

cosmodrome rocketry

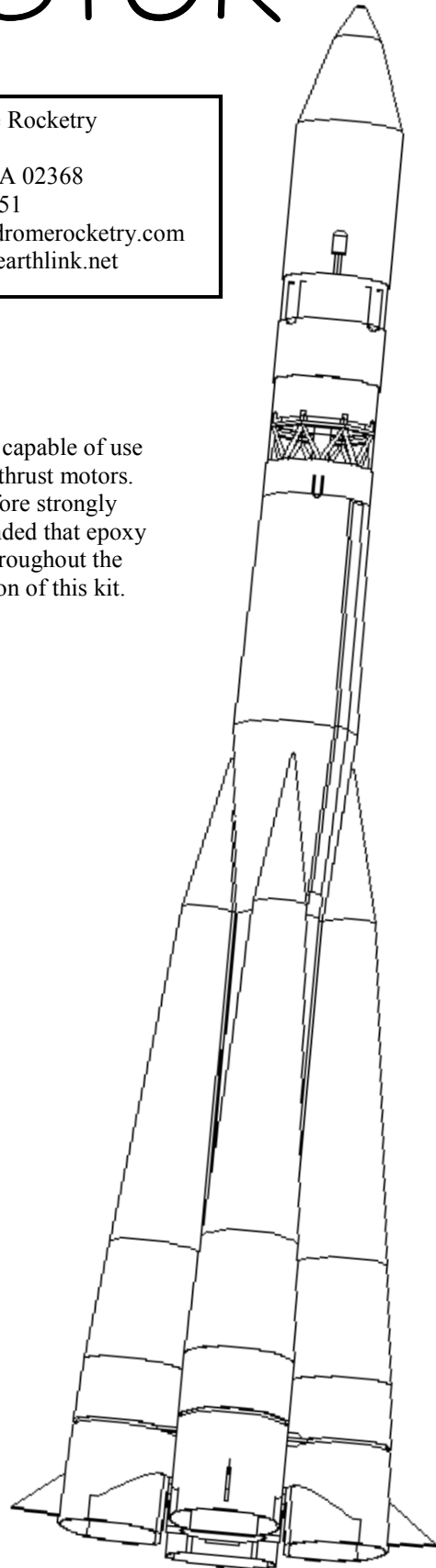
1:33 VOSTOK

A	1	Nose cone	Large nose cone
B	1	Nose weight	10oz. lead weight
C	1	Vostok forward body tube	3.1" x 4.5" body tube
D	1	Vostok middle body tube	3.1" x 1.7" body tube
E	1	Vostok aft body tube	3.1" x 1.0" body tube
F	1	Vostok inner body tube	3.0" x 6.0" body tube
G	1	Vostok coupler	3.0" x 3.0" body tube
H	1	Vostok fairing	3/16" x 3/8" x 2" balsa
I	6	Straight antenna	0.6" long wire
J	2	Large antenna	4.5" long wire
K	1	Small antenna	2.75" long wire
L	1	Vostok support	1/8" x 1/4" x 6" balsa
M	1	Octagon	8 sided plywood
N	1	Truss	1/8" x 24" dowel
O	2	Vostok rings	2.9" ring with small hole
P	1	Shock cord	7.5' long shock cord
Q	1	Large eye bolt	Large eye bolt
R	2	Large washer	Large washer
S	1	Large nut	Large nut
T	1	Lock nut	Nut with nylon insert
U	1	1" spacer	1" long nylon spacer
V	1	1/4" spacer	1/4" long nylon spacer
W	1	Core body tube	2.46" x 26" body tube
X	1	Outer core body tube	3.1" x 7" body tube
Y	1	Forward core ring	2.46" x 3.1" ring with notch
Z	1	Aft core ring	2.46" x 3.1" ring
AA	1	Small eye bolt	Small eye bolt
AB	1	Quick link	Quick link
AC*	2	Core shroud stock	7.25" x 12" poster board
AD*	1	Core shroud tab	7.0" x 2" poster board
AE	1	Max ring	biggest ring
AF	4	Forward booster stand-off	1.5" x 1.75" plywood
AG	4	Aft booster stand-off	1.5" x 2.75" plywood
AH	1	Forward lug stand-off	1.5" x 1" plywood
AI	1	Aft lug stand-off	1.5" x 1.4" plywood
AJ	2	Lug	1/2" x 1.5" launch lug
AK	1	Motor mount tube	38mm tube
AL	1	Forward motor mount ring	small ring without notch
AM	1	Aft motor mount ring	small ring with notch
AN	1	Engine retainer	3" threaded rod
AO	1	Small washer	Small washer
AP	1	Small nut	Small nut
AQ	1	Core housing	1/2" x 1" x 8" balsa
AR	1	Forward core conduit	1/8" x 3/8" x 12" balsa
AS	1	Aft core conduit	1/8" x 1/2" x 18" balsa
AT	4	Booster nose cone	Small nose cone
AU	4	Booster coupler	1.4" x 3" body tube
AV	4	Booster core tube	1.5" x 14" body tube
AW*	4	Booster shroud stock	11" x 14" poster board
AX*	1	Booster shroud tab	3" x 14" poster board
AY	4	Forward booster tube	3.2" x 1.8" body tube
AZ	4	Aft booster tube	3.2" x 2.9" body tube
BA	4	Booster inner tube	3.1" x 1.5" body tube
BB	8	Booster ring	1.5" x 3.2" ring
BC	4	Fin	Fin
BD	4	Forward booster conduit	1/8" x 3/32" x 16" balsa
BE	4	Aft booster conduit	3/8" x 3/32" x 6" balsa
BF	4	Booster support	1/8" x 1/8" x 8" spruce
BG	1	Booster triangle	1/4" x 9" balsa triangle
BH	1	Booster backing	1/8" x 2" x 9" balsa
BI*	1	24" parachute	Small parachute
BJ*	1	35" parachute	Large parachute
BK*	1	Decal	Decal sheet

