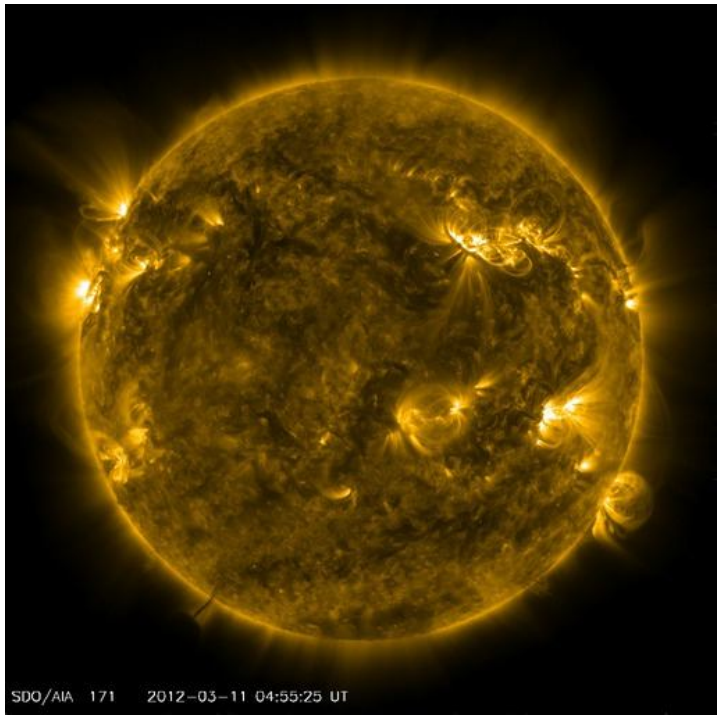
The **Solar Dynamics Observatory** (SDO) provides a new eye on the sun that delivers solar images with 10 times better resolution than high-definition television. This mission will zoom in on the cause of severe space weather—solar activity such as sunspots, solar flares, and coronal mass ejections.

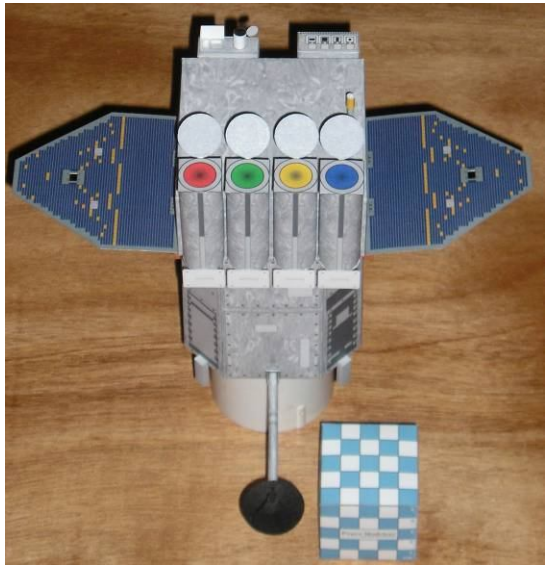
SDO observes the sun, from its deep interior to the outermost layers of solar atmosphere, at the highest ever time cadence. SDO snaps a full disk image in 8 wavelengths every 10 seconds. This rapid cadence required placing the satellite into an inclined geosynchronous orbit. This allows for a continuous, high-data-rate contact with a dedicated ground station at the White Sands Complex in southern New Mexico. SDO sends down about 1.5 terabytes of data per day, equivalent to downloading half a million songs each day.

SDO launched in February, 2010 on a 5-year mission to determine how the sun's magnetic field is generated, structured, and converted into violent solar events like turbulent solar wind, solar flares, and Coronal Mass Ejections (CMEs). The solar wind is a continuous stream of electrically charged particles that flow from the sun and fill the solar system with charged particles and magnetic fields. Solar flares are explosions in the sun's atmosphere, with the largest equal to billions of one-megaton nuclear bombs. CMEs are eruptions from the solar atmosphere that release billions of tons of solar material into interplanetary space at millions of miles per hour. All these phenomena are collectively called space weather and affect electrical and electronic systems in space and on Earth.

