

# I-46TH SCALE TITAN II MISSILE BUILDERS KIT BT-80

**DISCLAIMER** - *The products sold by Boyce Aerospace Hobbies are intended for display and/or flight with use of explicitly stated model rocket motors. Launching of model rockets may be dangerous; use our products at your own risk. Boyce Aerospace Hobbies is not responsible for any damages or injuries incurred from the use or misuse of our products. Our kits are not intended to be modified or used with motor sizes different than stated. The product should be purchased by an adult and if used by a minor, under the supervision of a parent at all times.*

## **Additional parts needed to complete the model:**

- 2) 30" parachutes
  - 2) Lengths of BT-80 body tube 14" long
  - 1) Length of BT-20 body tube 18" long
  - 2) 18 mm BT-20 motor blocks
  - 2) Lengths of 1/8" or 1/4" shock cord 18" long
- Assorted paint, glue and standard hobby/modeling tools

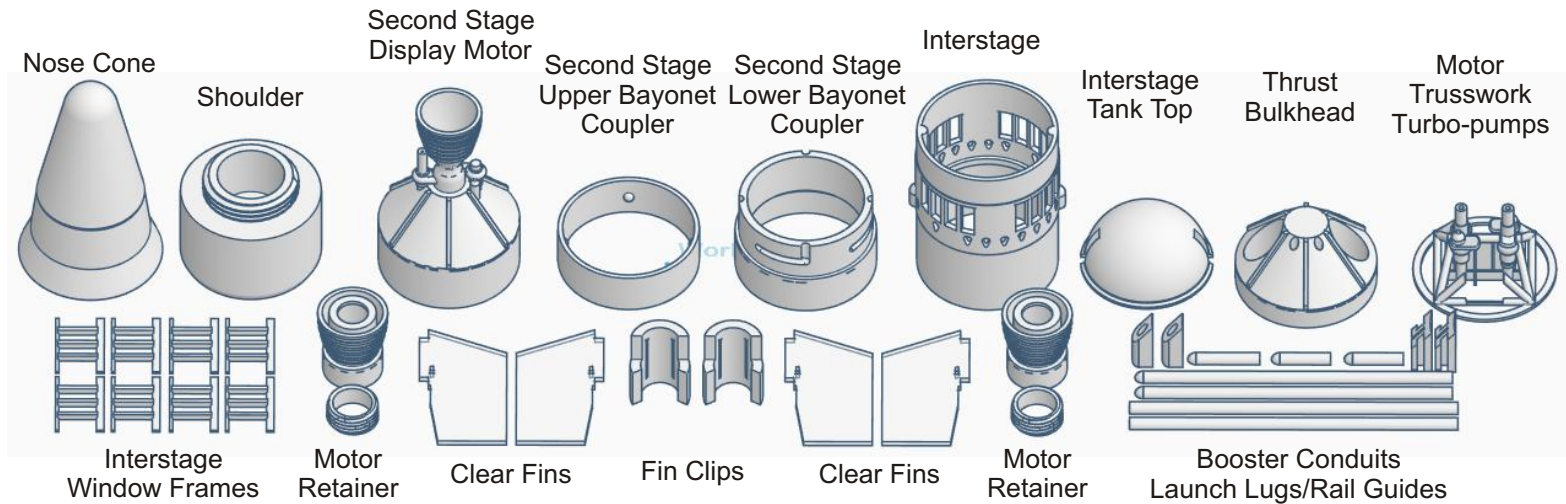


# 1/46th Scale Titan II Missile Builders Kit

Thank you for purchasing a Boyce Aerospace Hobbies Titan II Missile "Builders Kit". Please review all instructions prior to assembly. Visit us at <http://www.boyceaerospacehobbies.com>

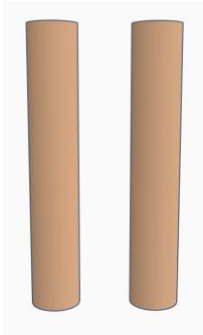
Pre-sand all parts prior to assembly. Use 220 grit sandpaper progressing to 400 grit until all parts are smooth to the touch. Make sure to pre-fit all parts that glue or slide together before you sand shoulders or glue surfaces. Note: Be careful when sanding the interstage window details. Due to the nature of 3D printing they are fragile!

## Plastic parts included in this kit:



**1**

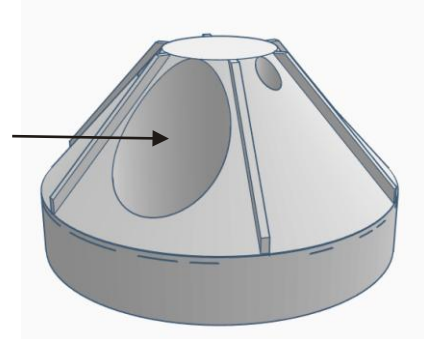
Cut two lengths of BT-20 tubing 95 mm in length.



**2**

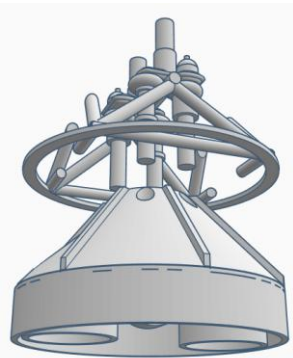
Sand the two motor holes in the motor bulkhead until the BT-20 motor tubes are a nice slide in fit.

Sand to fit  
18 mm motor  
tubes.



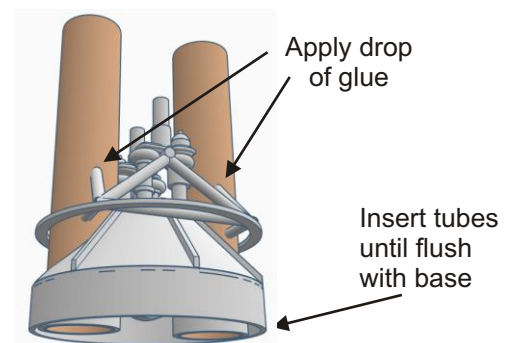
**3**

Test fit the rocket engine trusswork and turbo-pump assembly into the engine bulkhead. Super glue in place making sure it is fully seated in the holes and level.



**4**

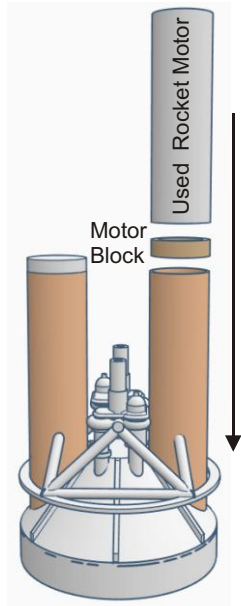
Super glue the two motor tubes in place flush with the base of the bulkhead. Add a small drop of super glue at each point where the trusswork touches the motor tubes.



# 1/46th Scale Titan II Missile Builders Kit

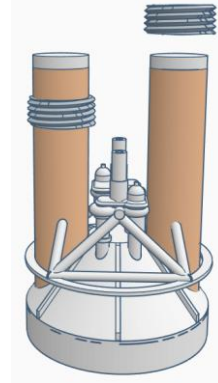
5

Using an old used 18 mm rocket motor install the motor blocks. Draw a line on the motor casing 5 mm from the top edge. Spread glue, inside each tube, about 60 mm down from the top of the tube. Do one tube at a time. Slide the motor block into the top of the tube and push it into place with the spent motor case. Stop at your marked line and quickly pull out the motor casing. Allow to dry then do the second motor tube.



