JUNO mission to Jupiter 1:24 scale

The Juno mission is a NASA New Frontiers Program mission to significantly improve our understanding of the formation and structure of Jupiter. Understanding Jupiter is essential to understand the origin and early evolution of our own solar system - and those we are discovering around other stars.

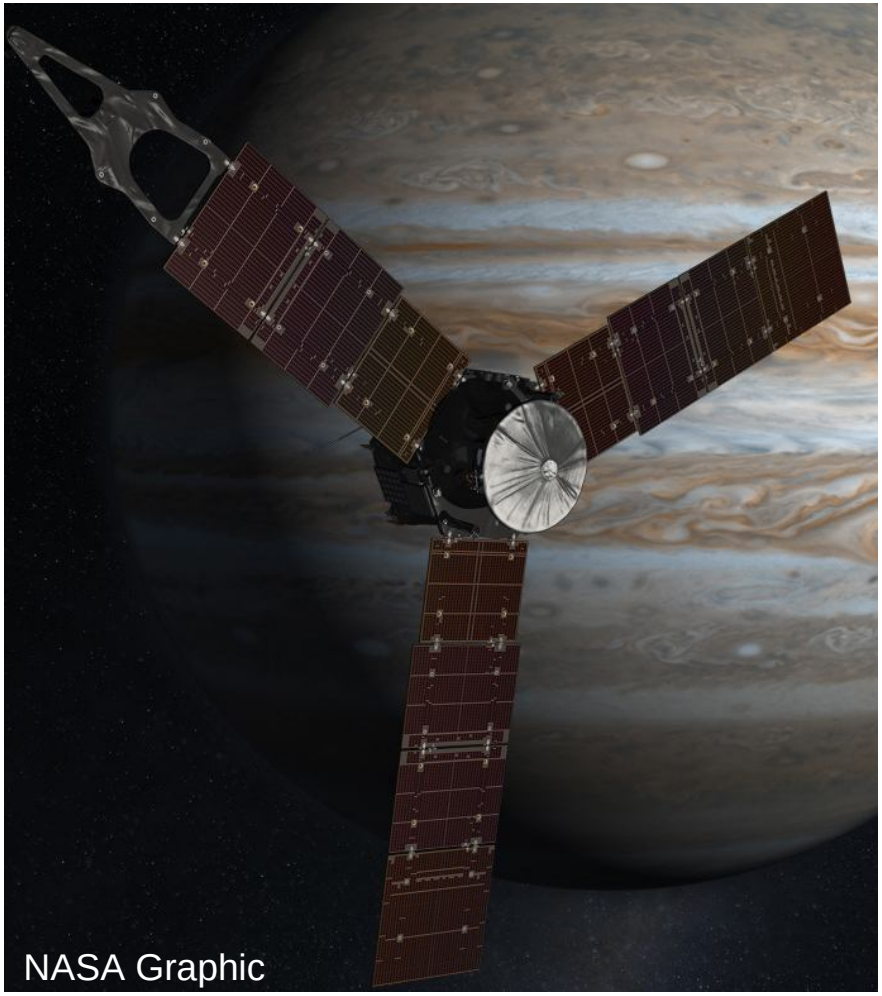
Juno will investigate Jupiter's origins, its interior structure, its deep atmosphere and its magnetosphere from an innovative, highly elliptical orbit with a suite of seven science instruments. In addition, the JunoCam will be used by young students to take the first images of Jupiter's polar regions.

Juno is unique in using three large solar panel spanning more than 20 meters for power. Because the Sun is more distant, the amount of sunlight available to generate power for a spacecraft exploring the outer planets is about twenty seven times weaker than that available to spacecraft exploring the inner solar system. To generate enough power Juno needs very large solar panels.

At Jupiter Juno will dive into a unique elliptical polar orbit, dropping to just 4000km (2500 mi) above the cloud tops. The unique orbit satisfies mission science requirements while minimizing Juno's radiation exposure. Juno's electronics are housed in a "vault," a titanium-armored cube just under a meter in size for protection. Despite this, the intense radiation belts around Jupiter will likely limit Juno's lifetime to just over one year (32 orbits).

Juno is currently planned to be launched in August 2011 on an AtlasV booster with an Earth fly-by in October 2013 to provide a gravity assist. After a five year journey the spacecraft arrives at Jupiter in 2016.

For more information go to
http://www.nasa.gov/mission_pages/juno/main/index.html



Juno

Model can be rescaled:
For common scales: print at 50% or 4 pages per sheet print for 1:48 scale. 25% or 8 pages per sheet for 1:96 scale.

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- Score all fold lines before cutting out parts. Red arrows mark folds. Glue sparingly.

- Spacecraft Bus: Cut out the spacecraft bus top/bottom/sides (pages 3-5). Glue the bus side panels together, fold into a hexagon and glue. Fold down the tabs and glue the top and bottom decks in place (use tabs on decks to align). Cut out the payload adapter, roll into a circle and glue. Glue to the white circle on the bottom of the bus.

- Solar arrays/PVA wings: Print two copies of pages 7 and 9. Cut out the top and bottom panels for the photo-voltaic arrays (PVA) and the wing support struts (pp 7-11). Glue the inner and outer bottom panels together for each PVA wing. Optional – a piece of wire glued between the top and bottom surfaces will help keep the arrays from sagging. Glue the outer top PVA panel to the lower panels, then glue the inner top panel in place. Glue the six strut parts to another piece of card, then glue two parts together to make three thick/stiff struts (four layers of card). Glue the tabs at the inner ends of the PVA wings to the top of the bus with the PVA-magnetometer boom where indicated. Place the assembly top-down on a flat surface to dry. When dry, bend the tabs at the top of the wing support struts (forked end) – glue the tabs (hinges) over the first set of hinges on the bottom of each PVA, then glue the bottom tab to the side of the bus (centered side-to-side) to keep the wings straight.

