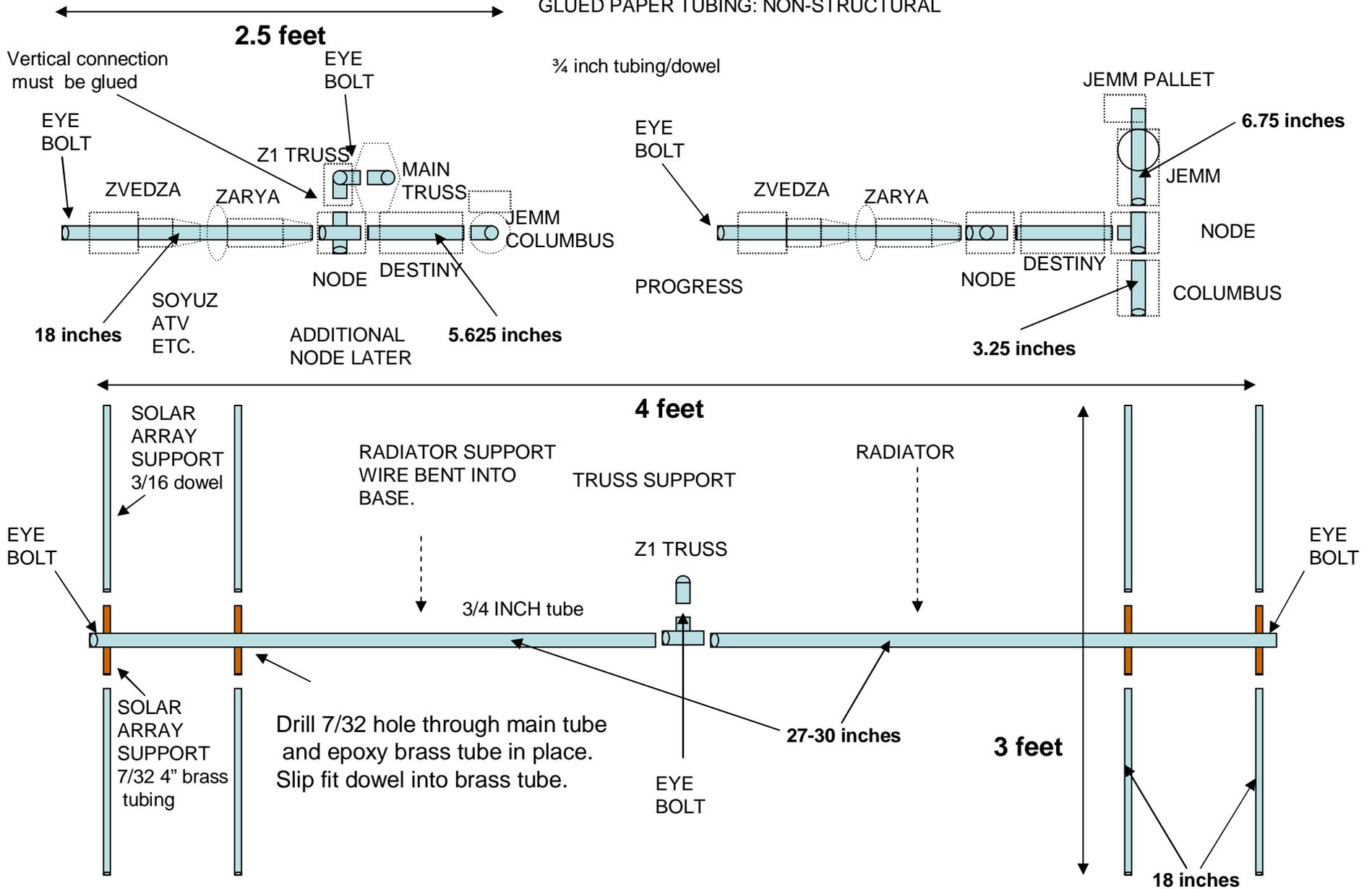


# Four-foot ISS – 1:80 scale

- Building this model requires a moderate level of modeling skill and an intimate familiarity with the International Space Station structure – see [http://www.nasa.gov/mission\\_pages/station/main/index.html](http://www.nasa.gov/mission_pages/station/main/index.html)
- The armature for this model should be dowel/tubing about  $\frac{3}{4}$  inch in diameter (2 cm). Details of the connection between the spine and truss have not been verified – can be made with fittings as shown if available. An alternate method would be to connect the spine and truss armatures with a vertical dowel drilled into the long pieces that penetrates the Destiny module (Z0 truss would then be non-structural).
- Model is approximately 1:80 scale. The finished model will be 3 feet high across the main solar arrays, just over 4 feet wide across the main truss, and about 3 feet long along the main spine where the modules mount.
- Most sections consist of a cylinder and two end caps. More complex shapes are formed from cones and boxes. Sections are assembled with  $\frac{3}{4}$  to  $\frac{13}{16}$  inch tubing running through the parts and connectors where needed. Most conics are formed by cutting on the solid radial lines, then forming and overlapping to the dotted line.
  - Non-structural connections are made with either a paper tube rolled to the same outside diameter as the tubing or with slip-fit cylinders. These connections include the cupola, airlock, JEM small experiment module, the PIRS docking compartment and Soyuz spacecraft.