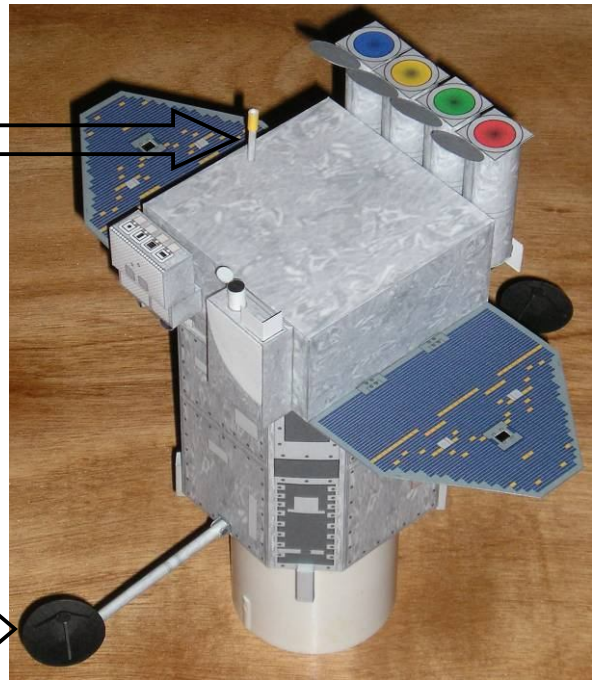


Solar Dynamics Observatory – 1:24 scale

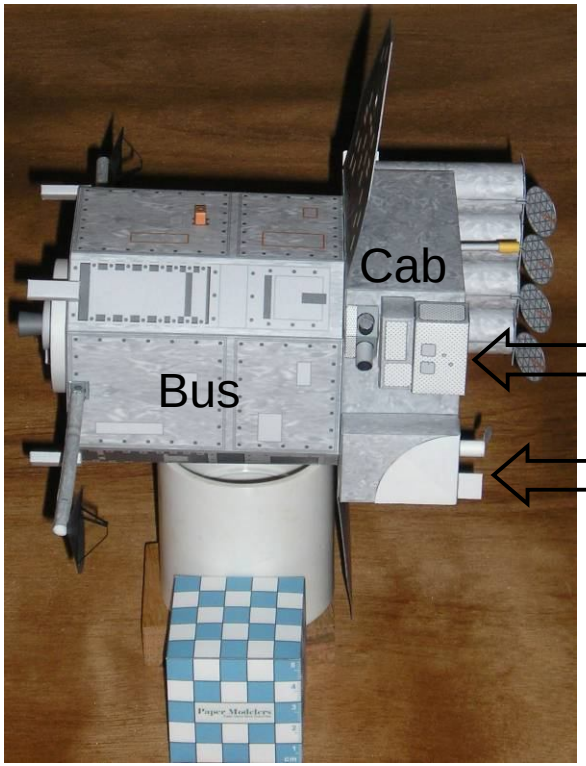
1. Carefully score fold lines, then cut out parts. Arrows generally indicate fold lines, red marks indicate cut lines where needed.
2. Cut out instrument cab and base. Fold the cab into a box and glue. Glue bottom in place to close the box (note the black triangles for alignment).
3. Cut out AIA base electronics and base radiators. Fold the electronics into narrow boxes. Glue radiator panel to the gray end of the box, centered.
4. Cut out AIA bodies, top lens, cover and bottom. Roll the bodies into long cylinders and glue. Fold the top lens in half and glue, then glue the top lens and bottom to the AIA body cylinder. One square side of the top lens should be aligned with the seam on the AIA body cylinder. Glue small tab on the top cover to the side of the body cylinder over the seam so the cover is open and the lens exposed. Glue the completed AIA instruments to the side of the instrument cab with the seam against the cab – refer to the illustration for the location of the various colored lenses. The square top lens should be lined up with the box of the cab with the covers to the inside over the instrument cab.
5. Glue the AIA base electronics assemblies to the side of the instrument cab (over the dark rectangles) and to the bottoms of the cylinders.
6. Cut out the HMI parts. Fold the main part into a box and glue. Roll the aperture into a cylinder and close the top with the black circle. Apply glue to the open end of the aperture cylinder and glue over the gray circle – aligning the cover to the side to match the picture on that page. Fold the HMI shield, apply glue to the bottom and glue in place over the black line. Cut out the overlays for the HMI radiator (white quarter circle and 1/8 circle). Glue the quarter circle to the side of the HMI inside the outline, then glue the 1/8 circle to the lower part of the the assembly.
7. Cut out the EVE parts. Fold and glue the top and bottom sections into boxes. Glue the bottom box to the side of the instrument cab where indicated. Glue the top box to the bottom box with the white side out – note the offset when gluing to the bottom box.
8. Cut out the star tracker parts. Color the backs of the barrel parts with a black marker, then roll into cylinders and glue with the black inside. Fold the base and glue overlapping the small tabs on the sides. Apply glue to the bottom edges of the barrels and glue in place over the dark circles, then glue the assembly to the side of the instrument cab over the graphic just below the EVE.
9. Roll the LGA (low gain antenna) into a long cylinder and glue to the top of the equipment cab over the gray circle.
10. Cut out the two solar panel arrays, fold in half and glue. Glue the arrays to the bottom of the instrument cab using the gray rectangles on the side of the cab for reference. OPTIONAL DETAILING – cut out the panel lock apertures using the small gold rectangle on the top of arrays as a guide.
11. Cut out the parts for the spacecraft bus and its base. Glue the two bus sections together, then fold to form an octagonal column. Glue the base to the bottom of the bus, then glue the bus to the bottom of the equipment cab – line up the solar arrays with the markings on the top tabs.
12. OPTIONAL DETAIL – cut out the solar panel locks, fold into a box and glue. Glue the boxes to the sides of the bus over the printed graphic.
13. Roll the outer base ring (the one with the tab on the end) into a circle and glue. Glue the inner ring to the inside. Glue the completed assembly to the bottom of the bus over the large gray circle.
14. Cut the nozzle and nozzle shroud, form into cones and glue. Glue the shroud to the bus bottom over the small gray circle, then glue the nozzle to the dark circle.
15. OPTIONAL DETAIL – Cut out the thrusters (4) and form into boxes and glue. Glue the completed thrusters to the narrow sides of the bus where indicated.
16. Cut out the HGA, HGA mast, and HGA mast hinges. Fold the “ears” of the hinges together and glue, then fold up. Glue the hinges into place over the graphic on the side of the bus. Roll the HGA mast into a long cylinder and glue. Form the HGA dish into a flat cone and glue, then glue the legs of the secondary reflector to the dish. Glue the HGA dish assemblies to the indicated end of each HGA mast. Glue the bottom of the HGA mast to the mast hinge.



