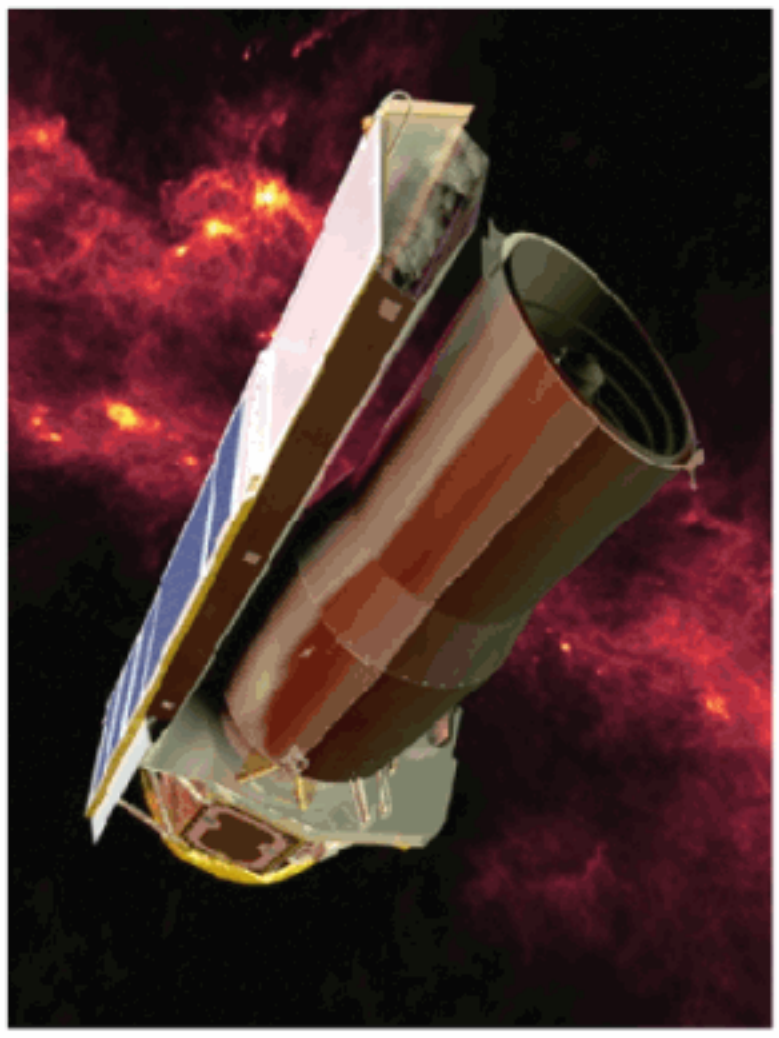
The **Spitzer Space Telescope** (formerly SIRTF, the Space Infrared Telescope Facility) was launched into space by a Delta rocket from Cape Canaveral, Florida on 25 August 2003. During its 2.5-year mission, Spitzer will obtain images and spectra by detecting the infrared energy, or heat, radiated by objects in space between wavelengths of 3 and 180 microns (1 micron is one-millionth of a meter). Most of this infrared radiation is blocked by the Earth's atmosphere and cannot be observed from the ground.

Consisting of a 0.85-meter telescope and three cryogenically-cooled science instruments, Spitzer is the largest infrared telescope ever launched into space. Its highly sensitive instruments give us a unique view of the Universe and allow us to peer into regions of space which are hidden from optical telescopes. Many areas of space are filled with vast, dense clouds of gas and dust which block our view. Infrared light, however can penetrate these clouds, allowing us to peer into regions of star formation, the centers of galaxies, and into newly forming planetary systems. Infrared also brings us information about the cooler objects in space, such as smaller stars which are too dim to be detected by their visible light, extrasolar planets, and giant molecular clouds. Also, many molecules in space, including organic molecules, have their unique signatures in the infrared.



Because infrared is primarily heat radiation, the telescope must be cooled to near absolute zero (-459 degrees Fahrenheit or -273 degrees Celsius) so that it can observe infrared signals from space without interference from the telescope's own heat. Also, the telescope must be protected from the heat of the Sun and the infrared radiation put out by the Earth. To do this, Spitzer carries a solar shield and will be launched into an Earth-trailing solar orbit. This unique orbit places Spitzer far enough away from the Earth to allow the telescope to cool rapidy without having to carry large amounts of cryogen (coolant). This innovative approach has significantly reduced the cost of the mission.

Spitzer will be the final mission in NASA's Great Observatories Program - a family of four orbiting observatories, each observing the Universe in a different kind of light (visible, gamma rays, X-rays, and infrared). Other missions in this program include the Hubble Space Telescope (HST), Compton Gamma-Ray Observatory (CGRO), and the Chandra X-Ray Observatory(CXO). Spitzer is also a part of NASA's Astronomical Search for Origins Program, designed to provide information which will help us understand our cosmic roots, and how galaxies, stars and planets develop and form.

http://www.spitzer.caltech.edu

Stichting Volkssterrenwacht

PHILIPPUS LANSBERGEN

Thank you for downloading our Spitzer paper model. The Philippus Lansbergen Public Observatory in Middelburg is proud to have this model posted on the Spitzer Space Telescope website. Erik te Groen is one of our enthousiastic co-workers. If you would like to see more of his work, visit www.lansbergen.net and discover many more fantastic models for you to build. We offer many different models of various difficulty levels, for kids and for experienced model builders.

Our club is located in Middelburg (the Netherlands), hometown of the inventor of the telescope in 1608, Hans Lipperhey. Founded in 1967 by just a few co-workers then, we are proud to have grown into a large club over the years. Astronomy, space travel, science, computers, paper scale modeling, it's all part of our education program.
The Philippus Lansbergen Observatory has the goal to teach the public, young and old, about the universe we inhabit. We do this by giving lectures and hand to hand observations. If you like, you can send your comments and experiences with the model and our website to the e-mail address located on our website. If you are also associated with a public observatory or you are an amateur astronomer yourself, you are welcome to send us your comments and experiences. We enjoy hearing from our "colleagues" .

This paper model of Spitzer is one of many on our website, and many more will come. There are all kinds of models available; from the early satellites to the latest rockets. There are models for kids and unexperienced modelers, as well as models of medium difficulty. There are even big, super-detailed models for the experienced paper modelers, who wish to add a model of high accuracy and high level of detail to their collection. We wish you all a lot of fun making our models and don't forget to visit our website !