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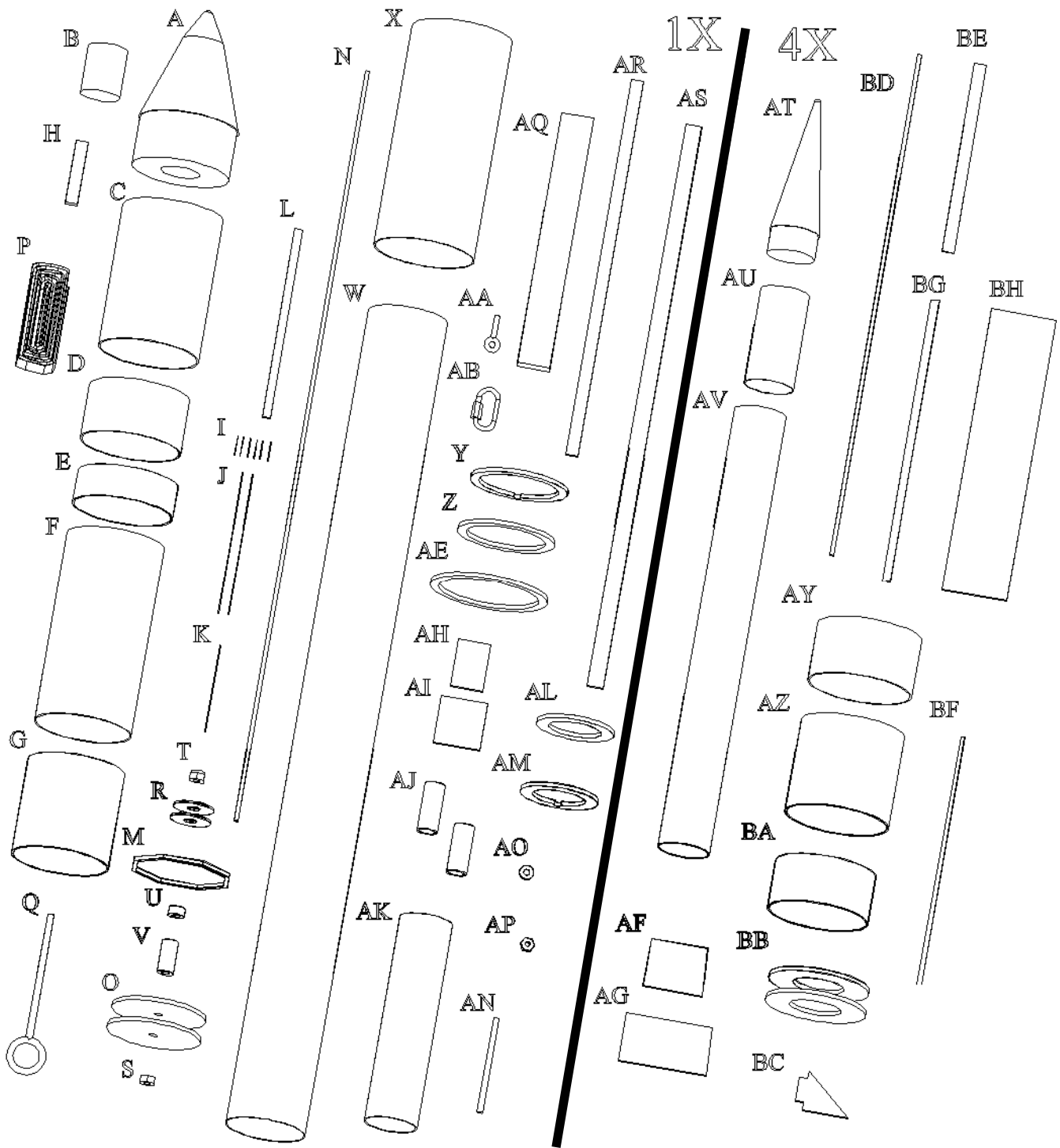
This kit is capable of use with high thrust motors. It is therefore strongly recommended that epoxy be used throughout the construction of this kit.

* Not shown on exploded view next page.



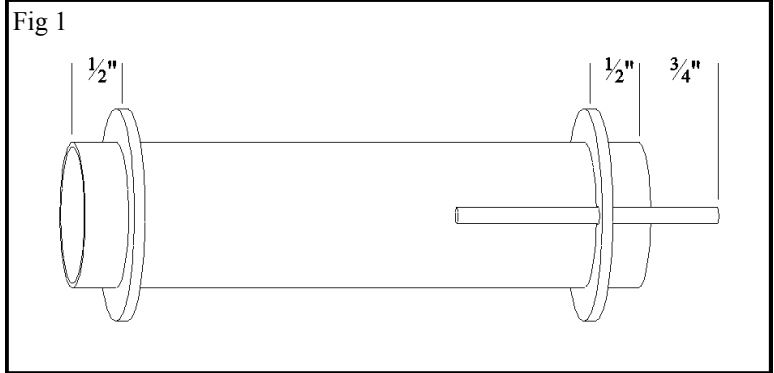
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Exploded view of parts. Everything to the right of the thick line quantities are 4X what is shown.

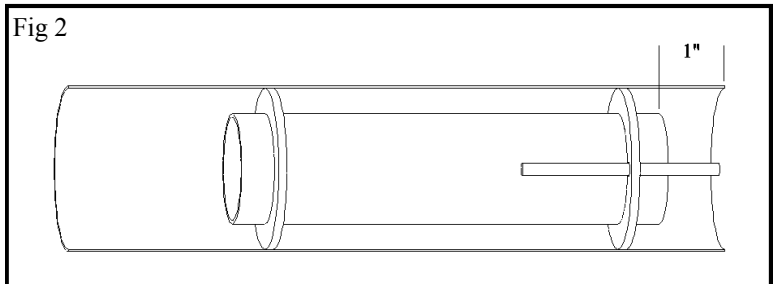


SECTION 1: CORE

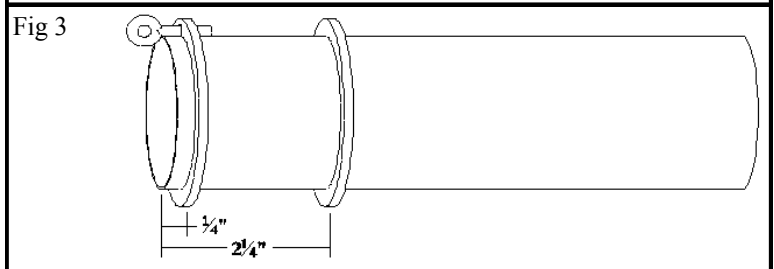
1. Draw a line down the side of the 38mm motor mount tube and mark the line 1/2" from both ends. Slide the aft centering ring onto the tube to one of the 1/2" marks. Line up the notch in the centering ring with the line on the tube. Insert the engine retainer into the notch so that 3/4" of it extends beyond the tube. *Note: One end of the retainer is cut (painted end), the other is not.* To make it easier to thread the nut on, position the uncut end so that it extends beyond the tube. Line up the retainer with the line on the tube. Epoxy the retainer to the tube while making sure that no epoxy gets on the threads of the retainer that extend past the tube. Epoxy the forward centering ring onto the tube at the other 1/2" mark.