LGA



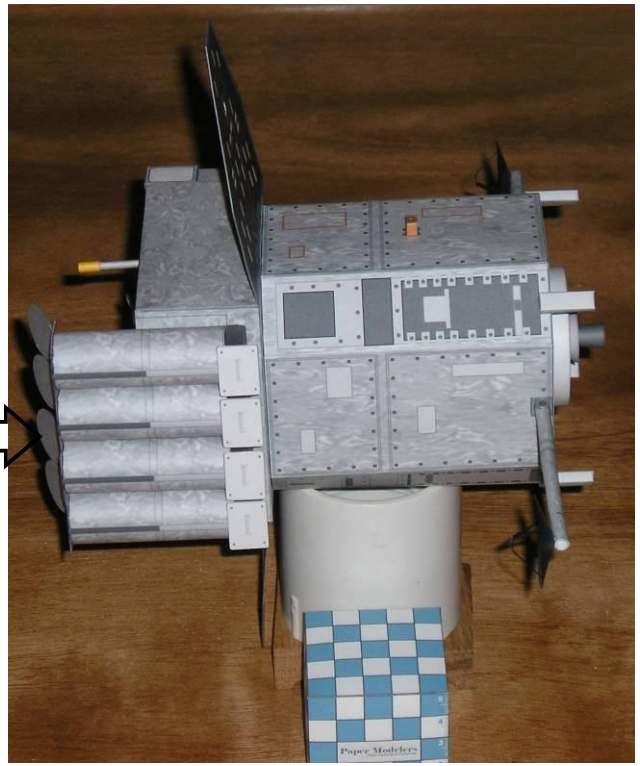
HGA



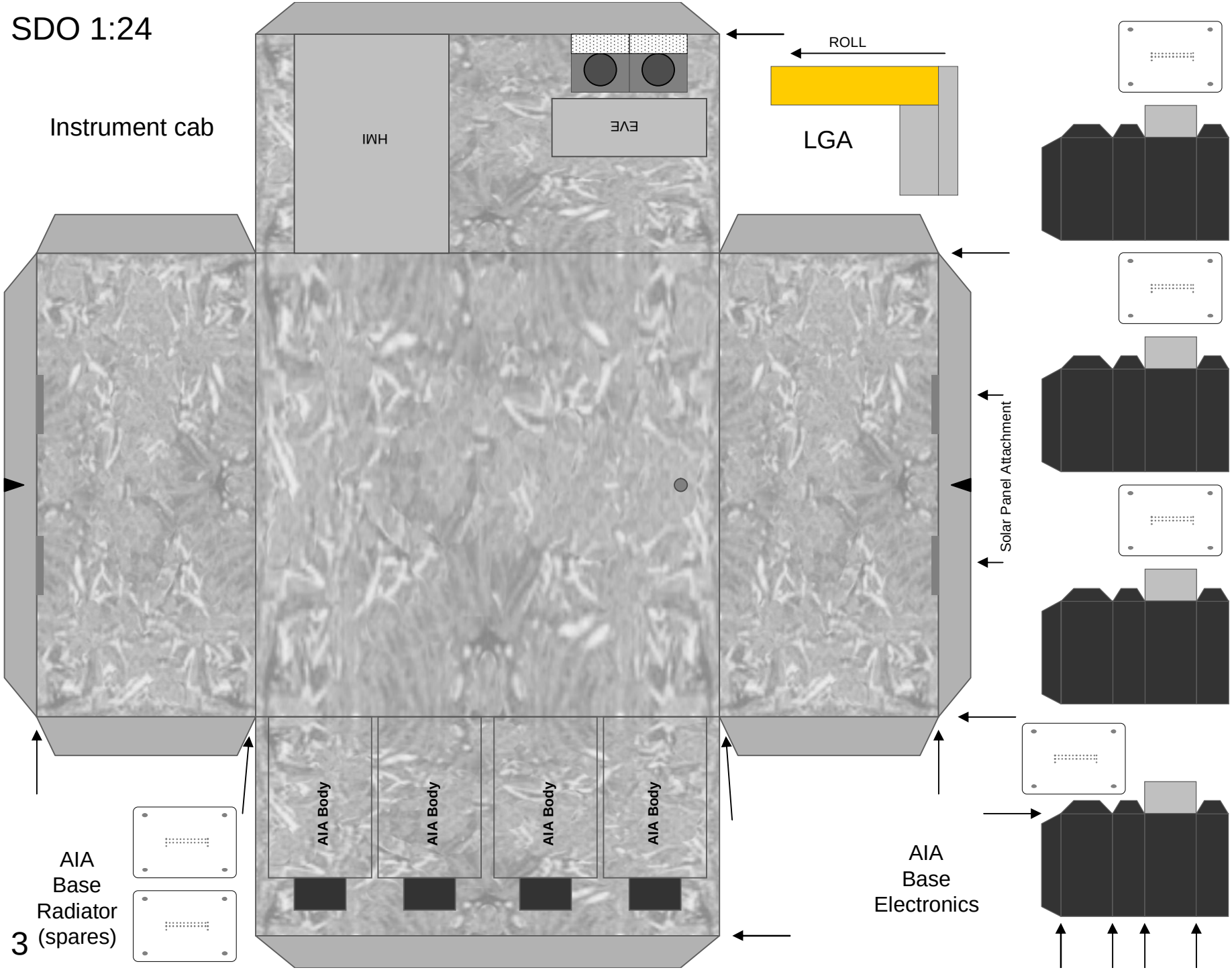
EVE

HMI

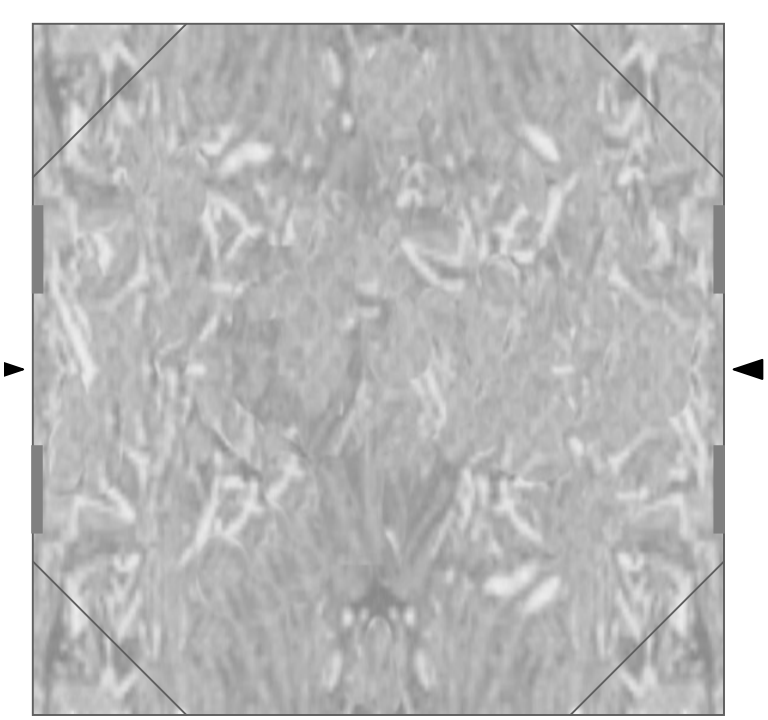
AIA



SDO 1:24

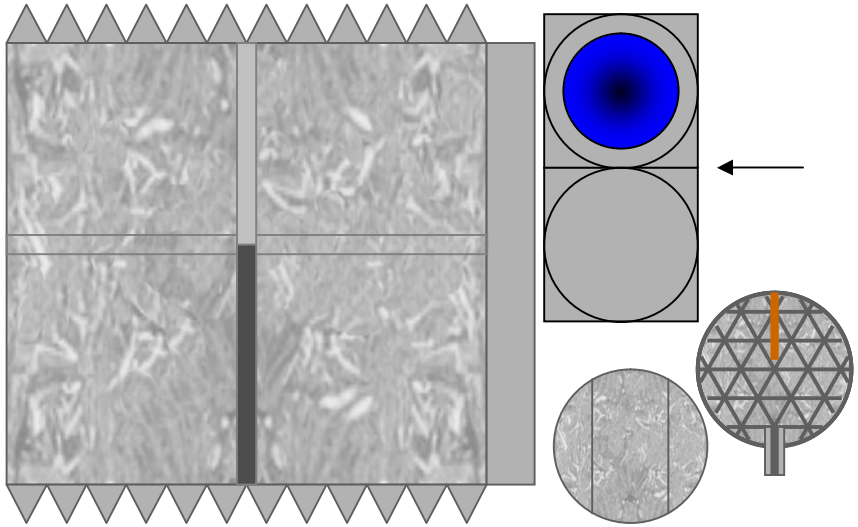