- High Gain Antenna (HGA): Cut out the HGA cover, conics, and base parts (pp 12-13). Curve the cover into a flat cone and glue. Bend the tabs around the edge down. Roll and glue the two conics. Roll the base band into a ring and glue. Glue the base to the base band using the tabs on the band. Apply glue around the top of the base band and attach the smaller HGA conic. Glue the large conic in place using the tabs. Apply glue around the inside edge of the large conic and insert the tabs on the HGA cover inside to secure it in place.

- Electronics Vault: Cut out the electronics vault and two SASU parts (p 6). Fold and glue into boxes. Glue the SASUs to the side of the vault over the dotted lines. Glue the HGA to the top of the vault.

- Low/Medium Gain Antenna (LGA/MGA) assembly: Study the provided picture (p 12) to see how the parts are arranged (p 14). Cut out the antennae; roll the MGA into a cone and glue; roll the LGA mast into a narrow stick and glue the folded disk on top. Cut out the strut assembly and glue the two pieces back to back – folding as indicated to match the picture and diagram. Glue the tips of struts marked “1” together. Glue the base marked “3” to the vault over the light gray rectangle on the side of the vault. Glue the joined tips of struts “1” to the side of the HGA base to make the top of the assembly level (dots where the LGA and MGA will mount) and bring the top of the assembly near the rim of the HGA. Glue the tips of struts “2” between the bottom of the assembly and vault. Glue the MGA and LGA antennae into place.

- Instruments and Detailing: Science instruments and equipment are provided for detailing. Note the instructions next to the parts (p 5-6). Cut out, fold/roll/glue into shape and glue to the spacecraft bus and magnetometer boom over the matching printed graphics referring to the pictures and diagrams as needed. The JEDI and JADE-I instruments have a curved section that wraps around the top of the parts. Some parts are too small for assembly tabs – edge glue where necessary. Extra surface graphic detail parts have been provided for use if desired (hinges, etc.)

- Final assembly: Apply glue to the base of the Electronics Vault/HGA assembly and glue in place over the square marked on top of the bus.

- DISPLAY: The long solar arrays will require support if the model is displayed flat or the model can be suspended from one of the PVA wings.