  - To make a slip-fit docking connection, first close the open ends of the modules to be joined with a circular piece of card. Using a mandrel (cylindrical form), roll and glue a cylinder at least 1 inch long from card stock. When dry, roll a second cylinder over the first, wrapping tightly. When gluing the second cylinder, make sure you don't glue it to the first (inner) piece. Cut a  $\frac{1}{2}$  inch (1 cm) section from both cylinders and glue one piece to each of the parts to be joined. When dry, the two cylinders should slip over each other for a friction fit. Secure with glue for a permanent display.
- The truss is assembled from hexagonal and rectangular box sections. Each section is capped and that end cap has a hole to allow the support tubing to pass through. The tubing runs off-center to accommodate the shape of the S1 and P1 truss sections.
- The main solar arrays are made from plain paper segments (to save weight) supported by a  $\frac{3}{16}$  inch dowel glued up the center of each array. The arrays are mounted to the truss using a  $\frac{7}{32}$  inch brass tube secured in a hole drilled through the main truss support tube/dowel. The solar array dowels then slip into the tubing.
- The radiators for the solar arrays are suspended from a dowel attached to the main truss and attached to the outer end of the radiator.
- The main thermal radiators are suspended from a stiff wire that runs up the center of the mount, then bends 90 degrees and extends out to connect with the end of the top radiator panel. All three panels are tied together at the outer end with a strip of card to hold them up.
- The finished model should be suspended from (or supported at) at least four points: both ends of the truss, the center of the truss, and the back end (Progress/Zvezda) of the central spine. A strong armature may be able to be supported from the bottom with a vertical member up through the Unity node.

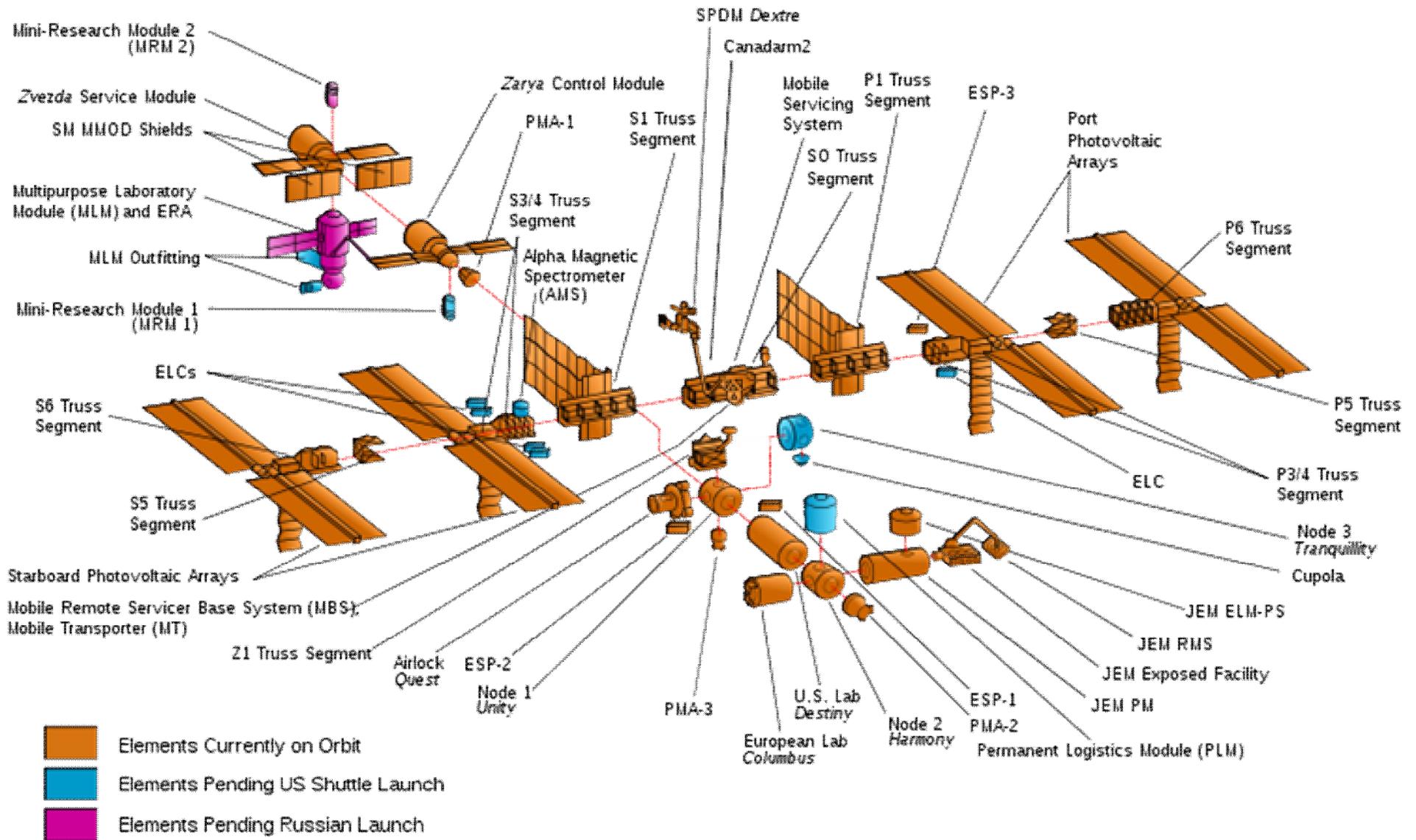
# STRUCTURAL SUPPORT CEILING HANGER DISPLAY

