

I-17.5TH SCALE MERCURY REDSTONE BUILDERS KIT

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Additional Parts Required:

- 1) 3.90 LOC airframe tube 34 inches long (optional cut to 33.82" for scale accuracy).
- 1) 3.90 LOC airframe tube 16 inches long cut down to 5.40 inches long.
- 1) 3.90 LOC tube coupler.
- 1) 29 mm motor tube at least 8.5 inches long.
- 1) Length of shock cord 4 feet long.
- 1) Length of thin Kevlar (3 to 4 feet)
- 1) Length of Heavy Kevlar (4 to 5 feet)
- 2) 40 inch parachutes.

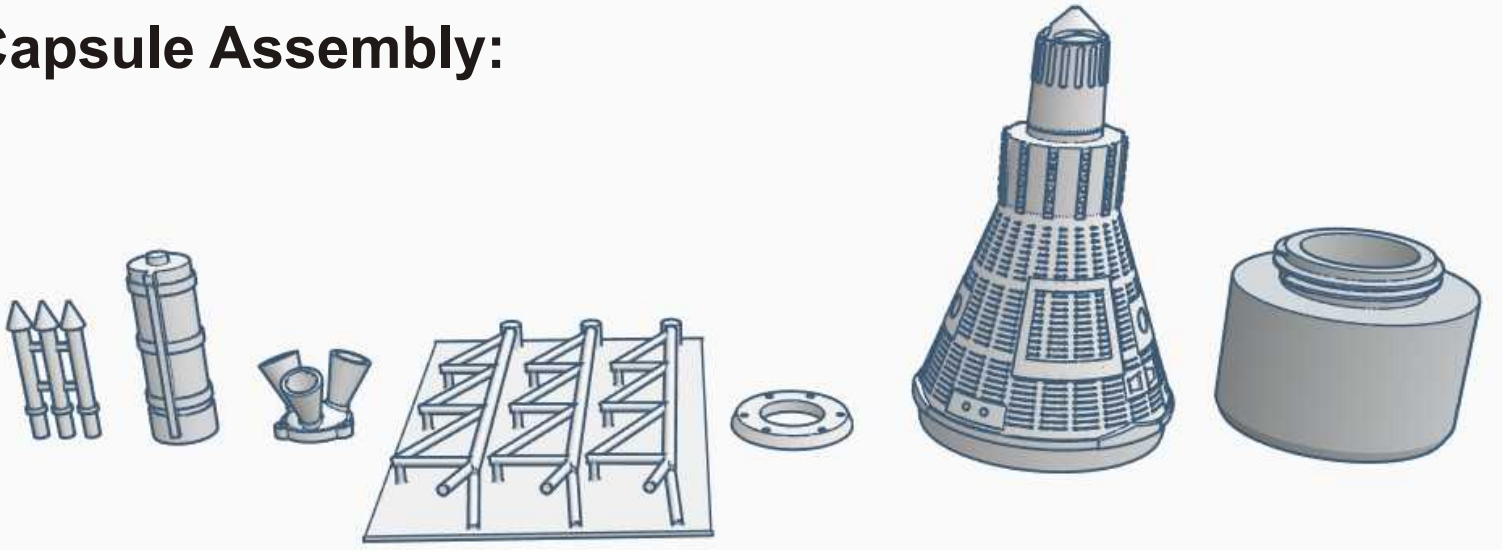
Plus assorted glues, sandpaper, paint, and standard hobby tools.



1/17.5 Scale Mercury Redstone 3.90 Builders Kit

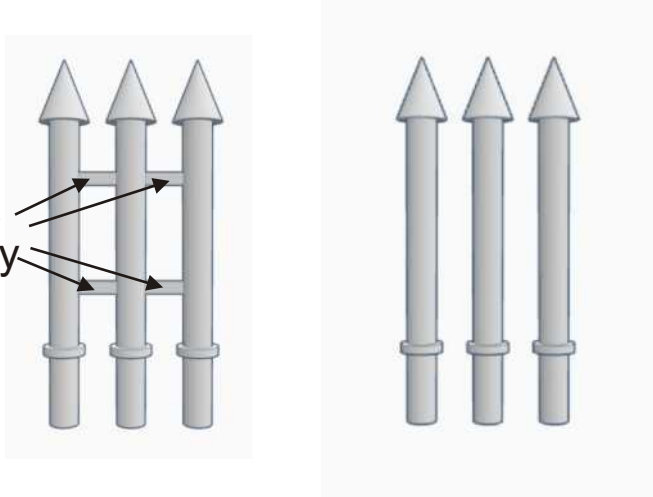
Thank you for purchasing a Boyce Aerospace Hobbies 3.90 Mercury Redstone "Builders Kit". Please review the drawings below before gluing and assembling your kit. Visit us at boyceaerospacehobbies.com

Capsule Assembly:



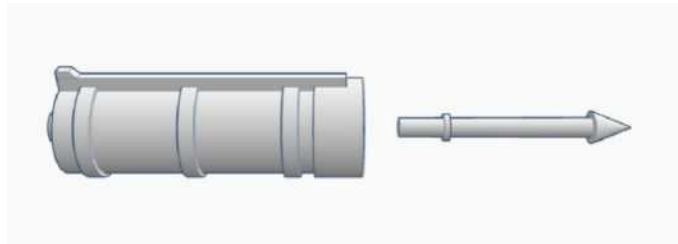
1

Carefully cut apart the three aerospikes provided. Use a hobby knife and 220/400 grit wet/dry sandpaper to clean up any rough edges.



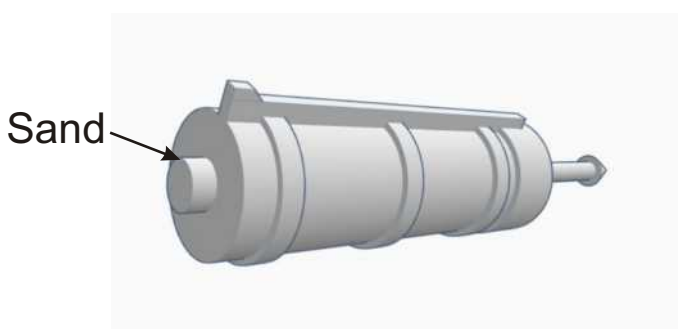
2

Test fit the aerospike into the top of the escape motor casing. Decide if you want to glue the aerospike in or just leave it a pressure fit so it can be removed for flight. Sand the base of the spike as needed.



3

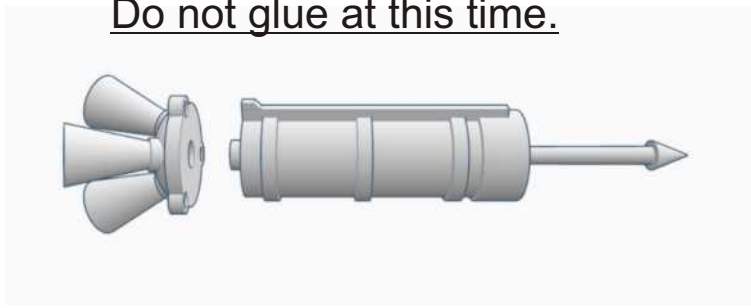
Sand around the sides of the male alignment tab with an emery board until it is a nice slide fit with the escape tower rocket nozzles.



4

Test fit the rocket nozzle base plate with the escape tower rocket motor.