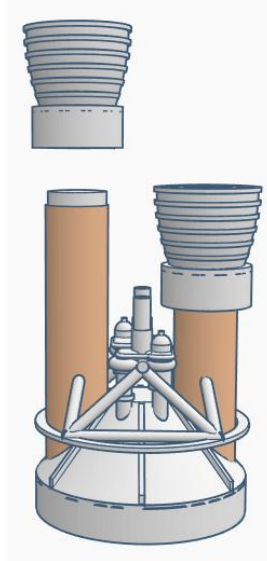
6

Find both male threaded rings from the motor retainers. Test fit them on the two motor tubes. Make sure you have two rocket motors in place as shown. Sand the inside of the rings until you have a nice sliding fit on the tubes.



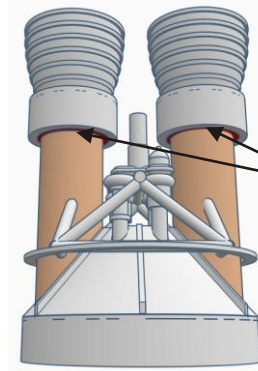
7

Slide the threaded rings off the motor tubes and slide the motor bells in place. Sand the inside of each engine bell until it is a nice slide fit over each motor tube. Make sure that you don't damage the inside threads when you sand. Remove the motor bells from the motor tubes.



8

Thread the retainer parts together fully and slide each motor retainer over a motor tube until the retainer is touching the rocket motor. Make a pencil line on each tube at the bottom of the male threaded ring.



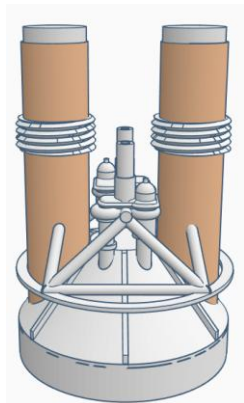
Mark here with a pencil on both motor tubes.

9

Remove the male threaded rings from the motor bells. Slide them on to the motor tubes and glue them in place using the pencil marks to insure they are glued at the correct location.

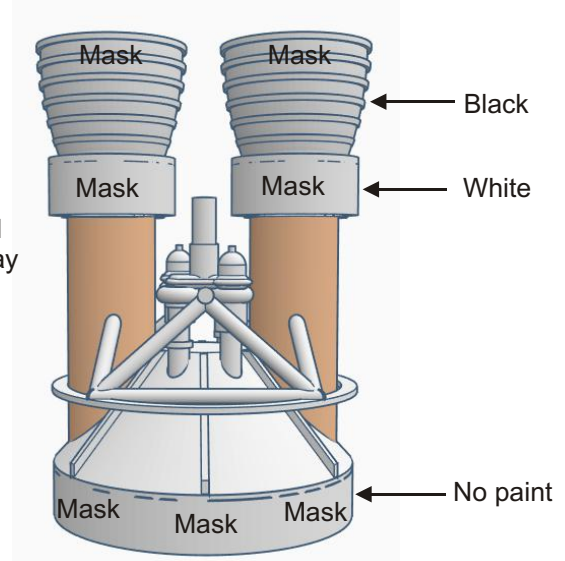
Make sure that no glue gets on the exposed threads!

When the glue is dry, screw the motor retainers in place.



10

Mask off and paint the assembly as shown below.



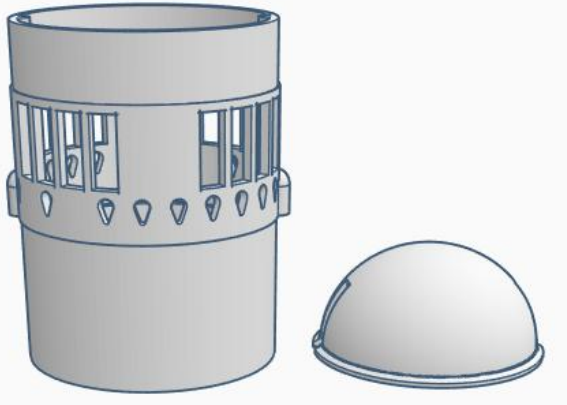
Mask the noted areas then spray the assembly metallic silver. When dry paint the details as shown.



# 1/46th Scale Titan II Missile Builders Kit

11

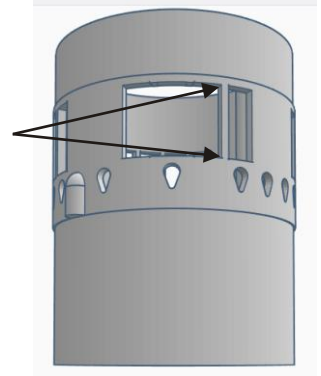
Find the vehicle interstage and the tank dome. Test fit the dome into the bottom of the interstage. Sand to insure a good fit.



12

Unfortunately, the window frames in the interstage are extremely fragile do to the orientation of the printed part. Remove the tank dome and carefully cut out all vertical interstage struts leaving just four large window frames.

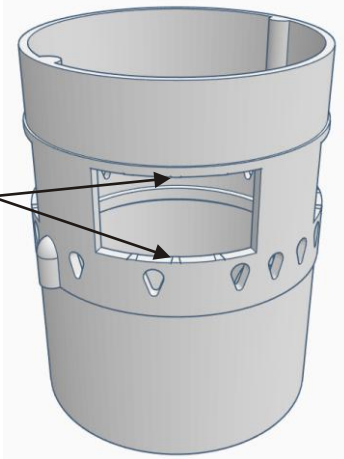
Cut out the three vertical struts at the top and bottom of all four interstage openings.



13

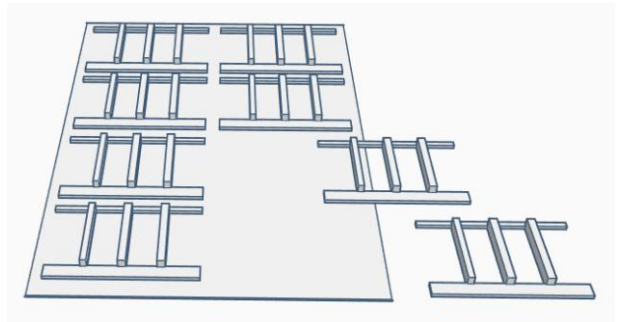
Using an emery board or fine toothed file carefully file each interstage window frame smooth.

File smooth



14

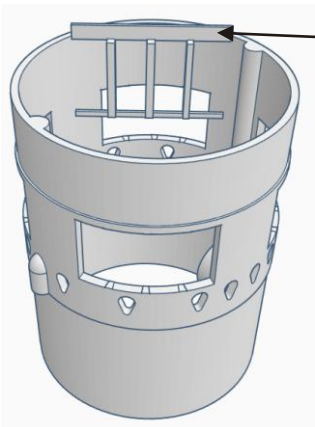
Find the interstage window frames in the parts bag. We provide you with two complete sets in case you damage any during installation or flight. Carefully remove four sets by flexing the raft they are printed on. If they are stubborn you can slide an exacto knife under them to help.



15

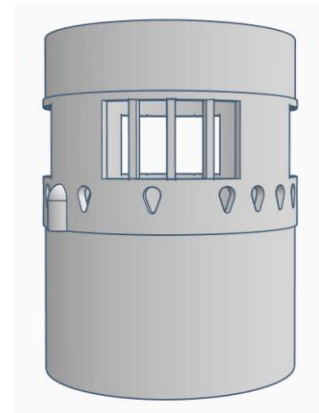
Test fit each window frame section into place from inside the top of the interstage as shown. Sand the top and bottom of the interstage opening until a good fit is obtained.

