

By Gary Reign**General 3D Printing and Assembly Instructions**

Introduction: The model described below is my interpretation of the launch sled from the 1960's era Gerry Anderson TV Show, *Fireball XL5*. I based my version after viewing many photos and videos of the show as well as other modeler's versions of the sled. It only represents an approximation of the original. It is not intended to be a true scale model as detailed reference material is not readily available. The wheels on it are also not functional as it is intended solely as a display piece. I hope you will enjoy it for what it is.

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The Fireball XL5 Launch Sled model was designed entirely by me in TinkerCAD, a free online, web-based 3D modeling program. The resulting designs were exported from TinkerCAD to '.stl' files for printing. You may modify any of these files to change the look, design, size, etc. of these objects as part of your assembly. My licensing requirement is that you do not use these files, even if modified by you, to create a kit or built-up model for sale to the public or upload them to any 3D sites (i.e. Thingiverse, etc.) without contacting me first to determine any licensing fees and crediting arrangements. I also do not take any responsibility or liability for how these files are used or their suitability for any purpose. Use them at your own risk.

The stl files are available at <https://cults3d.com/en/3d-model/art/fireball-xl5-launch-sled> for a nominal charge.

Scaling: This model was designed to be printed at 100% scaling in scale with my 28" 3D printed Fireball XL5 model. If all the parts are printed at 100% scale, the finished model should fit a 26" to 30" length Fireball XL5 rocket. If your rocket is smaller or larger, use the scaling function of your slicer to enlarge or shrink the parts as necessary. Note that shrinking them smaller will result in a possible reduction in quality/structural strength depending on the type of printer you use. Printing at 100% will require a printer with a build area able to handle at least 110mm x 240mm otherwise you may have to cut some of the parts in two.

Layer Height: As is always the case with FDM printers, the smaller the layer height, the finer the results. However, reducing the layer height below .2mm increases the build time substantially. I have indicated some parts where I feel the smaller layer size is needed. For other parts use your own judgment.

Glues – I use a plastic adhesive which melts the parts together. It is called "Same Stuff" available from Micromark.com. You can also use CA adhesive or other plastic cements. Test first for best results.

Finishing – The finish you achieve for the parts largely depends on the quality of your printer. You may wish to paint some of the model in subsections, for example, the booster tubes should be painted before gluing them to the sled. You should print some test pieces to determine the appropriate settings to achieve the desired results. The instructions below include information on the printer settings I used for my FDM printer. (I also printed many of the detailed parts using a resin printer. See the appendix for more information on that.). Feel free to use whatever settings work best for you and your printer. Expect to need to use a good filler/primer paint to hide some of the layer lines if an FDM printer was used. Plastic putty is also a good for fixing any other larger printing flaws that may happen.

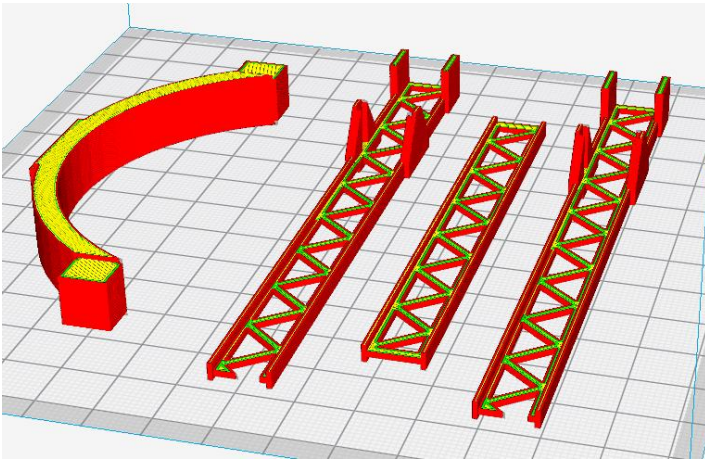
Parts List – A list, count and picture of all the .stl files for this project can be found at the end of this document.

(n) = number of pieces required to be printed.

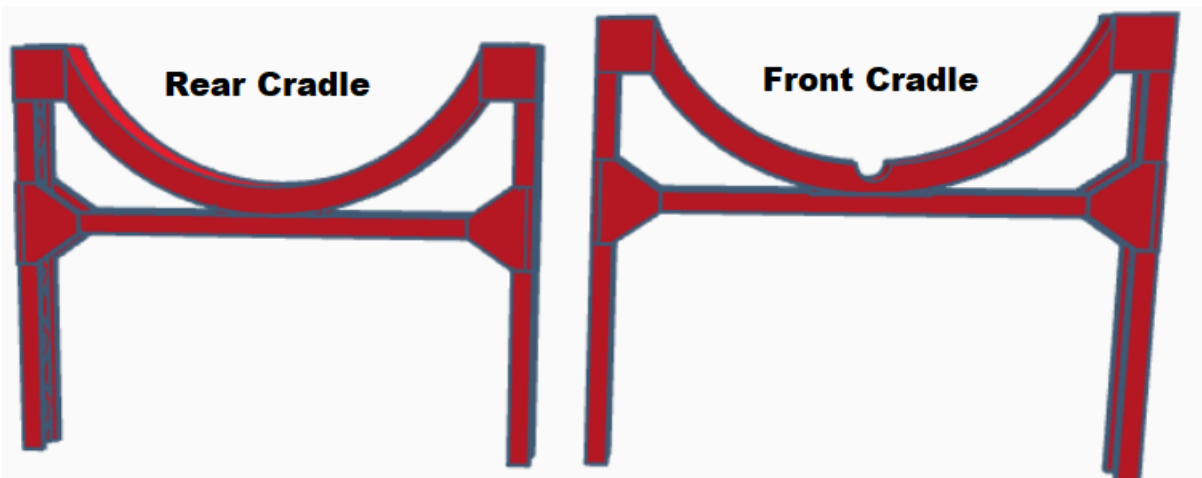
Rocket Holder or Cradle

Use the following settings for these pieces:

