lee) Piester in his garage while he was still in college in Phoenix, Arizona. With his wife, Betty, they built Centuri into one of the largest model rocket companies ever.

Centuri was known for its unusual and innovative designs, producing over 140 different kits with something for every model rocketeer. They also produced model rocket engines and pioneered the modern composite high powered engines with their Enerjet line.

Centuri Engineering was sold to Damon in the late 1960's and shared the same parent corporation with Estes Industries, the largest model rocket company in the world. The Centuri product line was kept separate from the Estes line until 1983. A few of the old kits have been reissued by Estes since then, but for the most part, Centuri Engineering Company lives today only in the dreams of the senior members of the model rocket community.

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About the Centurion™

The Centuri Centurion was released in the 1970 American Rocketeer Volume 4 Number 1. It introduced the patented ejection baffle to eliminate recovery wadding. Slightly longer than the other "large" model rockets of the time, it was a great demo rocket. Slow liftoffs made the Centurion popular on small fields. The Centurion was designed with a longer nose cone that was changed at the last minute to accept one of the new plastic nose cones that were being released in 1970. The Centurion was introduced as Catalog #KC-2 for \$3.00.

The Retro-Repro Centurion™ is a close replica of the early prototype model using a longer rounded ogive balsa nose cone. Most of the photos in Centuri sales literature and catalogs showed the longer nose cone instead of the shorter PNC-160 that was used in production. It also uses laser-cut balsa fins for ease of construction. The original 20" parachute is replaced with two 12" two-color chutes.

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. Masking tape is also required.



ASSEMBLY

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

ENGINE MOUNT

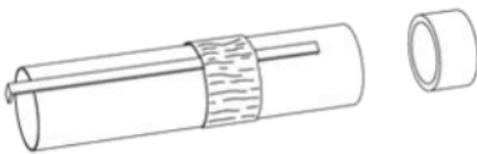
- 2.** Bend the engine hook slightly so it forms a slight bow in the direction shown.



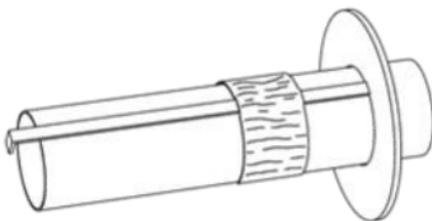
- 3.** Insert one end of the engine hook into the pre-punched engine tube slot.



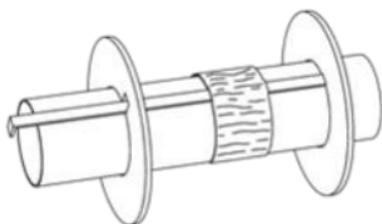
- 4.** Wrap a piece of masking tape or a paper strip with glue) around the center of the engine mount. Apply a bead of glue on the engine hook between the tape and the slot. Glue the thrust ring in place on top of the engine hook as shown.



- 5.** 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.

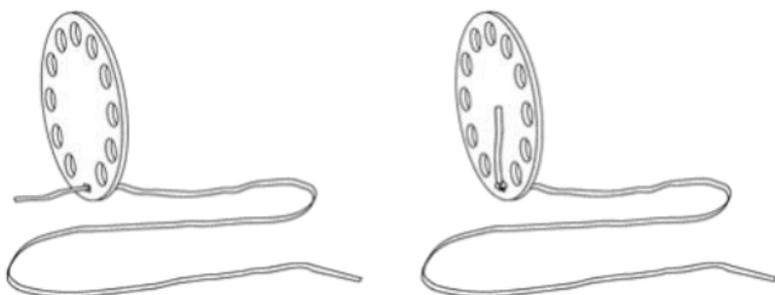


- ❑ **6.** Slide the bottom centering ring onto the engine tube with the notch centered over the engine hook and 3/4" from the end of the tube. Apply a bead of glue around both sides of the ring keeping glue away from the engine hook. Continue turning the assembly until the glue does not run. Set the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