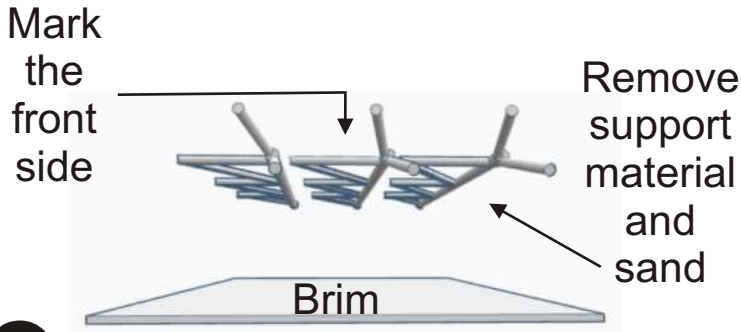
Do not glue at this time.



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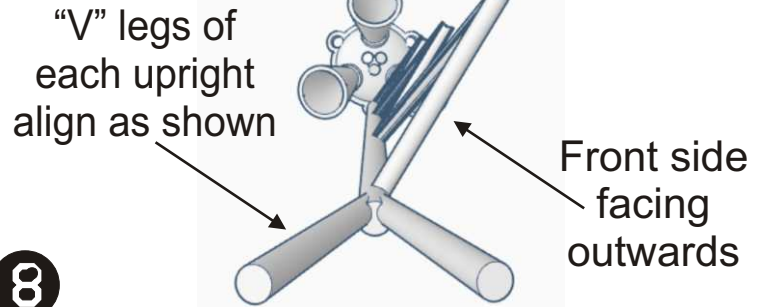
5

Mark the front of each tower upright. Pull the “brim” away from the escape tower uprights. Carefully remove the support material from the back side of the uprights. Sand the back side of the uprights until smooth.



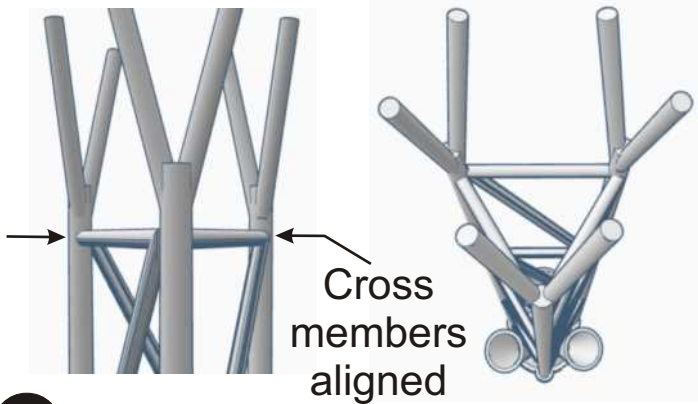
6

Lay the escape tower nozzle assembly upside down on a smooth flat surface. Fit all uprights in the holes in the nozzle assembly until they touch the surface (see step 8 image). Align as shown with front sides facing outwards.



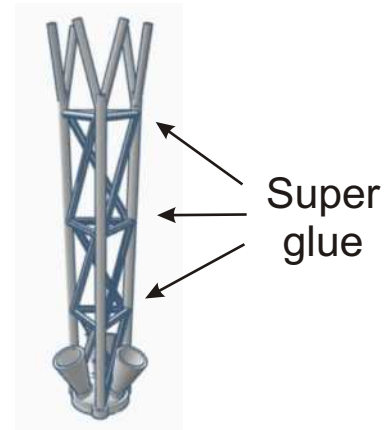
7

Align the uprights to the nozzle assembly as shown. Align the cross members as shown.



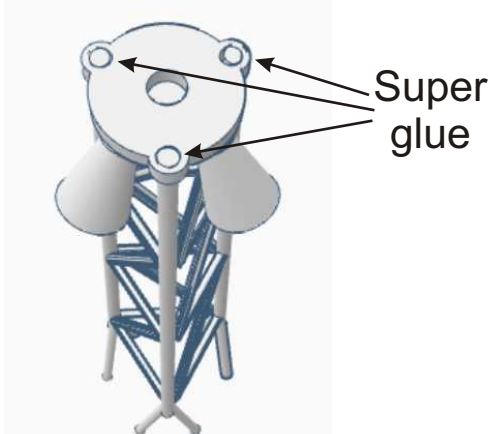
8

After all 3 uprights are seated and aligned apply super glue to each cross member/upright joint and hold till dry. Repeat for each upright.



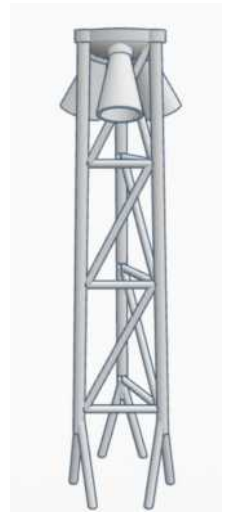
9

Carefully flip the tower assembly over and insure each upright is fully inserted into its hole in the nozzle assembly. Apply a drop of super glue to the top of each tower upright through the holes.



10

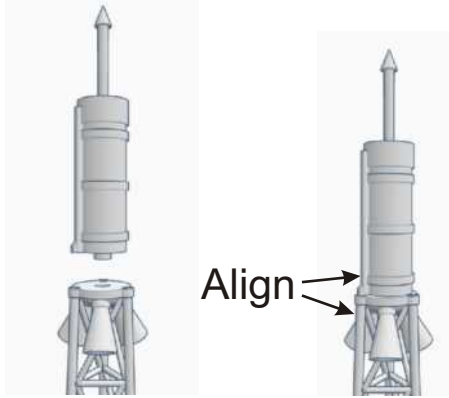
After the tower is dry, check it for vertical trueness on each of its 3 sides.



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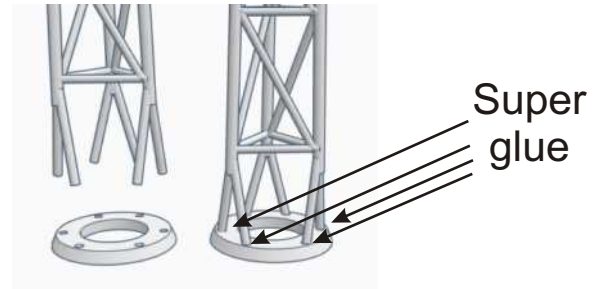
11

Glue the escape tower rocket motor casing in place. Make sure to align the tunnel on the side of the casing to one of the tower uprights.



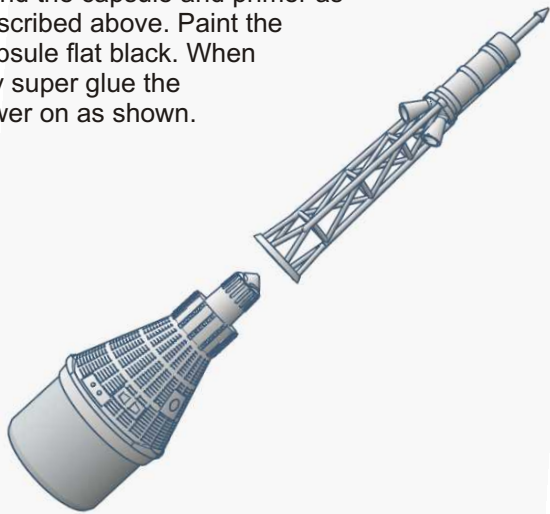
12

Sand and use auto spray primer to coat the tower. Sand and repeat until tower is ready for paint. Spray the tower bright red. Sand and paint the base flat black. Glue the tower to the base as shown while adjusting for vertical trueness.