- ✓ sled curved rocket holder rear.stl (1)
- ✓ sled curved rocket holder front.stl (1)
- ✓ sled vertical holder beam.stl (4)
- ✓ sled horizontal holder beam.stl (2)
- ✓ End brace rear.stl (1) }
- ✓ End brace front.stl (1) } These will be used during final assembly later on.
- ✓ Middle brace.stl (1) }
- ✓ Infill: 100%
- ✓ Support: Yes (build-plate only required)
- ✓ Layer Height recommendation: 0.1 to 0.12 for best quality
- ✓ Position all beams flat on the print bed as shown (parts shown are only half those required – note the two different curved rocket cradle pieces)



Here are the pieces assembled into the two rocket holders or cradles. The fit of the horizontal girder into the slots on the two side girders is tight. Sand or file the ends of the girder so they fit snugly but do not bow the piece outward. The cradle with the cutout is for the front of the sled and is there to accommodate the bump on the bottom of the XL5 fuselage in that area. Also, the forward cradle should be higher to accommodate the different diameters of the XL5 where it sits on the cradles. You want the rocket to sit level on the cradle, not pointing up or down. You will adjust the length of the vertical beams by trimming them later in the instructions. **DO NOT GLUE THESE TOGETHER YET.** Put these aside until you complete the main body of the sled.

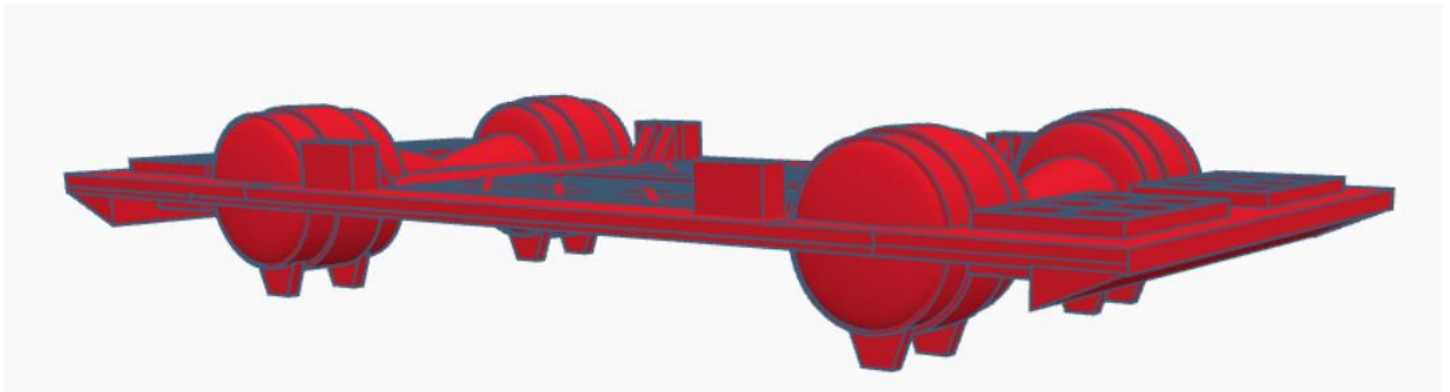


Main Body

Start by printing the top and bottom main pieces. The largest pieces are the sled top and bottom main pieces. Printing at 100% will require a printer with a build area able to handle at least 110mm x 240mm. If your printer is not that large, you can cut the parts in two using your slicer or 3D drawing program. Just stagger the location of the cuts so when the two halves are mated, the joints overlap to give the sled the necessary strength.

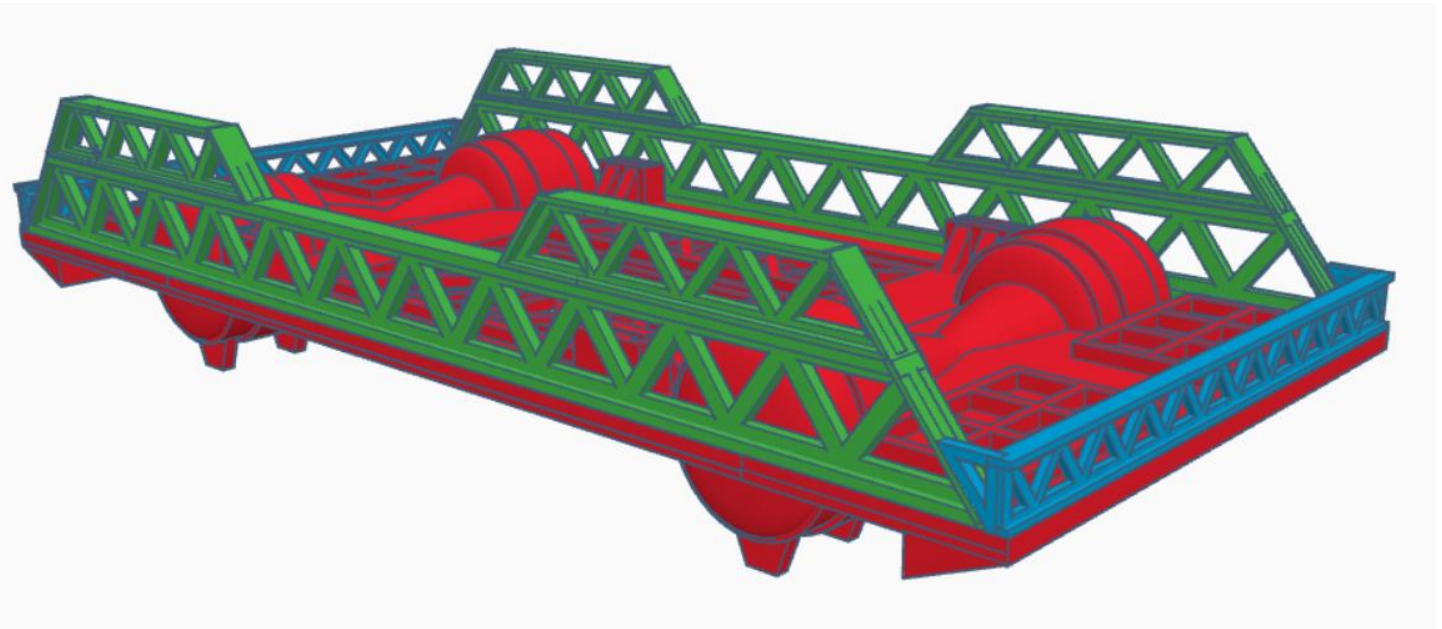
- ✓ Sled main top.stl (1)
- ✓ Sled main bottom.stl (1)
- ✓ Support: None required
- ✓ Infill: 25-30%
- ✓ Layer Height recommendation: 0.16 but for best quality 0.1 or 0.12 is recommended