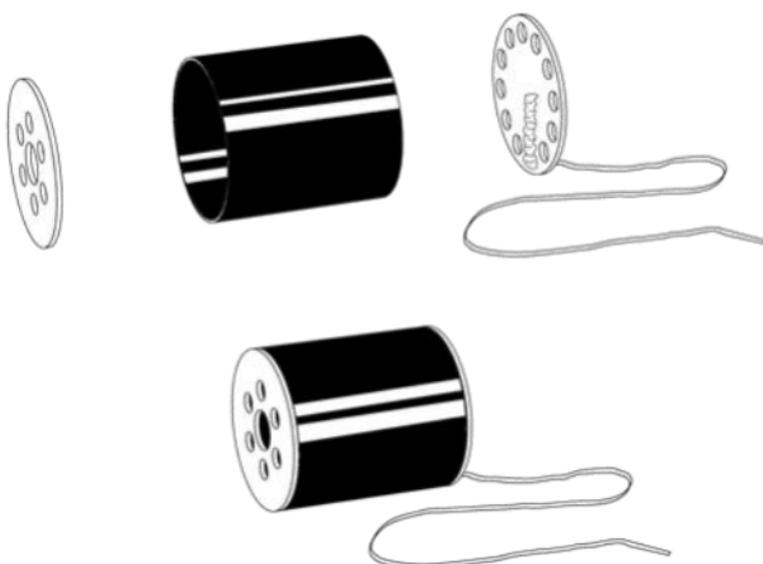


EJECTION BAFFLE

- ❑ **7.** Insert the elastic cord into the small slot in the upper baffle (the one with the most holes). Tie a large knot in one end leaving about 1" of cord free. Apply a heavy bead of glue to the knot and end of the cord as shown.



- ❑ **8.** Apply a bead of glue around the edge of the upper baffle and glue to the tube coupler (HTC-16). Apply a bead of glue to the lower baffle and glue to the opposite end.

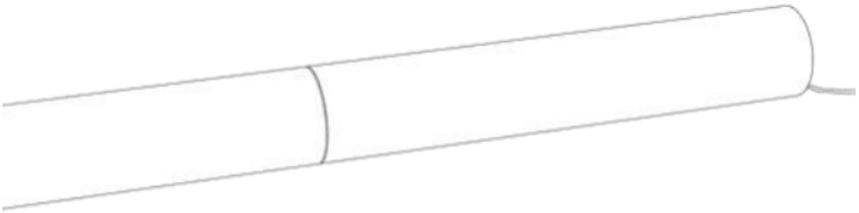


MAIN BODY TUBE

- ❑ **9.** Check the assembled baffle for fit in both body tubes. Sand it if necessary to get a good fit. Apply a bead of glue inside the top of the large tube (ST-16120). Insert the bottom end (without the elastic cord) of the ejection baffle into the body tube until about half of the baffle is in the tube. Let the glue set, but not dry completely.

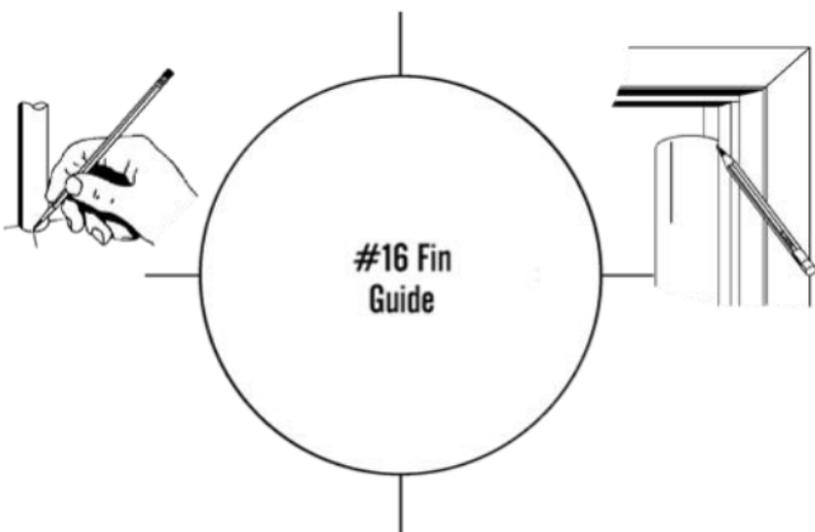


- ❑ **10.** Apply a bead of glue inside the bottom of the short body tube (ST-1690). Pull the elastic cord through the short tube and insert the ejection baffle until the tubes touch. Try to keep glue off the elastic cord as much as possible. Roll the completed tube on a flat surface to make sure it is straight while the glue is drying.