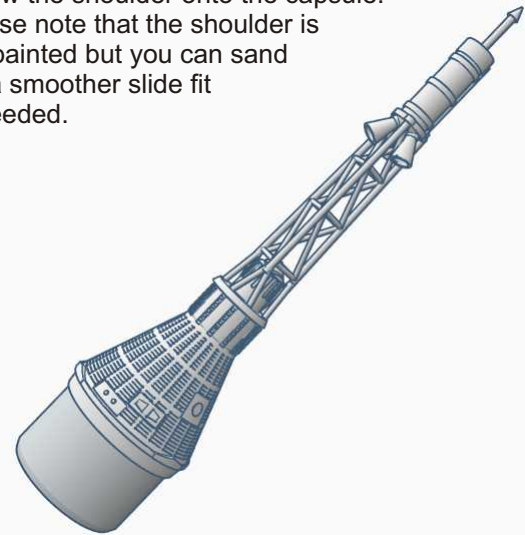
13

Sand the capsule and primer as described above. Paint the capsule flat black. When dry super glue the tower on as shown.



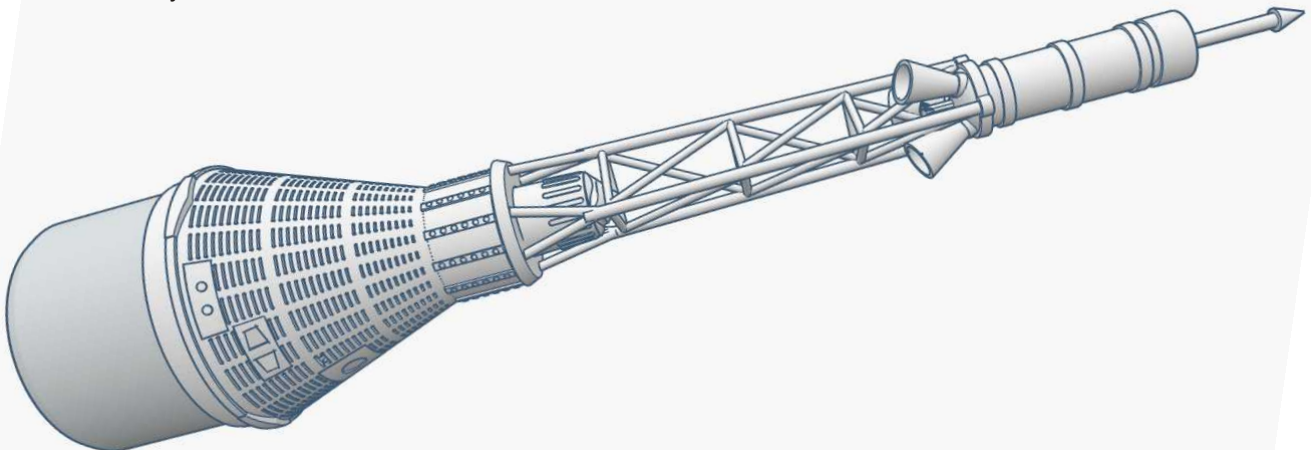
14

Screw the shoulder onto the capsule. Please note that the shoulder is not painted but you can sand it if a smoother slide fit is needed.



15

Your Mercury Capsule is now complete. Towards the end of this instruction manual nose weight will be added to the capsule and a Kevlar recovery bridle will be installed.



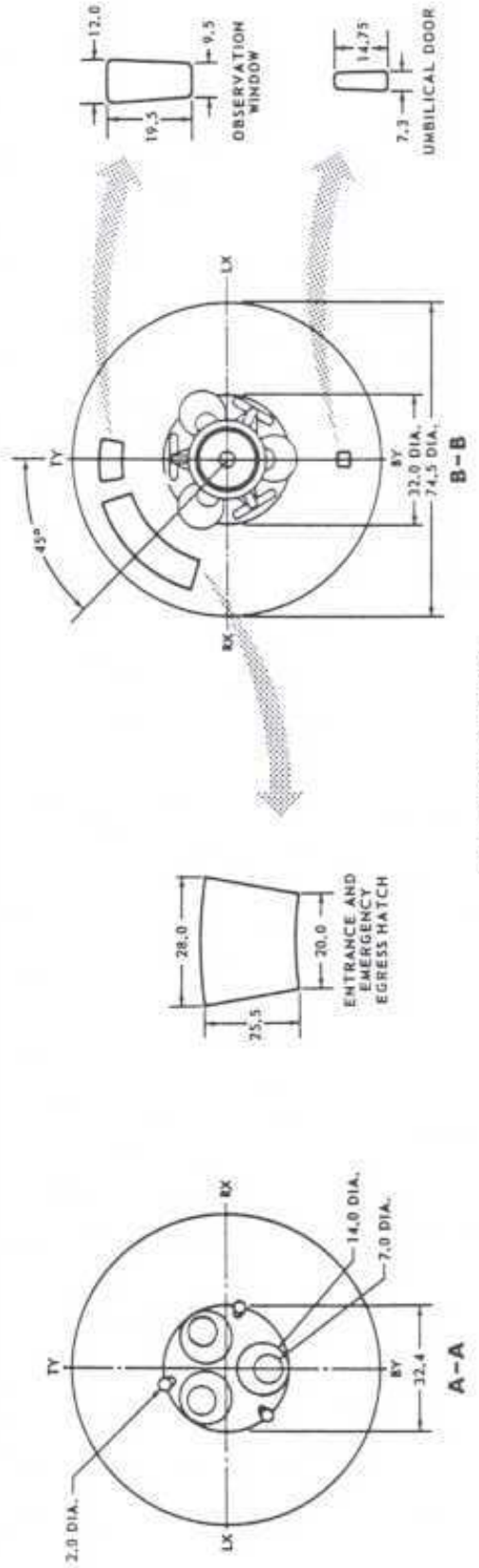
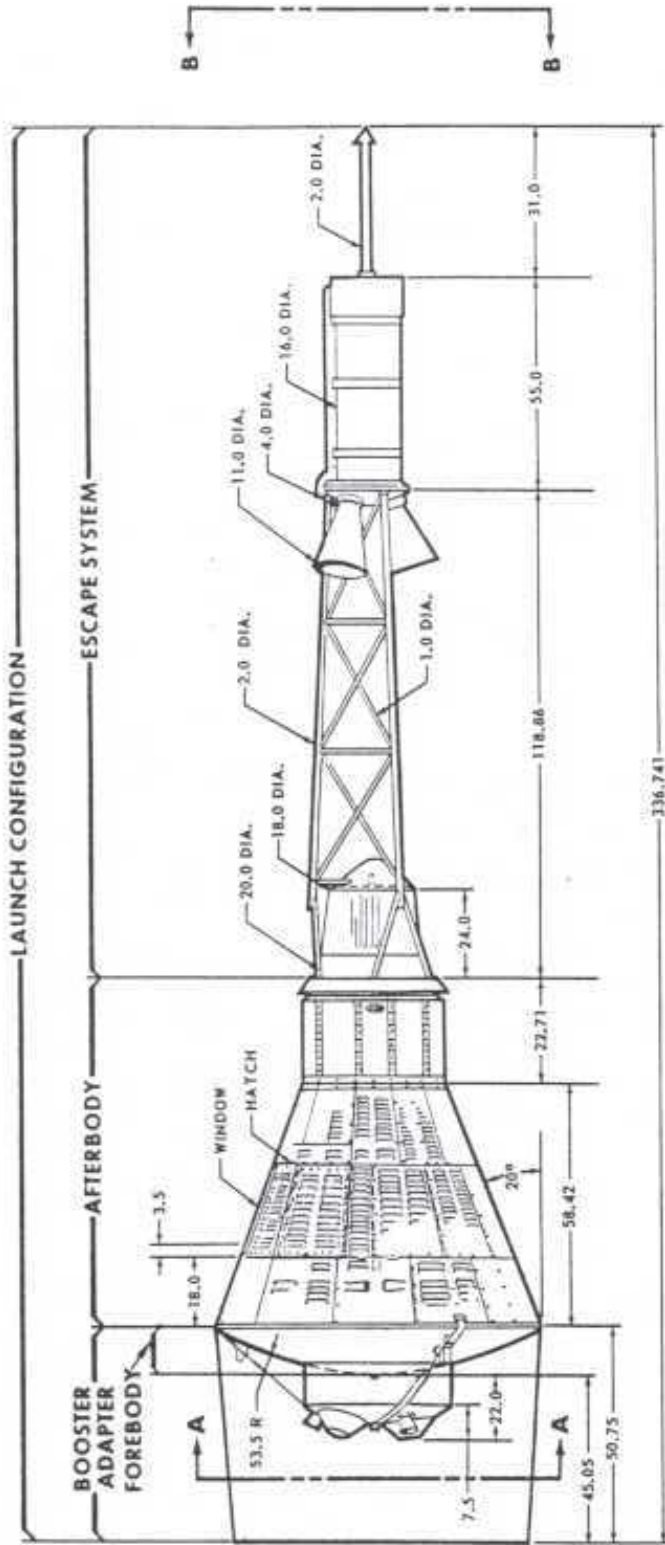
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MCDONNELL MERCURY SPACECRAFT