Public Observatory Philippus Lansbergen: http://www.lansbergen.net/eng.index.htm
More about the Spitzer telescope: http://www.spitzer.caltech.edu

JPL CALTECH NASA

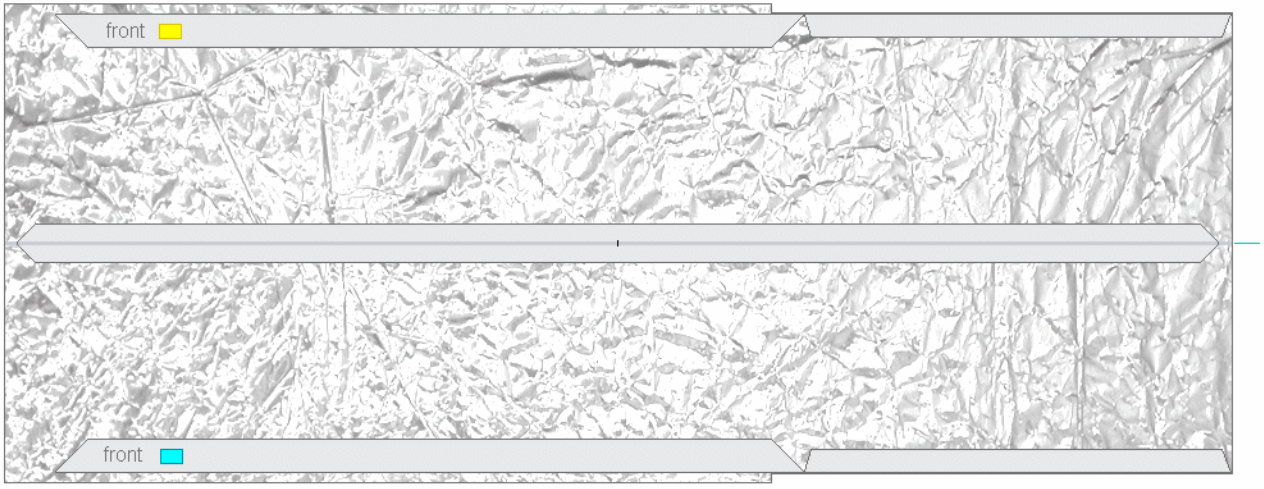
SPITZER SPACE TELESCOPE

The new space telescope for infrared observation.

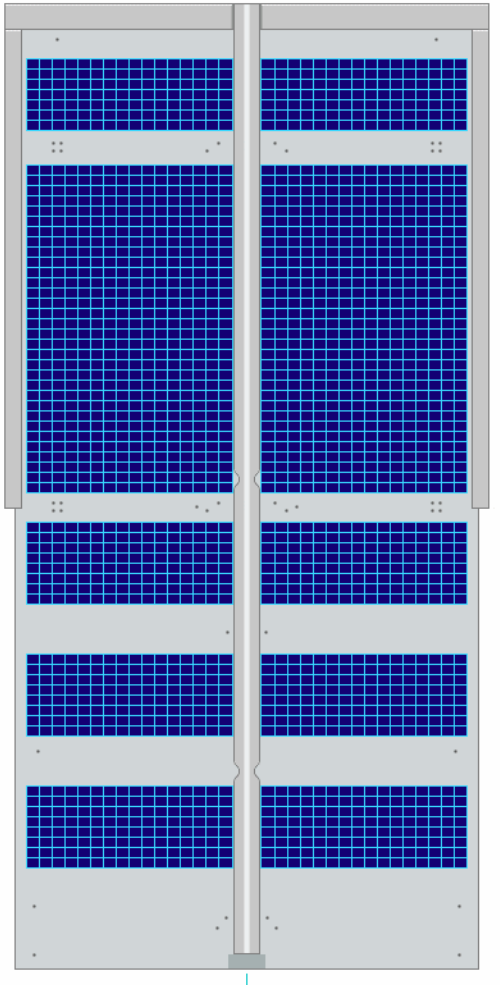
Learn more about Spitzer at :
http://www.spitzer.caltech.edu

Scale 1:25

3



1



2

1 inch

1 cm

1 cm

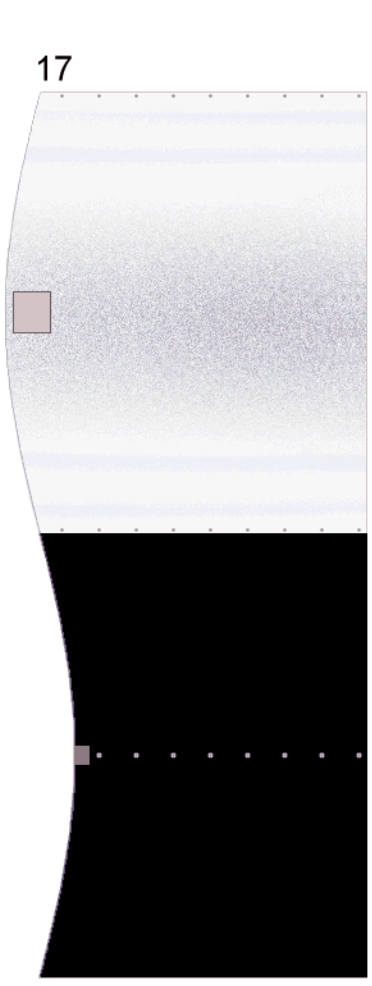
1 inch

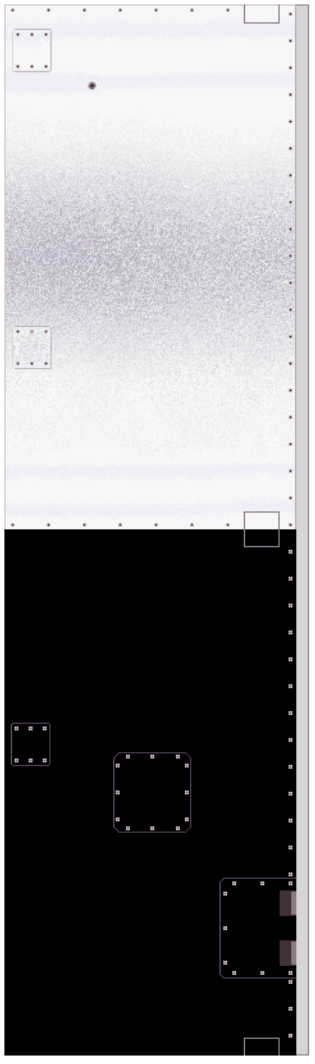
JPL CALTECH NASA

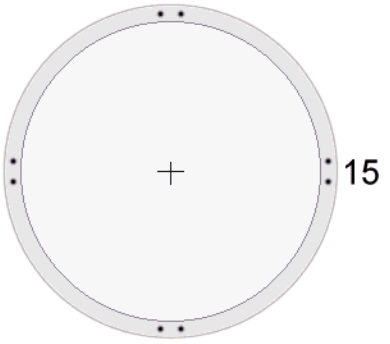
SPITZER SPACE TELESCOPE

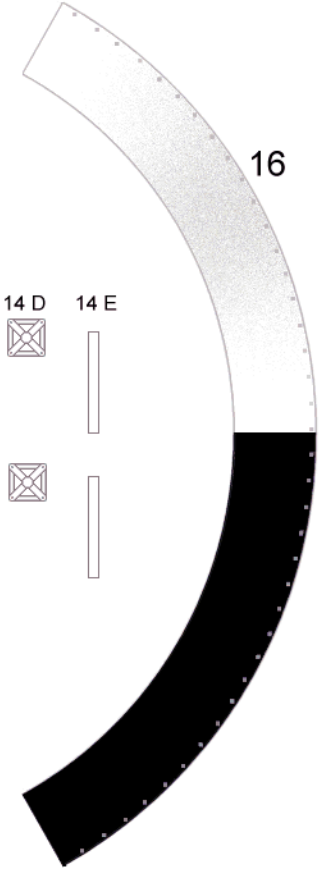
http://www.spitzer.caltech.edu

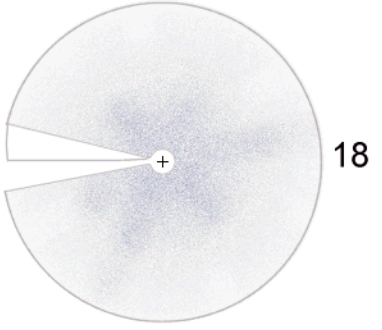
Scale 1:25

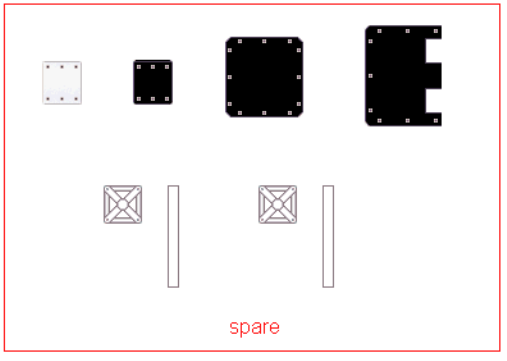












The new space telescope
for infrared observation.