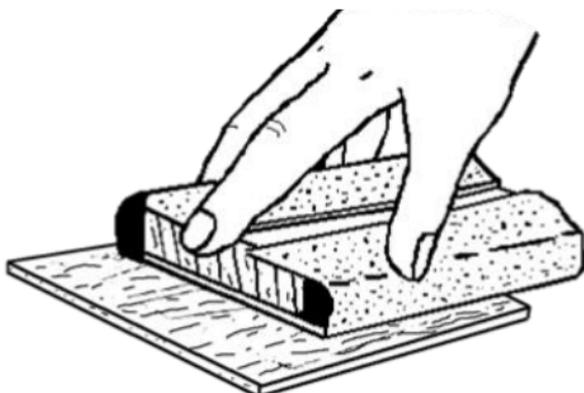
MARK THE TUBE

- ❑ **11.** Stand the assembly on the fin guide below **with the longest tube down**. Mark the four fin positions on the side of the tube. 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 tube to provide lines for aligning the fins.



PREPARE THE FINS

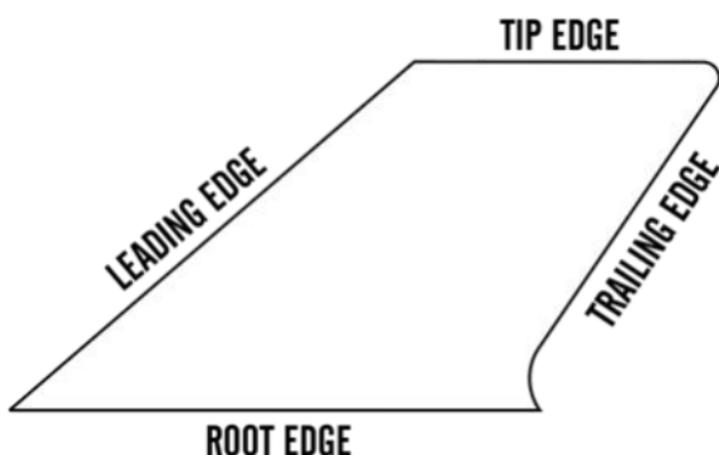
- ❑ **12.** Lightly sand each side of the laser-cut fins. Carefully push the laser-cut fins from their sheet. Start at one point on each fin and slowly and gently work around the fin.



- ❑ **13.** Stack the four 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.