3

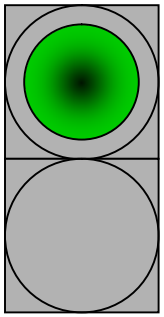


Instrument cab bottom

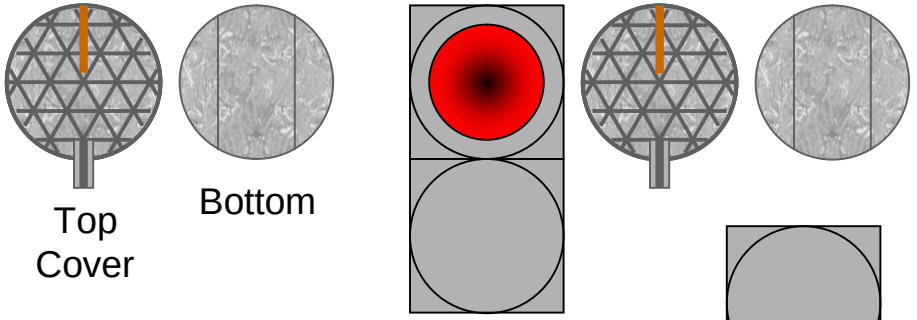
Atmospheric Imaging Assembly (AIA) Body



Top Lens



ROLL