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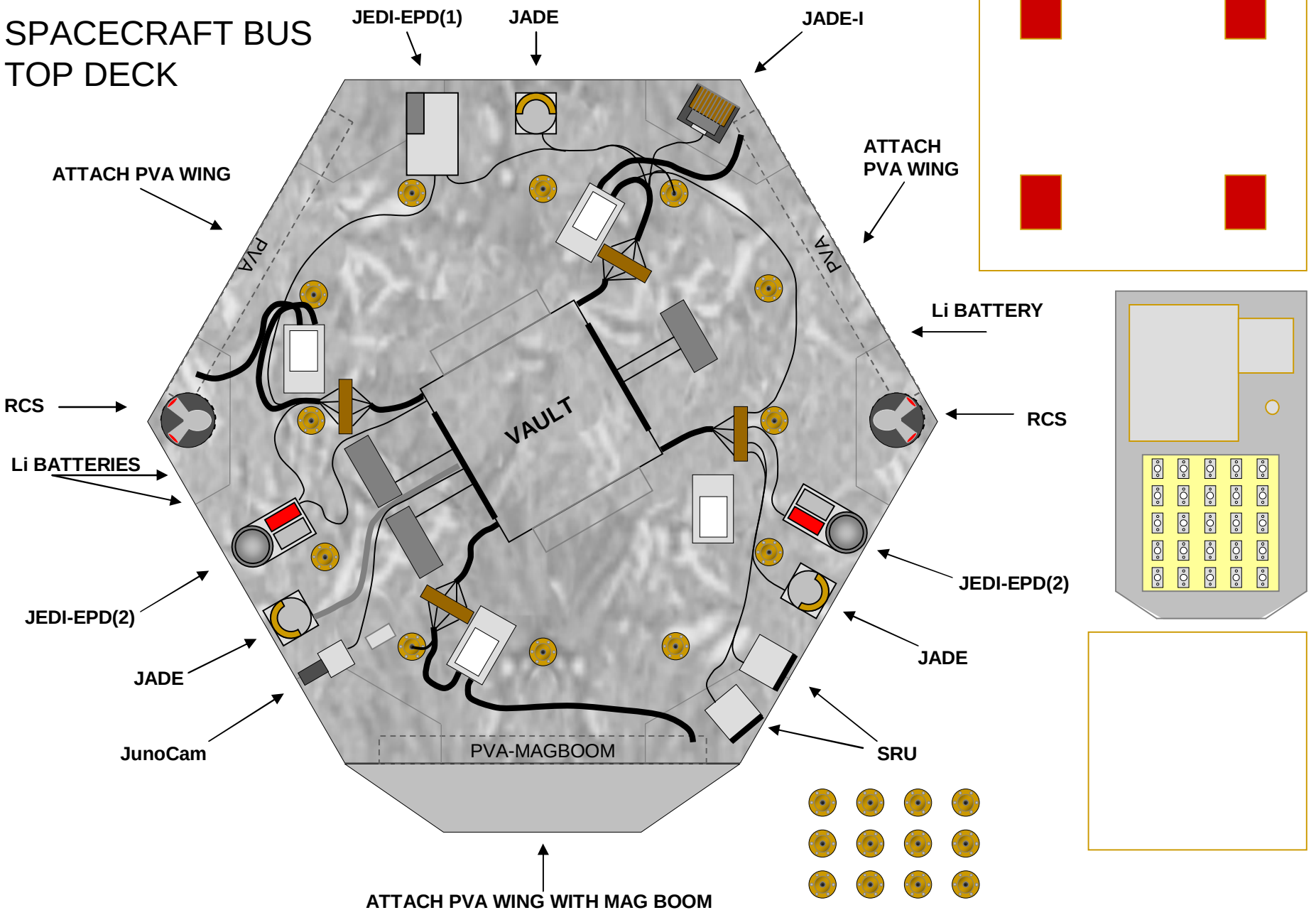
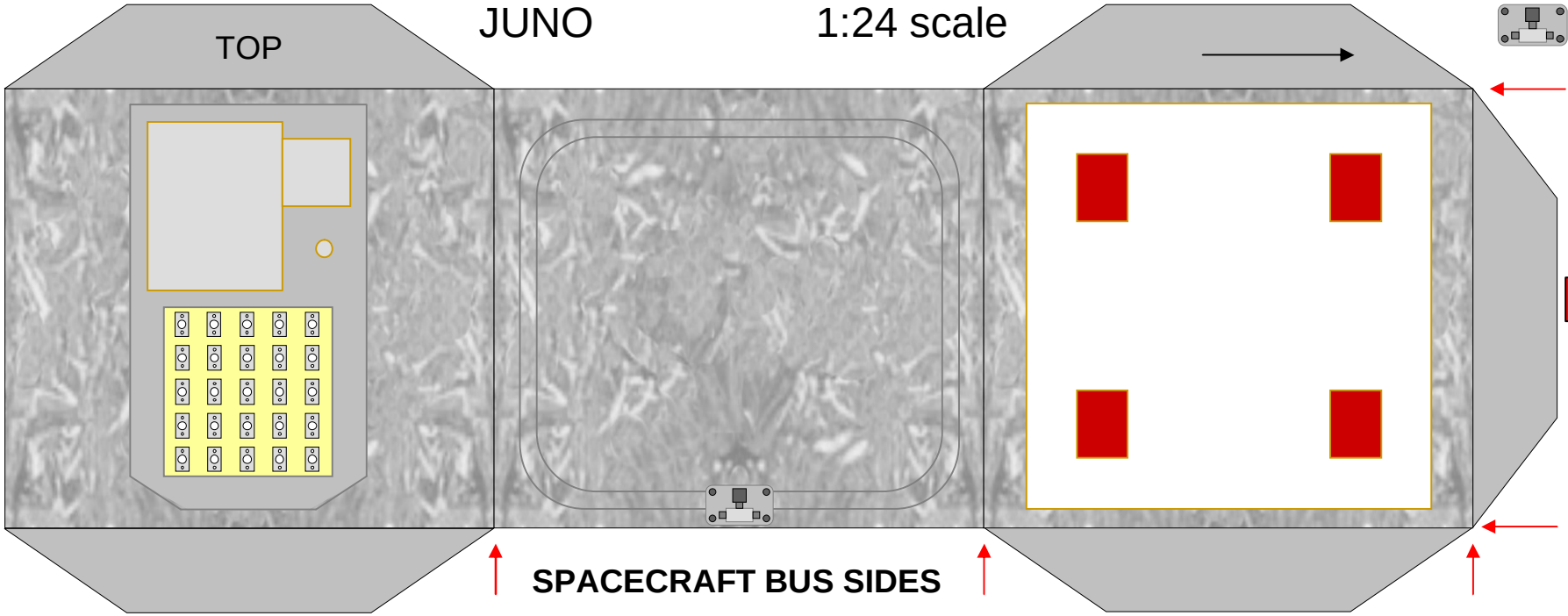
1:24 scale