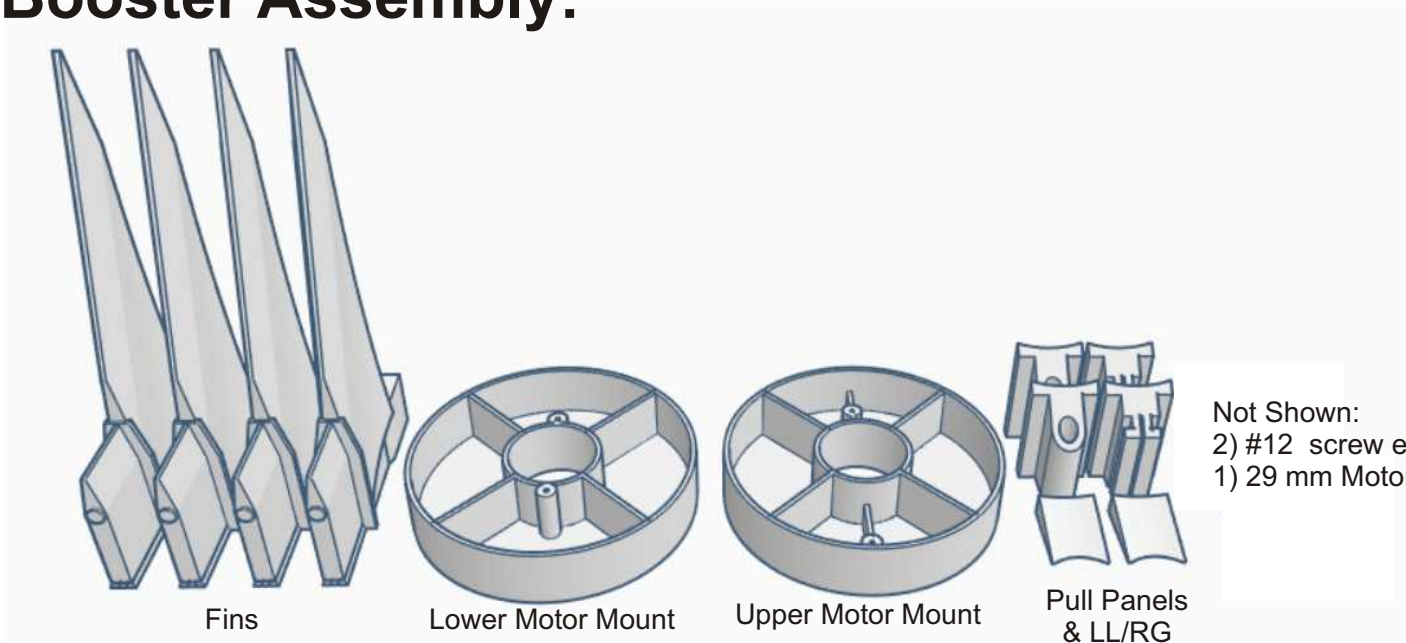
FIRST FREE MAN IN SPACE



ALL DIMENSIONS IN INCHES

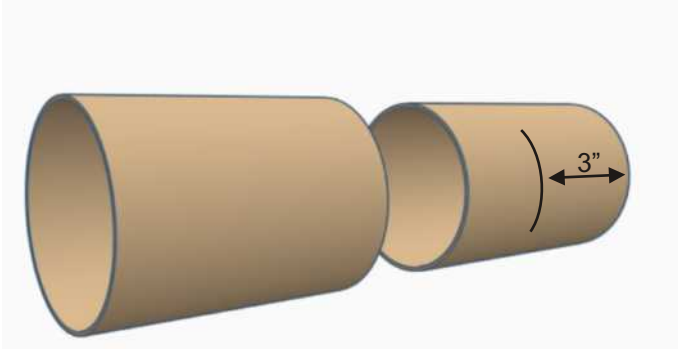
1/17.5 Scale Mercury Redstone 3.90 Builders Kit

Booster Assembly:



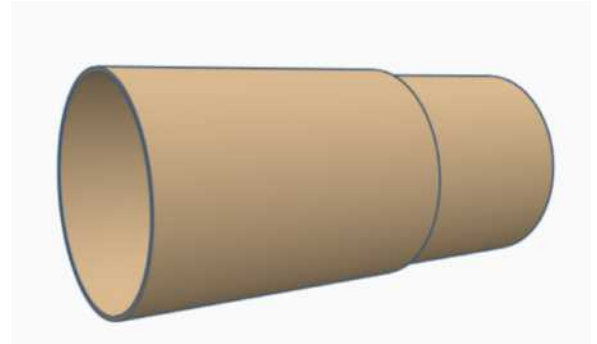
16

Cut a section of 3.90 tube down to 5.40 inches in length. Draw a line on the tube coupler 3 inches from the end.



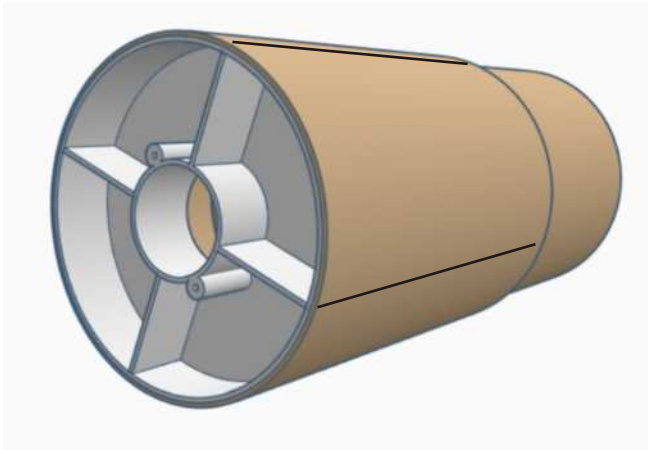
17

Use white glue or epoxy and glue the coupler into the 5.40" section of tube leaving 3 inches of coupler exposed.