Wider edge is positioned at the top.



16

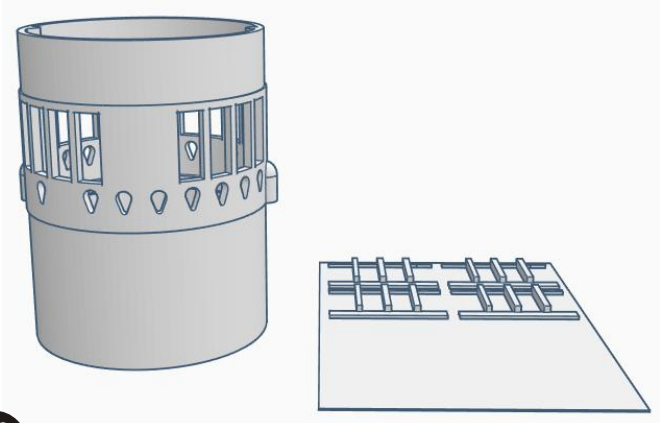
When a good fit has been achieved center the frame in the opening and superglue it in place from the inside of the interstage. Allow the superglue to wick under the top and bottom edges of the frame then wipe the excess glue from the outside of the part.



# 1/46th Scale Titan II Missile Builders Kit

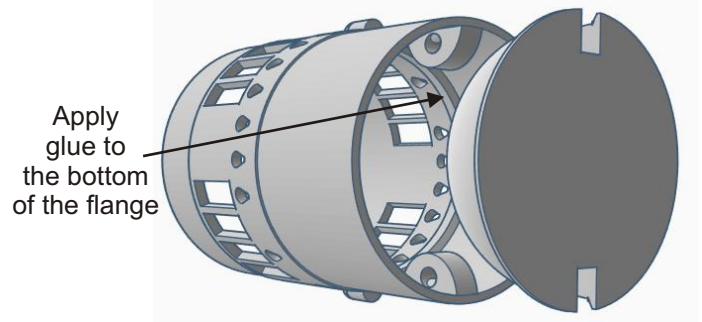
17

Repeat steps 16 and 17 until all window frames are installed. You should have four extra window frames left as spares.



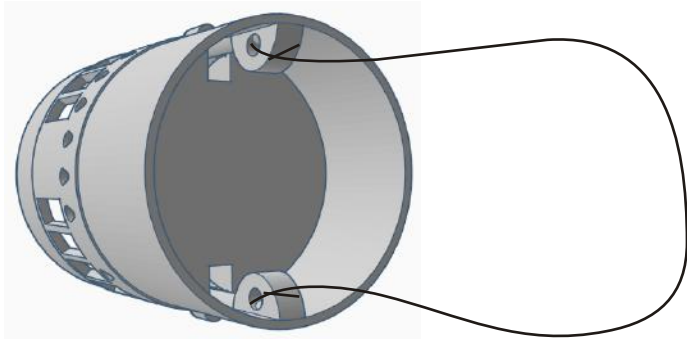
18

Apply a bead of medium CA to the underside of the attachment flange inside the interstage. Slide the tank dome into position from the bottom of the interstage and hold in position until dry.



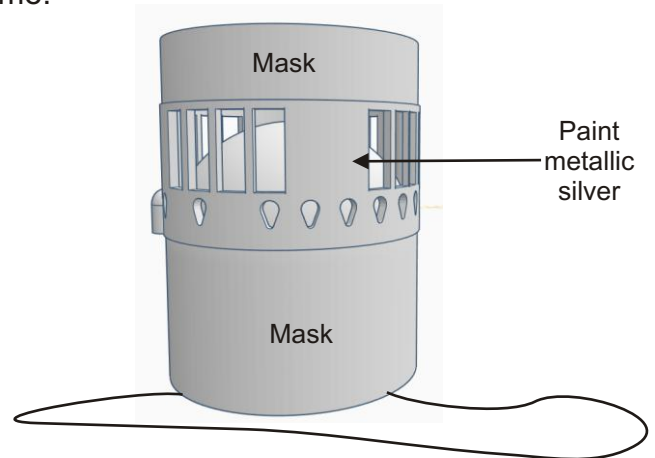
19

Attach a piece of Kevlar cord in a loop to the recovery attachment points. After you tie the cord make sure to place a drop of super glue on each knot to prevent the cord from accidental detachment.



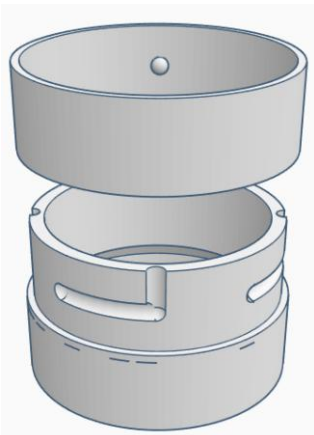
20

Mask off both exterior shoulder areas and paint the interstage metallic silver including the interior walls and tank dome.



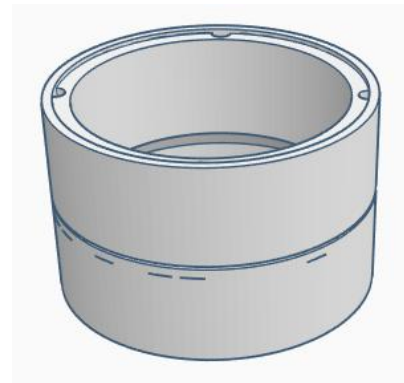
21

Locate the second stage bayonet rings. Put the two parts together then open and close the bayonet halves a few times to loosen up the action of the catch.



22

Once the bayonet action is smooth set the parts aside and prepare to cut your BT-80 tubes to length.



# 1/46th Scale Gemini Titan Builders Kit

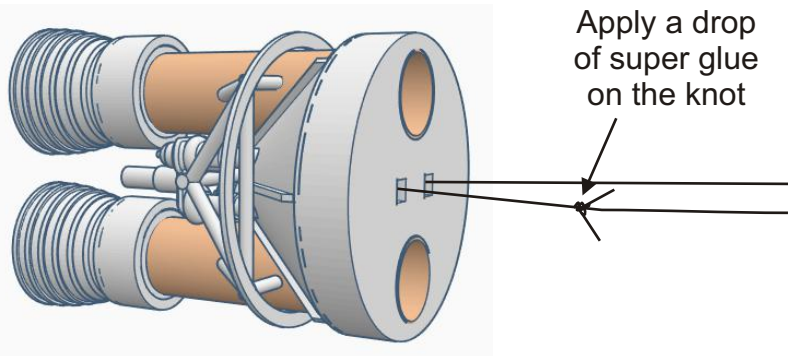
23

Cut three pieces of BT-80 body tube to the following lengths:



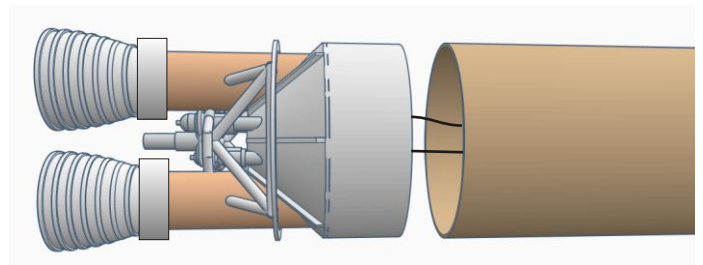
24

Tie the remaining piece of Kevlar through the motor base attachment point. Again apply a drop of super glue to the knot.