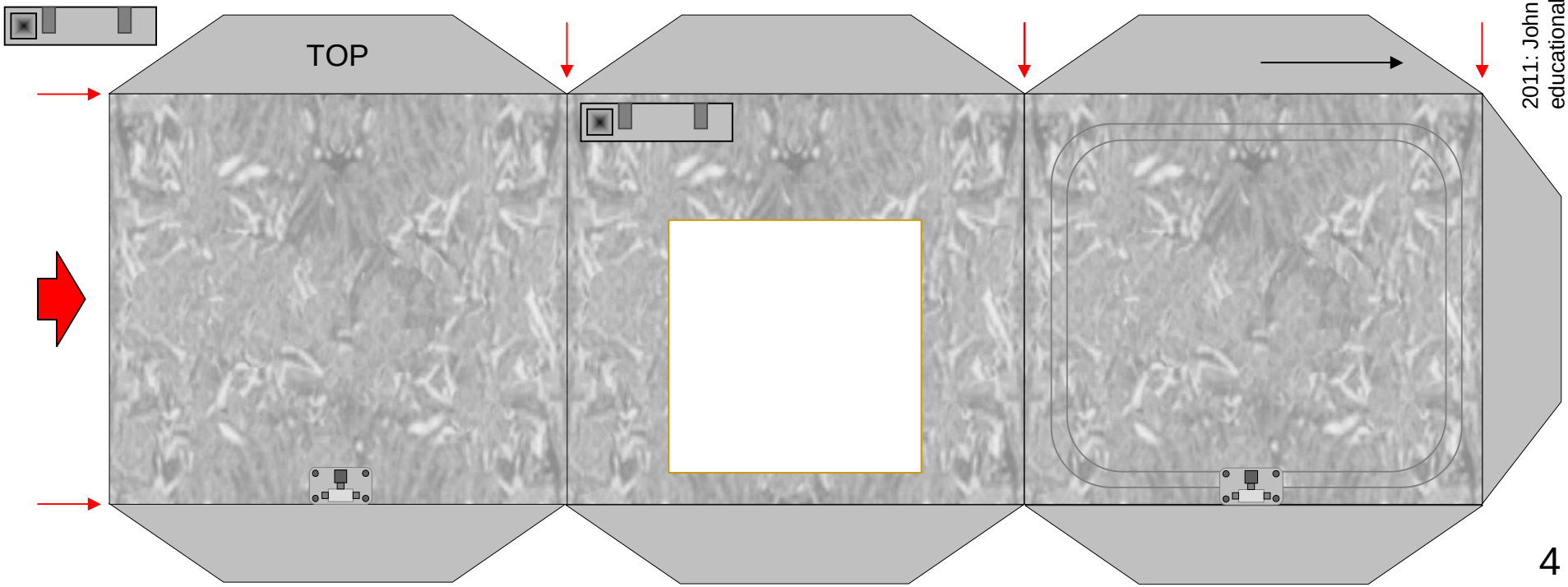
SPACECRAFT BUS TOP DECK



JUNO 1:24 scale



SPACECRAFT BUS SIDES



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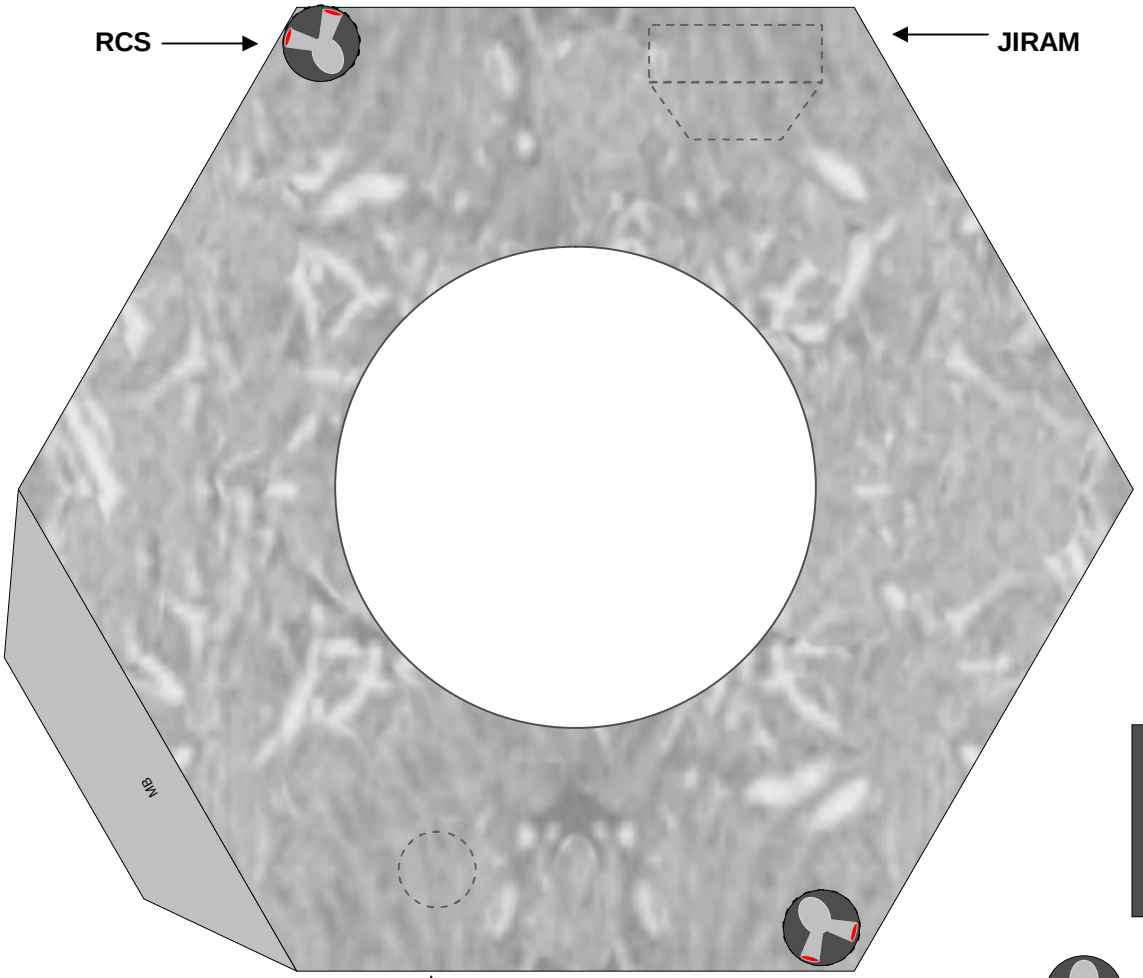
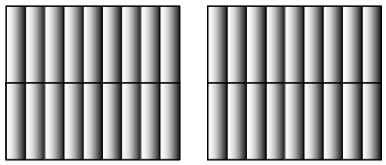
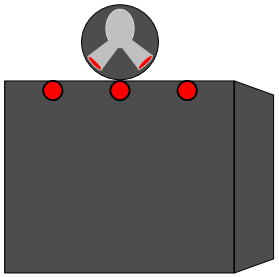


