

Instruction Manual: Space Launch System

Third Stage

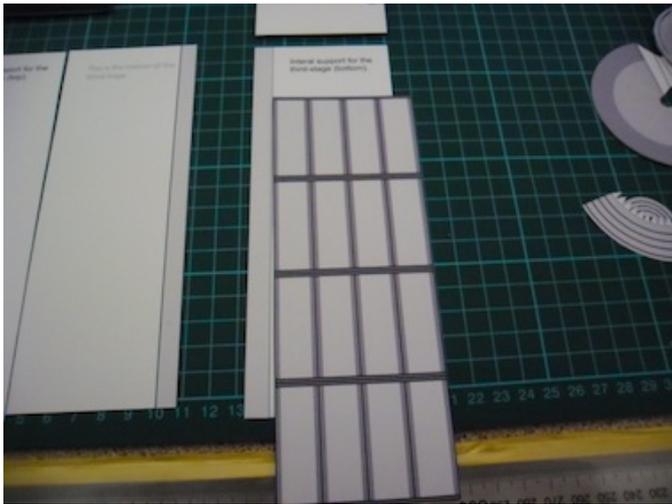
Designer's comments: This model has been designed without the benefit of engineering blueprints. Only publically available conceptual diagrams and illustrations have been used. As a consequence of this, a certain degree of 'artistic licence' has been used to create a model that exhibits at least a modicum of realism.

The assembly of a model should follow a procedure that vaguely resembles the method for cooking a meal; i.e.

- Prepare a place where you can work, without distractions.
- Get all of your equipment (utensils) out and ready.
- Get all of your parts for the model (ingredients) printed, cut out and ready to start.
- Lastly, try to have a location for your model prepared in advance, so that when it is finished, you will know where to place it.



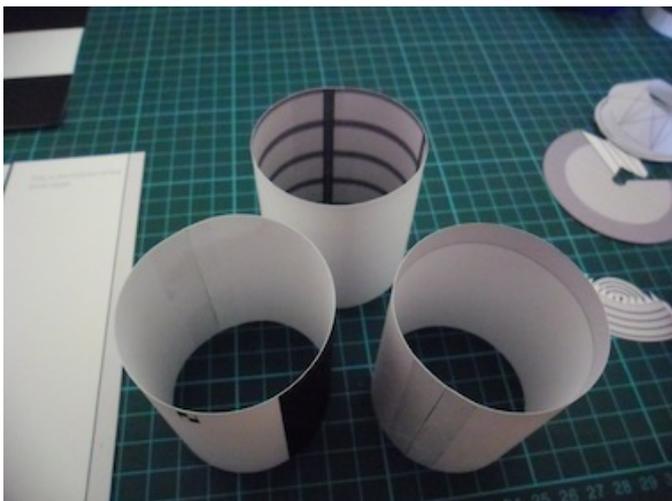
1. These are the parts that you will need to commence the assembly of the third stage. The pieces necessary for the third stage are presented in this image already cut out. The two black-and-white strips at the top of the picture are the exterior parts. The three [mostly] white strips at the bottom of the picture are the internal reinforcers. The rectangular striped part (on the right) is the internal 'bracing' at the base of the third stage.



2. The interior section act like a giant ‘glue tab’—eliminating the need for a separate glue tab. The striped internal ‘bracing’ is also glued to the interior of the support part.

A small strip of grey is visible to the left-side of the internal support (see image above). This grey strip should not be glued over, only the white portion should be glued. When you have finished gluing, none of the white portions of the various internal parts should remain visible.

You should be able to see how a small section of the ‘striped bracing’ overhangs the internal support (see above image). This small overhang, only a few millimetres long, is sufficient to act as a connector between the third stage and the SLS core stage.



3. Alternatively, if you prefer to use sticky tape, the three strips can be taped together to make three parts.

These are the external cylinder (left), visible internal cylinder (middle) and the concealed internal cylinder (right).



4. If using sticky-tape, gently push the internal cylinder inside the exterior cylinder (see above).



5. Repeat the procedure with the ‘bracing’ – but push it in from the base first (not from the top).



6. This is the exterior, after being glued. I made a mistake... the small rectangle (seen at the top of the cylinder in the image-above) should be at the base of the cylinder; i.e. the exterior is upside down.