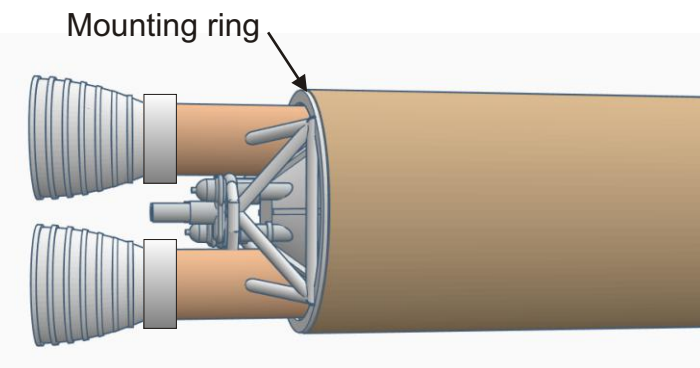
25

Test fit, sand if needed, then glue the 314mm long section of BT-80 body tube as shown.



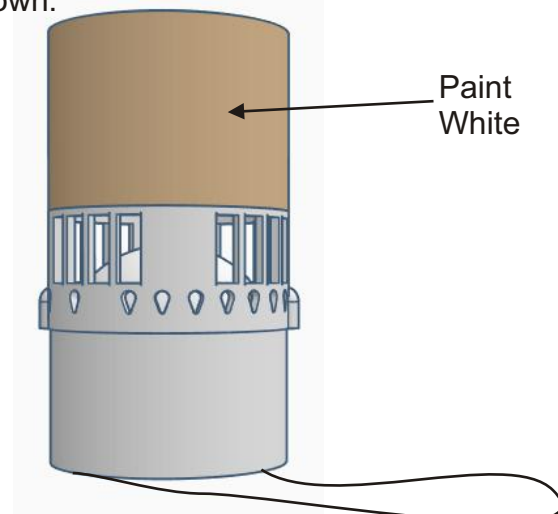
26

The engine assembly should be glued so that the turbo-pump mounting ring is flush against the end of the body tube.



27

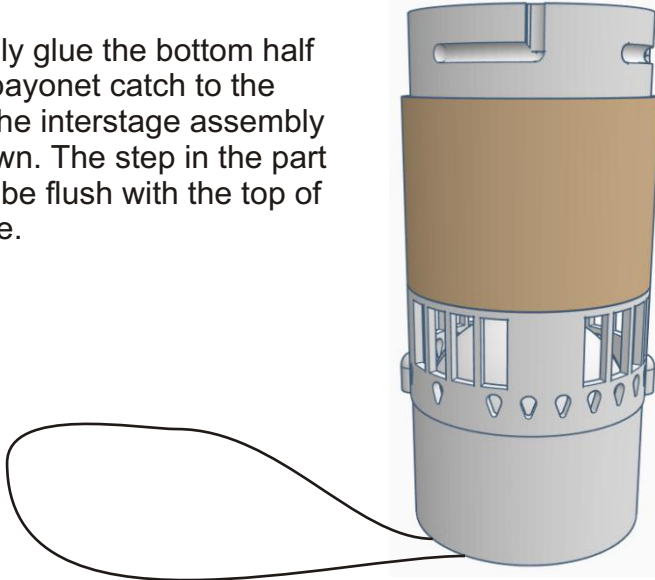
Paint the body tube section semi-gloss white. When dry glue the 49mm long section of BT-80 to the top of the interstage as shown.



# 1/46th Scale Titan II Missile Builders Kit

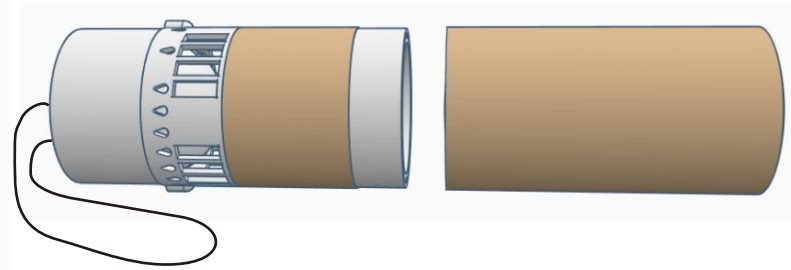
28

Carefully glue the bottom half of the bayonet catch to the top of the interstage assembly as shown. The step in the part should be flush with the top of the tube.



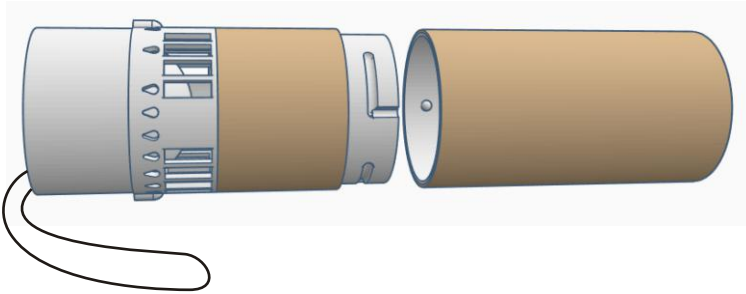
29

When dry, attach the top half of the bayonet catch to the interstage assembly. Test fit the top of the bayonet into the bottom of the second stage 111 mm long tube. Sand if needed for a good fit.



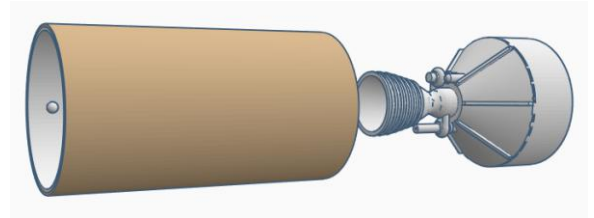
30

Remove the assembly and apply super glue gel in the bottom of the second stage tube. Quickly insert the interstage assembly until the tube ends touch. While applying pressure to the upper bayonet catch through the tube, twist and remove the interstage assembly without moving the upper catch.



31

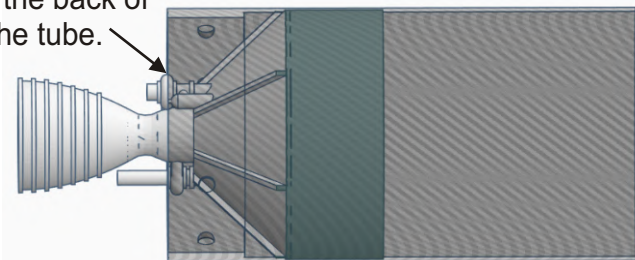
When the upper bayonet catch is dry in the second stage body tube test fit the display motor assembly in the tube. Sand if needed.



32

Carefully glue the second stage motor assembly into the tube as shown in the cutaway image below. Note that the part must be glued so that the outer turbo-pump is even with the back of the tube. **If you glue the display motor against the bayonet ring the lower bayonet ring will not fit correctly!**

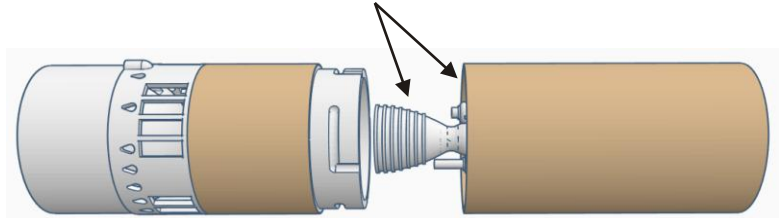
This turbo-pump must be even with the back of the tube.