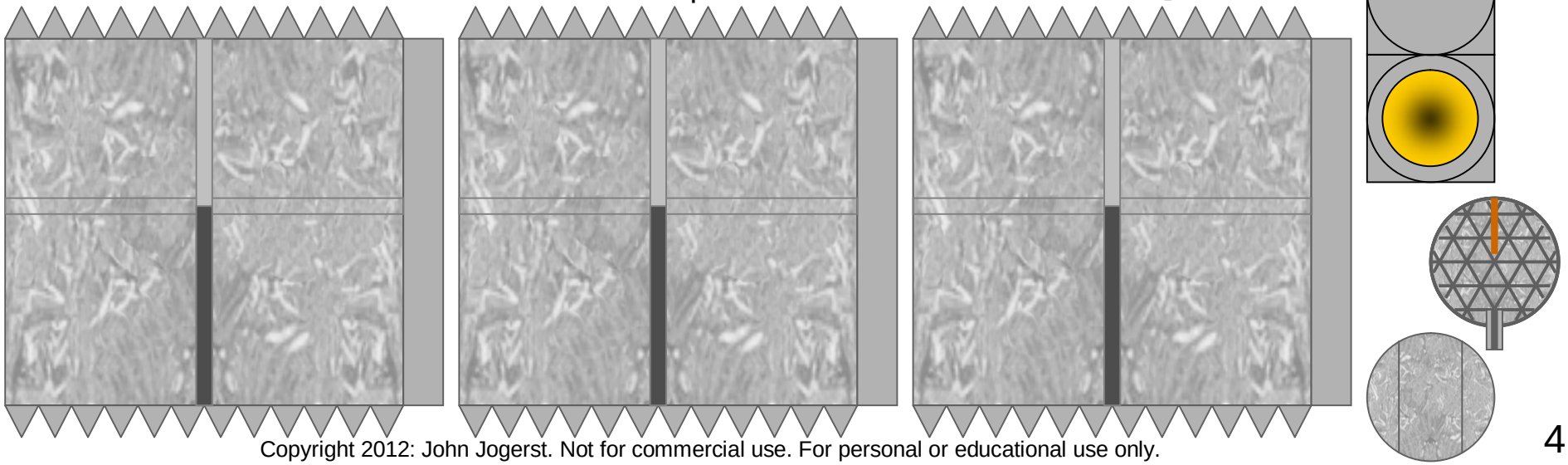


Top Cover

Bottom

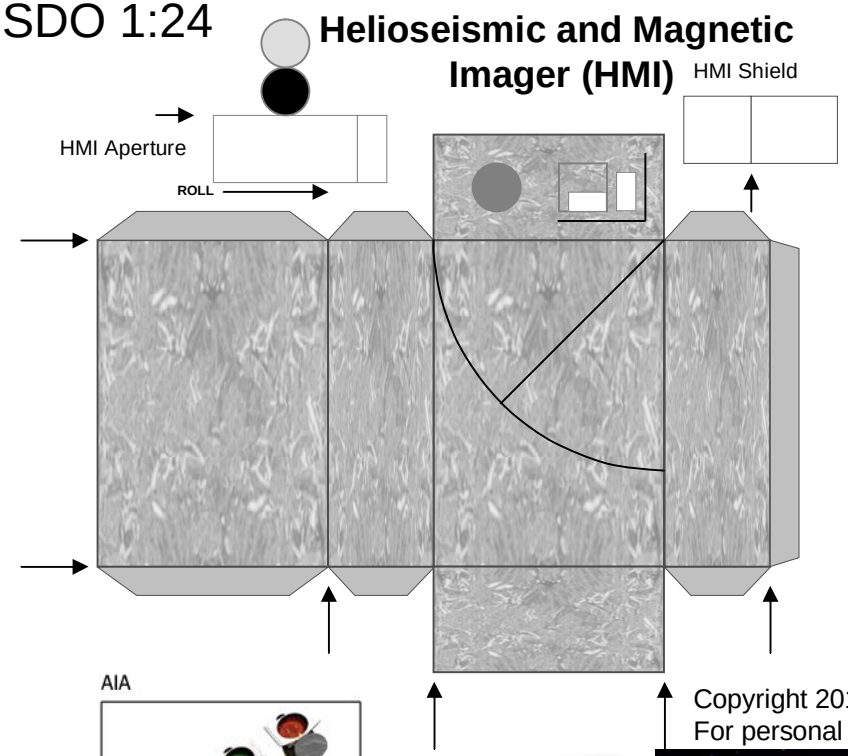
SDO 1:24

AIA Solar Telescopes

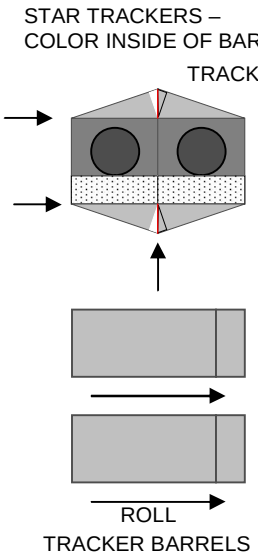


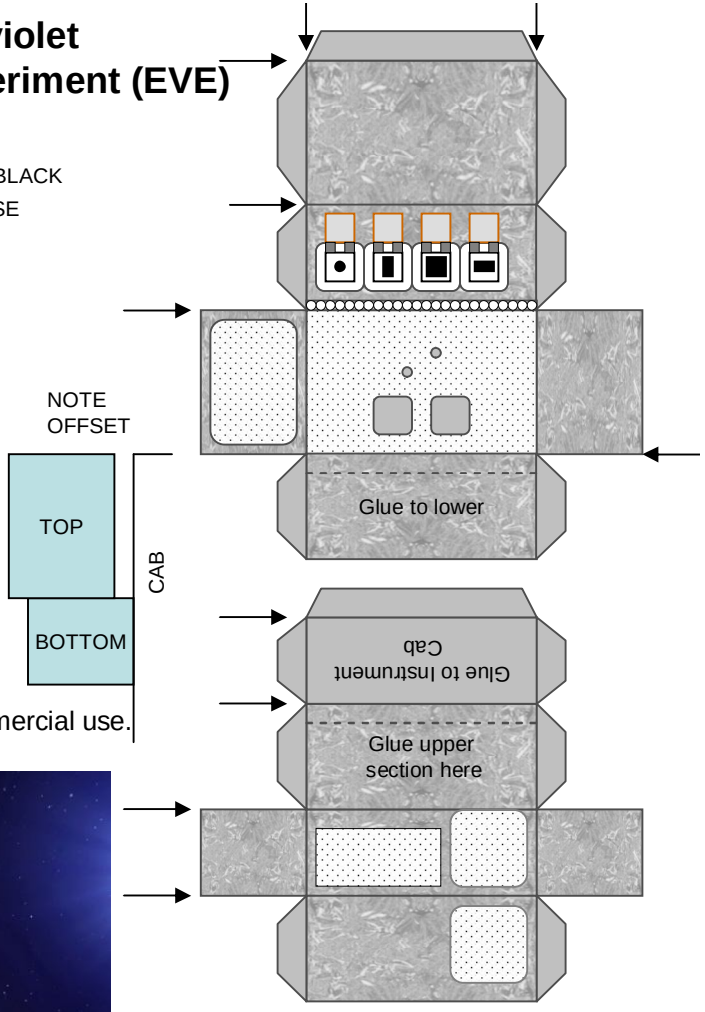