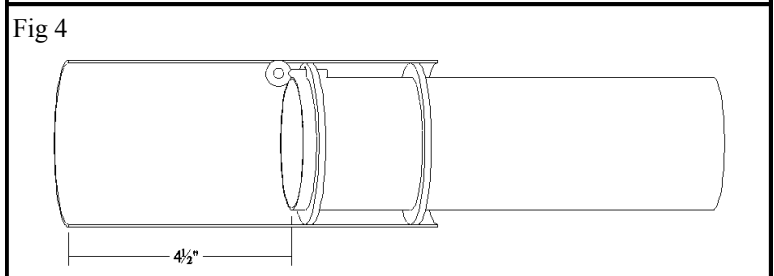
2. Apply a ring of epoxy to the inside of the core body tube, approximately 5" from one end. Push the motor mount tube assembly into the body tube until the aft end is 1" inside the body tube. Stand upright so that the epoxy settles on the centering ring. Let cure. Turn the assembly over and epoxy the aft centering ring to the body tube. Position the aft tube over the core tube marking guide and mark the tube at all the lines. Extend the marks all the way up the tube.



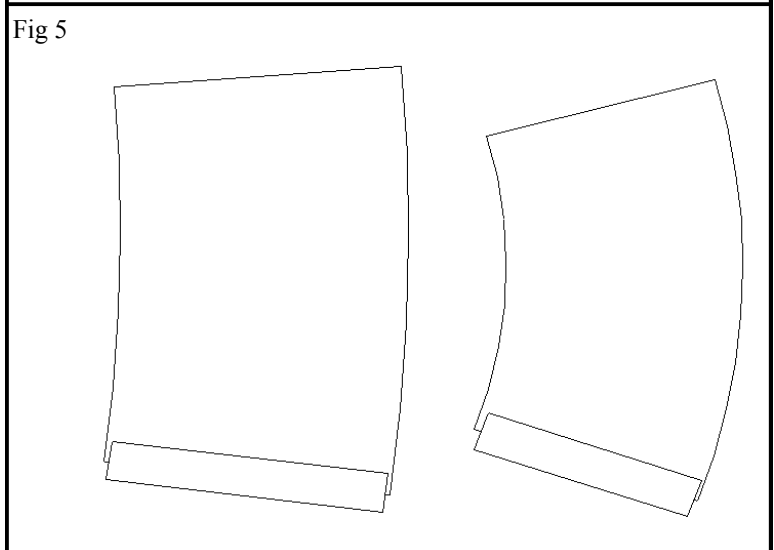
3. Mark the other end of the core body tube 2 1/4" and 1/4" from the end. Epoxy the aft core centering ring to the tube at the 2 1/4" mark. Position the forward core centering ring on the 1/4" mark. Insert the small eye bolt into the notch in the centering ring so that it is perpendicular to the body tube. Epoxy the centering ring and eye bolt in place.



4. Slide the outer core tube over the core centering rings so that the forward end is 4 1/4" from the forward end of the core tube. *Note: The small eye bolt is a very tight fit against the outer core tube, it may even cause the tube to bulge out a little. This is normal. Since the tube will be covered with a shroud, any deformation will be hidden.* Epoxy the outer core tube to the core centering rings.

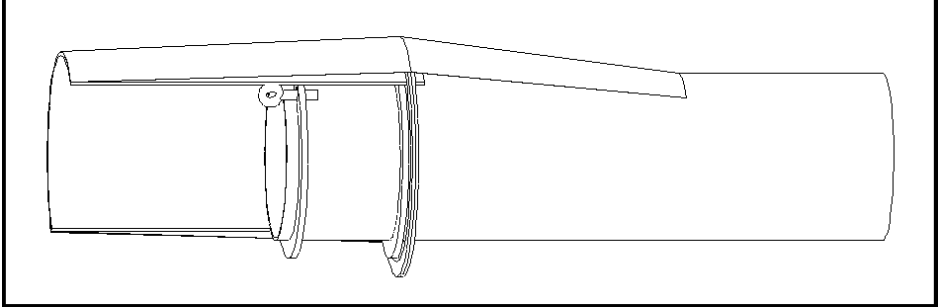


5. Cut out the forward and aft core shroud templates. Trace the templates onto shroud stock (7 1/4" x 12" pieces). Carefully cut out the shrouds. Cut out two core shroud tabs (7" x 1") from the 7" x 2" shroud stock. Lightly mist one of the shrouds with water from an atomizer bottle. It should be evenly sprayed, on both sides, but not soaking. The water is used to help form the shrouds without creasing them. Do not use too much water as this might deform the shroud. Work slowly, and don't try to get the shroud formed in one try. Once the shroud is completely formed, secure the ends together temporarily with clothespins. Let the shroud air dry. Repeat this for the shroud tab. Try to get the tab as close to the curve of the shroud as possible, the closer it is the better the shroud joint will look. Using yellow wood glue, glue one half of the tab to the inside of the shroud. Let dry. Glue the other half of the tab to the other end of the shroud so that the shroud ends butt up to one another. Repeat for the other shroud.