ADDITIONAL STRUCTURE (NODE, LS MODULES, CREW VEHICLES) ATTACHED WITH  
GLUED PAPER TUBING: NON-STRUCTURAL

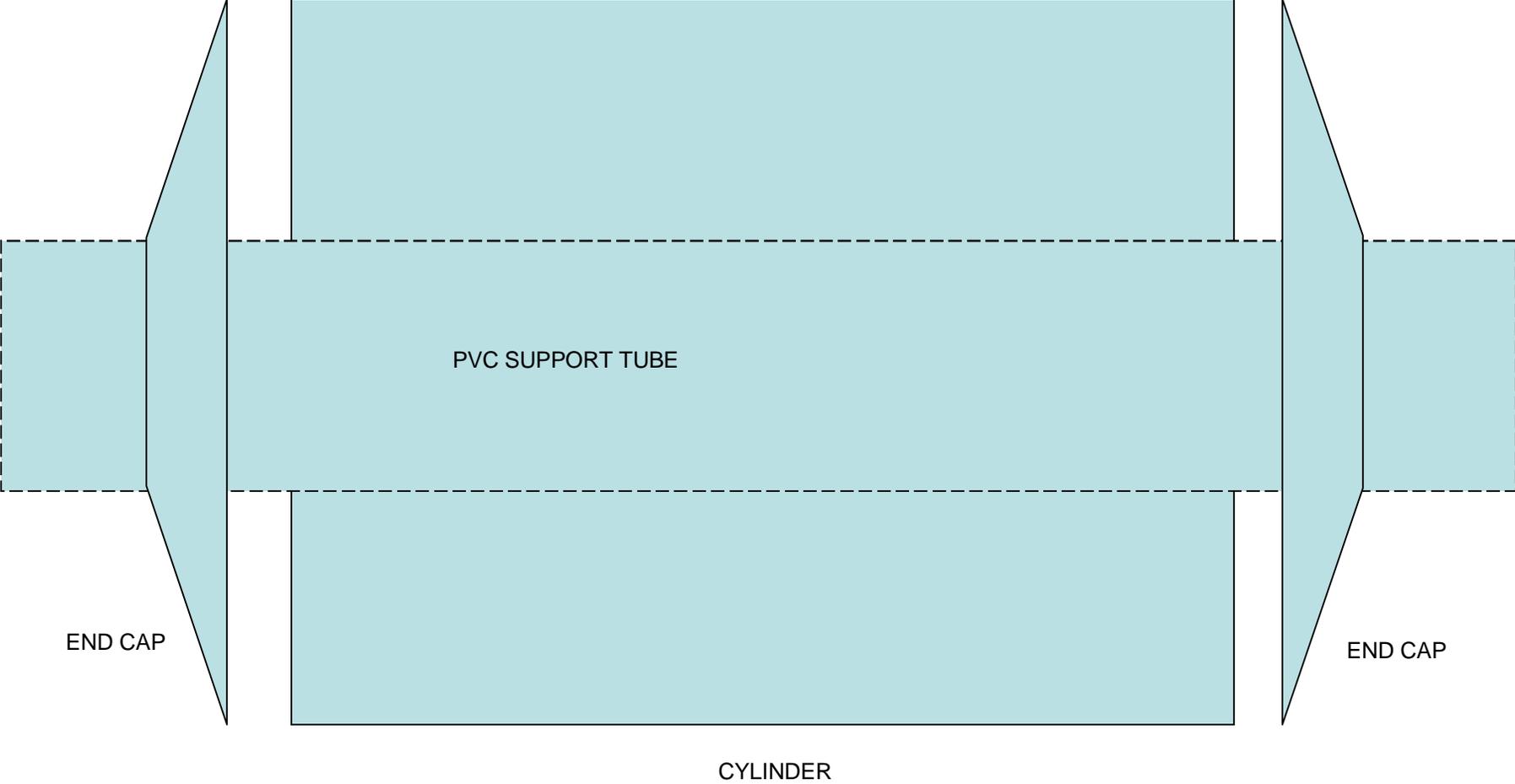