33

Allow the second stage tube and display motor to dry then spray paint the second stage motor assembly and the inside of the rear of the tube with an aluminum paint.

Spray the engine bell and rear end of the tube bright aluminum

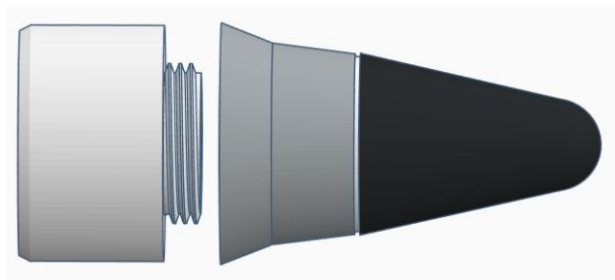




# 1/46th Scale Titan II Missile Builders Kit

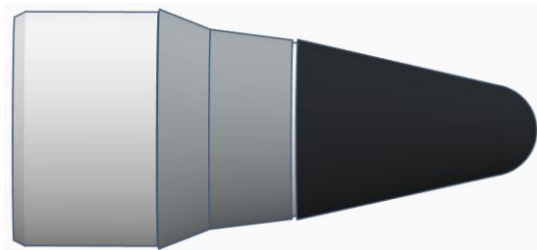
34

Locate the top parts of the Titan missile nose cone. Sand and prime the parts as needed (test fit the shoulder and sand if needed but do not prime or paint the shoulder). Paint the top of the nose cone black and the lower part aluminum..



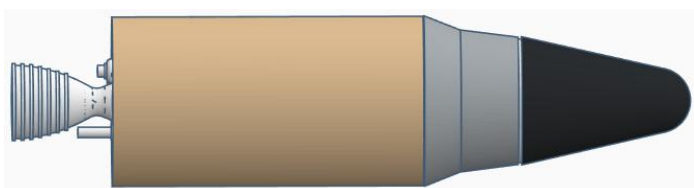
35

When dry screw the shoulder to the nose cone as shown below.



36

Slide the capsule assembly on top of the second stage body tube **but do not glue!**



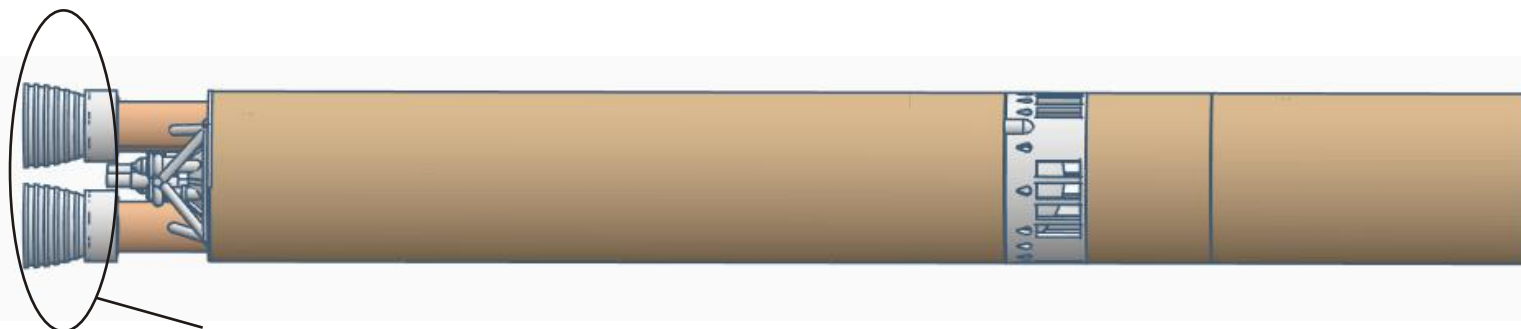
37

You have now completed the major subassemblies of the model as shown layed out below. Now we'll move on to painting the model and the installation of the body wraps.



38

Remove the nose cone from the model and mask off the two motor bells so that they will not be painted in the following step. Carefully spray paint the remainder of the model using a high quality metallic aluminum paint and allow to dry. Give the model three even coats of paint allowing ample drying time between coats.



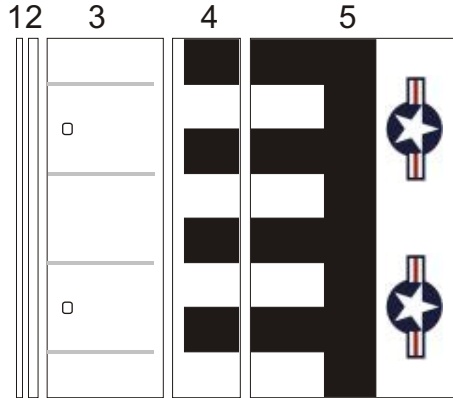
Mask off the entire motor bell screw on retainer then leave in place on the model to prevent paint from covering the male threads glued on the motor tubes.



# 1/46th Scale Titan II Missile Builders Kit

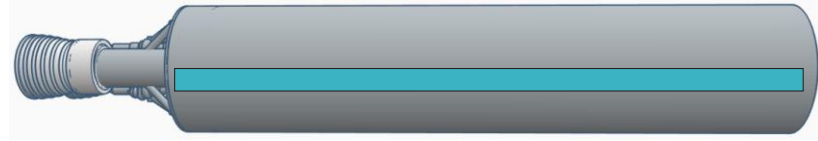
39

Using a sharp exacto knife and a steel ruler carefully cut out the body wrap decals just inside of the edge lines. There are five panels..



40

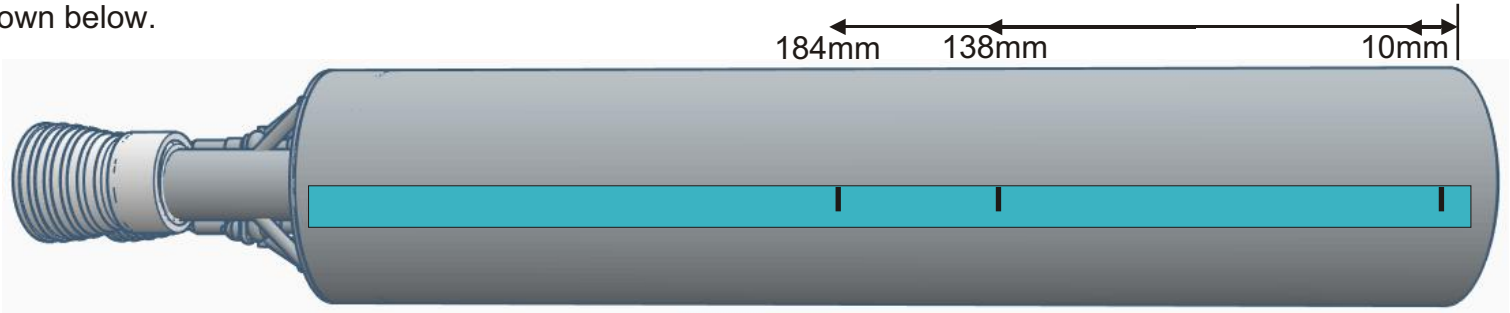
Using a thin piece of blue painters tape, mark a starting center line on one side of the first stage. The tape should be aligned as shown below.