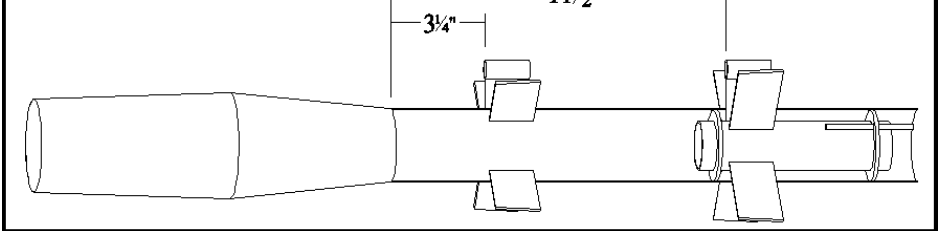
6. Round the outside edges of the max centering ring. Slide the centering ring onto the outer core tube, from the aft end to avoid any bulge made by the small eye bolt. Slide the forward core shroud over the forward end of the outer core tube. The forward end of the shroud should be even with the forward end of the tube. Slide the centering ring into place so that the shroud covers half over it. Epoxy the exposed side of the centering ring to the tube. Let dry. Remove the shroud and epoxy the other side of the centering ring to the tube. Let dry. Replace the shroud and slide the aft core shroud onto the outer core tube until it sits against the forward shroud. Adjust the two shrouds so that their seams are aligned with the conduit line on the core tube. Make sure the shrouds form a good joint with no gaps. Use CA to glue the shrouds to the body tubes and the centering ring.

Fig 6



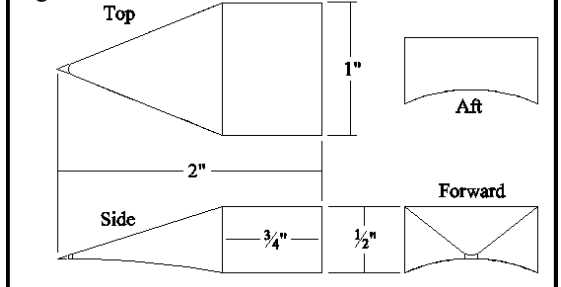
7. Mark the core tube on the booster and lug lines at 3 1/4" and 11 1/2" from the aft end of the aft core shroud. Place an aft booster stand-off on one of the 11 1/2" marks and trace around it. Repeat for the other 11 1/2" marks (5 total, including the lug line). Cut out slots in the core tube along the tracings so that the stand-offs fit through them, cut just on the inside of the tracings and enlarge as needed for a proper fit. Epoxy the aft booster stand-offs to the motor mount tube and the core tube through the booster slots. Epoxy the aft lug stand-off to the motor mount tube and core tube through the lug slot. Epoxy the forward booster stand-offs and the forward lug stand-off to the 3 1/4" marks, these do not go through the tube. Epoxy the lugs to the lug stand-offs. Use a launch rod to make sure that they are aligned with each other.

Fig 7



8. Cut the 1/2" x 1" x 8" piece of balsa into four 2" lengths. Sand the four core housings to the shape shown (the figure is actual size). The curved surface is formed by wrapping a piece of sandpaper around the core tube and running the housing over it. Wrap the aft end of the housing with 3/4" masking tape, this will prevent it from getting sanded. Sand the top and two sides of the forward part of the housing to a point. Round the end slightly. Once the correct shape has been formed, epoxy the housings to the core body tube on the same marking lines as the booster stand-offs. The aft end of the housings should be even with the aft end of the core body tube.

Fig 8



9. Using the 1/8" x 1/2" x 18" balsa strip, form the two pieces of the aft core conduit as shown (the figure is actual size). These are epoxied to the core body tube, on the conduit line. The forward end of the longer conduit is even with the aft end of the aft core shroud. The shorter conduit is epoxied to the forward end of the longer conduit, on the aft shroud. Use the seam in the shroud as a guide line. Epoxy the 1/8" x 3/8" x 12" balsa strip to the aft shroud, along the seam, so that its aft end is butts against the forward end of the shorter conduit. Cut the forward core conduit so that it is even with the forward end of the aft shroud. Epoxy the remainder of the forward core conduit to the forward shroud, so that it continues along the seam. Cut it so that it is even with the forward end of the forward shroud. Round the top of the forward end of the forward core conduit.

Fig 9a

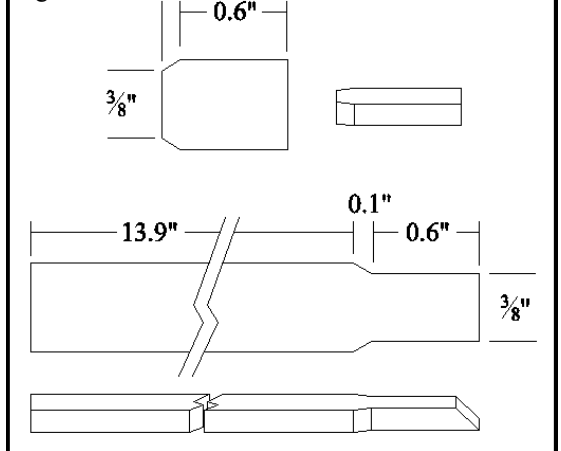
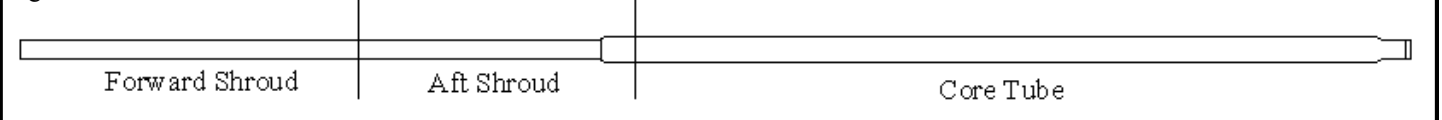
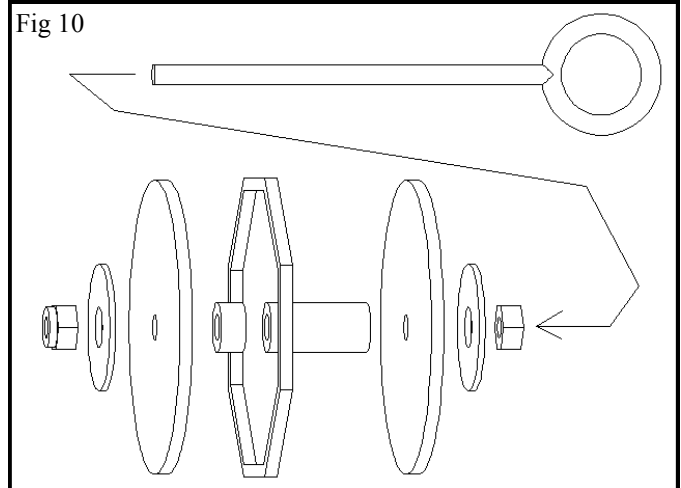