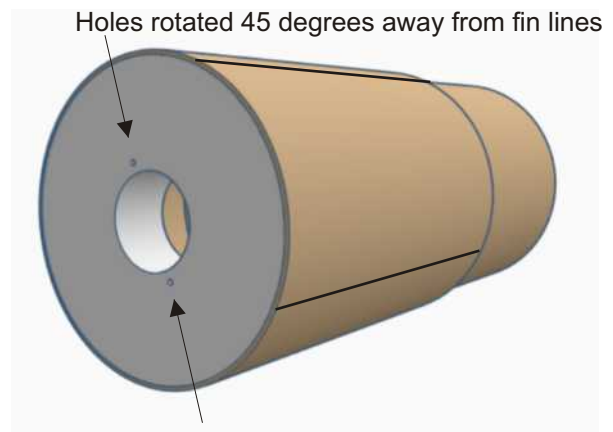
18

Slide the bottom motor mount into the assembly as shown and use it as a guide to mark the placement of the fins. Use a piece of angle aluminum channel and pencil to extend the marks the length of the 5.40 tube section.



19

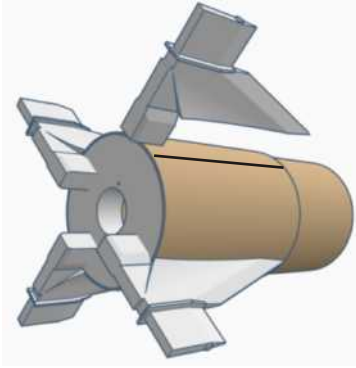
Flip the bottom motor mount over and glue it into position flush with the bottom of the assembly. Make sure the two holes for the motor retention ring are 45 degrees to the drawn fin lines. Use epoxy made for plastic to glue in place.



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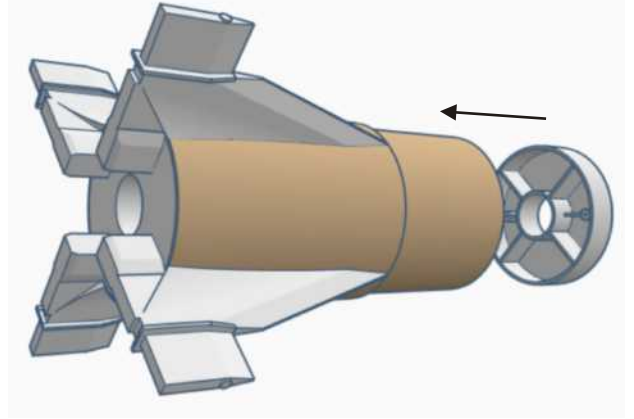
20

Using plastic epoxy carefully glue each fin to the 5.40" long tube section. Using a large straight pin poke holes along the body tube where the fin will be glued. Apply epoxy to the root edge of the fin and the top of the steering fin motor housings where they make contact with the bottom motor mount. Use your gloved finger to wipe away any excess epoxy. Use blue painters tape to hold each fin in place as it dries.



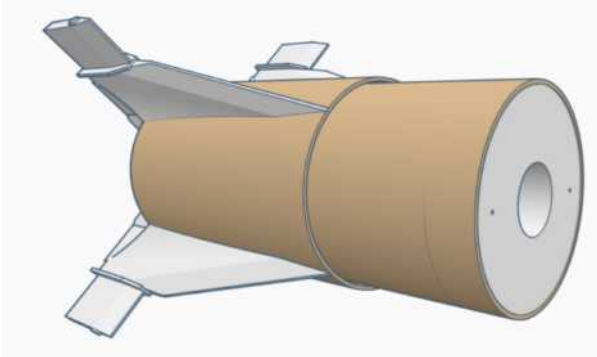
21

Epoxy the top motor mount into place flush with the top edge of the coupler. Rotate the recovery system mounting holes in the mount 45 degrees to the fins as shown.



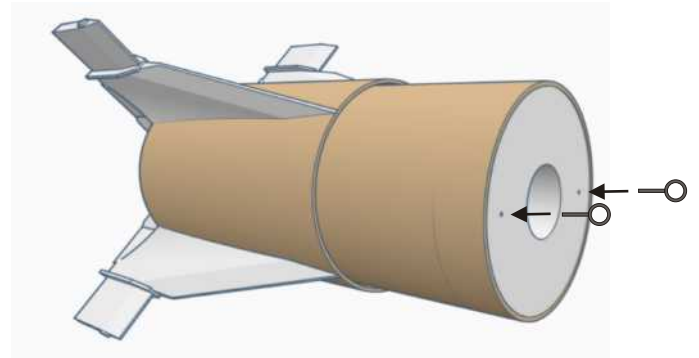
22

Wipe away any epoxy from the outside of the coupler.



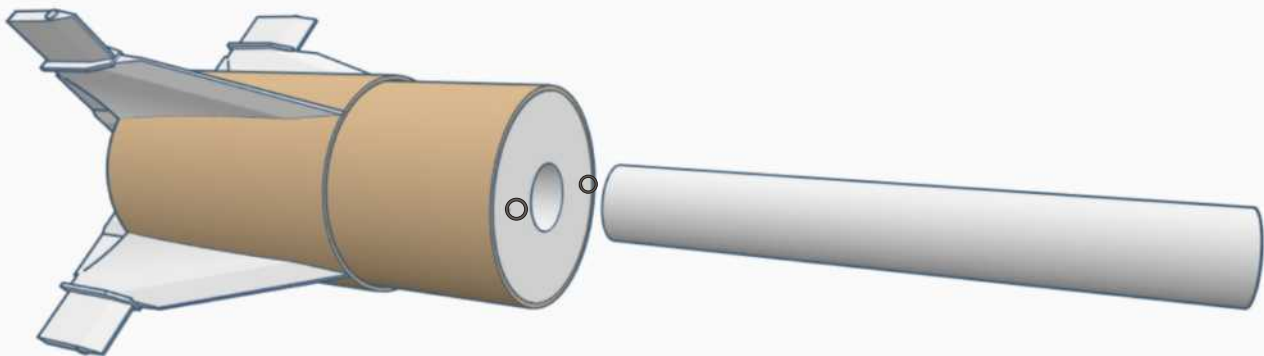
23

When the epoxy has dried carefully screw the two recovery system eyelets into their holes on the mount. Apply a drop of super glue to prevent them from being removed.