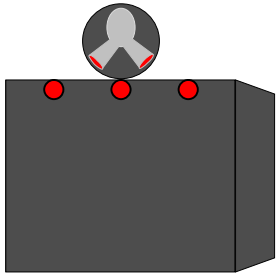
SPACECRAFT BUS BOTTOM DECK

TOROID ANTENNA



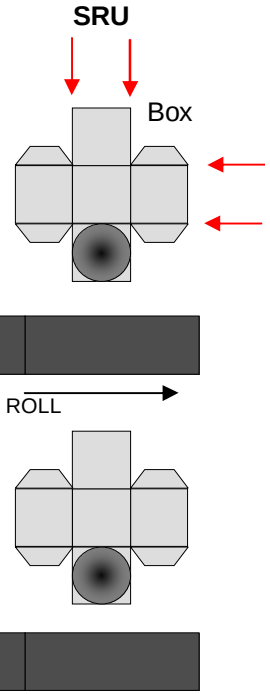


RCS

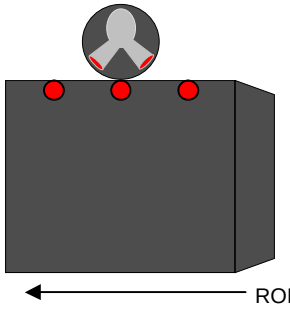


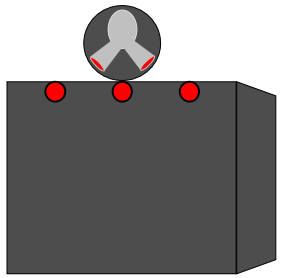
RCS – roll/glue into a cylinder, fold down the top disk to cap.

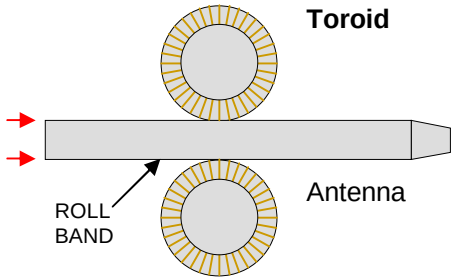
SRU box – fold/glue into a box.
SRU baffle – roll/glue into a cylinder and glue to the circle on the face of the SRU box. Apply glue to the open bottom edges and attach to bus.



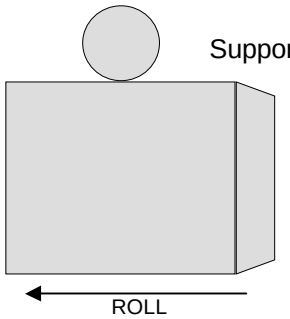
RCS







Toroid antenna – roll/glue the band into a ring, fold the top and bottom down to close the disk. Support – roll/glue into a cylinder, fold down the top disk to cap.