SDO 1:24

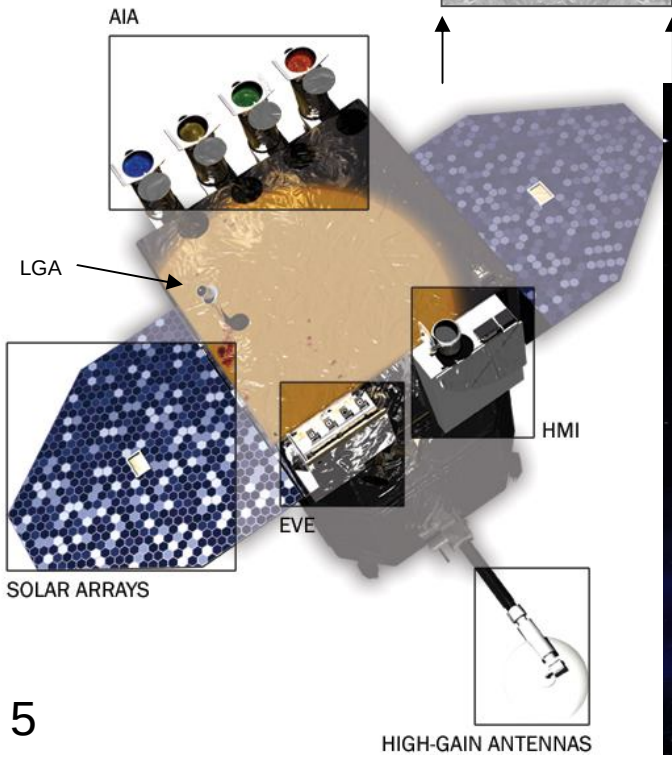
Helioseismic and Magnetic Imager (HMI)

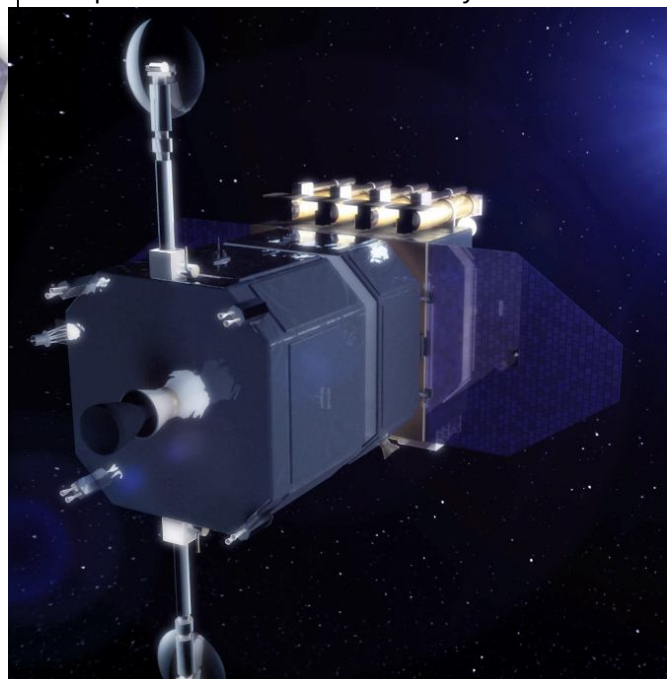


Extreme Ultraviolet Variablity Experiment (EVE)