Fig 9b

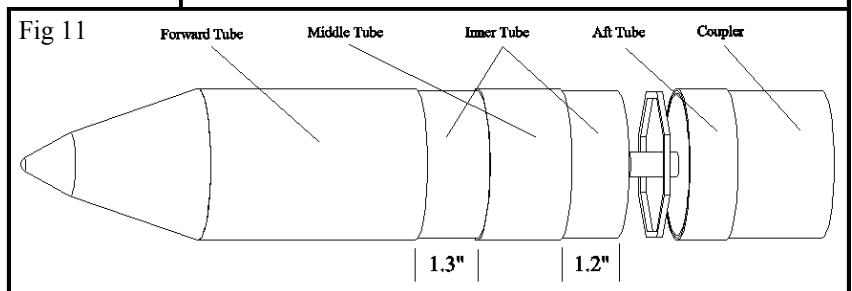


SECTION 2: VOSTOK

10. Thread the large nut all the way onto the large eye bolt and tighten it. Place a large washer, then a vostok centering ring onto the bolt. Next, place the 1" spacer then the 1/4" spacer onto the bolt. If the fit is too loose, wrap a piece of masking tape around the bolt. Next, place the octagon over the spacers. Next, place the other vostok centering ring, and large washer onto the bolt. Lastly, thread the lock nut onto the bolt, tightening it so that the assembly does not move. Do not tighten it so much that it crushes the centering rings. Epoxy the lock nut to the bolt.

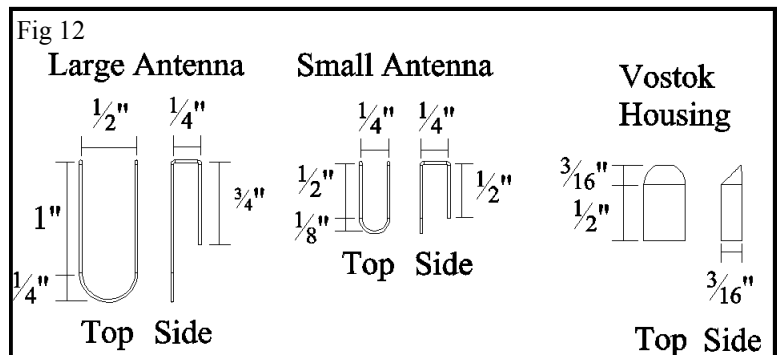


11. Place the vostok aft tube over the truss marking guide and mark the tube at all the lines. Place the core coupler on the aft vostok centering ring so that the ring is flush with the forward end of the tube. Place the vostok coupler on the forward vostok centering ring so that the ring is flush with the tube. Roll the assembly on a flat surface to ensure that the tubes are parallel with each other. Once the tubes are parallel, epoxy them to the rings, from the inside of the tubes.

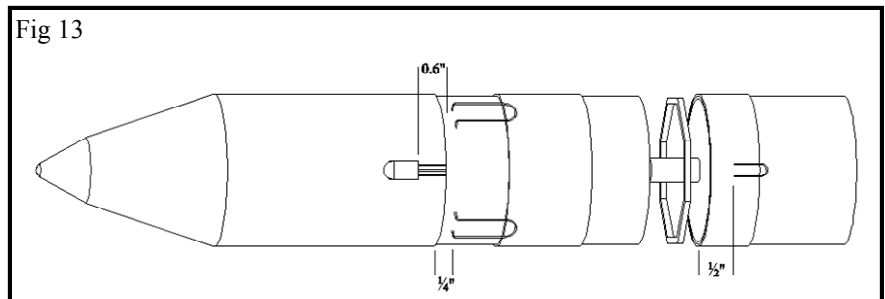


As the epoxy cures, make sure that the tubes remain parallel with each other. Epoxy the vostok lower tube to the core coupler so that their forward ends are even. Epoxy the vostok middle tube to the vostok coupler so that the aft end of the tube is 1.2" from the aft end of the coupler. Epoxy the vostok forward tube to the vostok coupler so that the aft end of the tube is 1.3" from the forward end of the vostok middle tube. Extend the upper Truss (UT) lines to the lower part of the vostok coupler. Extend the large antenna (LA) lines to the upper part of the vostok coupler. Extend the vostok Housing (VH) lines to the lower 2" of the upper vostok tube. Extend the small antenna (SA) lines to the vostok lower tube. Epoxy the nose cone weight into the cavity in the nose cone. Epoxy the nose cone onto the vostok upper tube.

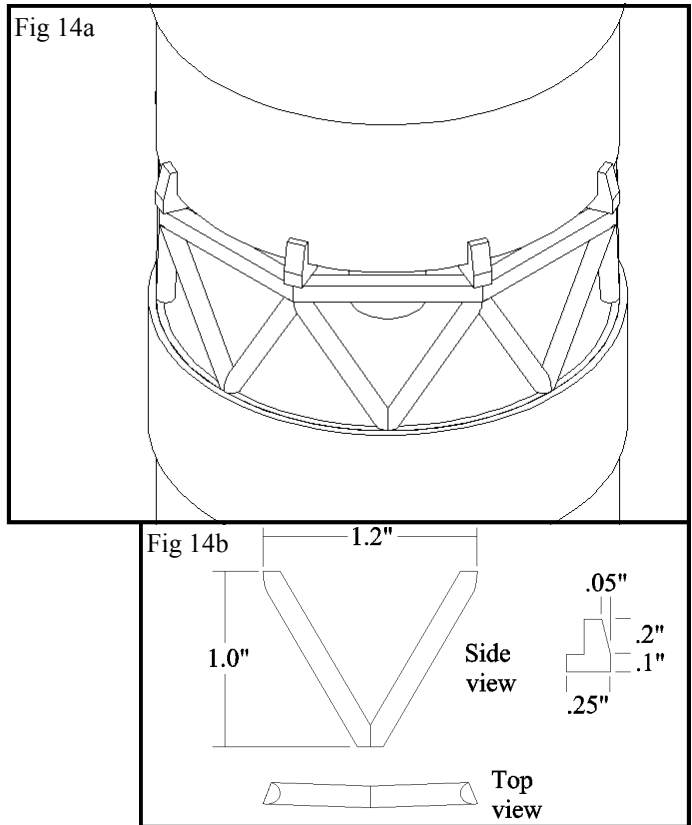
12. Form two large antennae out of the two long pieces of wire and one small antenna out of the medium piece of wire. Use a pair of pliers to bend the 90° angles and launch rods or wooden dowels to form the half circles. Using the 3/8" x 3/16" x 2" balsa, form two vostok housings as shown.