24

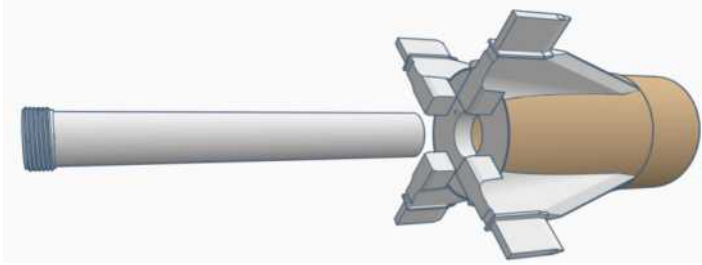
Carefully sand the flanges of the holes in the upper and lower motor mounts until a 29mm motor tube will epoxy cleanly into place. The minimum length of the 29mm tube should be 8.5 inches but a long tube can be used if the builder wants the security of less ejection volume to pressurize. If a longer tube is used, make sure to glue an additional plywood bulkhead into the airframe tube at the end of the motor tube along with a shock cord mount (the shock cord mount on the fin would not be used if the motor tube is extended).



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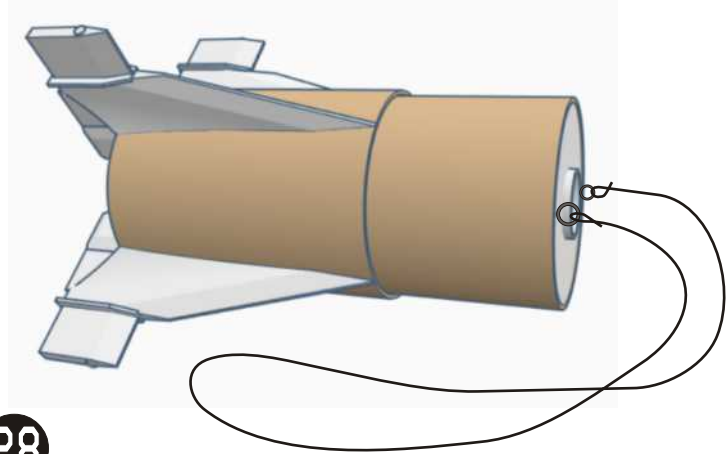
25

Glue the male motor retainer threads flush with the end of the 29mm motor tube. When dry glue the motor tube into the fin can until the retainer threads are against the bottom motor mount.



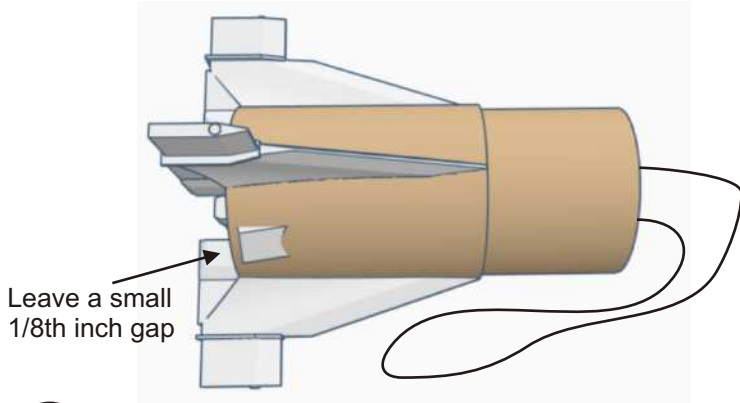
26

Attach your preferred recovery system to the fin can's two eyelets. We recommend thin Kevlar or steel cable followed by elastic shock cord to the parachute.



27

Measure and mark a centerline point between two fins. Epoxy a pull plug panel to the side of the fin can as shown. Leave a small 1/8th inch gap at the bottom of the housing. Repeat for the opposite of the fin can.

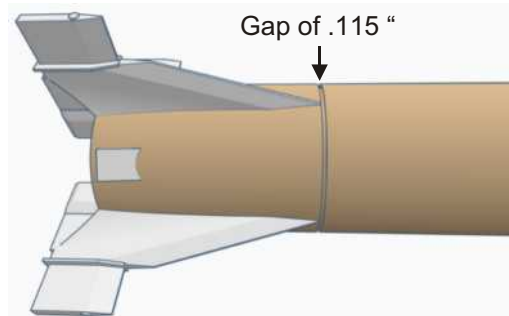


28

Cut a piece of 3.90 airframe tube to the following length:

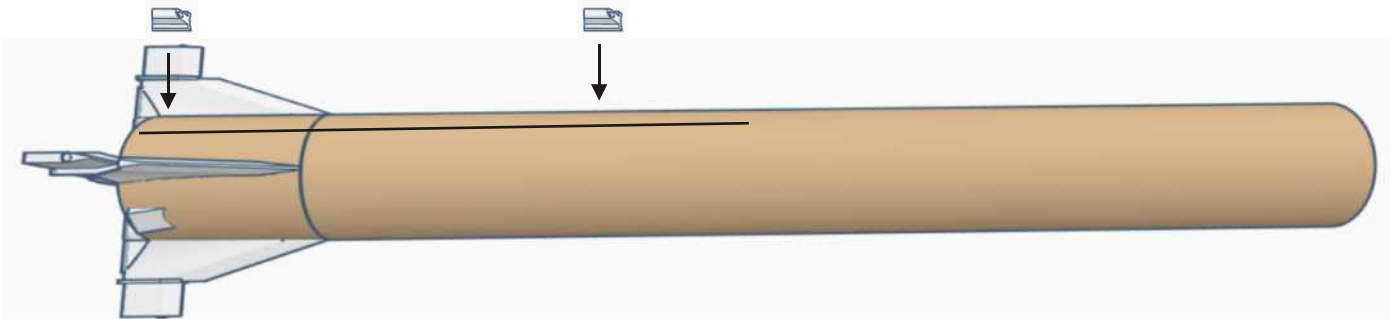
Mercury Redstone - 33.82 inches (optional 34")

Epoxy the tube to the fin can leaving a gap between the tubes of .115 inches.



29

Measure and draw a line between two fins (any 2 fins without the pull plug housings) and extend the line approximately halfway up the side of the booster. Epoxy your choice (launch lugs or rail guides) onto the vehicle as shown. The bottom lug or guide should be near the base of the booster and the top lug or guide about 3 inches below the vehicle's midpoint.