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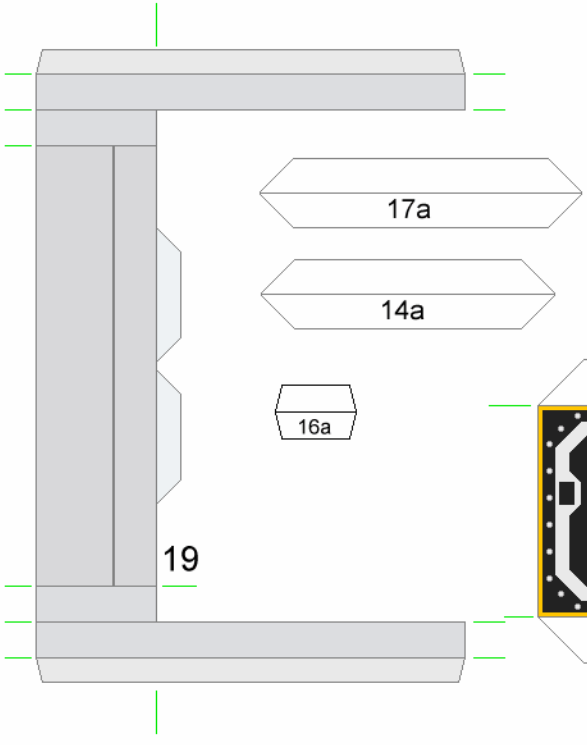
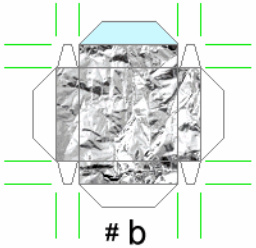
http://www.spitzer.caltech.edu

Scale 1:25




a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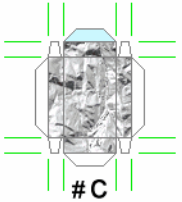
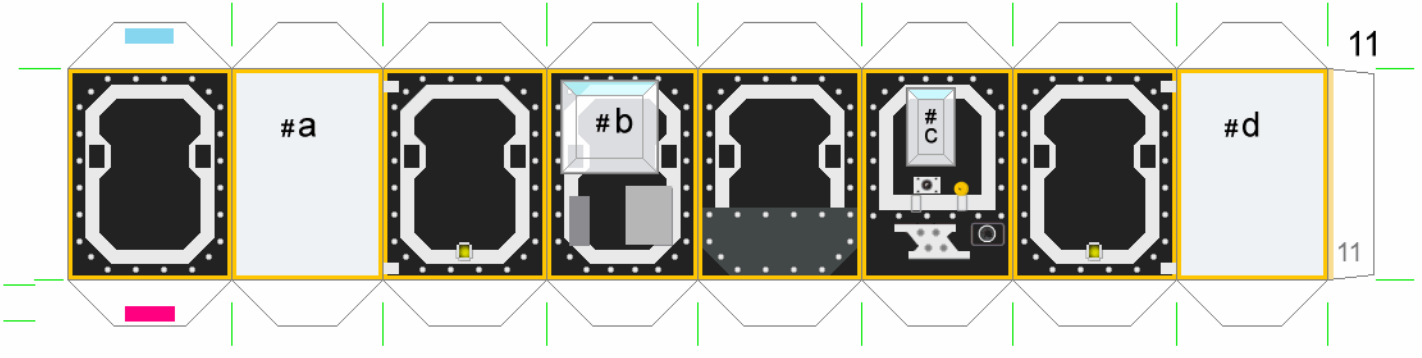
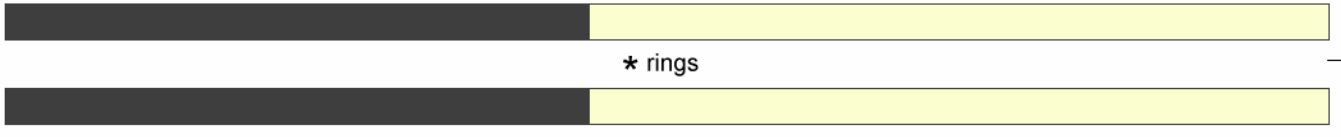
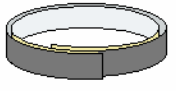

c


d

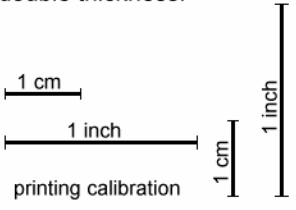



* rings

Make this shape.



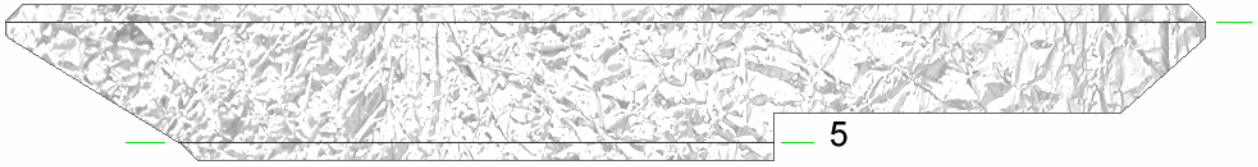
Roll up, to double thickness.

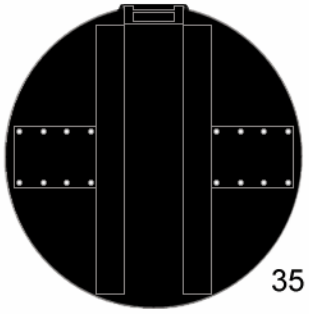


The new space telescope
for infrared observation.