After printing, the two pieces should line up, flat side together, and the ends should all meet. If this is not the case, you may have to adjust the scaling of one piece or use some sandpaper. Glue the two pieces together so they look like this:

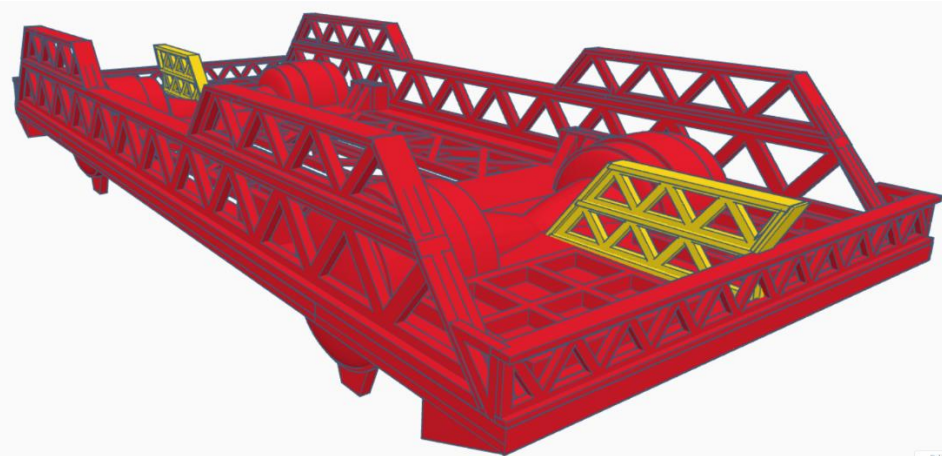


- ✓ Sled main side girder.stl (2)
- ✓ Sled middle end girder.stl (2)
- ✓ Sled forward panel.stl (2)
- ✓ Sled side plate.stl (2 – copied, 2 - mirrored)
- ✓ Sled forward girder.stl (2)
- ✓ Sled end trim.stl (2)
- ✓ End brace rear.stl (1)
- ✓ End brace front.stl (1)
- ✓ Infill: 100%
- ✓ Support: Yes (buildplate only)
- ✓ Layer Height recommendation: 0.12
- ✓ Position all beams flat on the print bed

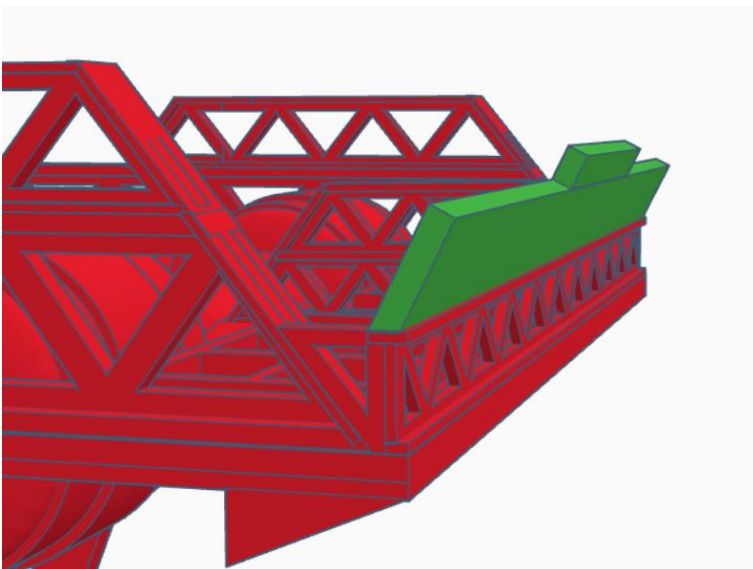
Now add the two main side girders (green) on the left and right. Position them equidistant between the ends. The forward girder (blue) can then be placed on each end and matched up to the side girders. All four pieces should be flush with the sides of the main body. If not, file or sand them until they do.



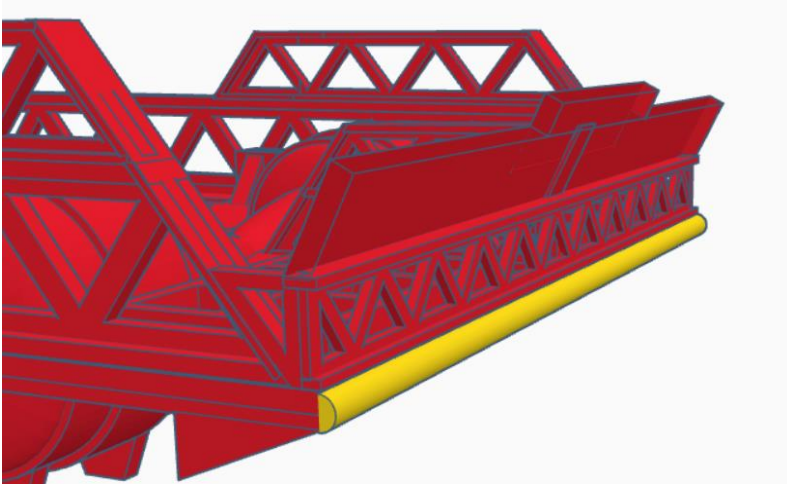
The two middle girders (yellow) can be added now. They should butt up and into the end girders.



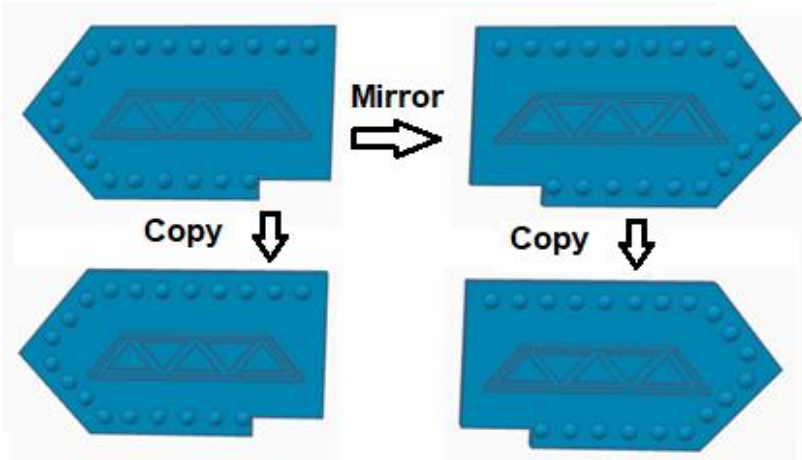
The forward panel (green) piece can now be placed on top of the end girder and butted up against the middle girder you just installed. Repeat this for the back side.