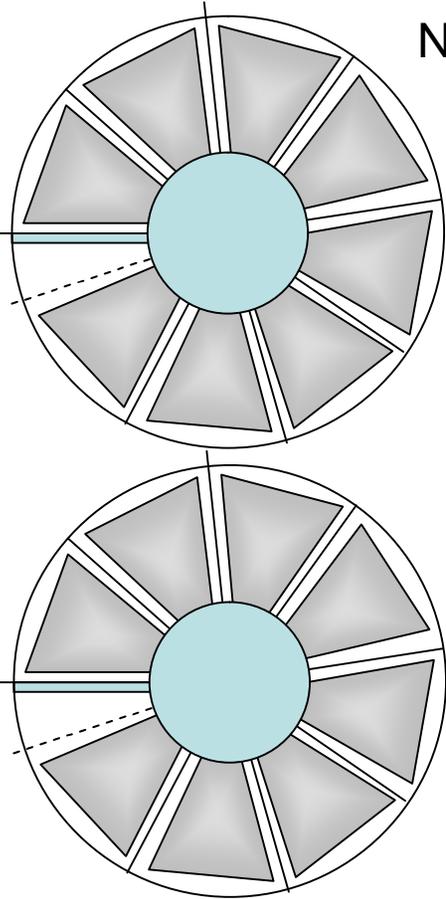
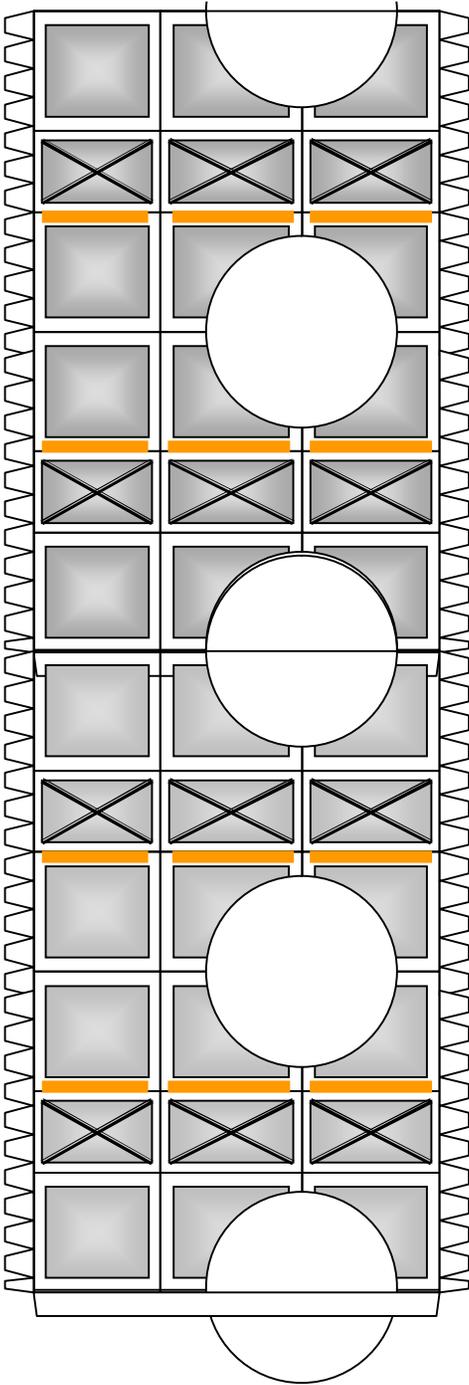
# ISS Configuration

As of July 2009 (2J/A)