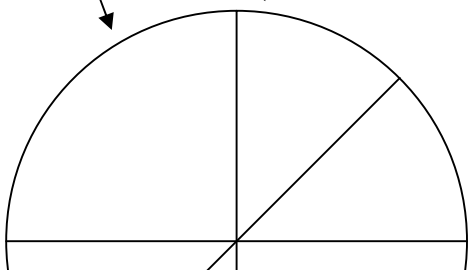






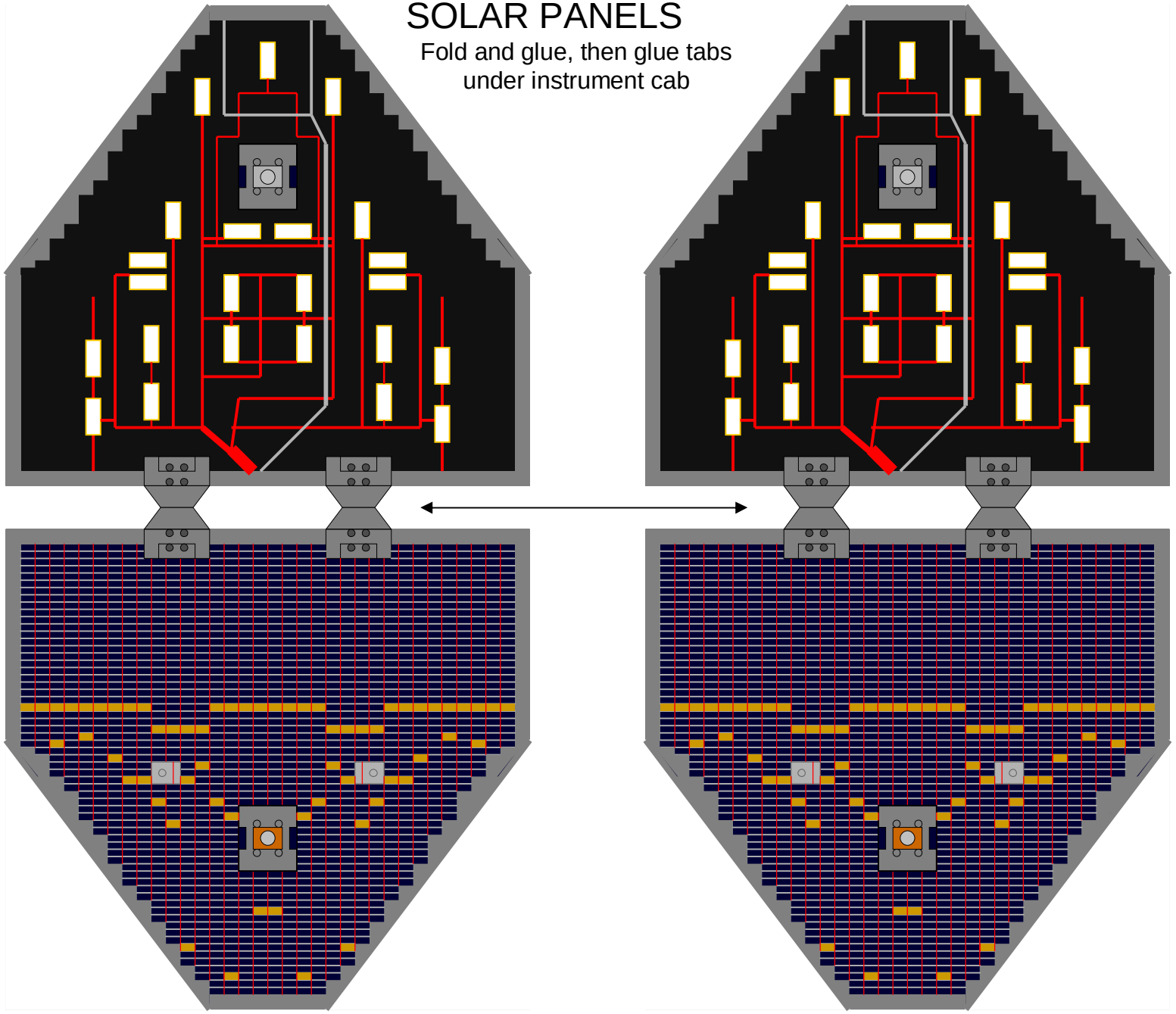


CUT OUT OVERLAYS FOR HMI RADIATORS
BOTTOM LAYER, TOP LAYER GLUE TO LOWER OCTANT.



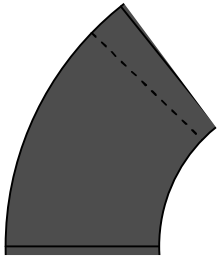
SOLAR PANELS

Fold and glue, then glue tabs under instrument cab

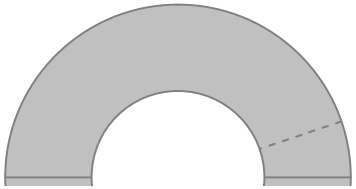


TOP SIDE – POINTS SAME DIRECTIONS AS INSTRUMENTS

SDO 1:24



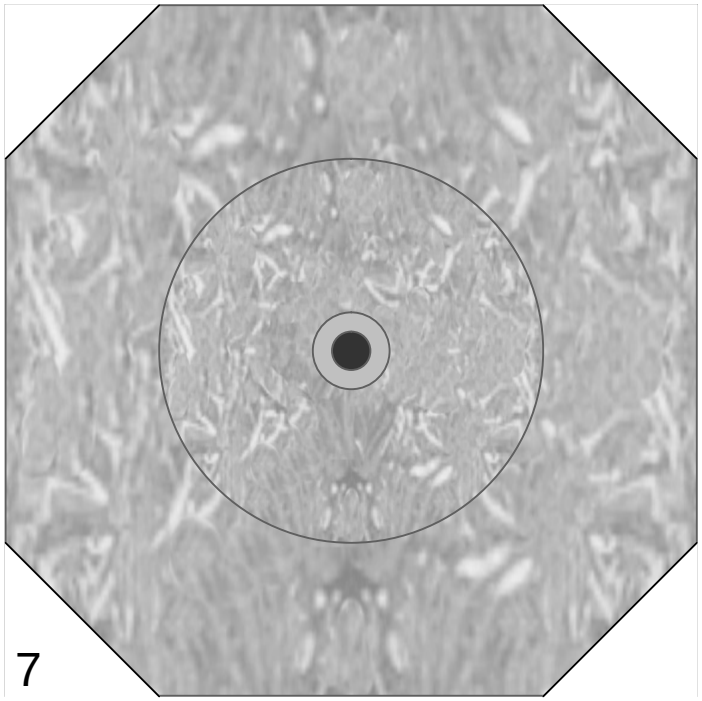
NOZZLE
Roll into cone.