SPITZER SPACE TELESCOPE

Scale 1:25

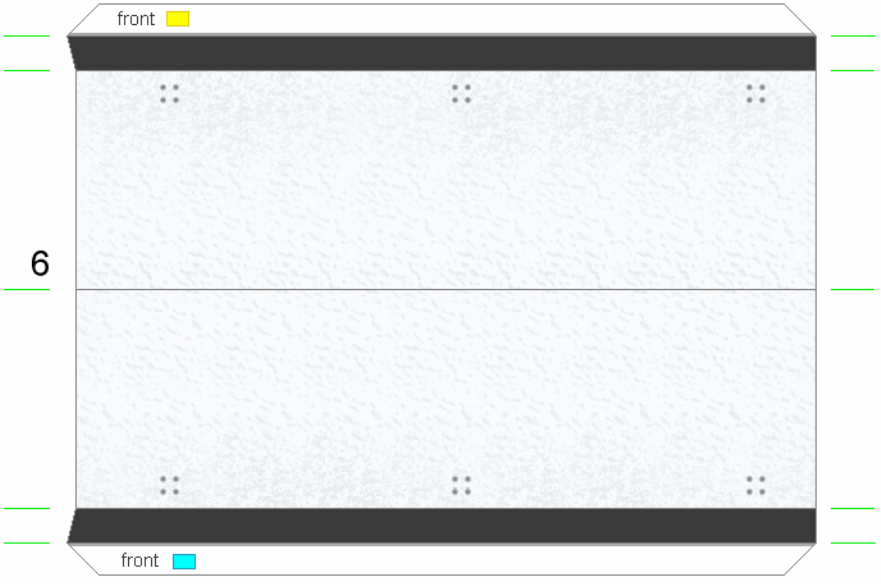


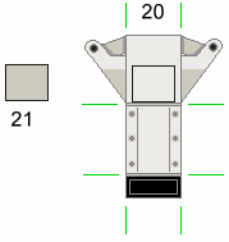


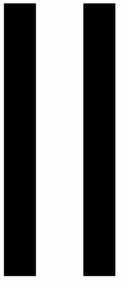
Dust cover.
One time use. Is ejected
once in space.

Glue onto cardstock

Keep the rim white or paint it silver.

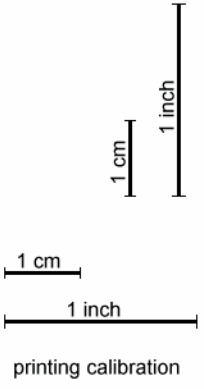






Glue onto cardstock

Make rims black



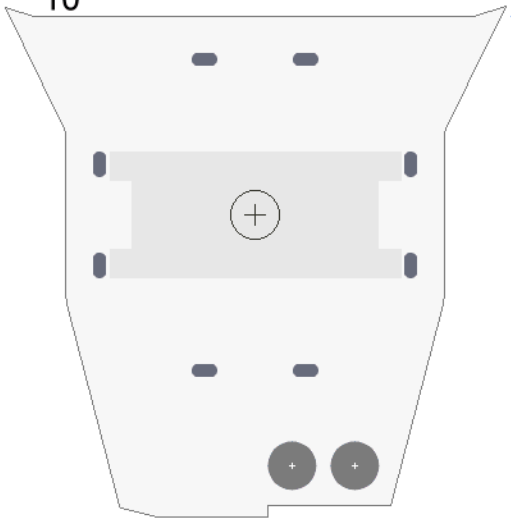
printing calibration

The new space telescope
for infrared observation.

SPITZER SPACE TELESCOPE

Scale 1:25

10



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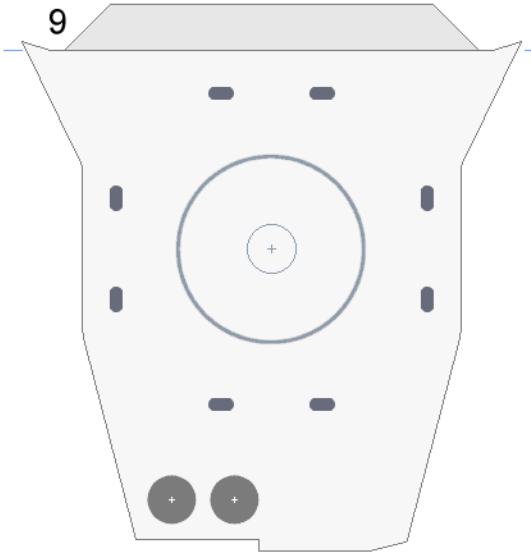
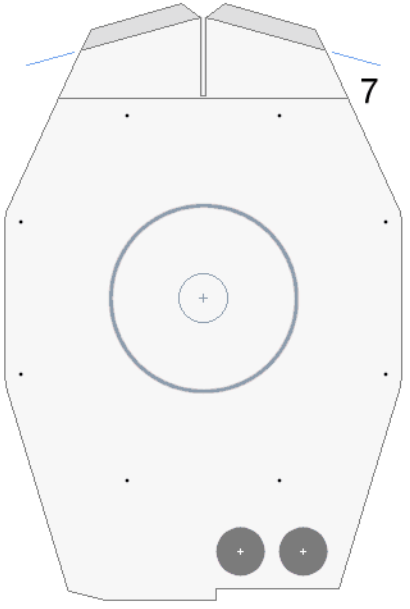


Glue this part onto extra layer of paper.

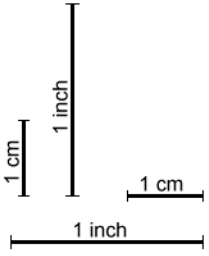
7



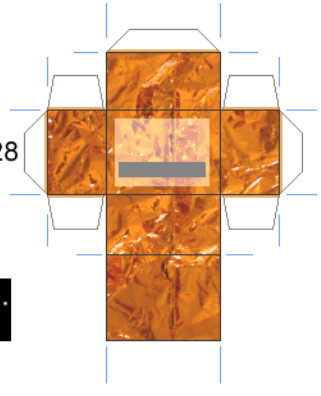
8

Glue onto cardstock.

Color rims oker yellow or orange-gold.

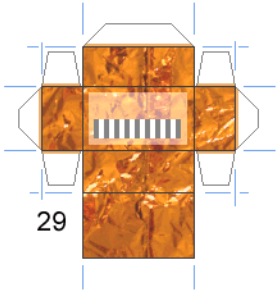


28



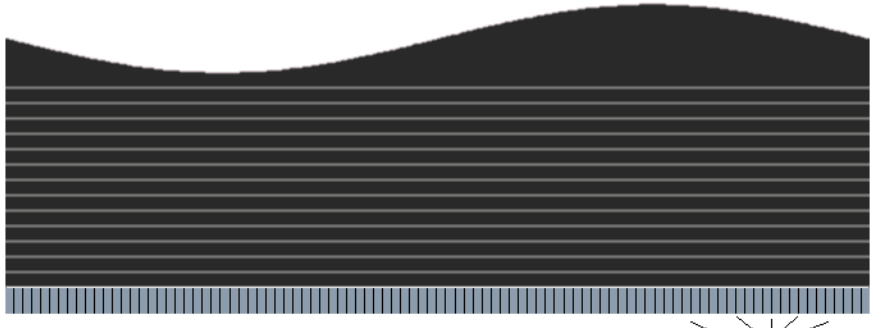
28A

29



29A

23



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SPITZER SPACE TELESCOPE

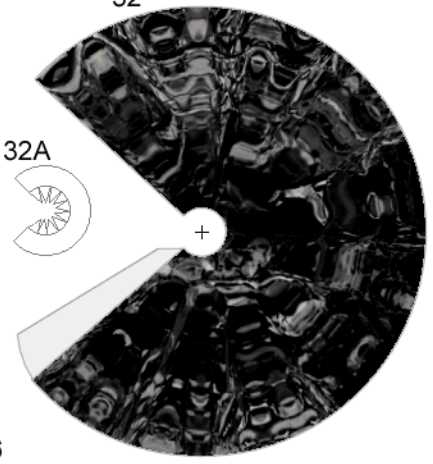
Scale 1:25

24

33

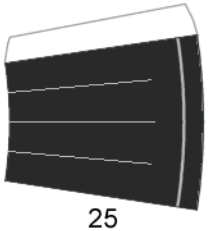
32A

32



27

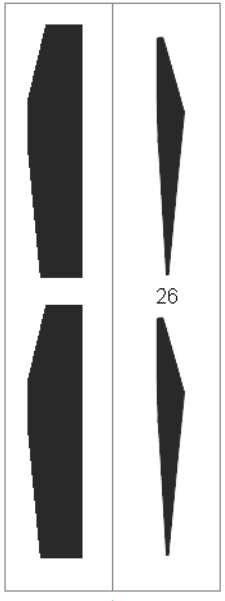
25



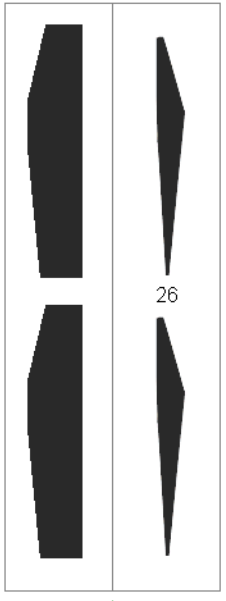
Glue this part
onto cardstock.