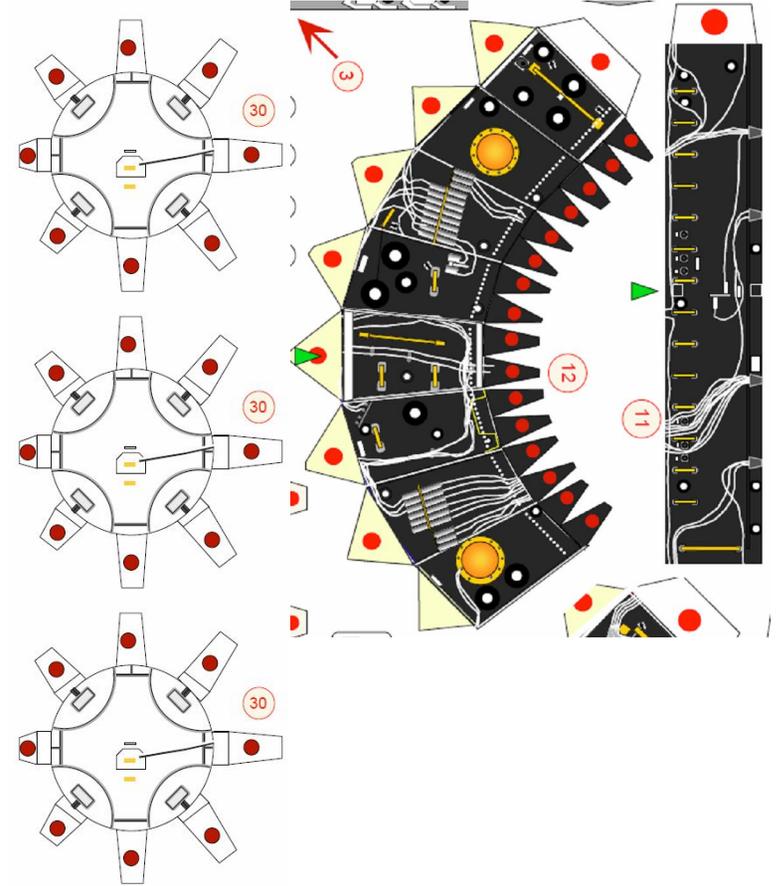


Modules

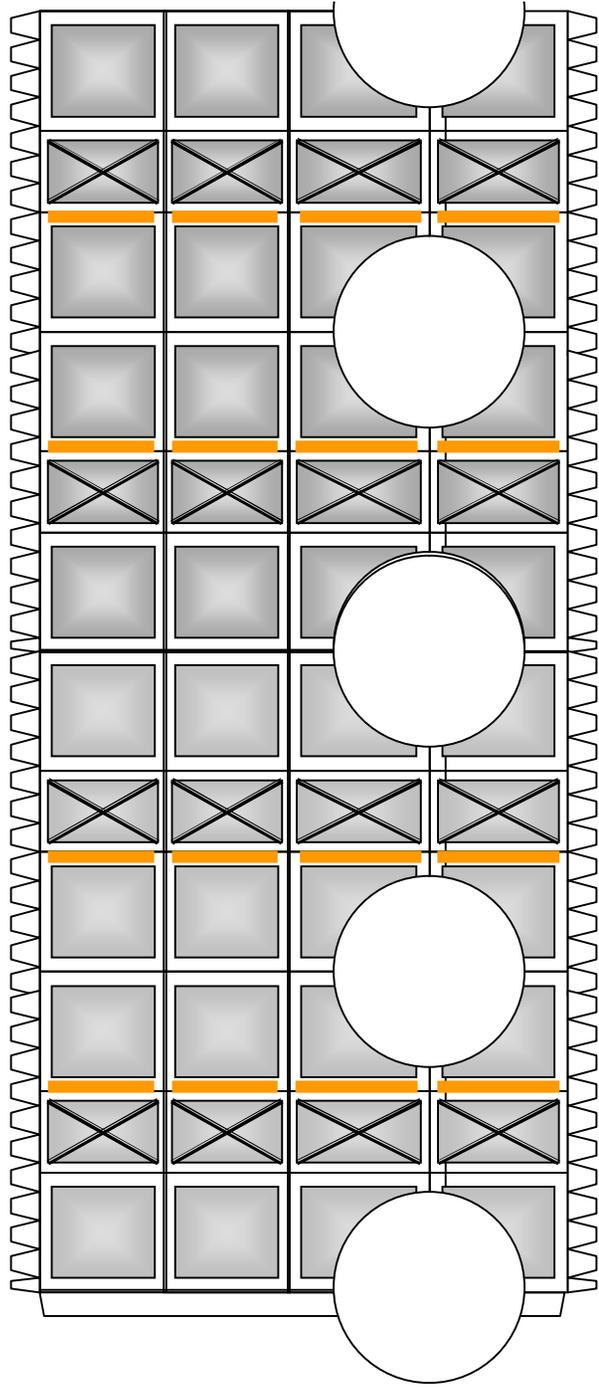