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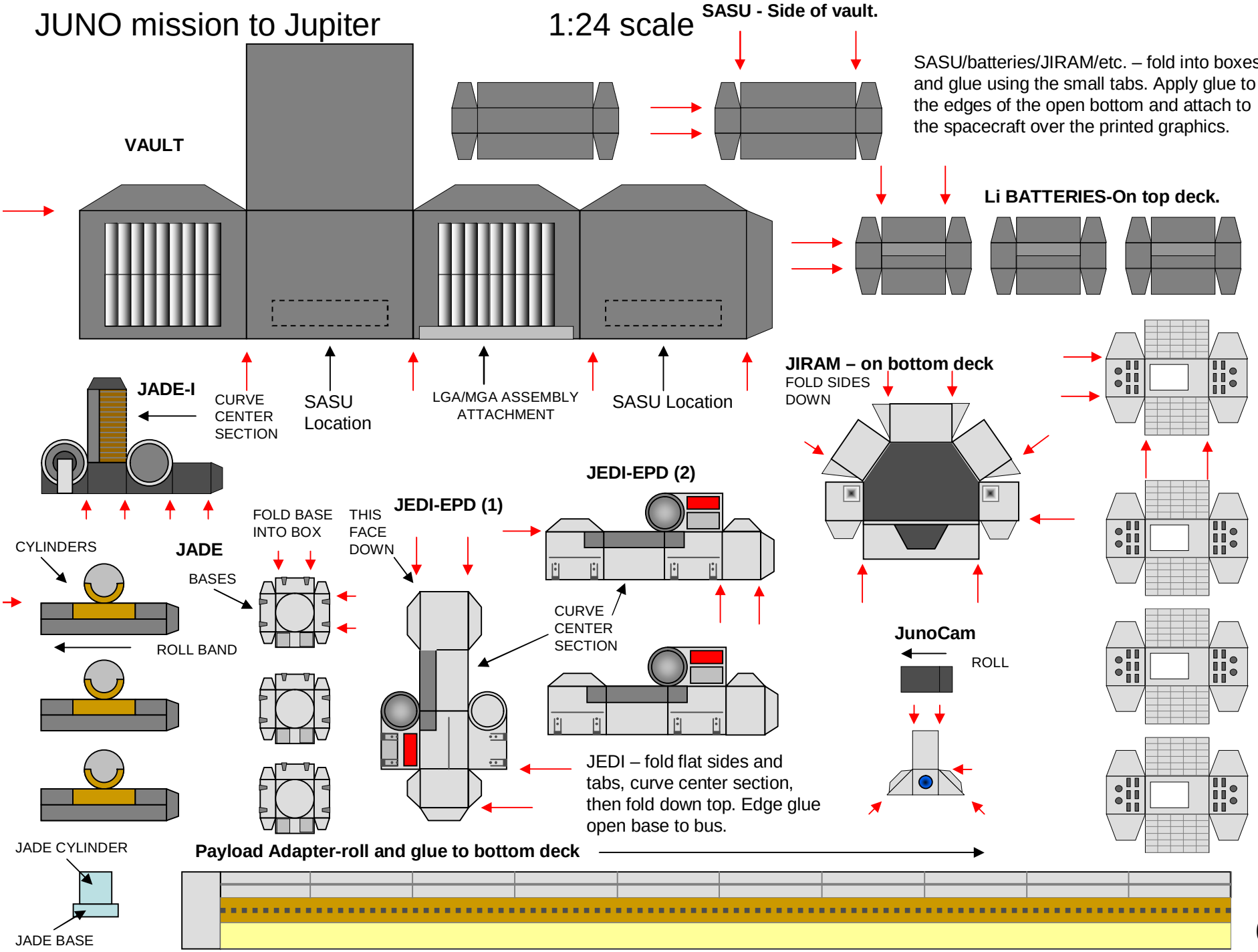
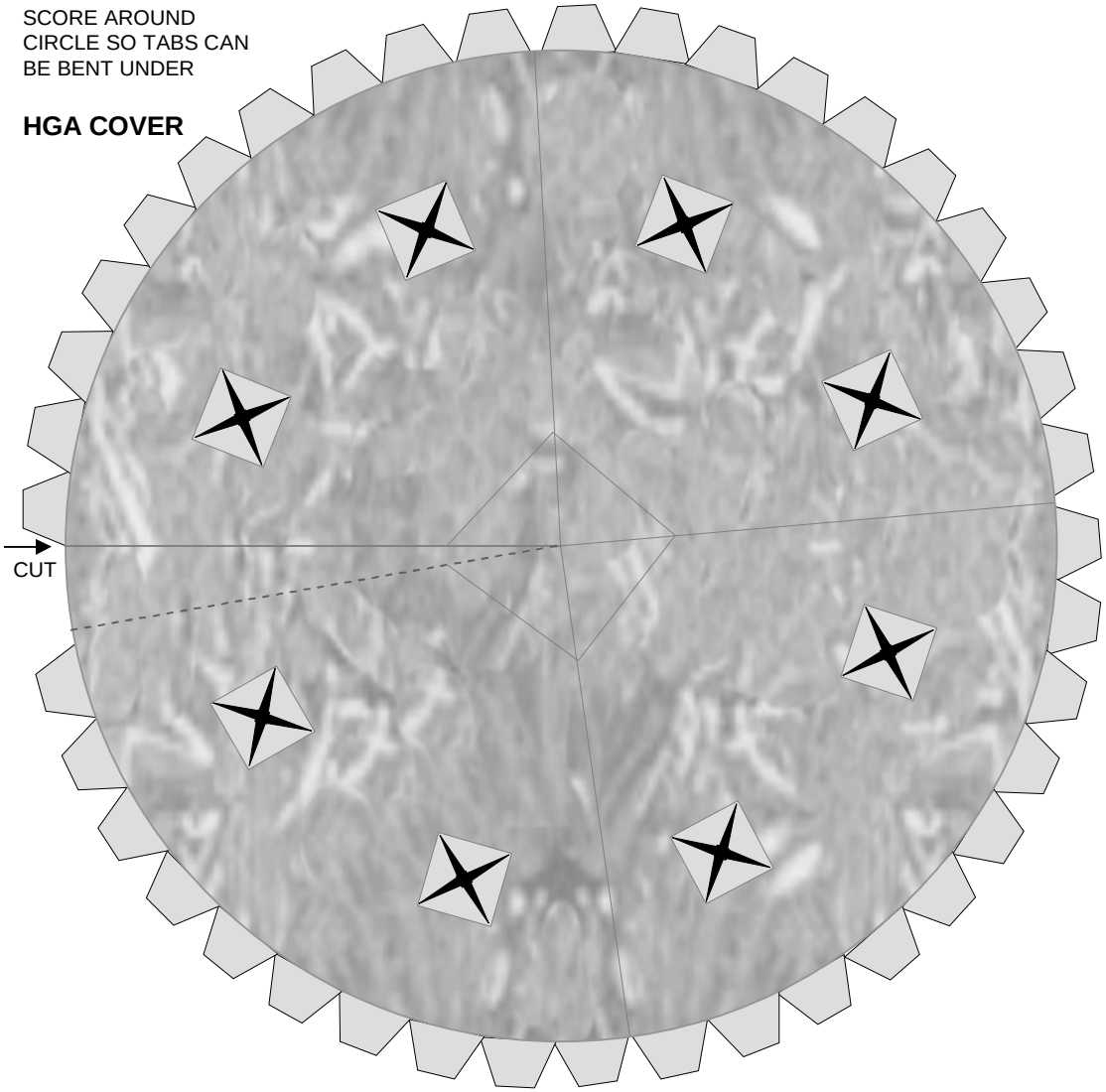
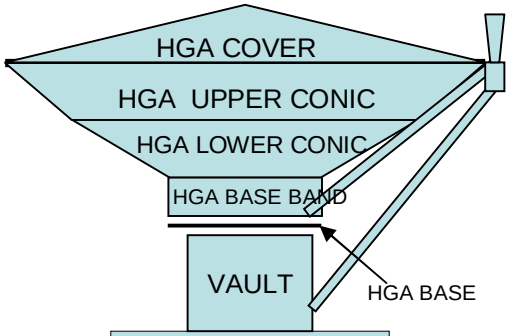