Top edge of blue painters tape is on the centerline of the side of the first stage as shown

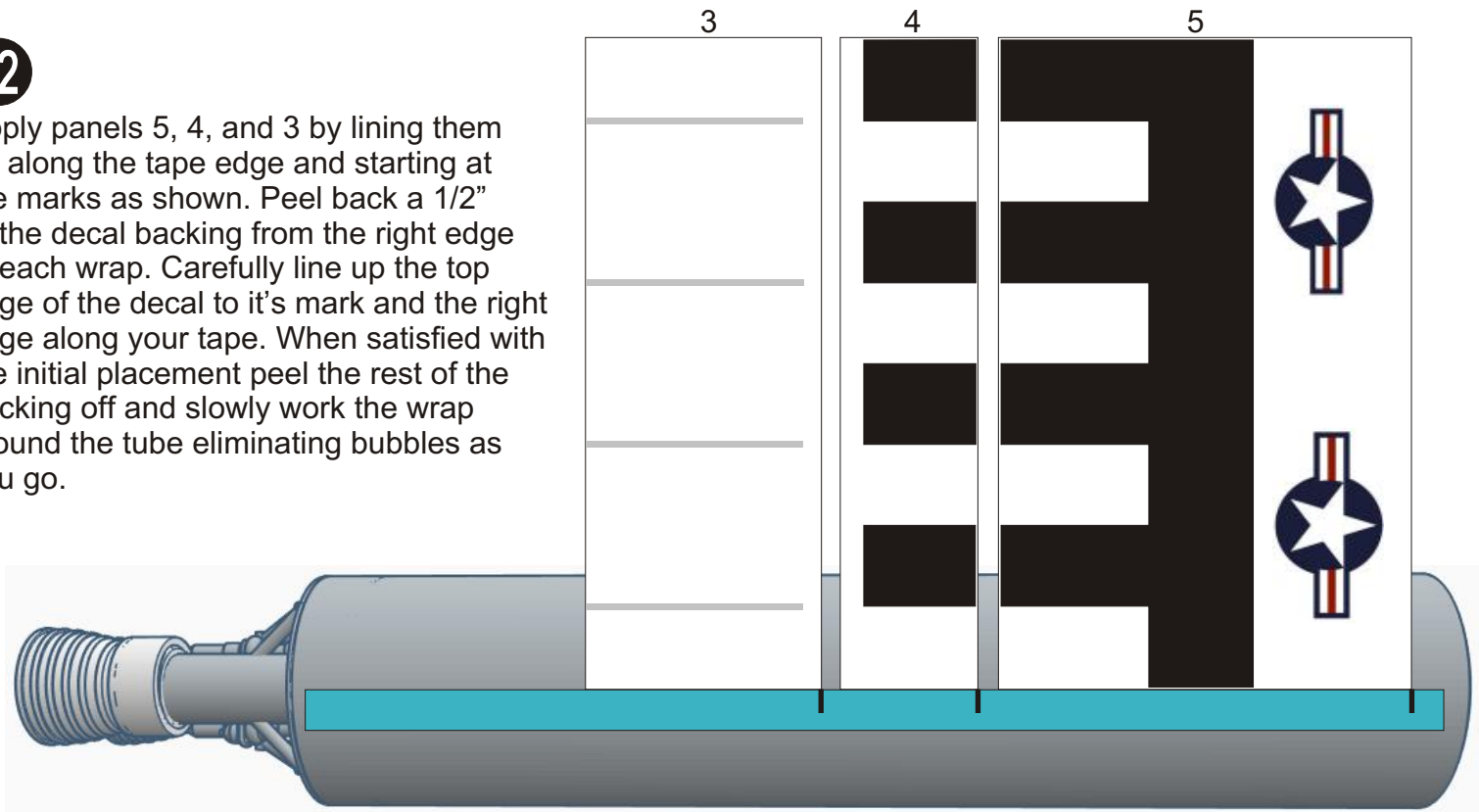
41

Mark the edge of the painters tape with the starting point location for the first stage decal wrap panels as shown below.



42

Apply panels 5, 4, and 3 by lining them up along the tape edge and starting at the marks as shown. Peel back a 1/2" of the decal backing from the right edge of each wrap. Carefully line up the top edge of the decal to it's mark and the right edge along your tape. When satisfied with the initial placement peel the rest of the backing off and slowly work the wrap around the tube eliminating bubbles as you go.



# 1/46th Scale Titan II Missile Builders Kit

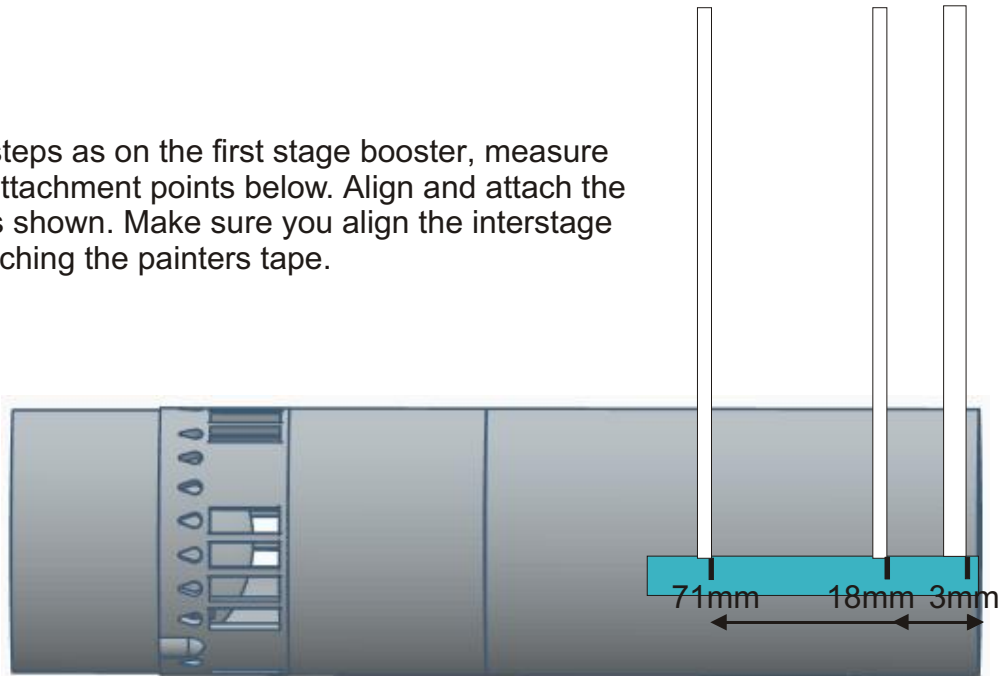
43

The first stage booster after the body wraps are completed.



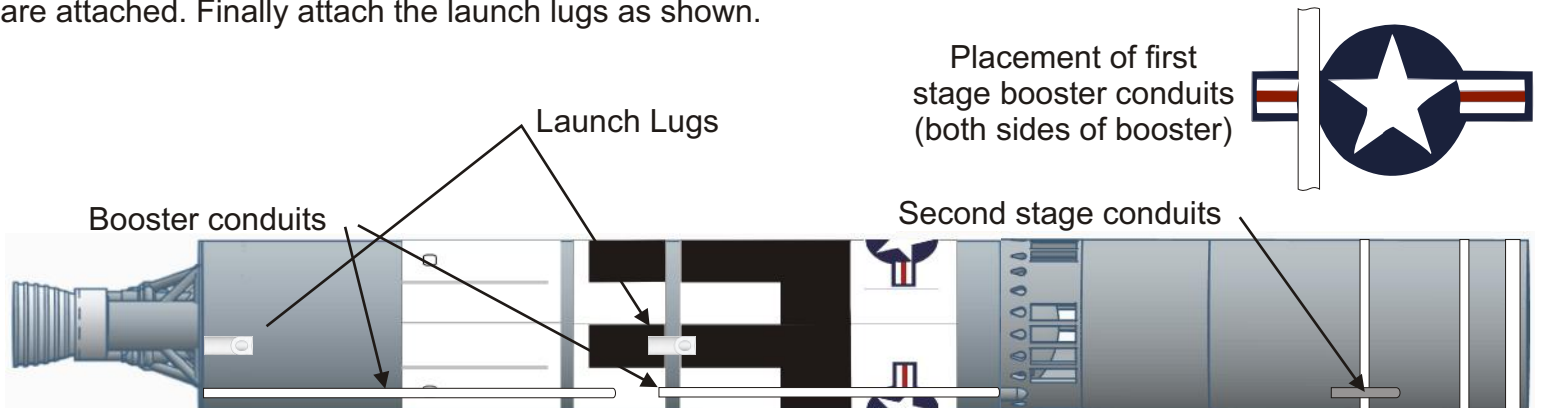
44

Following the same steps as on the first stage booster, measure and mark the decal attachment points below. Align and attach the three white stripes as shown. Make sure you align the interstage as shown before attaching the painters tape.