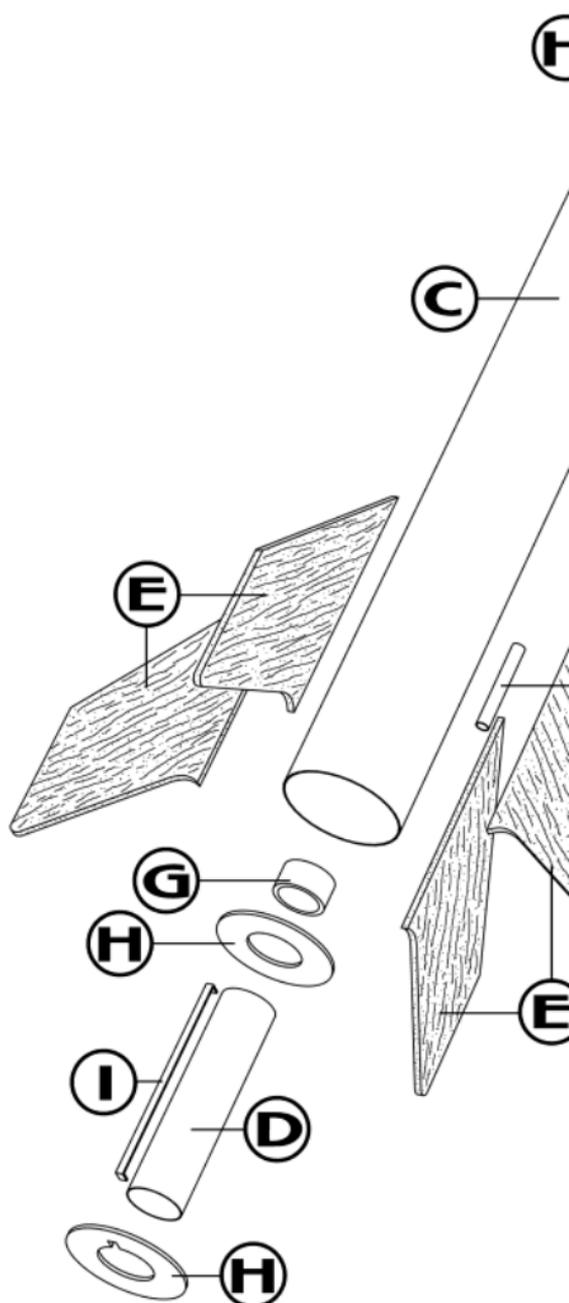


- ❑ **14.** Round all edges except the root edges (which will be glued to the body tube). The trailing edge and tip edge can be sanded to a taper for more aerodynamic fins. Be careful that the curve at the end of the root edge does not get broken off. It is fragile until glued to the body tube.