13. Put a mark on the lower vostok tube, 1/2" from the forward end, on the small antenna (SA) line. Draw a 1" line at this mark, perpendicular to the small antenna line. Put 2 marks on this line, 1/8" from the mark on the small antenna line. Drill a small hole in the tube at these 2 marks (not the one on the small antenna line). Use either a small drill bit or the tip of a sharp X-Acto blade. Pass an end of the small antenna through each of these holes. Epoxy the ends of the antenna to the inside of the tube. Repeat for the 2 large antennae, 1/4" aft of the vostok upper tube, with drill holes 1/4" from the large antenna (LA) lines. Epoxy the vostok housings to the upper vostok tube, 0.6" from the aft end, on the vostok housing (VH) lines. Epoxy one straight antenna to the upper vostok tube, behind each of the vostok housings, on the vostok housing line. Epoxy a straight antenna to the tube 0.1" on each side of the straight antennae already in place.

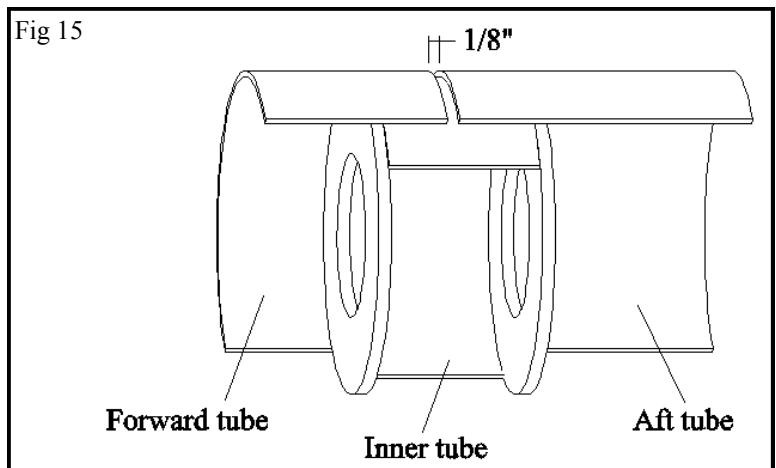


14. Form the vostok supports as shown in the figure (do not form the notch yet). Epoxy four of these onto the top of the octagon, one on every other corner. Notch the four vostok supports so that the octagon fits over, and is centered on the vostok coupler. One way to do this is to use a nail file to slowly sand the notch to shape. Once the octagon fits the coupler, add the remaining four vostok supports, one at a time, notching them as you go. Epoxy the vostok supports to the vostok coupler so that they are centered on the upper truss lines. Cut and sand the trusses out of the 1/8" dowel. These fit between the corners of the octagon and the lower truss lines on the core coupler.

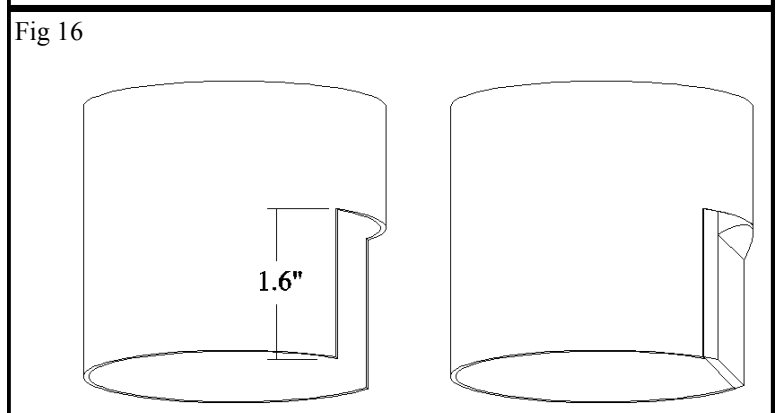


SECTION 3: BOOSTERS

15. Draw a mark on the inner booster tube, 3/4" from one end. Draw two more marks on the tube, 1/16" on both sides of the mark. Use a booster tube to extend these marks all the way around the tube. Epoxy an aft and forward booster tube to the inner tube, using the marks to leave a 1/8" gap between the tubes. Use one of the 1/8" x 1/8" spruce sticks to size the gap correctly. Roll the assembly on a flat surface to ensure that the tubes are lined up. Epoxy two booster rings in the assembly, one against the forward end of the inner tube, the other against the aft end.

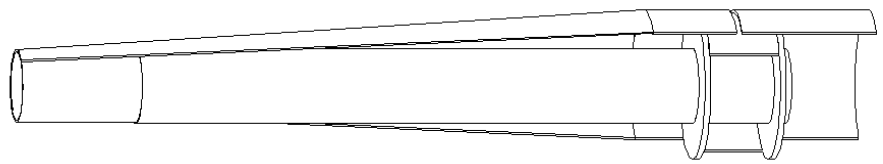


16. Place the booster assembly on the booster body tube template and mark the tube at all the lines. Extend the seam and the conduit marks all the way up the assembly. Extend the fin and cut out marks all the way up the aft booster tube. Draw a line around the aft booster tube, 1.6" from the aft end. Cut the aft booster tube along the cut out lines up to the 1.6" line. Don't cut the sides of the tube perpendicular to the tube, instead when making the cut, point the blade at the other cut out line and cut. Next, cut the tube along the 1.6" line, in-between the previous cuts. Cut the booster backing into 2" long pieces. Sand the sides of the booster backing so that it fits inside the cut out part of the tube. Make sure that it is even with the outside of the tube. Epoxy the booster backing in place. Cut the booster bevel into 2" long pieces. Epoxy to the booster backing so that it is flush with the aft booster tube. This covers up the gap between the backing and the tube. Sand the bevel so that it is even with the outside of the tube.