13

26



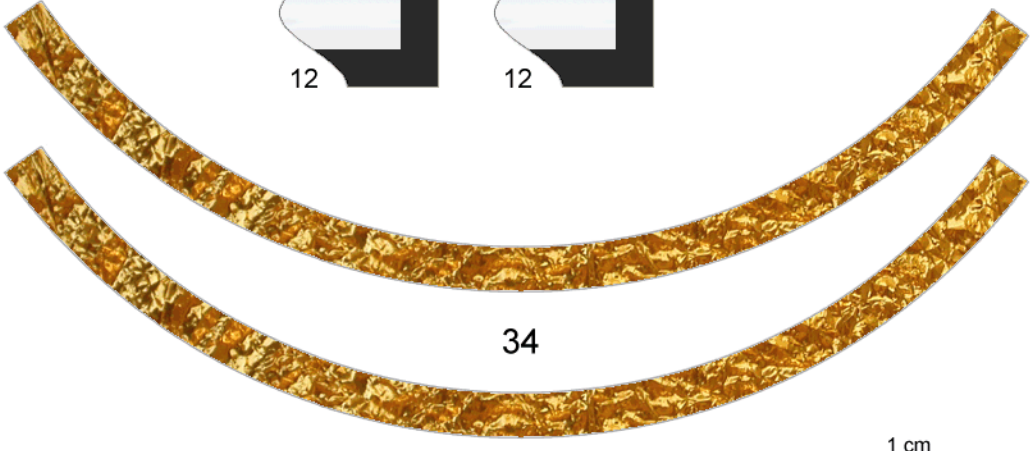
26



12

12

34



1 cm

1 inch

printing calibration

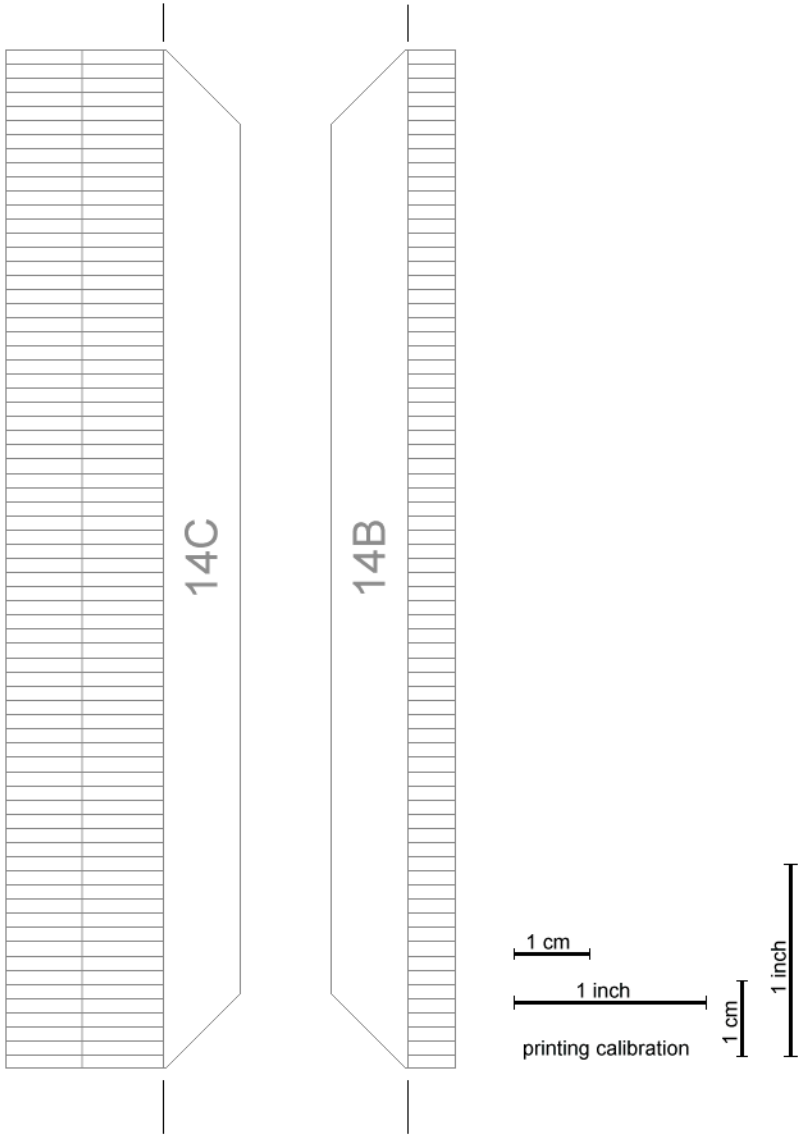
1 cm

1 inch

The new space telescope
for infrared observation.

SPITZER
SPACE TELESCOPE

Scale 1:25



Instructions for building the Spitzer satellite.

What do you need to construct this model ?

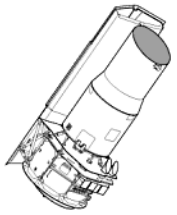
* Sharp scissors
* A sharp hobby knife
* A ruler (steel or plastic)
* A dull knife (or similar) to score the folding lines
* Glue (waterbased or synthetic)
* Permanent marker (black)
* Color crayons
* Several toothpicks or thin bamboo sticks.

Also important :

* Patience and the ability to work accurately.

For those who want to add a little extra detail :

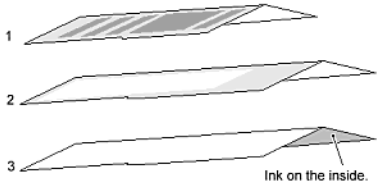
* Self adhesive gold and silver foil (as thin as possible) Please refer to the pictures on internet for the correct placement of the foil.



Read these instructions thouroughly and make sure you know what is to be expected. Familiarize yourself with the components and if you can, try to find pictures of SIRTF on internet or in books, to get a better impression of what this spacecraft looks like.

Note from the designer: This paper model is difficult enough as it is. Some parts and ways of construction have been left away or have been simplified. Therefor, some details may vary from details that can be seen in pictures from the real spacecraft.

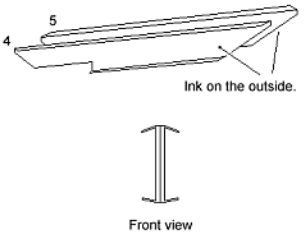
1



Cut and glue parts 1, 2 and 3.