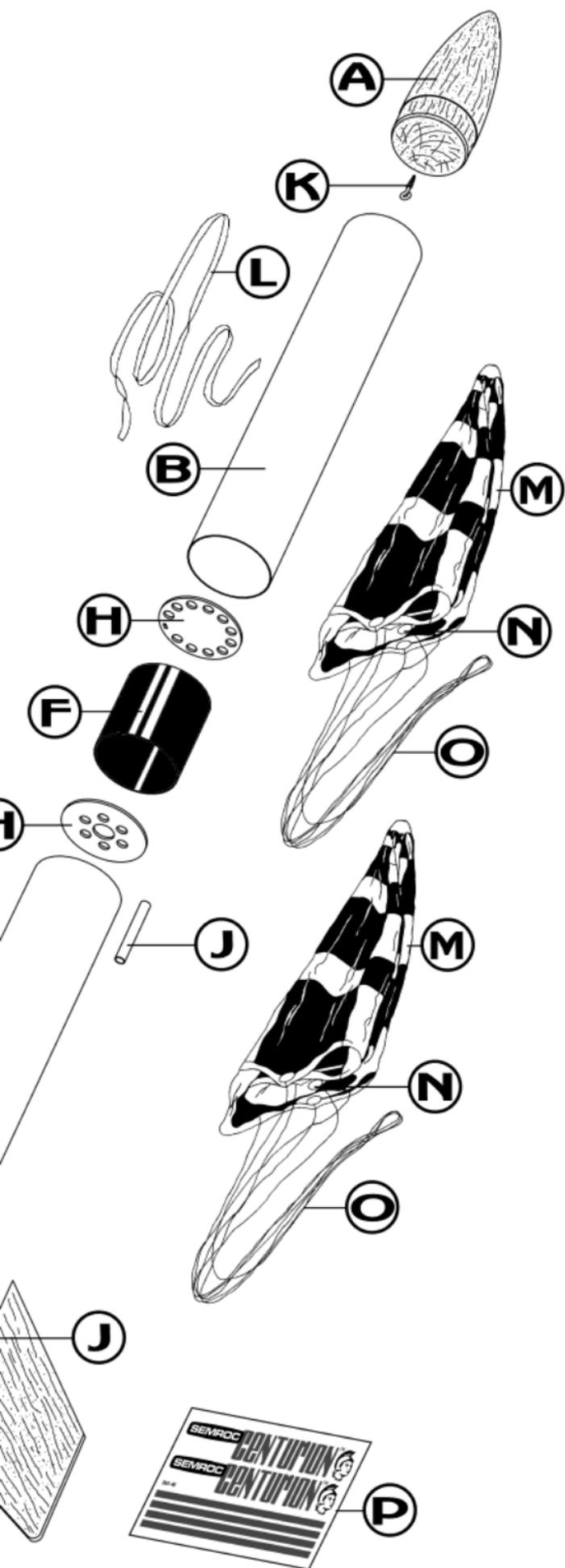


Parts List

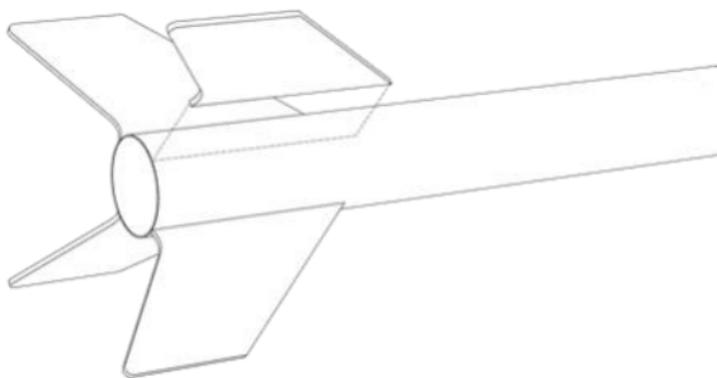
A	1	Balsa Nose Cone.....	BC-1636
B	1	Body Tube.....	ST-1690
C	1	Body Tube.....	ST-16120
D	1	Body Tube.....	ST-730E
E	1	Laser Cut Fins.....	FV-40
F	1	Tube Coupler.....	HTC-16
G	1	Thrust Ring.....	TR-7
H	1	Centering Ring Set.....	CR-KV-40
I	1	Engine Hook.....	EH-28
J	2	Launch Lugs.....	LL-2A
K	1	Screw Eye.....	SE-10
L	1	Elastic Cord.....	EC-124
M	2	Plastic Parachute.....	RC-12
N	2	Tape Discs.....	TD-6
O	2	Shroud Line.....	SLT-6
P	1	Decal.....	DKV-40



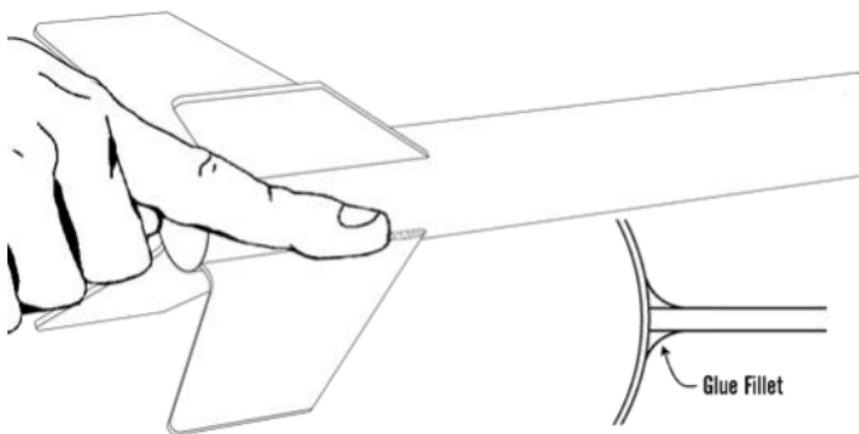
EXPLODED VIEW



❑ **15.** 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 bottom (longest) tube. Remove, allow to dry, apply additional glue, and reposition into place. Repeat for the other three fins. Allow the fins to completely dry, checking for runs occasionally.

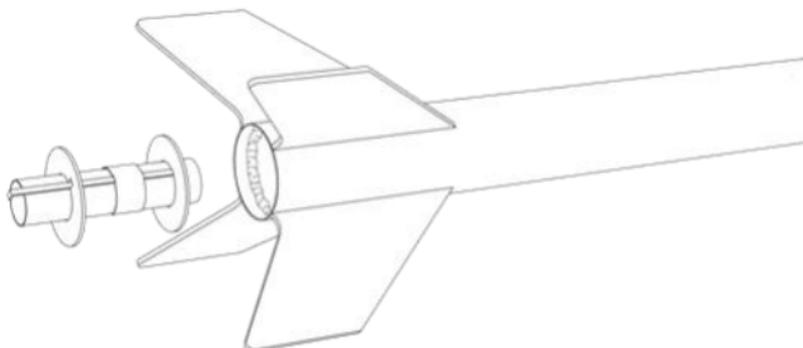


❑ **16.** Apply a fillet of glue along each fin and body tube joint. Use your finger to smooth the glue to the shape as shown. This adds much strength to the joint.