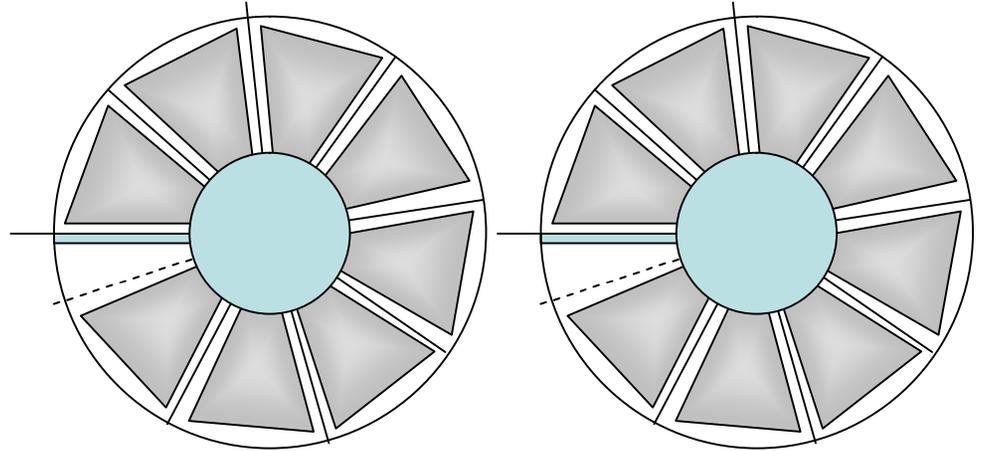
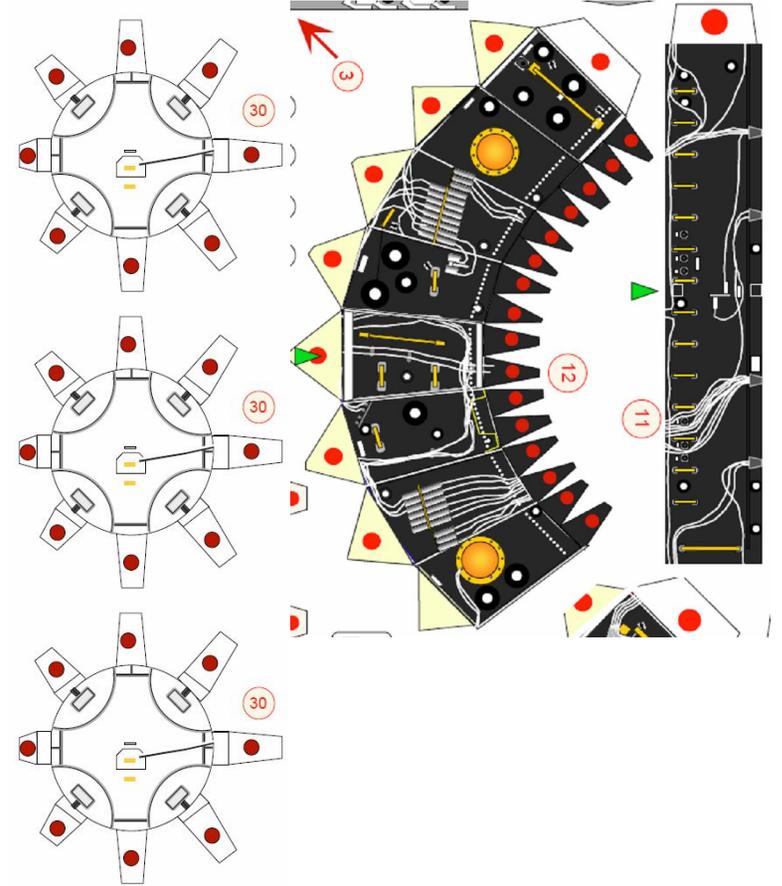
NODE (2)