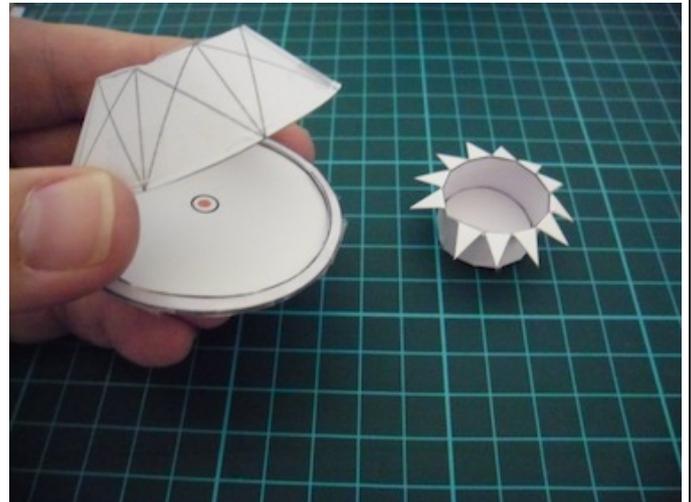
7. This is the completed lower section of the third stage placed on top of the SLS core-stage..



8. The internal supports and exterior of the upper section. Glue these together (like giant glue tabs).



9. The lower and upper section of the third stage. The small rectangle on the lower section should be towards the base (I made a mistake and had it around the wrong way – but I fixed it later).



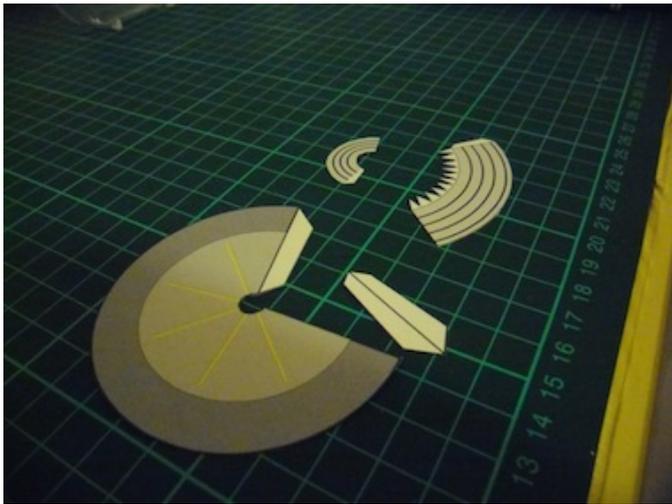
10. The payload support scaffolding consists of a truncated cone, three circles and a cylinder. When cut out, they attach as shown above.



11. The finished payload support scaffolding. This has been done with sticky-tape.



12. You must not attach the payload scaffolding (yet). If you wish to permanently attach the scaffolding, you can glue it in and then glue in the band (the rectangular strip seen above).



13. These are the parts to create the thruster-support-base and the J2 rocket engine.



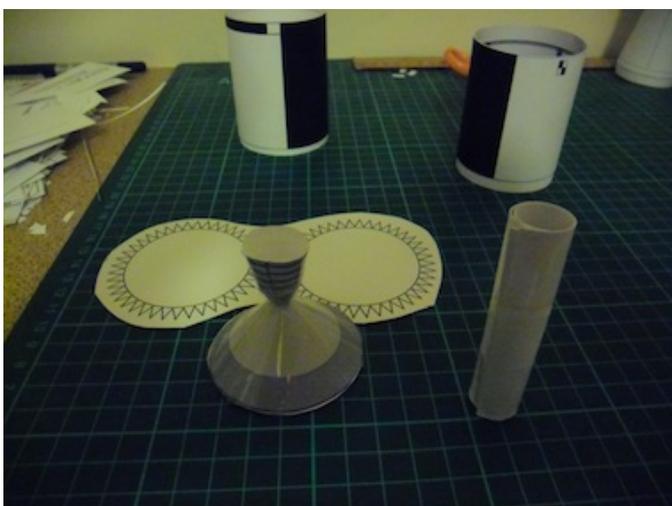
16. The optional support cylinder will act as a 'skeleton' to keep the thruster-base in position.