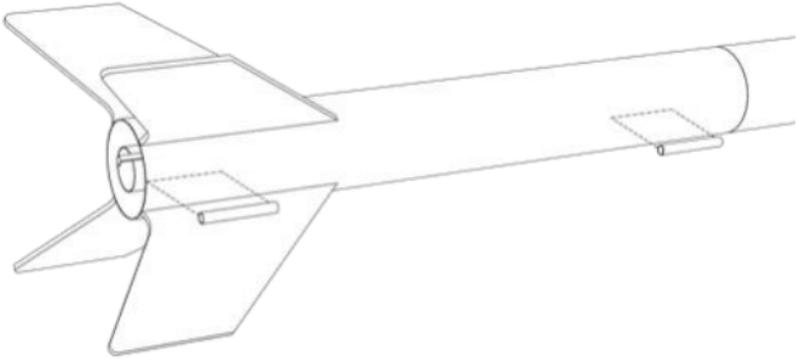
ENGINE MOUNT

❑ **17.** Apply a bead of glue inside the bottom of the main body tube. Insert the engine mount into the main tube until the end of the engine mount is even with the bottom of the main tube. Stand the rocket upright and allow the glue to dry. Then, turn it upside down and apply a bead of glue around the joint between the bottom ring and the body tube. Allow to dry.



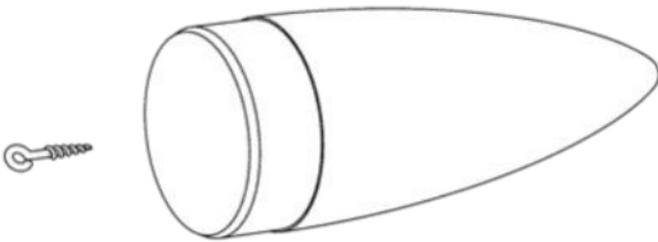
LAUNCH LUGS

- ❑ **18.** Apply the lower launch lug between two of the fins and even with the bottom of the body tube. Apply the upper launch lug about 2 inches below the joint between the two body tubes and in line with the lower launch lug. Align it by sight. Allow both launch lugs to dry and apply an additional fillet of glue on each joint.



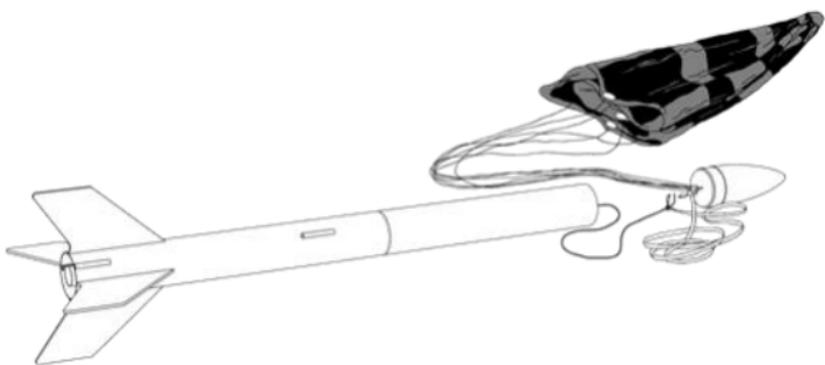
FINAL ASSEMBLY

- ❑ **19.** Twist the screw eye into the center of the nose cone and squirt glue into the hole. Reinstall the screw eye and wipe off any excess glue. Check the nose cone for fit. If it is too tight, slight sanding may be required. If it is loose, a small strip of masking tape around the shoulder will make it tighter.