45

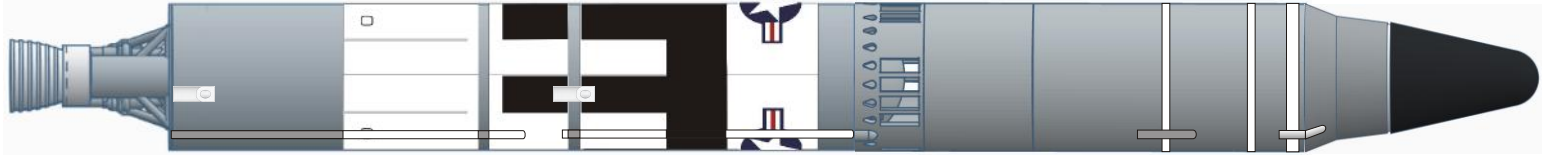
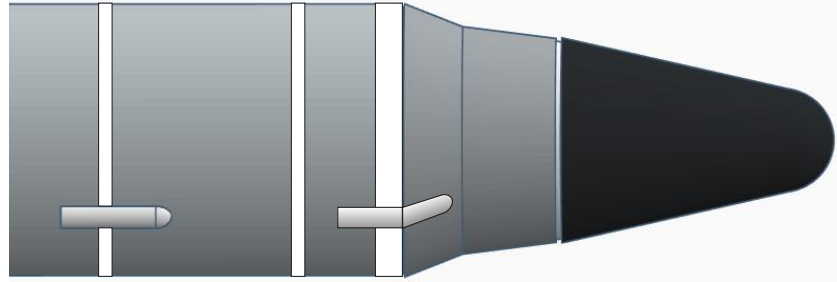
Attach the body conduits to the airframe after painting them to match the body wrap colors where they are attached. The conduits on the first stage booster should be located and aligned so that they are attached directly over the left side of each star chevron as shown. Once the first stage booster conduits are attached the interstage and second stage are rotated to match the conduit end points and the second stage conduits are attached. Finally attach the launch lugs as shown.



# 1/46th Scale Titan II Missile Builders Kit

46

Cut and fit the last conduit piece as shown to the right. Rounded end to the top, one side of the vehicle only. Do not glue the nose cone in place yet. Paint it the same aluminum color as the airframe.



Go to the last page of these instructions for placement and application of the US AIR FORCE decal.

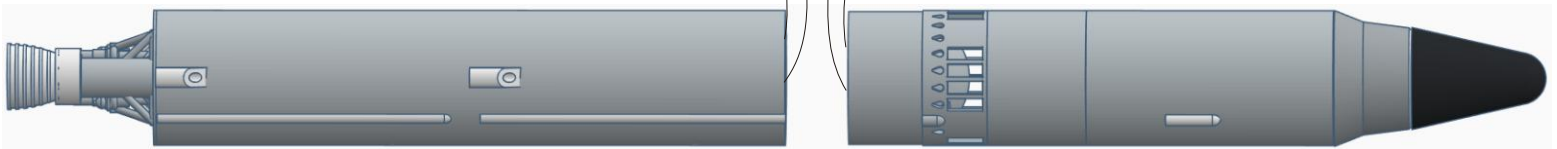
47

Attach shock cords and chutes as shown:

Attach shock cord to Kevlar loop then attach 30" chute to shock cord

Kevlar loops

Attach shock cord to Kevlar loop then attach 30" chute to shock cord



48

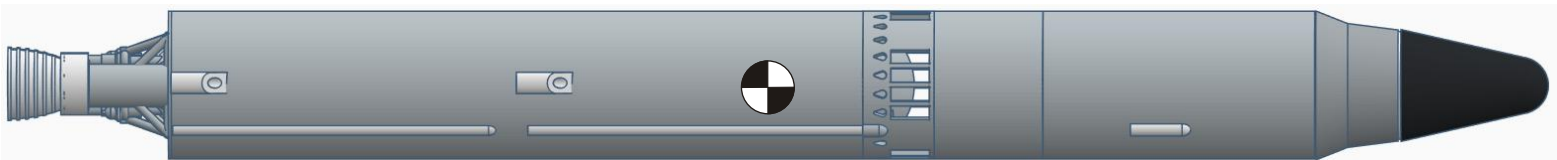
**IMPORTANT!**

**IMPORTANT!**

**IMPORTANT!**

Put two Estes C6-7 rocket motors in the model, add recovery wadding and both chutes. Check the balance point of the model (CG or center of gravity). It should be very close to balancing at the recommended CG point. If the model balances behind the required CG add clay to the space in the base of the Gemini capsule where the shoulder attaches until the CG is correct. Glue the shoulder in place then when dry glue the capsule in place as shown (note the capsules windows should be parallel to the plane of the motors).

14.25 inches

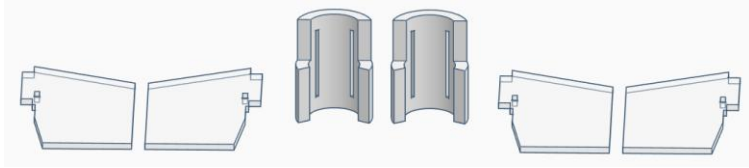


**Failure to adjust the models C.G. to the position shown will result in a unstable flight that could injure someone, damage personal property and damage or destroy your model.**

# 1/46th Scale Titan II Missile Builders Kit

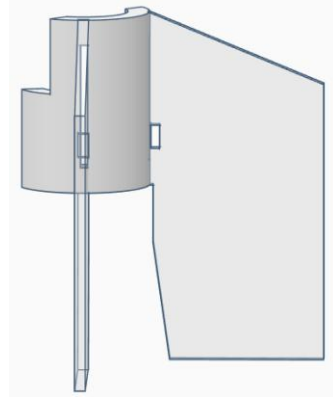
49

Locate the clear fins and the 3D printed fin clips. Sand the outside of the clips then prime and paint silver so that match the motor assembly.



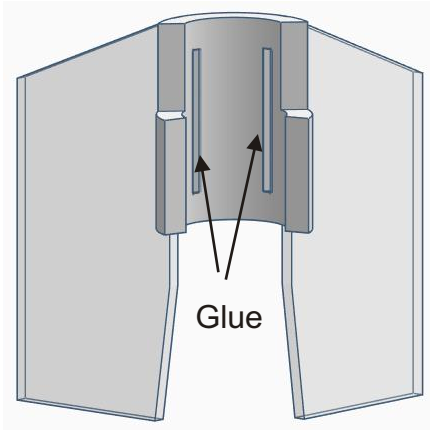
50

When dry, test fit the fins into the slots in the clips. File the slots if needed with an emery board.