Finally add the end trim (yellow) to both ends.



For the side plates (blue), you need to make 4. One of them is a direct copy of the original. The other is a copy of the mirrored one. They should look like this when done printing.



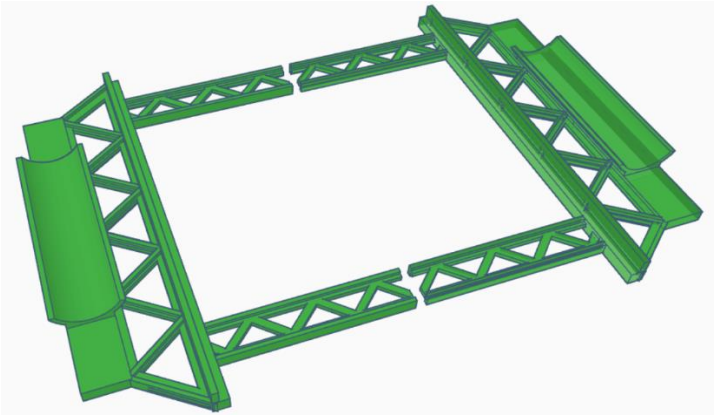
Install them as shown butting up against the side girder and matching the end angles. The notches at the bottom should clear the booster tube mounts in the next step. ***You should dry fit everything before gluing to make sure they clear.***



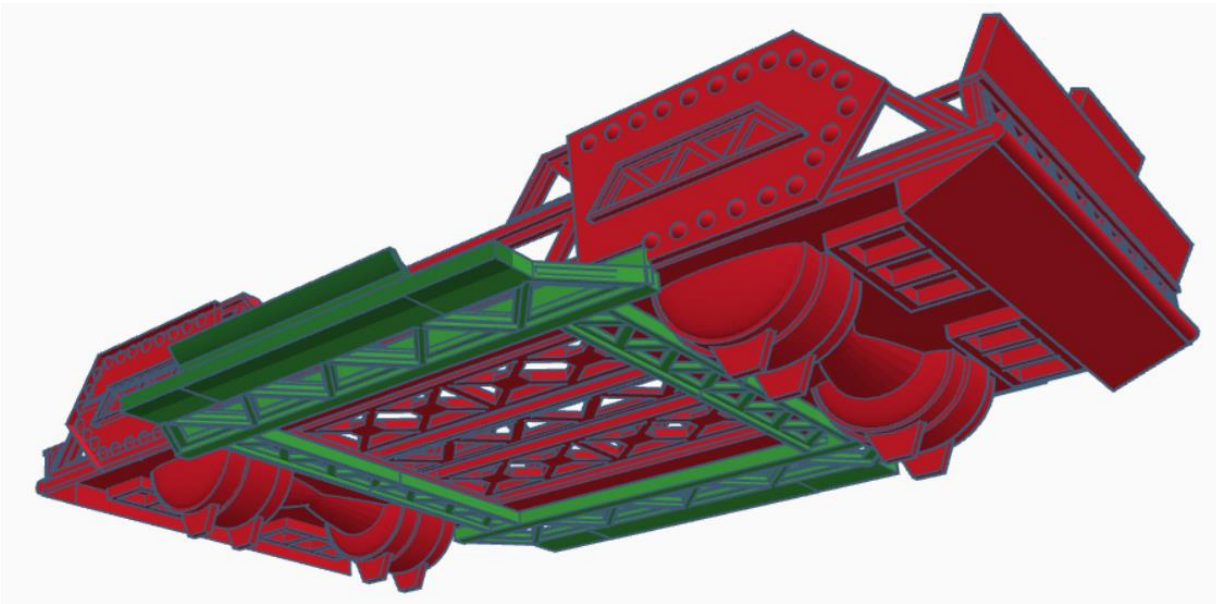
The main part of the sled is now complete. Next is mounting the booster rocket mounts.

- ✓ Sled booster holder.stl (2 – mirrored along the long axis so the girder diagonals line up)
- ✓ Outside sled booster holder.stl (2)
- ✓ New booster rocket tube.stl (2)
- ✓ Infill: 100% holder; 25%-30% for the rocket tubes
- ✓ Support: Maybe (depends on the orientation of the part you are printing)
- ✓ Layer Height recommendation: 0.12-.016
- ✓ The tubes can be printed either lying down or standing up. Whichever gives you the best results.

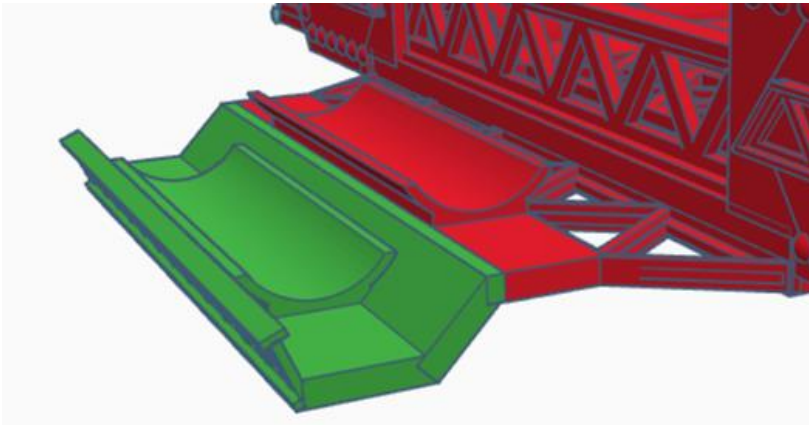
After printing two copies of the mount (one mirrored along the long axis so the girder diagonals line up), trim if necessary so they fit together tight across the bottom of the sled.



Mount the rocket holders underneath the sled directly in the center.