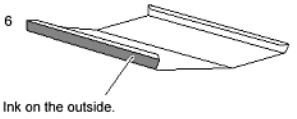
It is recommended to glue part 2 onto cardboard for extra rigidity. The rest of the model will be mounted to this construction.

2



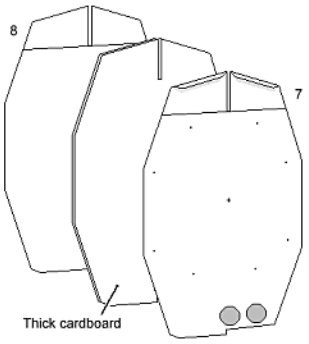
Glue parts 4 and 5 back to back, ink on the outside.

3



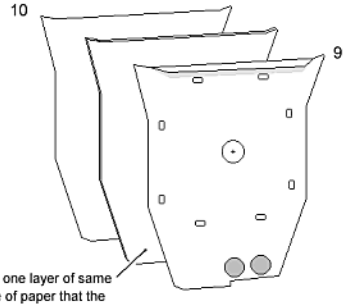
Cut part 6 and form it as shown.

4



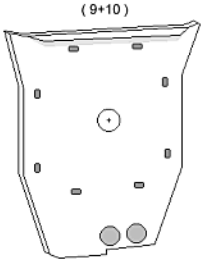
Assemble as shown. Take a thick piece of cardboard and make the entire assembly about 2 mm ... 2.5 mm thick

5



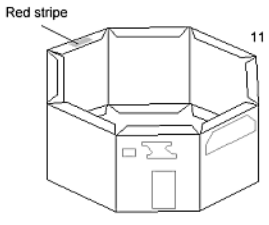
Same situation, but make this assembly about 1 mm .... 1.3 mm thick.

6



This one will be difficult : making the holes. This is the point where you have to decide if you want to use the struts or not. If you don't, then use parts A and B and do not make the holes.

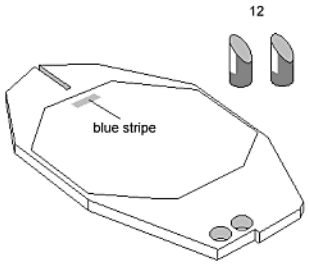
7



Make part 11.

Be careful when scoring the folds. Make them sharp, but don't cut the paper.

8

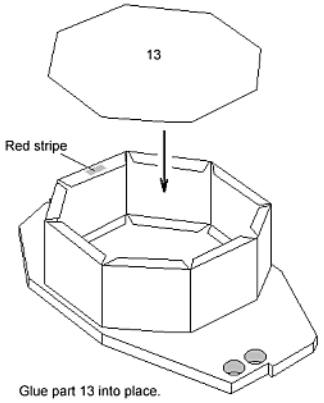


First, make the star trackers (12).

Now, drill the holes until they are big enough for the star tracker to pass through easily. Cut the holes with a sharp, pointed knife. Then use course waterproof sanding paper # 80. Use finer paper to make nice round holes and smooth edges.

! Do not glue the star trackers yet ! We'll do that later.

9

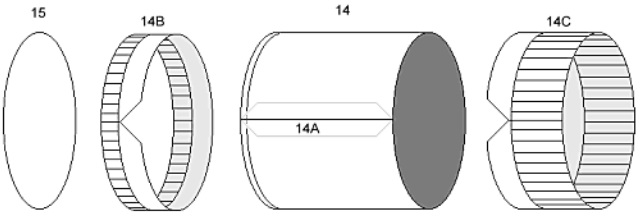


Glue part 13 into place.

All the small details will be added later.

Instructions for building the Spitzer satellite.

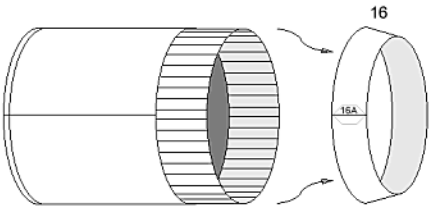
10



Assemble the rear part of the telescope. Begin with part 14, then add the other parts.

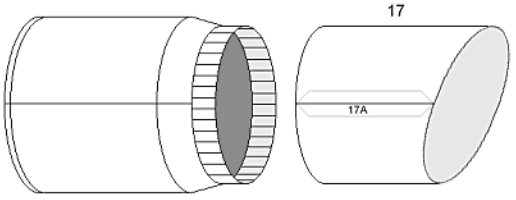
Glue parts 14B and 14C inside part 14.

11



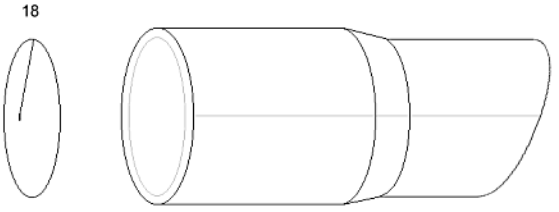
Now assemble part 16 and wait until connector 16A has fully dried. Now carefully bend the flaps of part 14C inward and glue part 16 into place. Once dry bend the remainder of the flaps back outward, pointing straight forward.

12



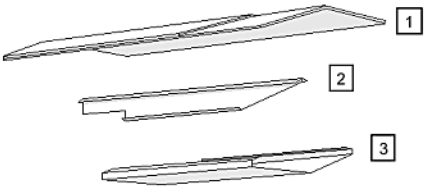
Assemble part 17 and glue into place.
If you want part 23 to fit nicely, it's better to cut a connector out of thin paper. Once part 23 is inserted and glued, the whole assembly will be very firm and strong.

13



Assemble part 18 and glue into place, with the seam facing up.

14

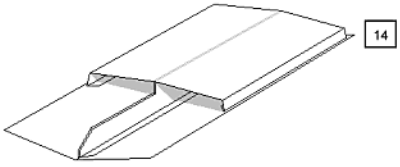


Assemble the parts from drawing 1, 2 and 3.
Look at the parts and pay notice to the correct way of assembly.

Front view

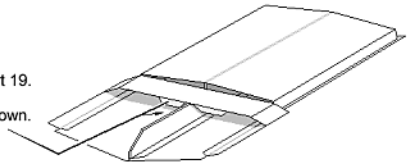
15

This is what it should look like.

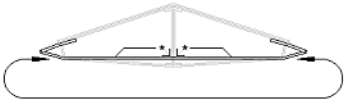


Glue part 19.

Fold both flaps down.



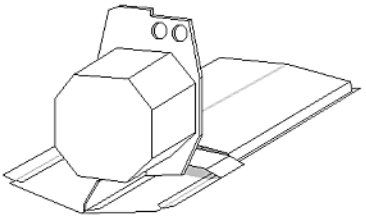
16



Make sure part 19 is perfectly straight, here.

If not, cut off a piece of part [2] or add 2 small pieces of paper as shown *

17



Glue assembly [9] into place.

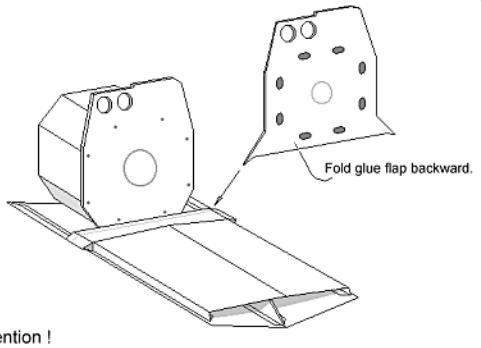
Would you like this model to stand out ?
You could build another one, but this time you apply silver and gold foil !