14. Here is the thruster-base and rocket engine completed. You have a choice of two different tabs to glue the thruster base (whichever is less visible).



17. Insert the thruster-base from the top and push it until it is only 1-2mm from the base (see above image). Glue into position.



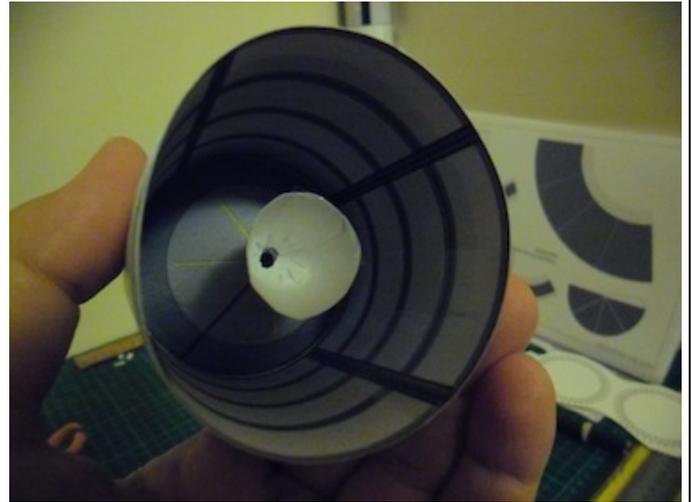
15. Two internal support rings (circles) are provided for a 'base' for the thruster-base. **Optional:** take a piece of scrap paper and roll it to create a support.



18. The top of the third stage (minus the payload support scaffolding). This shows how the [optional] internal support cylinder could be positioned.



19. You should, by this time, have two complete cylinders – third stage: upper and lower sections.



22. The interior of the third stage base, showing how the engine is nestled in the alcove.



20. The upper section should easily (maybe tightly) fit on top of the lower section.



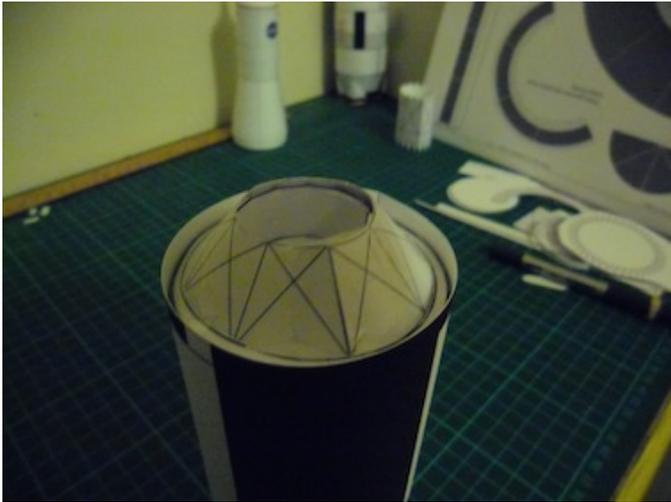
23. You should now be able to attach the payload support scaffolding.



21. The exterior of the upper stage with the two sections connected. Notice how the lower section has been fixed (the small rectangle at the base).



24. This is the payload support scaffolding (which would 'carry' the mass of the payload and transfer it (the physical stresses) into the third stage).



25. The payload support scaffolding placed into position. It can be glued or not (for later removal).



28. Your finished third stage (and SLS core stage) have been designed so that they can be 'dismantled' (separated) and reattached to create different spacecraft / vehicle combinations. Examples are:

- Cargo booster / lunar mission.
- CEV booster / near-Earth asteroid mission.
- Large space station (Skylab-sized) booster.



26. The third stage can then be placed on top of the core-stage of the SLS vehicle.

Examine/read other manuals that I have created, to see what other vehicles and spacecraft are available to enable you to make use of this third stage model.



27. The above image shows how the third stage should fit (snugly) onto the core-stage.