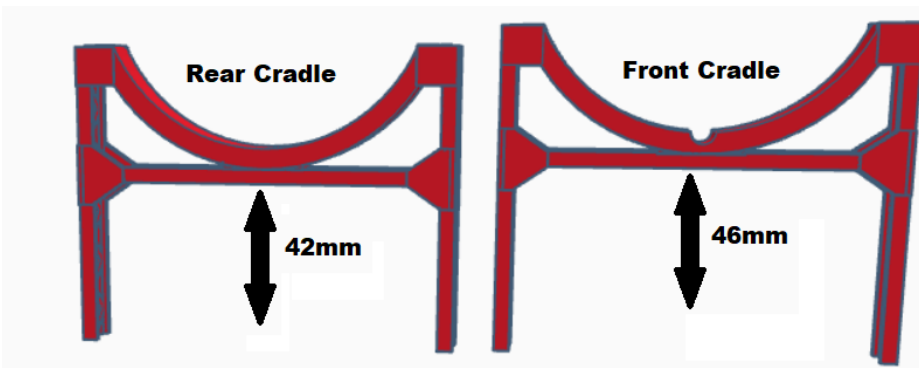
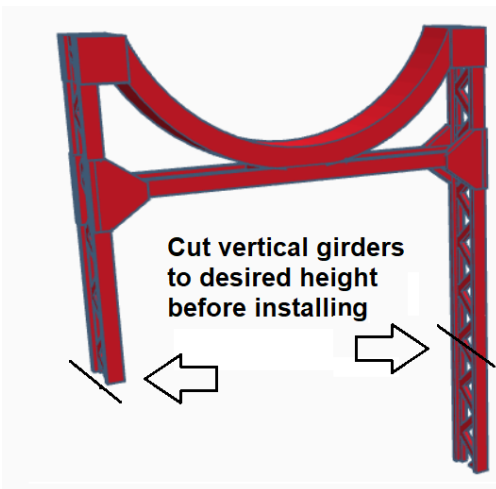


Then mount the outside rocket holders on both sides as shown below.

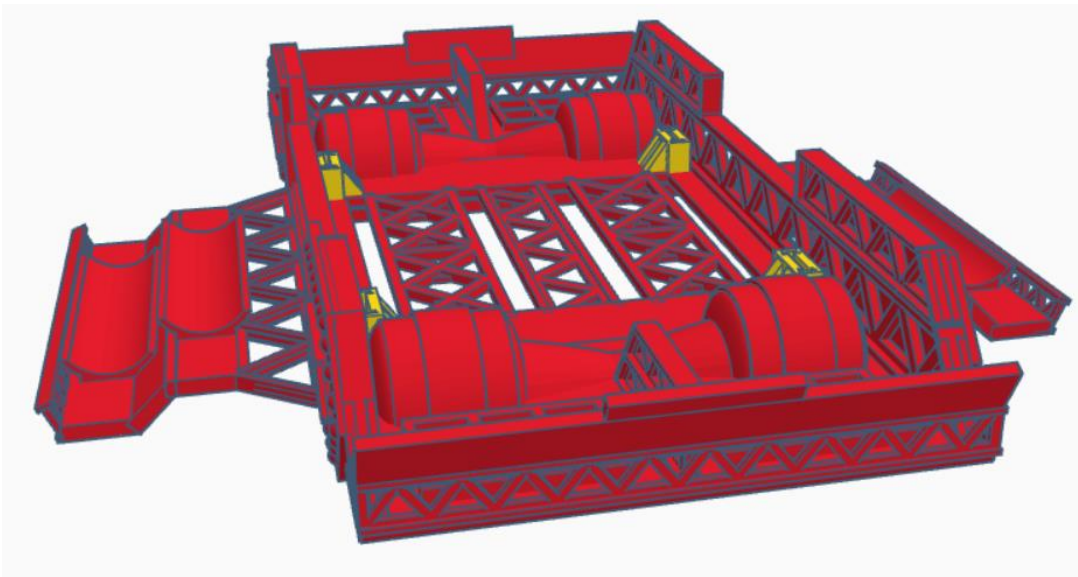


Main Rocket Cradle

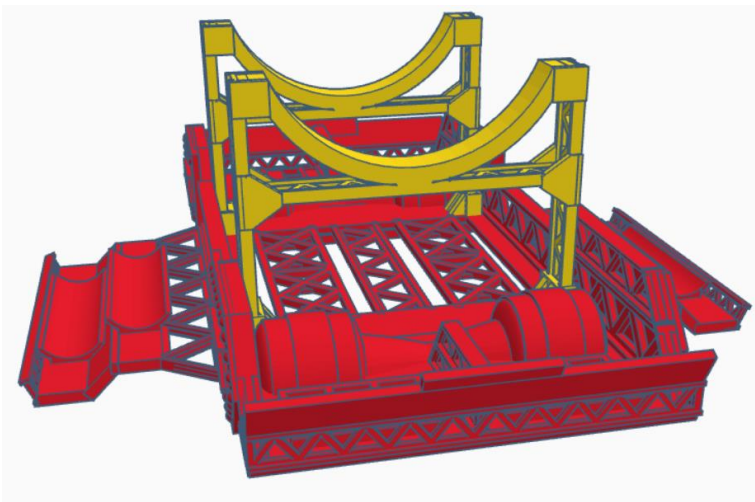
Take the main rocket cradles that you assembled earlier and **trim the vertical girders down to your preferred size**. **DO NOT** leave them at the height as printed as they will be too long. The front cradle should be about 3-4mm higher than the rear cradle when mounted to allow for the fuselage thickness where the XL5 sits on the cradle. Use your model to determine the correct height. You want the model sitting parallel to the launch rail when on the sled. It should not point up or down. In my model, the cradles were set so that the height from the floor of the sled to the bottom of the horizontal beams were 46mm and 42mm respectively for the front and rear pieces.