Look up the pictures on internet or find some books about this wonderful spacecraft and see where the foil should be applied.

Give it a try ! It's worth the effort !!

Instructions for building the Spitzer satellite.

18



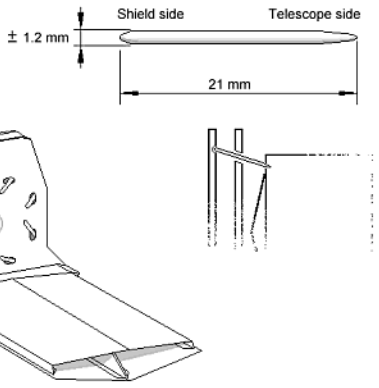
Attention !

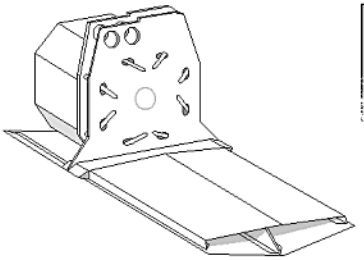
Remember that assembling the struts and connecting the telescope to it, later, is difficult and is not recommended for unexperienced modelers.

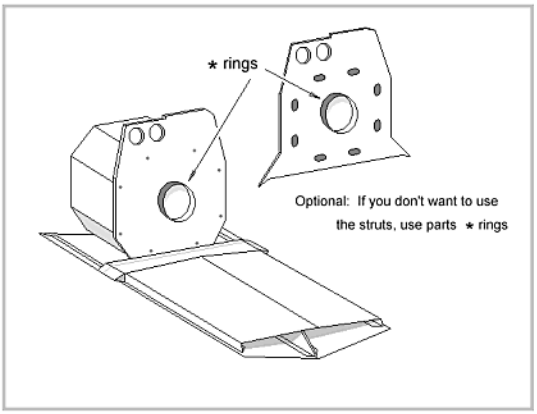
In the instructions we will continue using the struts on the model.

19

Paint the struts yellow or orange-yellow.

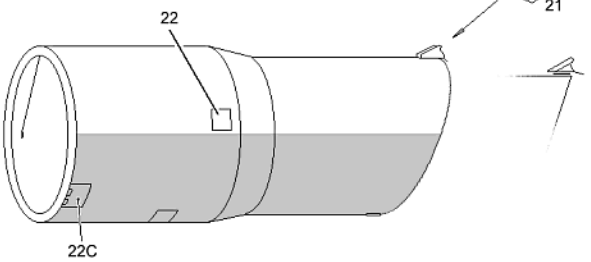




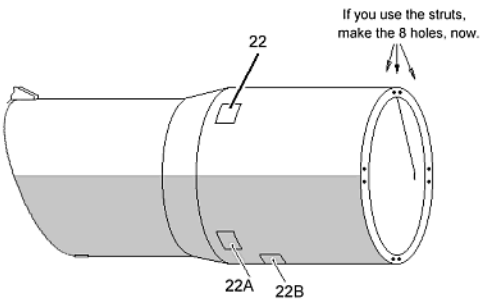


20

Before the telescope can be glued into place, a few more details will have to be added. If you want to add the other details too, do it now, at this stage. It's easy to tell by the color where each part should be placed.

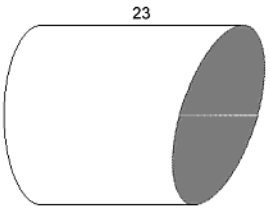


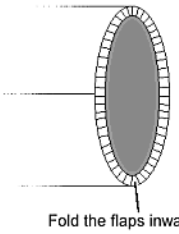
21



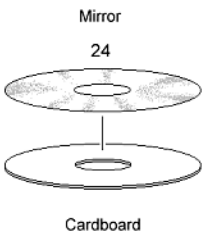
22

Cut and shape part 23.



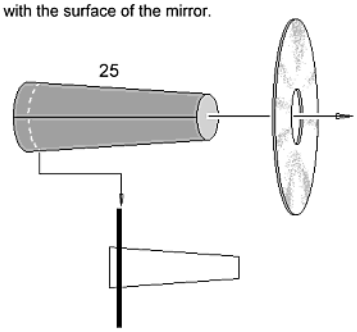


23



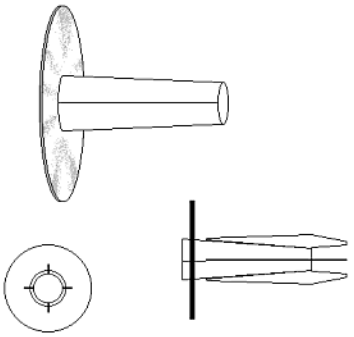
24

Insert part 25 as shown.
The white dotted line should be aligned with the surface of the mirror.



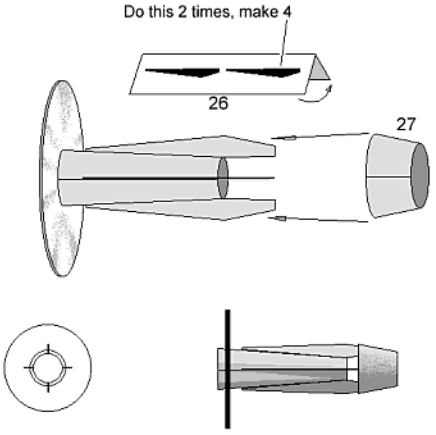
25

It's going to have to look like this :

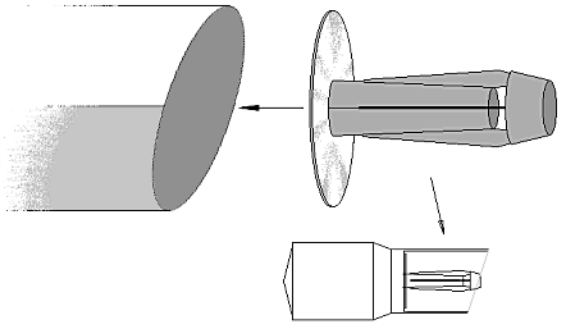


Instructions for building the Spitzer satellite.

26

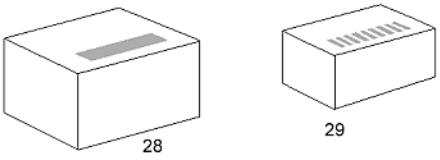


27



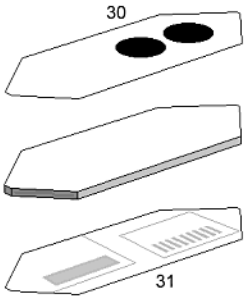
The diameter of the mirror is smaller than the diameter of the cylinder. Place mirror exactly in the middle.

28

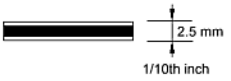


Assemble instrument box 28 and 29

29



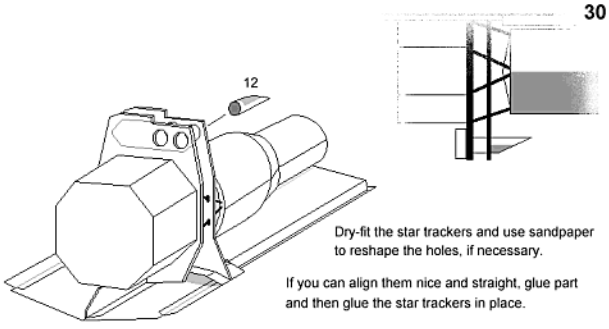
Ink on the outside !!