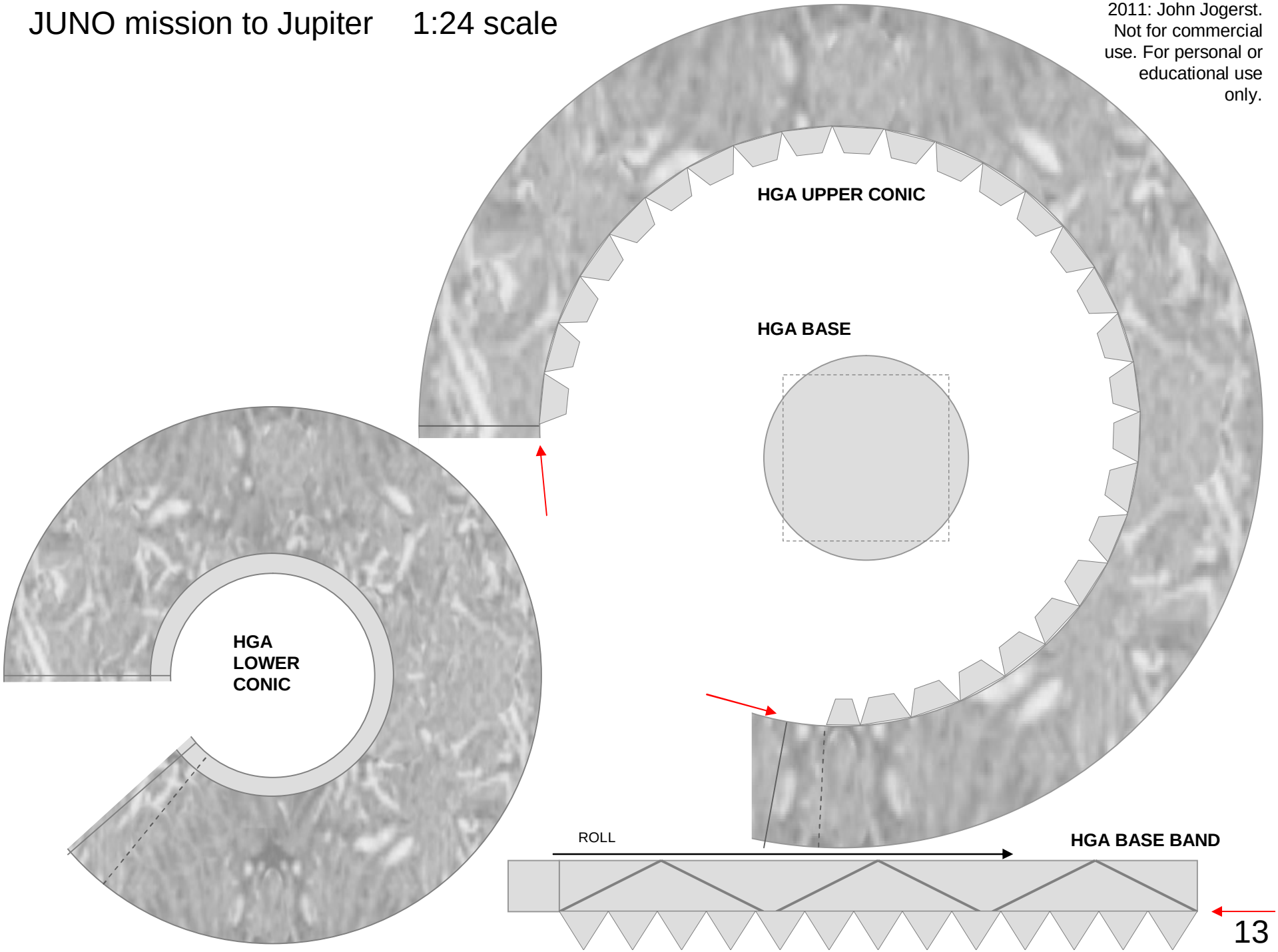
JUNO mission to Jupiter 1:24 scale





BUS

JUNO mission to Jupiter 1:24 scale



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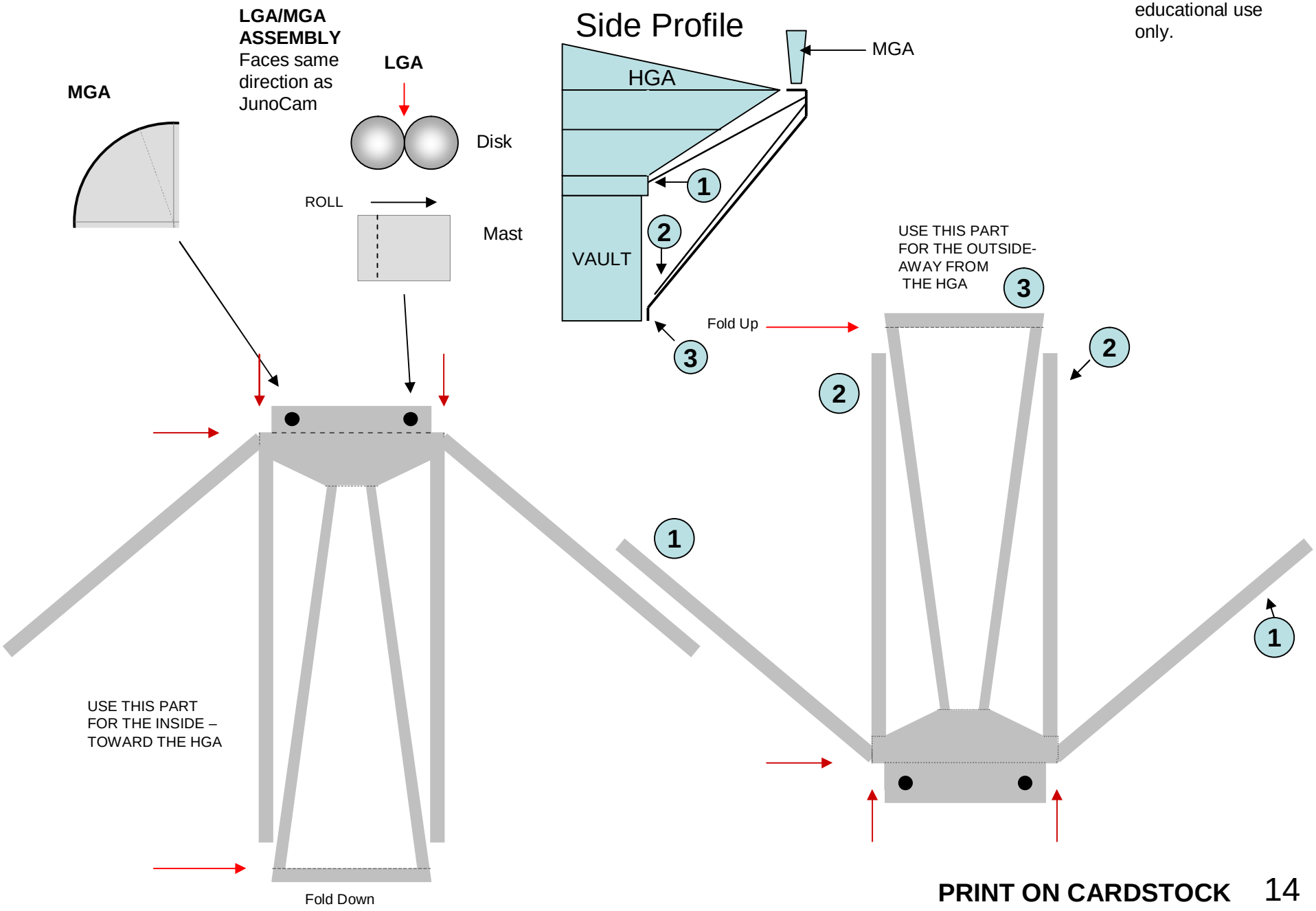
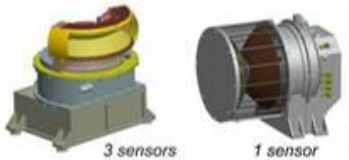