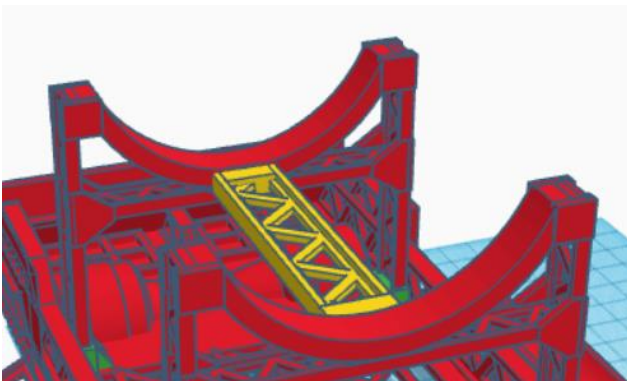
Insert them into the mounts on the top of the sled as shown in yellow below. Do not glue them in yet.



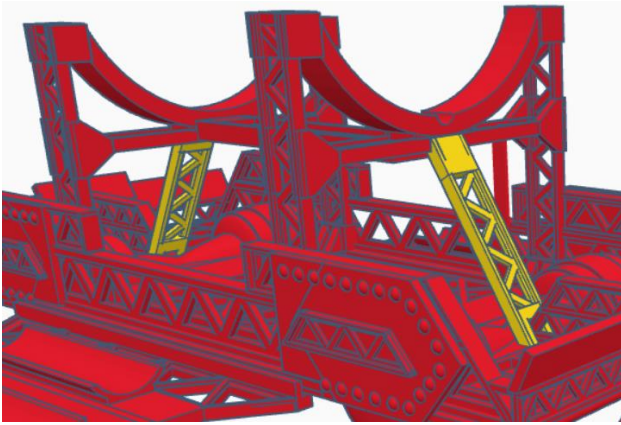
The result should look like this.



Trim to fit and add the horizontal middle brace between the two cradles. It will fit higher on the rear cradle than on the front due to the height difference. Just make sure it is level and not angled. Sand the piece so the two vertical girders are perpendicular to the sled and not bowed in or out.

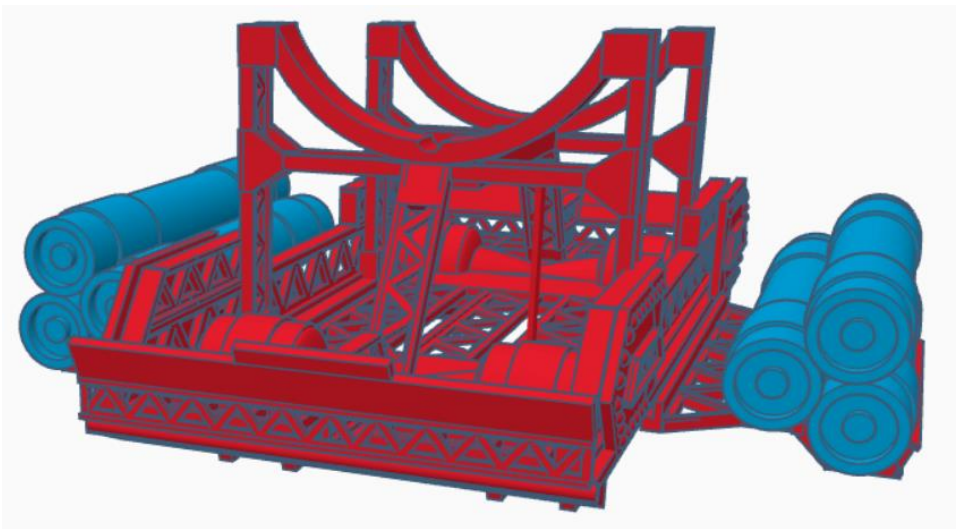


Now add the forward and rear brace pieces as shown below in yellow. Note they are different sizes with the longer piece used in the front of the sled. Once everything is aligned and perpendicular, you can glue all the pieces together.

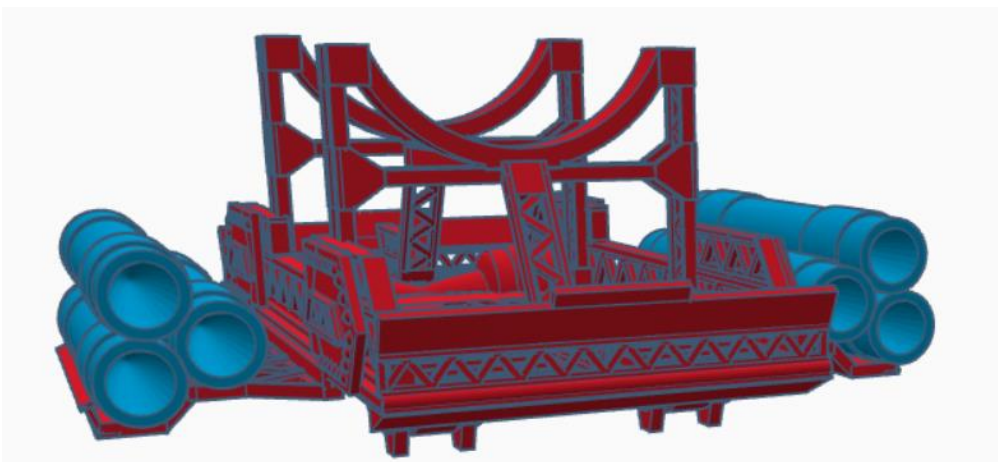


Add the two booster rocket tube parts (blue) to the booster mounts. The boosters sit in the mounts between the bands. The mount will set the proper angle of the tubes. It is best to paint the tubes before gluing them onto the sled.

Final Front View:



Final Rear View:



And this completes the build. You can paint the model according to your liking and add any appropriate decals or other decorations. Refer to screen captures from the TV show for additional information on how to finish it.

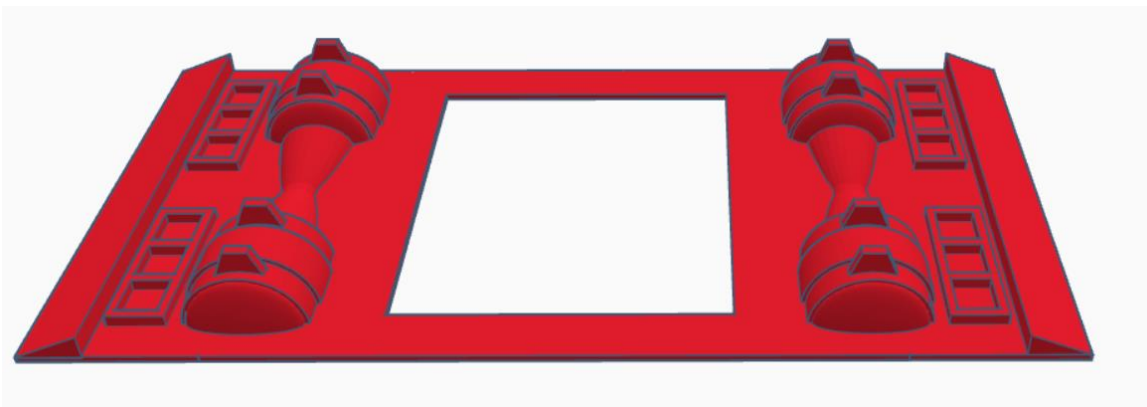
Enjoy!