- ❑ **20.** Assemble both chutes using instructions printed on the canopy. Two chutes are provided for different field conditions. For a soft field, only one chute is required. The drift will be much less with one small chute. If the field is large or has a hard surface, use both chutes for a soft, slow landing. Tie one of the chutes to the screw eye on the nose cone. Put a drop of glue on the knot to keep the lines from moving. The second chute may be glued or tied so it can be removed.

- 21.** Shake the elastic cord free so it extends out of the top of the rocket. Tie the loose end of the elastic to the screw eye in the nose cone.



This completes the assembly of your

SEMROC CENTURION™ 

FINISHING

- 22.** When the fillets have dried, prepare the balsa surfaces for a smooth professional looking finish. Fill the wood grain with balsa fillercoat or sanding sealer. Fill 'n' Finish diluted with water provides an even better finish. When dry, sand with fine sandpaper. Repeat until smooth.



1st coat of fillercoat



2nd coat of fillercoat



After 1st sanding



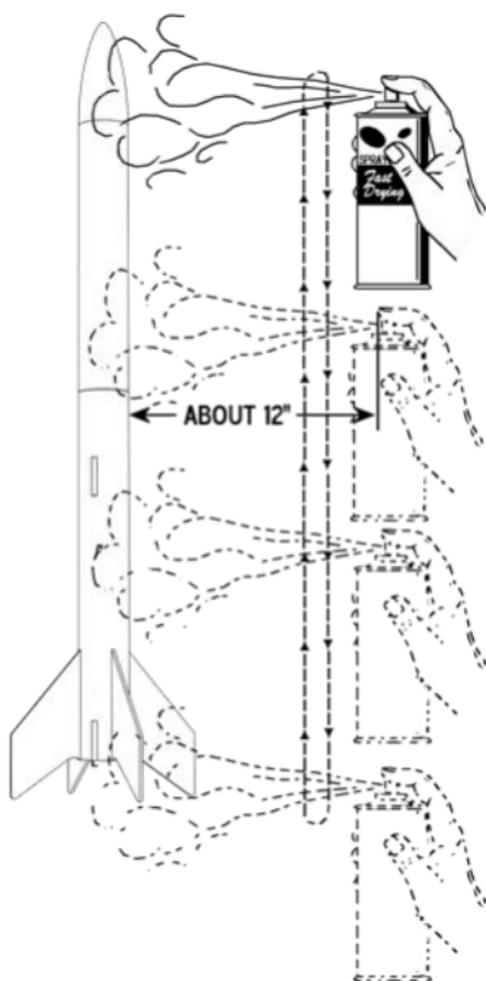
3rd coat of fillercoat



After 1st sanding

- 23.** 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.

❑ **24.** 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.



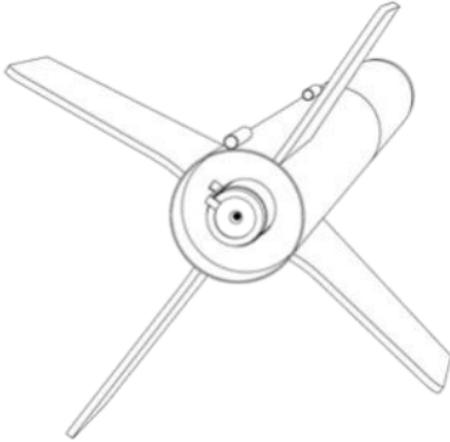
❑ **25.** The Centurion™ can now be painted with its final colors. The top body tube and nose cone are gloss black and the rest of the model is left white.

❑ **26.** After the paint has dried, decals should be applied. The decals supplied with the Centurion™ are waterslide decals. The top band is made from two strips and one fin uses the two remaining strips. Apply each decal before starting the next. Check for fit before wetting the decal.



FLIGHT PREPPING

- ❑ **27.** Mount one single stage engine in the engine tube. Make sure the engine hook retains the engine.



- ❑ **28.** The ejection baffle eliminates the requirement for recovery wadding, but it is still better to add some, just in case. If you do add recovery wadding, make sure it is not too tightly packed or the parachute will not eject.

- ❑ **29.** Fold the parachute and pack them 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 parachutes.

- ❑ **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 Centurion™ from a 1/8" diameter by 36" long launch rod.

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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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