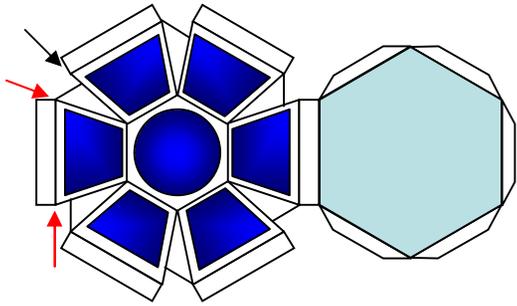
UNITY AND TRANQUILITY



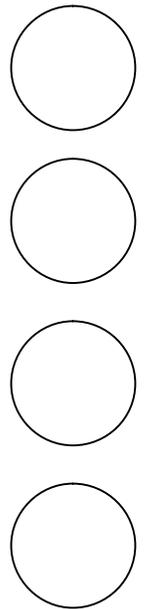
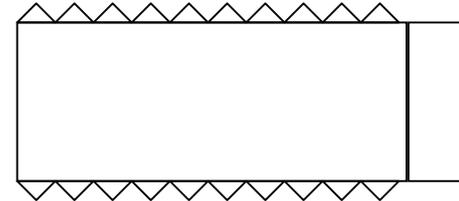
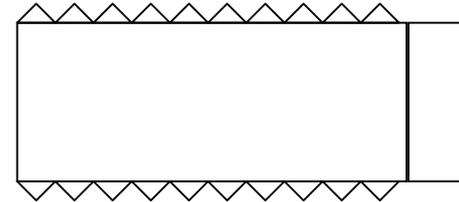
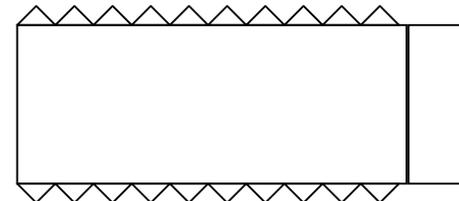
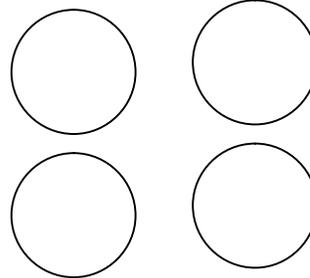
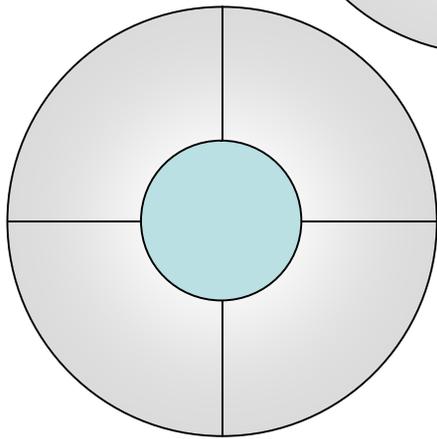
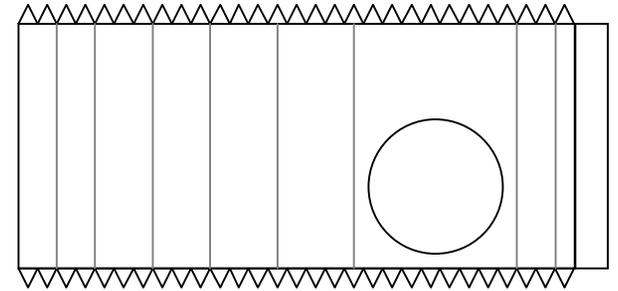
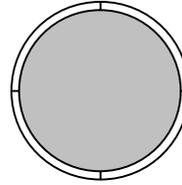
NODE  
HARMONY



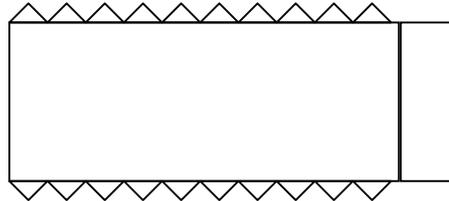
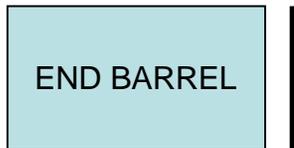
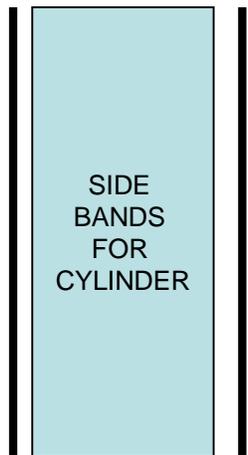
# NODE – cupola