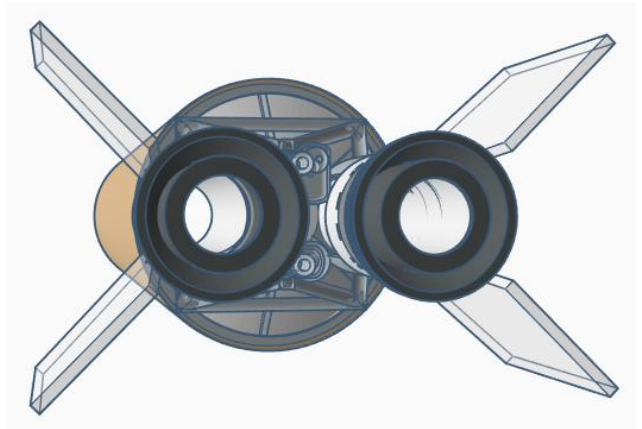
51

With the fins in place use super glue from the back side of the clips to wick into the slots and secure the fins.



52

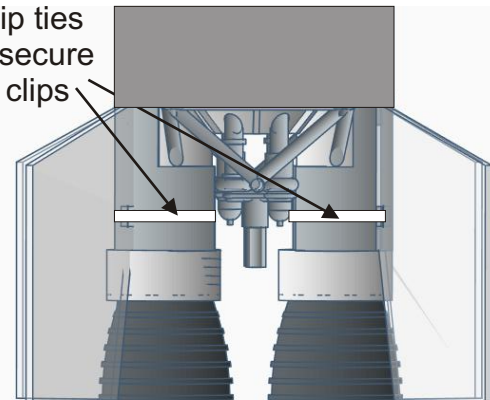
When the glue is dry test fit the clips in place. Make sure you first insert two motors in place in order to prevent the motor tubes from collapse.



53

When used during flight use small zip ties to secure the clips in place on the motor tubes as shown. The zip ties pass through the small square holes in the fins.

Small zip ties used to secure the fin clips



## Flight Recommendations:

- 1) Use small zip ties to attach the fin clips.
- 2) Make sure your ignition system can reliably ignite a cluster of two motors.
- 3) After placing recovery wadding in the booster pack the second stage chute below the first stage chute to insure both chutes eject.
- 4) Only use a 3/16 inch rod or 1 inch rail.

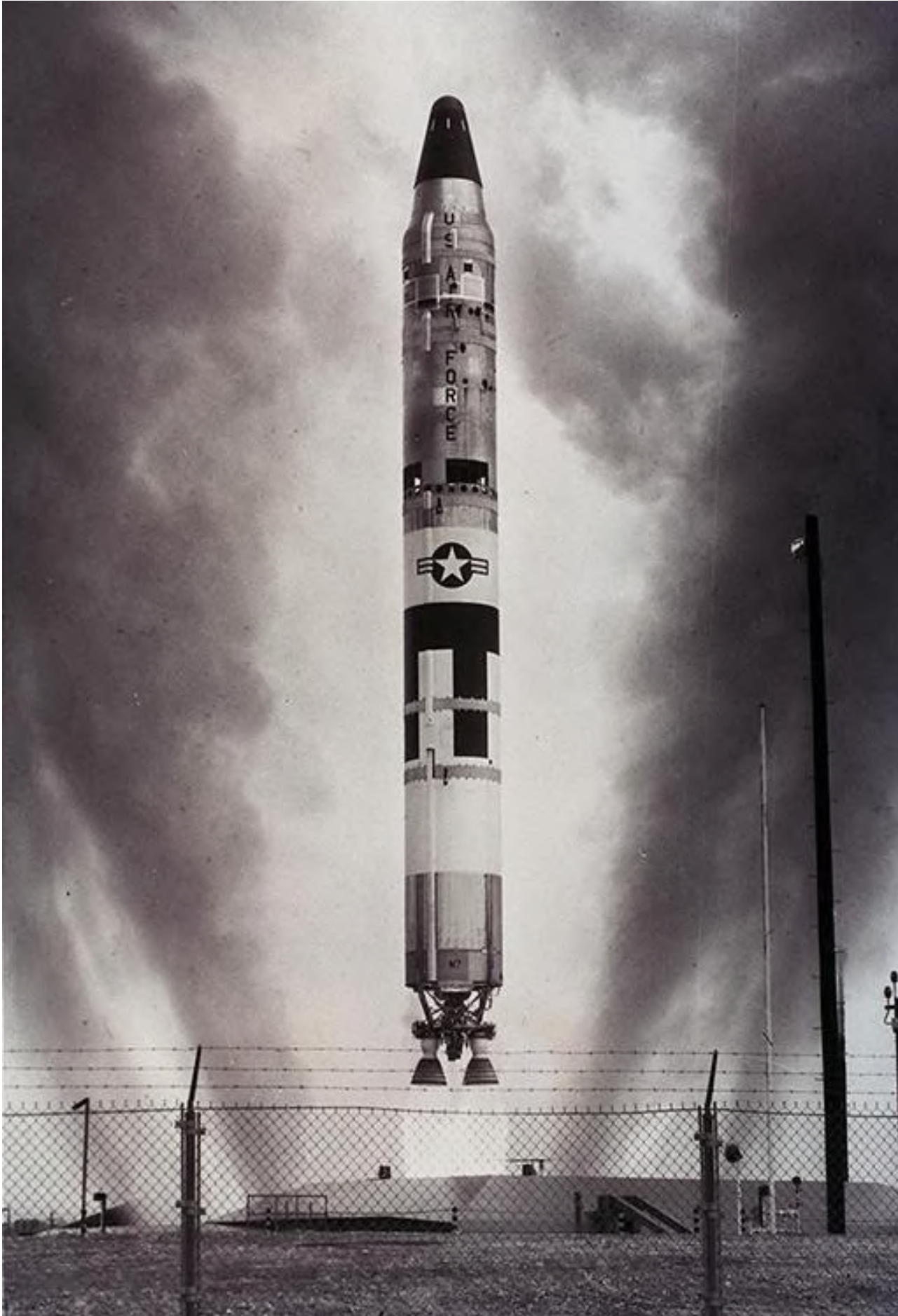
## Recommended Motors

2 x Estes Super C5-3	(Altitude - 298 feet)
2 x Quest Q-Jet C12-4	(Altitude - 335 feet)
2 x Quest Q-Jet D16-6	(Altitude - 455 feet)
2 x AeroTech single use D10-5	(Altitude - 769 feet)

Please follow all NAR and locale regulations and fly safe!



# 1/46th Scale Titan II Missile Builders Kit



Apply the US AIR FORCE decals on both sides of the model as shown. The "U" is on the angled base of the cone and the rest of the letters are along the side of the second stage airframe. The decals should be applied along a line centered on the first stage star chevrons.

Applying cut vinyl decals is easy. First cut out each decal strip. Rub the top of each strip using the edge of a credit card. Carefully peel the top tape layer of the decal strip off, taking the lettering off with the tape. Make a small bowl of soapy water (two drops of dish soap) and dip your finger into the soapy water. Rub the back side of the lettering with the soapy water. Position the decal on the model (the soapy water will allow the decal to be moved into its final position). Use the edge of a credit card to apply pressure to the top of the decal and squeeze the water from under the decal. Allow the decal to dry. Finally carefully peel off the top application tape layer.