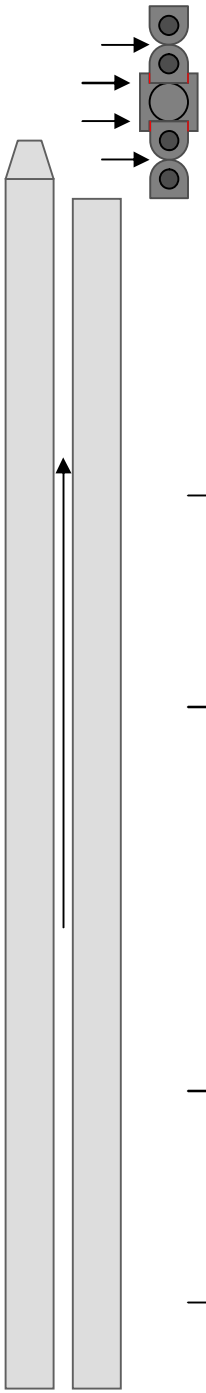


NOZZLE SHROUD
Roll into cone. Glue to center of base. Glue nozzle inside.

BASE RING -
Outer and inner.
Roll into rings
and glue to bottom.

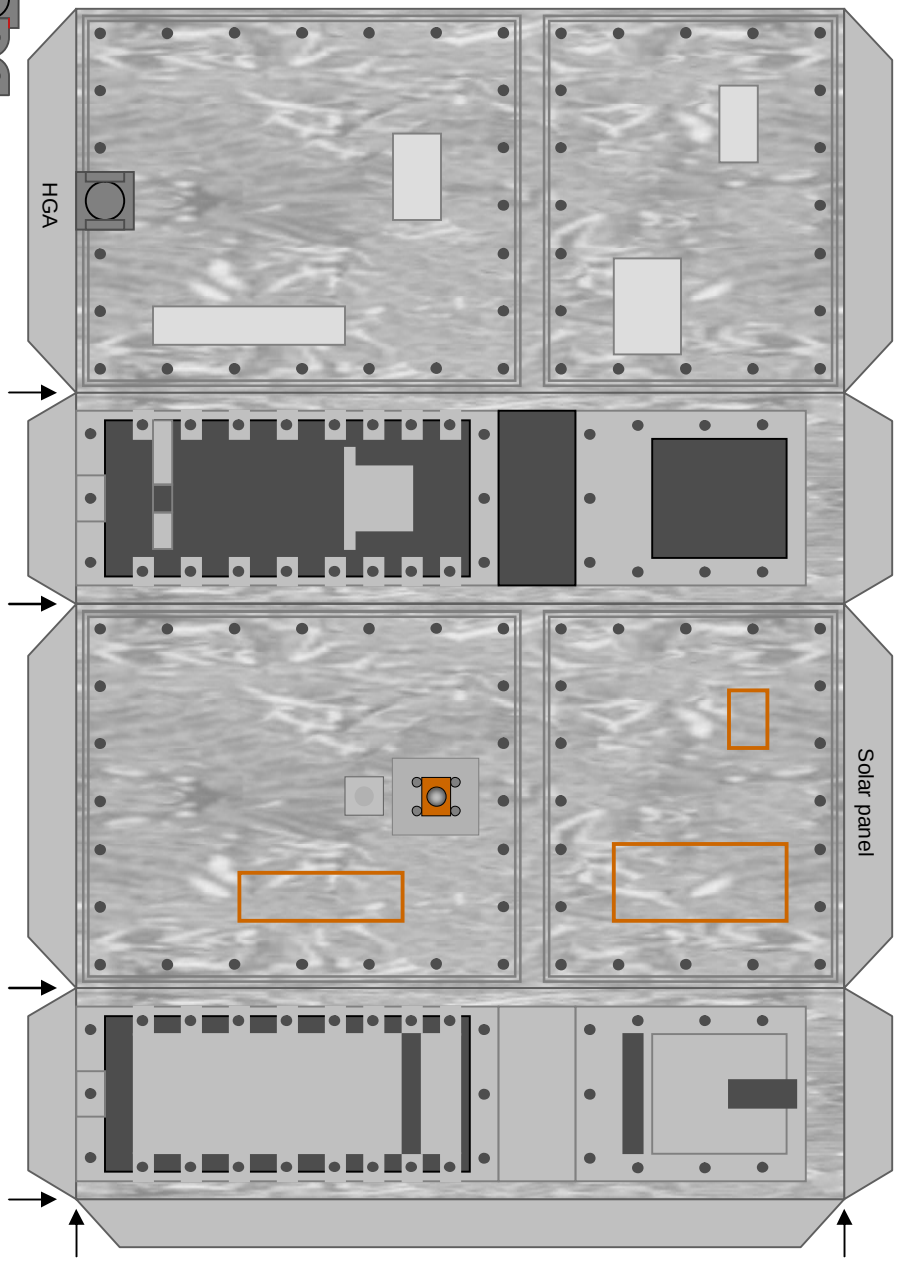
Spacecraft Bus Base.





HGA MAST
HINGE.

Spacecraft Bus



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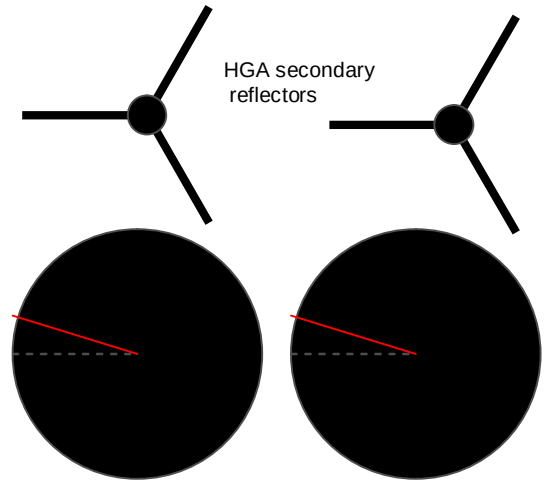

HGA dish – Form into flat cone