Parts List, Count and File Names:

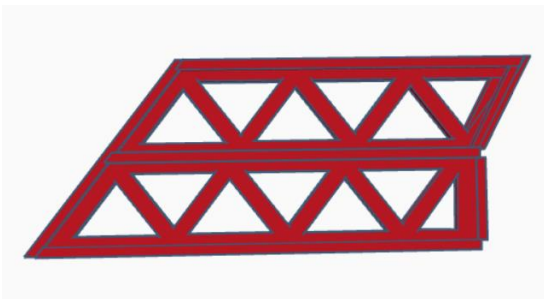
Sled main top.stl (1)



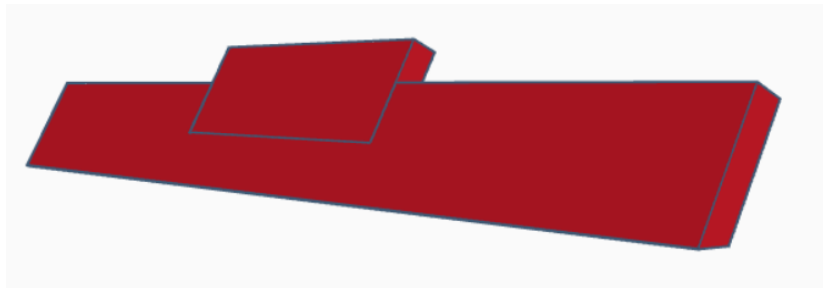
Sled main bottom.stl (1)



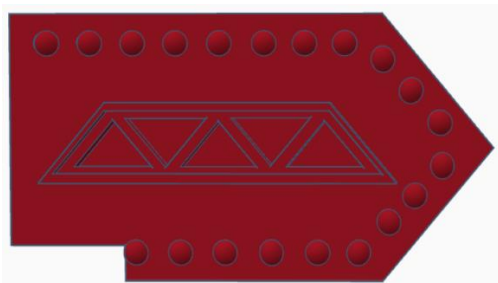
Sled middle end girder.stl (2)



Sled forward panel.stl (2)



Sled side plate.stl (2 – copied, 2 - mirrored)



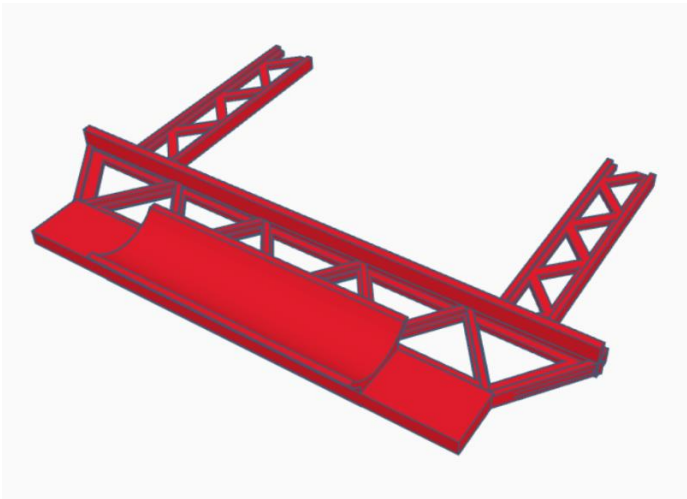
Sled forward girder.stl (2)



Sled main side girder.stl (2)



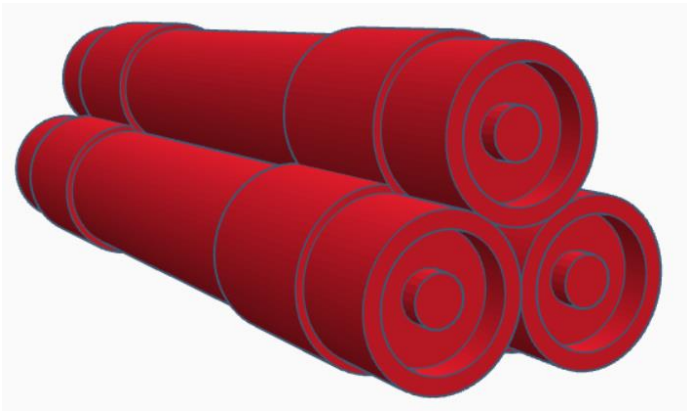
Sled booster holder.stl (2)



Outside sled booster holder.stl (2)

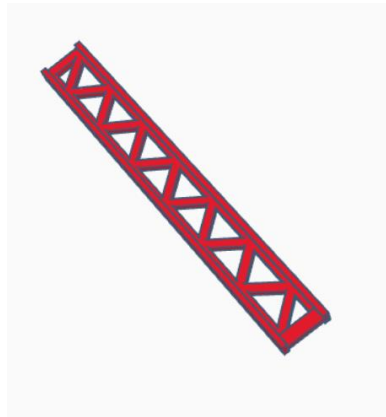


New booster rocket tube.stl (2)

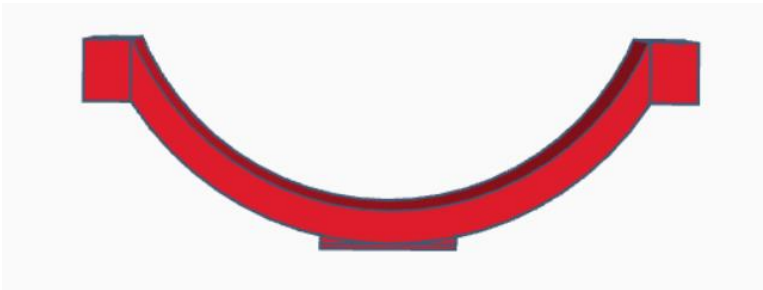


sled vertical holder beam.stl (4)
(To be trimmed down before install)

sled horizontal holder beam.stl (2)