17. Draw a line around the booster core tube, 1/4" from one end. Insert the tube into the two core rings, so that 1/4" extends beyond the aft center ring. Epoxy the tube in place. Cut out and form a booster shroud, following the procedures in step 5. Place a booster coupler (do not epoxy at this point) into the forward end of the

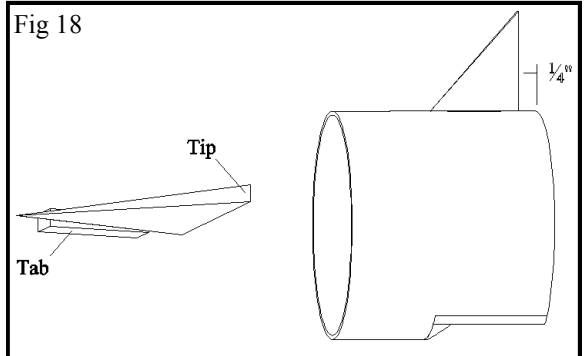
Fig 17



booster core tube. Bevel the forward end of the of the forward booster tube. Place the shroud so that it fits over the forward booster tube and the coupler. CA the aft end of the shroud to the body tube. Remove the coupler and epoxy back in place so that the forward end of the coupler is even with the forward end of the shroud. CA the forward end of the shroud to the coupler. Sand the aft end of the shroud so that it is even with the outside of the body tube. Do not glue the booster nose cone on at this time.

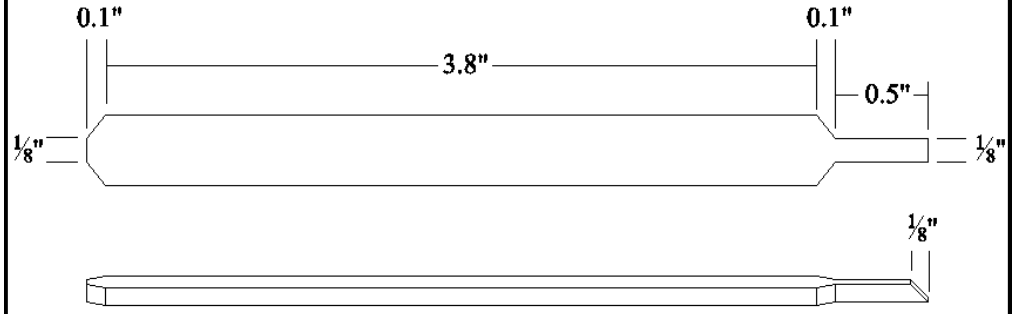
18. Sand the fins so that they are knife-edged as shown in the figure. Mark the aft booster tube 1/4" from the aft end on the fin line. Place the aft end of the fin on this mark making sure that it is perpendicular to the tube. Draw a line around the fin tab. Cut out a slot in the tube on this line, cutting just to the inside of the line. Carefully enlarge the slot until the fin just fits. Epoxy the fin to the tube and fillet the fin tab to the inside of the tube.

Fig 18



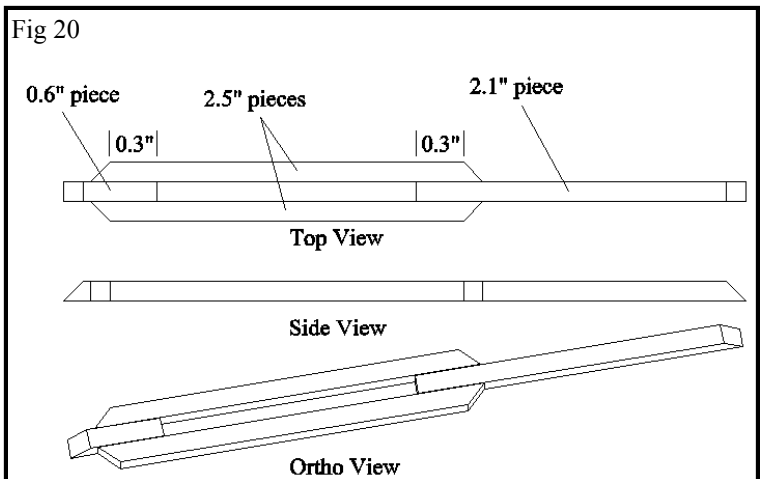
19. Extend the conduit line the length of the shroud. Mark the conduit line 1/4" forward of the gap between the booster tubes. Using the 3/8" x 3/32" x 6" balsa, form the aft booster conduit as shown in the figure. Epoxy it on the conduit line, so that the aft end is even with the mark on the conduit line. Epoxy the forward booster conduit (1/8" x 3/32" x 16") to the forward end of the aft booster conduit. Cut the forward end even with the forward end on the booster shroud. Epoxy a 3" piece onto the booster nose cone. Bevel both ends of the completed booster conduit.

Fig 19



20. Cut four pieces from each spruce stick, one 0.6" long, one 2.1" long and two 2.5" long. Bevel one end of the 0.6" and 2.1" pieces and both ends of the 2.5" pieces. All bevels should be at a 45° angle. Assemble the straps as shown in the figure.

Fig 20



21. This completes the primary assembly of the Vostok. Before final assembly, the pieces should be finished and painted. All exposed wood surfaces (except the Booster Stand-offs) should be filled with grain filler. Three or four coats of clear dope should be applied to the shrouds to prevent paint from seeping into the paper. All the spirals in the exposed tubes should be filled in.