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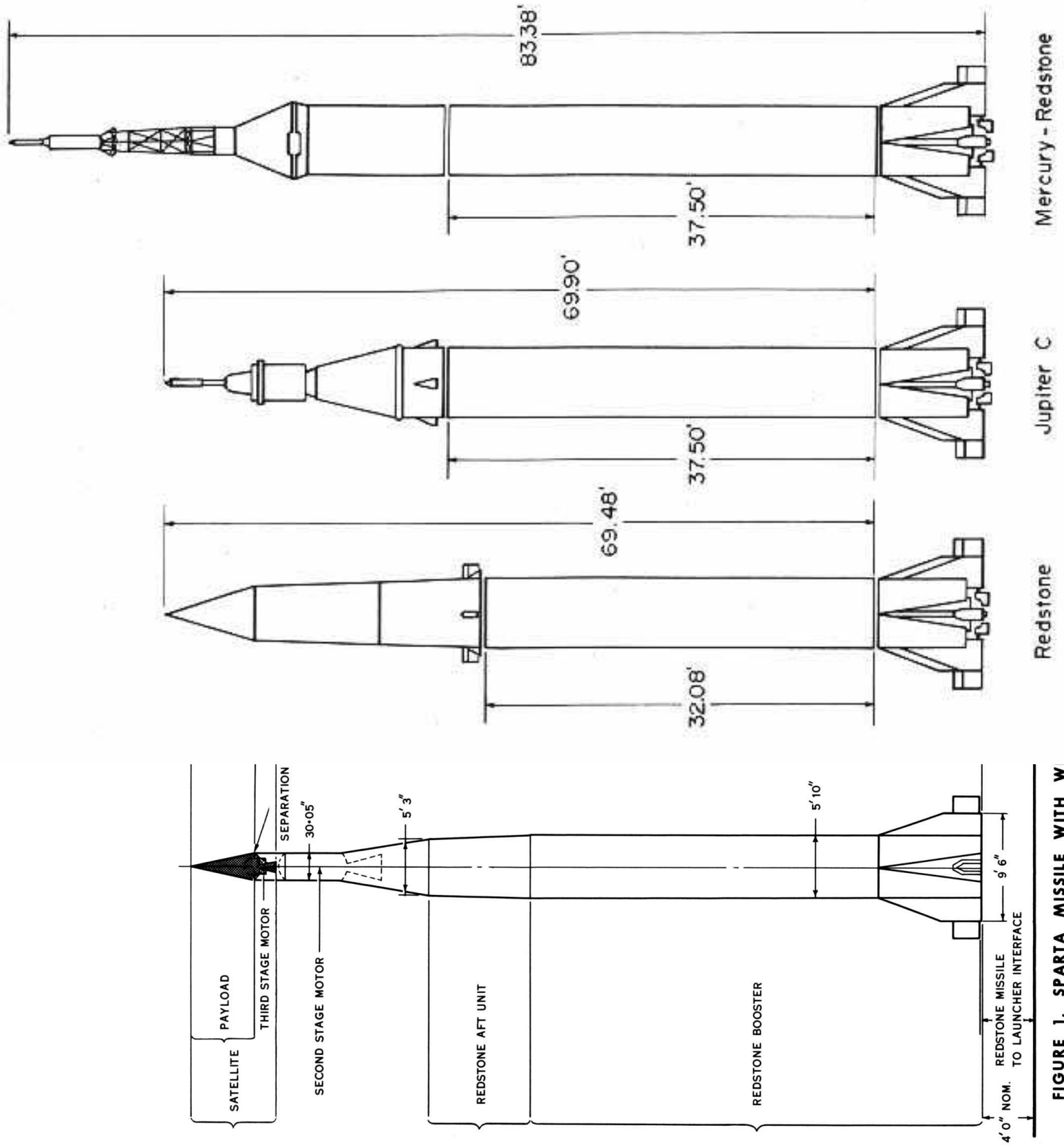
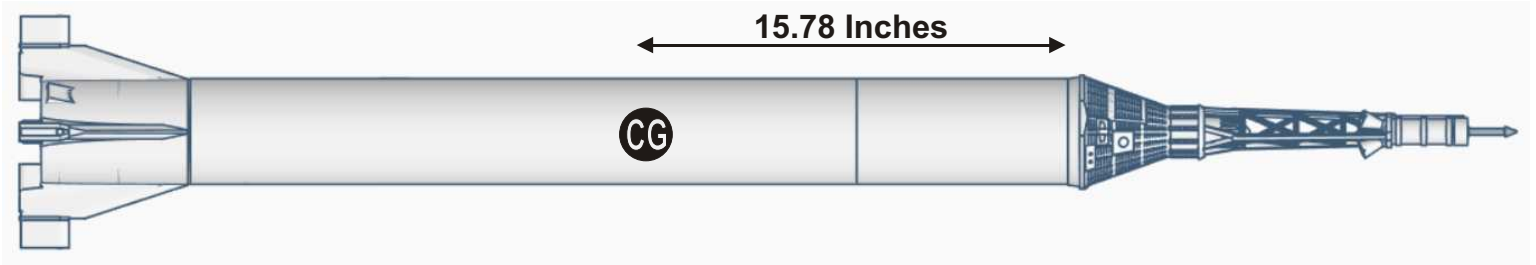


FIGURE 1. SPARTA MISSILE WITH W

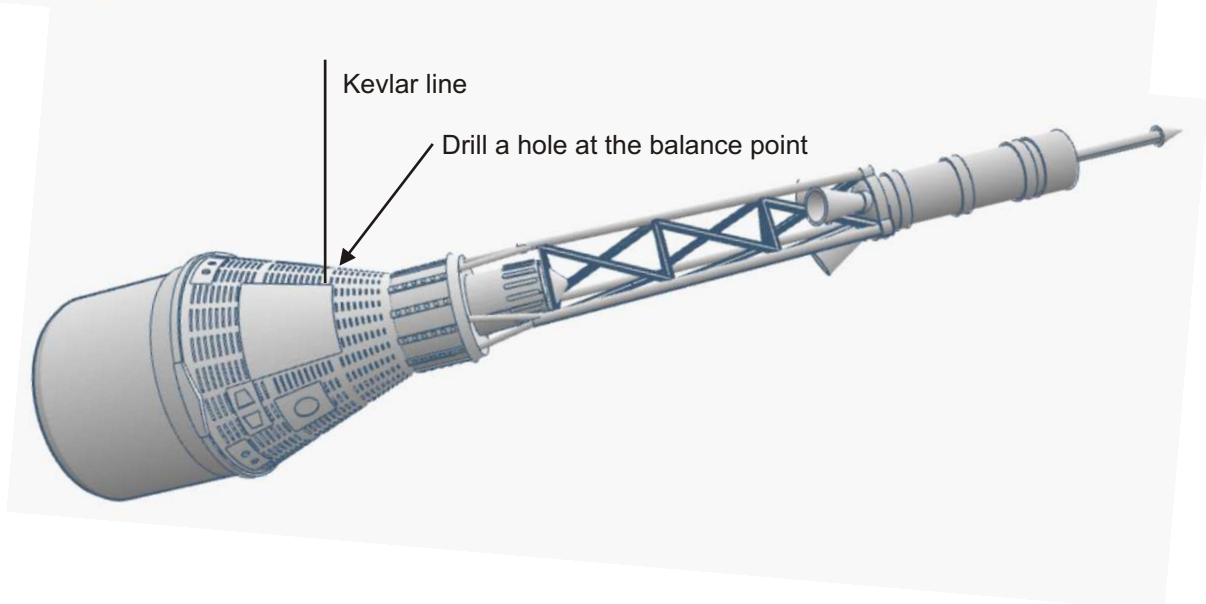
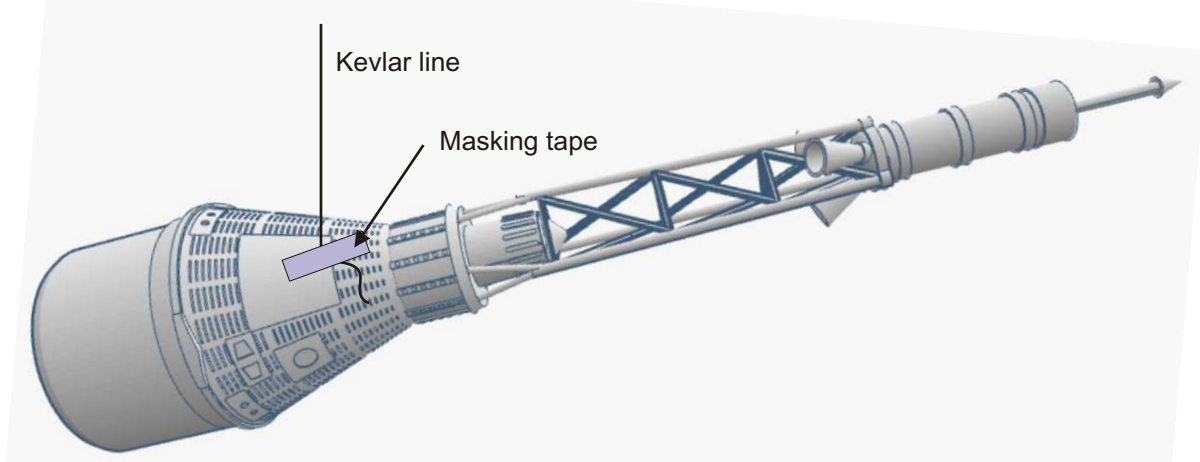
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At this point nose weight must be added to move the models center of gravity ahead of it's center of pressure in order to assure the model's stability. Slide the capsule section onto the airframe and install the largest motor you plan on using . Apply a piece of masking tape to the model and draw a line on the tape exactly 15.78 inches from the front edge of the airframe tube. The model must balance at or forward of this point. To add nose weight we recommend unscrewing the capsule shoulder and pressing clay into the recess in the capsule until the model is balanced as shown.