Use one ore more layers of thick cardstock to make it thick enough.

Take care in assembling this part the correct way.

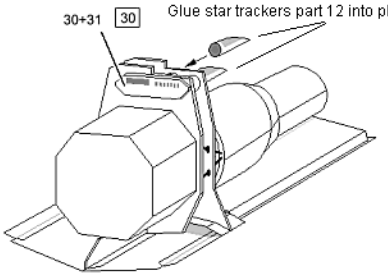
30



Dry-fit the star trackers and use sandpaper to reshape the holes, if necessary.

If you can align them nice and straight, glue part and then glue the star trackers in place.

31

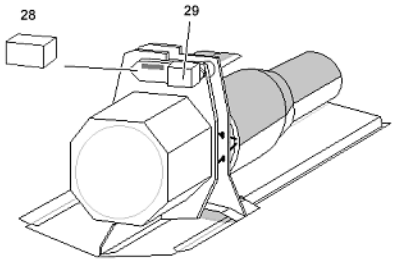


Glue assembly 30+31 into place.
Make sure the black circles are placed exactly in front of the holes !!

Do not make holes in parts 30+31.

Instructions for building the Spitzer satellite.

32

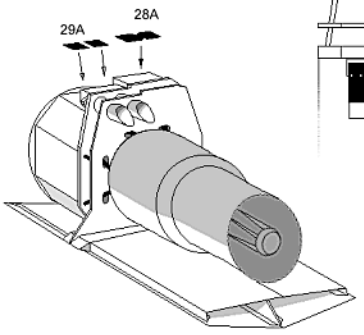


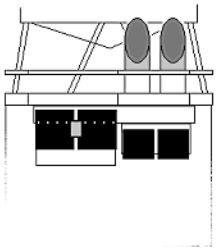
Glue the instrument boxes in place.

Pay attention to the markings so the parts are placed correctly.

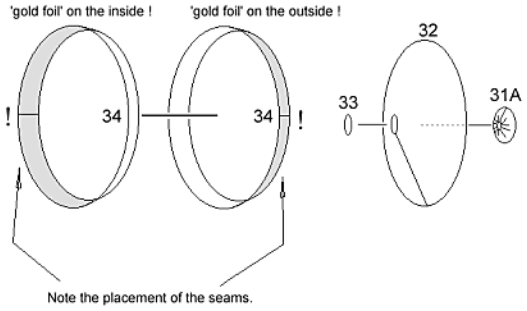
33

Glue parts 28A and 29A



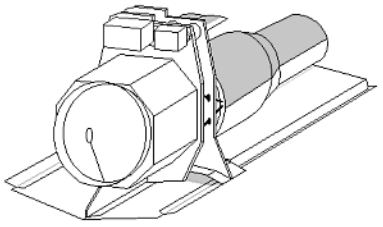


34



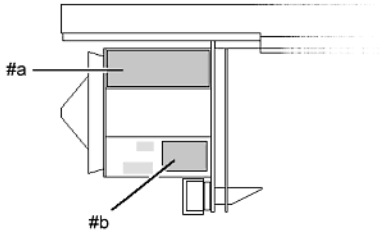
Note the placement of the seams.

35



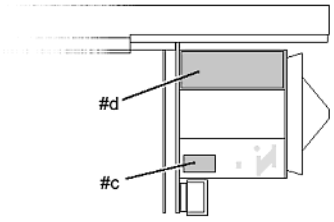
Place part 32 first and center it perfectly, then glue rings 34 into place.

36



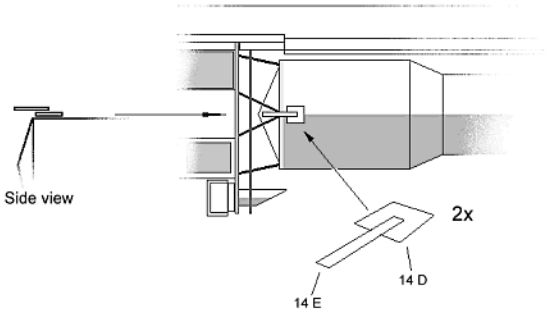
Add parts #a and #b. Part #a is preferably added at stage [9] or [17]

37



Add parts #c and #d. Part #d is preferably added at stage [9] or [17] .

38

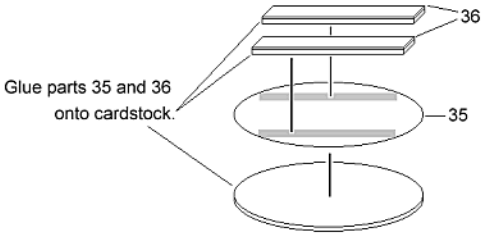


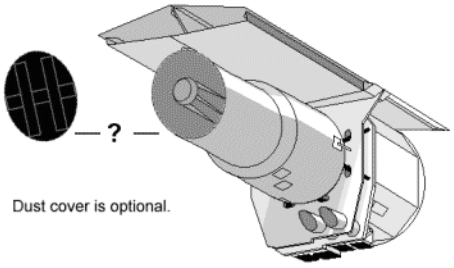
Glue part 14E to 14D, then glue both into place, on <u>both</u> sides.

39

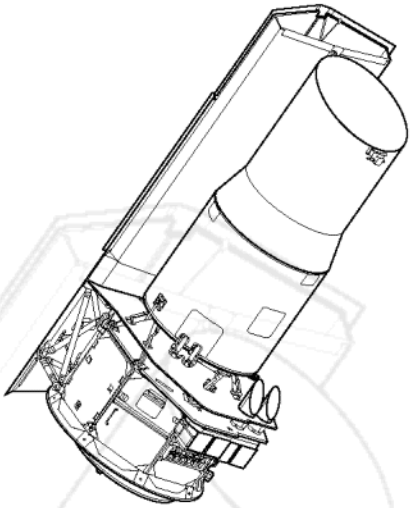
The last part to be assembled :

the dust cover.

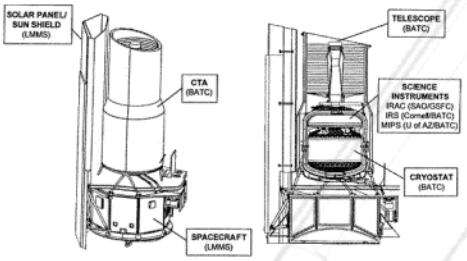


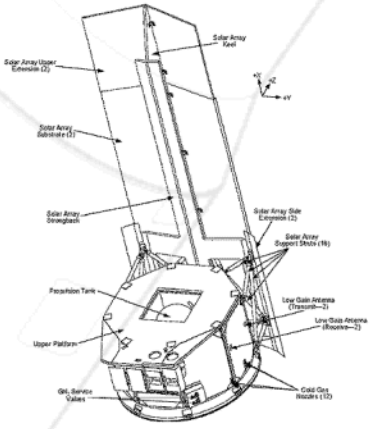


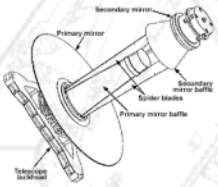
Dust cover is optional.



Your Spitzer model is now finished.







Special thanks to Dr. Robert Hurt from Caltech for helping us to create this paper model,
for providing us with additional information and for making this model available on a special NASA website.