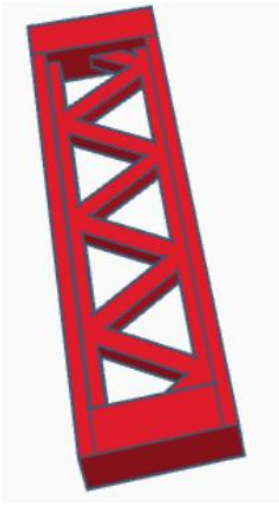
Sled curved rocket holder rear.stl (1)



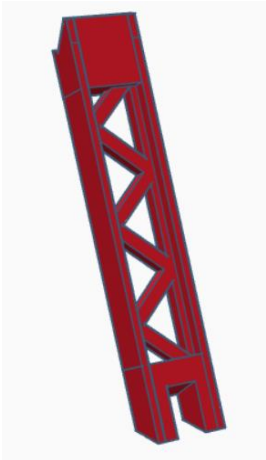
Sled curved rocket holder front.stl (1)



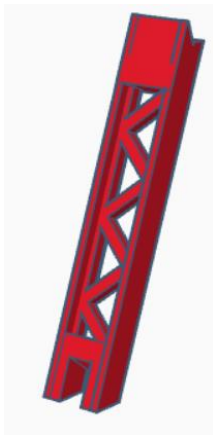
Middle brace.stl (1)



End brace front.stl (1)



End brace rear.stl (1)

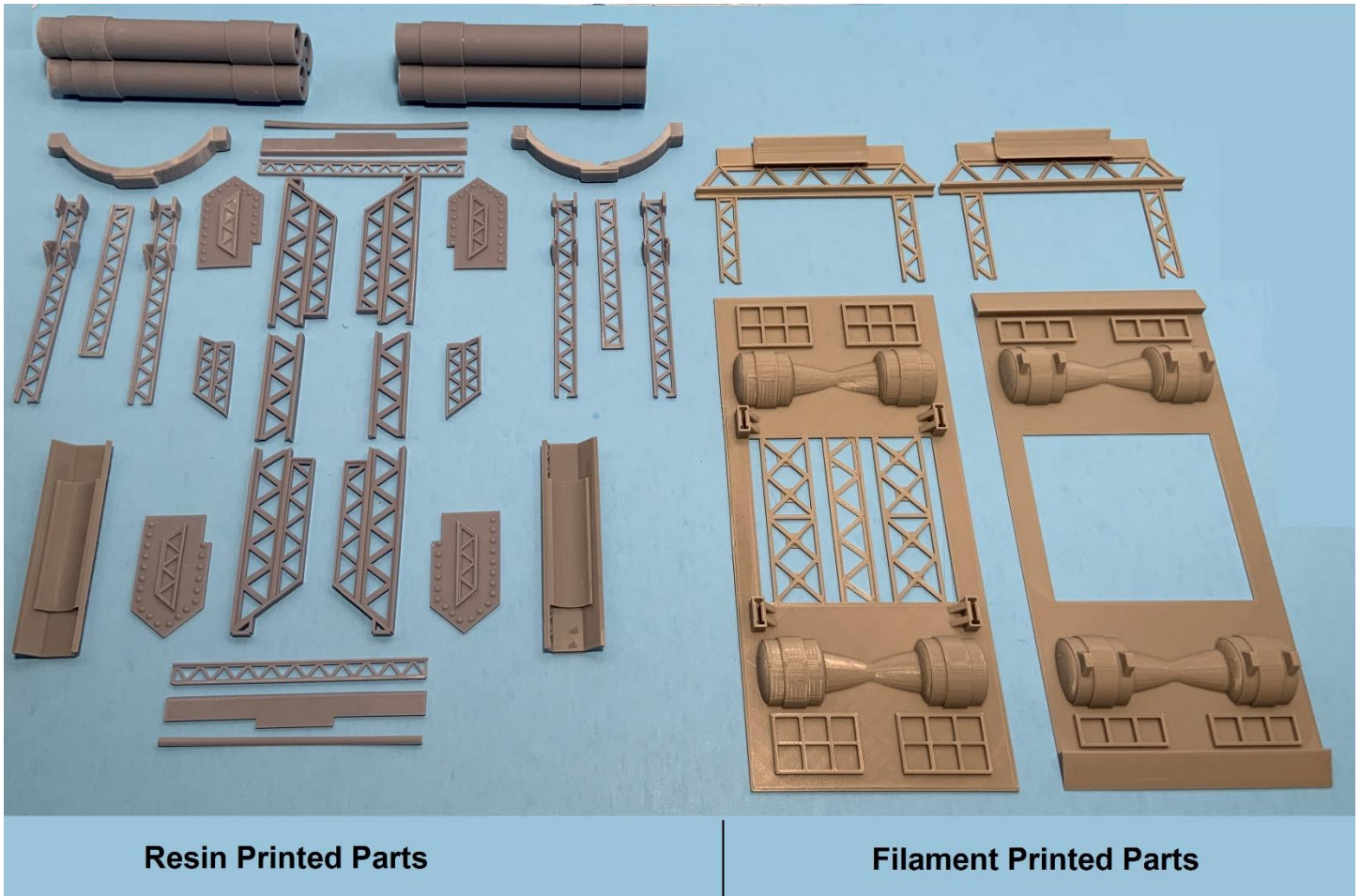


Sled end trim.stl (2)



Addendum

After designing and printing the prototype model, I purchased a resin-based LCD printer, the Elegoo Mars. This excellent machine can produce detailed parts down to .025 layer height, making the layer lines virtually invisible. As a result, for the final model I printed some of the more detailed parts using the resin printer and the larger, more structural parts using my FDM (filament) printer. I also had upgraded my filament printer to a Creality CR-10 Mini which allowed me to print the main top and bottom sled parts in one piece, thus avoiding having to split them up. Here is a photo of most of the parts I printed and will be assembling into my final model.



Here is the completed build yet to be fully painted and finished with my 28" Fireball mounted on it.