Please note that this procedure must be repeated if you use a larger/heavier rocket motor on later flights. Failure to correct the models center of gravity may result in an unstable flight which can damage or destroy the model and cause harm to personal property and human life.

Now that the nose weight has been added to the capsule the Kevlar line for the capsule's recovery system may be installed. Using the short piece of Kevlar line use masking tape and test various points on the capsule until you find the point where the capsule balances as shown below. Drill a hole with a small drill at the balance point and feed the Kevlar line into the capsule. Use epoxy to glue the line into the capsule. Attach a length of shock cord and a 40" parachute to the Kevlar line.



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Use spray primer to begin the painting process on the Redstone booster. The primer will fill in the 3D printing layer lines on the fins. Sand the model after each coat of primer paying extra attention to the fins and launch lugs.

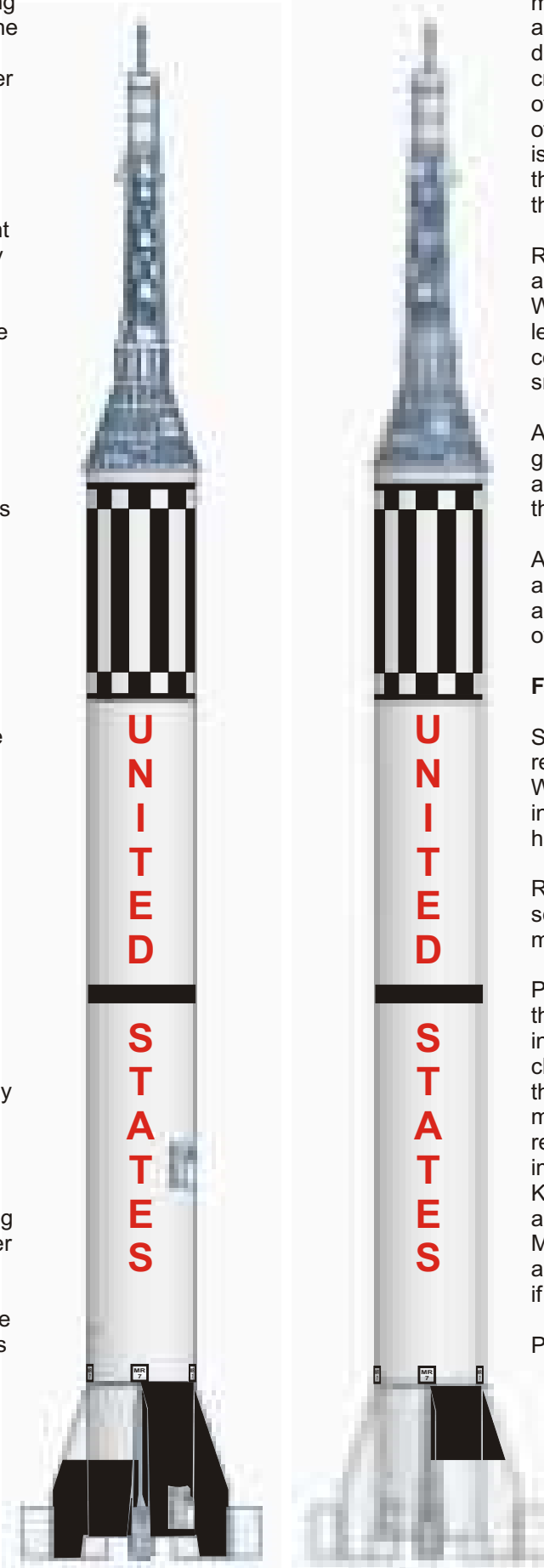
After about 3 coats of primer the 3D printed layer lines will disappear and the model will be ready to paint. Paint the entire booster with a good quality semi-gloss white enamel spray. Let each coat dry before the next coat is applied. Give the model at least three spray coats of paint.

After the paint has dried (24 hrs or more depending on temperature) carefully mask the paint pattern on the fin can. The images on this page show the fin roll patterns 180 degrees opposite each other. Tape a large garbage bag over the rest of the airframe and spray paint the fin roll pattern with semi-gloss black paint. When dry carefully remove all masking tape and the bag.

The decals provided are the upper roll pattern, the center stripe, and the vertical United States lettering. To prepare the decals for use first cut around each decal leaving a margin of about 1/2 inch. Use a credit card to apply pressure to the tape "mask" over the decal in long firm strokes. This will help the decal to peel off its backing paper and remain affixed to the "mask".

Get a small bowl and fill it half way with warm water. Drop two to three drops of dish washing detergent into the water and mix. You are now ready to proceed.

The first decal applied should be the booster roll pattern. Carefully peel the backing paper off the decal. Using a small sponge apply the soapy water to the decal. This will allow you to move and position the decal during its application. Lay the decal left edge in line with the launch lugs/rail guides and line up the top of the decal with the top of the booster airframe tube. Slowly wrap the decal around the body tube (repositioning as needed) so that the top of the decal lines up with the top of the boosters body tube. Once the positioning is good, use the credit card to work out as



much of the soapy water under the decal as possible. Be careful not to stretch the decal. As the decal starts to dry use the credit card to apply pressure to each part of the decal in order to assure adhesion of the decal to the model. When the decal is dry use the sponge to wet the "mask" then slowly peel it off the model leaving the roll pattern decal in place.

Repeat the process described above to apply the remaining decals to the model. We suggest applying the United States lettering decals second followed by the central black band and the finally the small MR-7 box decals.

A great method to make sure your decal goes on straight is to dry fit the decal and apply painters tape as guides for the edges of the decals.

After all the decals have been applied allow them to dry for 24 hours then apply a good quality clear coat spray over the decals to keep them in place

Flight preparation for the model:

Single use motors - Epoxy the motor retention band to the base of the motor. When dry screw the motor retention ring in place over the motor after the motor has been inserted in the rocket..

Reloadable motors Use the provided #2 screws with small washers to hold the motor in position.

Place ejection wadding in the rocket then fold and place the capsule chute in the body tube. Follow the capsule chute with the booster chute. Placing the chutes in this order improves the models recovery reliability. Pile the remaining shock cord and Kevlar cord into the model. Tuck the capsules Kevlar cord along the capsule shoulder and slide the capsule onto the booster. Make sure the shoulder slides smoothly and does not bind. Sand the shoulder if needed.

Please follow the NAR safety code and the motor manufactures instructions for igniting and flying your model. Enjoy your Boyce Mercury Redstone!

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