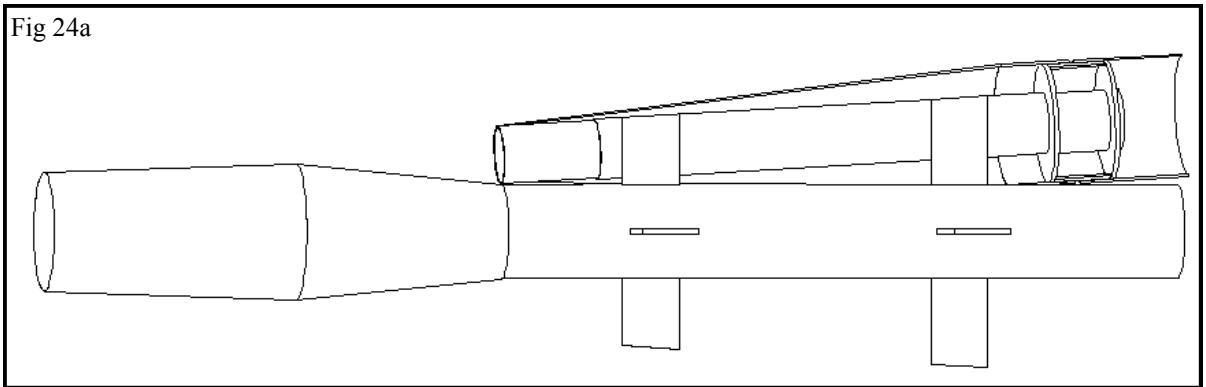
SECTION 4: FINAL ASSEMBLY

21. This completes the primary assembly of the Vostok. Before final assembly, the pieces should be finished and painted. All exposed wood surfaces (except the Booster Stand-offs) should be filled with grain filler. Three or four coats of clear dope should be applied to the shrouds to prevent paint from seeping into the paper. All the spirals in the exposed tubes should be filled in.

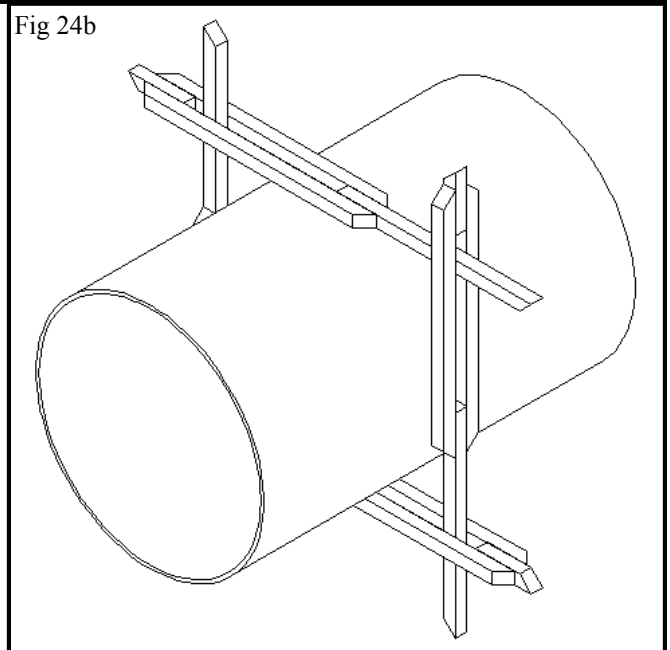
22. Mask off the booster stand-offs to prevent paint from getting onto them. Paint the entire model Olive Green. Wrap the booster paint pattern around the base of a booster. The pattern's aft end should be even with the aft end of the aft booster tube. The center line of the pattern should line up with the seam line on the booster. Mask off everything outside of the pattern. Remove the pattern. Paint the area of the body tube that is now exposed Silver. Repeat for the other boosters. This is the unfueled paint scheme. To depict a fueled Vostok, paint the core shrouds, booster nose cones and the forward 10" of the booster shrouds White. Do not paint any conduits white. There is one other paint scheme: the entire Vostok is White, except for the Sliver on the boosters.

23. The "BOCTOK" decals are placed on the forward core shroud. They are centered on the shroud, up and down and between the boosters that do not have the lugs or conduits. The "CCCP" decals are located on the forward vostok tube, in line with the "BOCTOK" decals. The bottom of the 'P' should be even with the aft end of the forward vostok tube. After the decals are positioned, the entire model (except the stand-offs) should be covered with a clear coat of paint to prevent contaminants from getting under the decals.

24. Put two marks on the seam of the booster shroud, one 2 1/4" and the other 11 1/2" from the forward end of the shroud. Cut slots in the shrouds just big enough for the booster stand-offs to fit through. Cut the same size slot in the booster core tube.



Use a long blade to reach the tube for the aft slot, an X-Acto #26 blade is perfect. Once the slots in the booster core tube are cut, enlarge the slots in the shroud so that it fits over the stand-off fillets. The booster should fit flush against the core tube, sand the ends of the stand-offs if necessary. Repeat for the other boosters. Assemble the four booster support assemblies around the core tube, between the aft booster stand-off and core housings. Do not epoxy them at this time. Place the first booster over the stand-offs and position the support that is between it



25. Pass the shroud lines of the 24" parachute through the large eye bolt. Loop the parachute through the shroud lines and pull tight. This will secure the parachute to the Vostok section. No glue is required to hold the parachute in place. Tie a 2" loop in both sides of the Shock Chord. Put the quick link onto one of the loops. Attach the quick link to the small eye bolt in the core/booster section. Secure the 35" parachute to the other end of the shock cord using the same method as the other parachute. Insert recovery wadding into the Core Tube, make sure that it goes all the way to the MMT, or there will not be enough room for the parachute. Fold the 35" parachute into the core tube. This is the most difficult part of the preparation, make sure that the parachute is a loose fit, yet allows the Vostok section and parachute enough room. Part of the parachute will be in the core tube, some will be in the Outer Core Tube. Fold the 24" parachute so that it fits into the vostok coupler. As you put the vostok section into place on the outer core tube, attach a 3-6" piece of masking tape to the two parachutes. This will ensure that the 24" parachute comes out of the vostok coupler. The two assemblies will recover separately. Assemble the motor in accordance with the manufacturer's instructions. Install the motor into the MMT. Slide the small washer onto the engine retainer. Thread the small nut onto the engine retainer, securing the motor in place.