PRINT ON CARDSTOCK

Juno Payload System Overview

Jovian Auroral Distributions Experient (JADE)



JADE will measure the distribution of electrons and the velocity distribution and composition of ions.

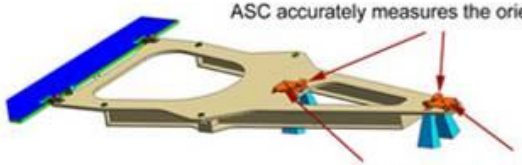
Gravity Science (GS)

The Juno Gravity Science Investigation will probe the mass properties of Jupiter by using the communication subsystem to perform Doppler tracking.

Magnetometer (MAG)

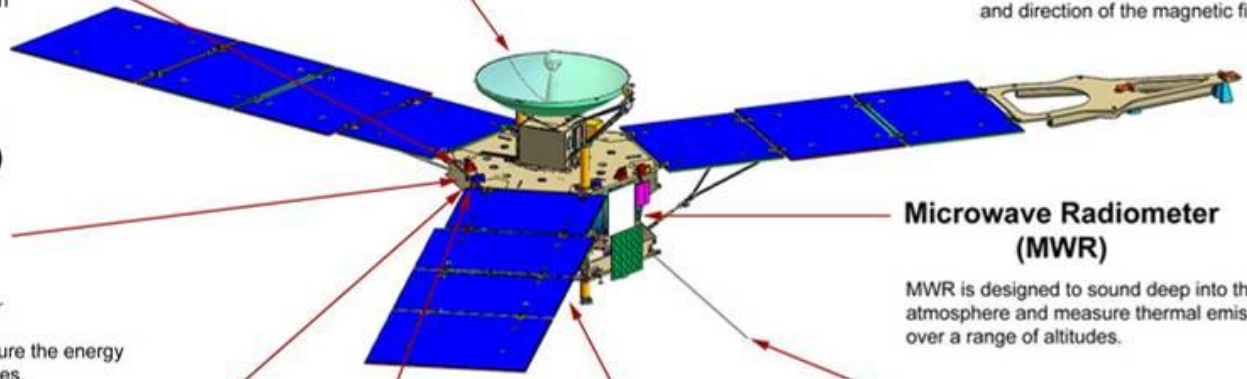
Advanced Stellar Compass (ASC)

ASC accurately measures the orientation of the magnetometers.

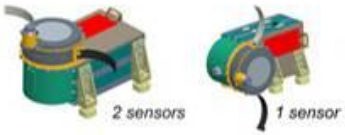


Fluxgate Magnetometer (FGM)

The two fluxgate sensors will measure the magnitude and direction of the magnetic field in Jupiter's environment.



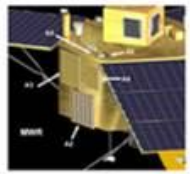
Jupiter Energetic-particle Detector Instrument (JEDI)



JEDI is a suite of detectors that will measure the energy and angular distribution of charged particles.

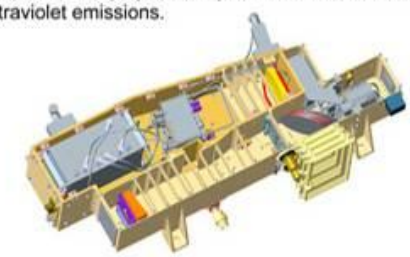
Microwave Radiometer (MWR)

MWR is designed to sound deep into the atmosphere and measure thermal emission over a range of altitudes.



Ultraviolet Spectrograph (UVS)

UVS is an imaging spectrograph that is sensitive to ultraviolet emissions.



JunoCam

JunoCam will provide visible-color images of the Jovian cloud tops.

Jovian Infrared Auroral Mapper (JIRAM)

JIRAM will acquire infrared images and spectra of Jupiter. JIRAM is located on the aft/bottom deck.

Plasma Waves Instrument (Waves)

Waves will measure plasma waves and radio waves in Jupiter's magnetosphere.

NASA Graphic