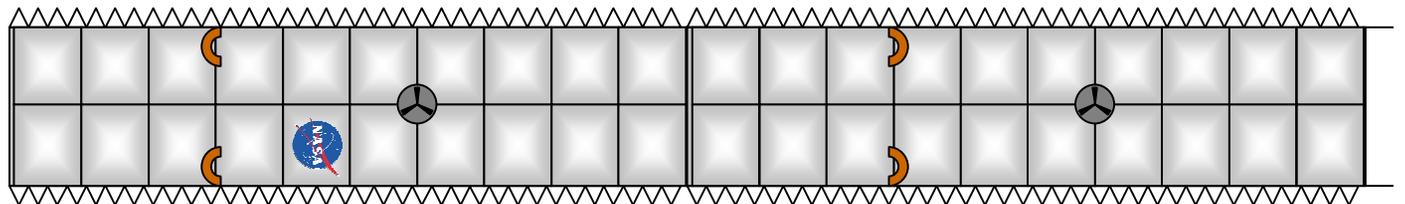
# NODE – airlock



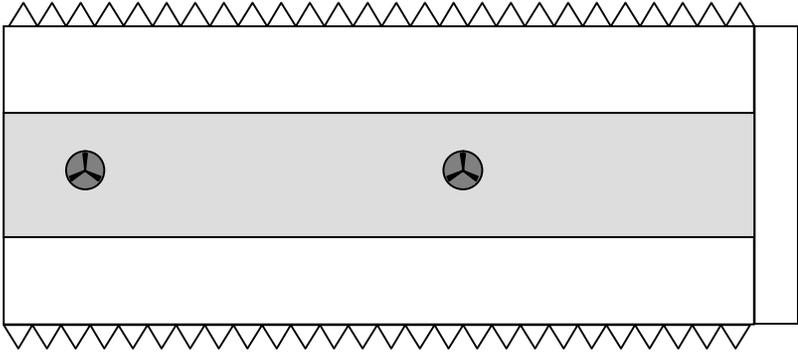
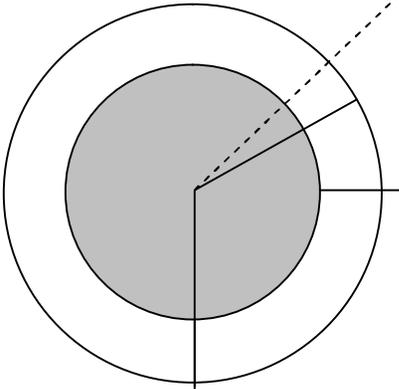
# NODE - AIRLOCK



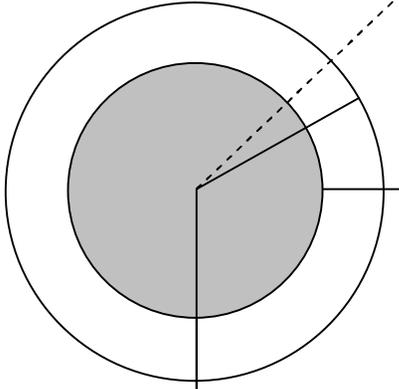
LARGE CAPS



PIRS DOCKING  
COMPARTMENT (2)

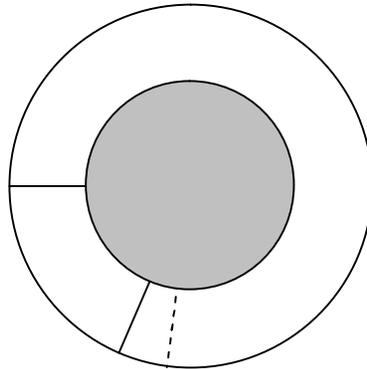
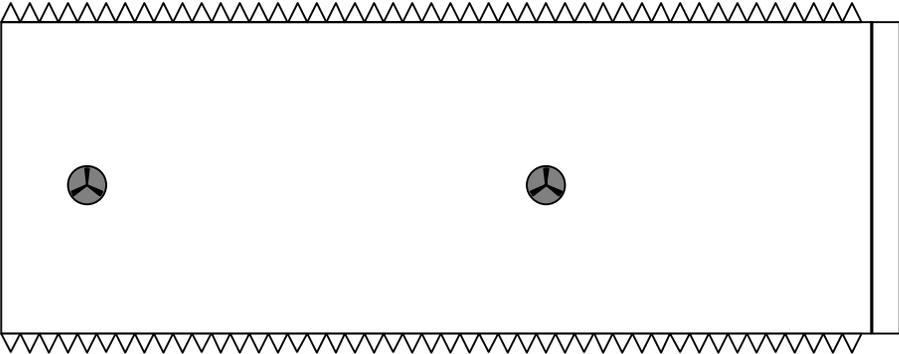
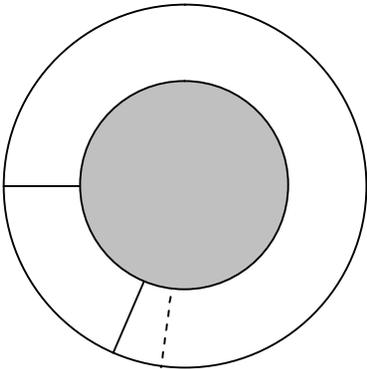


BODY CYLINDER



END CONES

LIFE SUPPORT  
MODULE (future)



# FGB/UDM

Zarya (use radiator array)

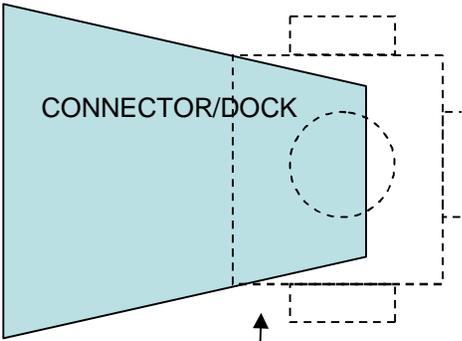
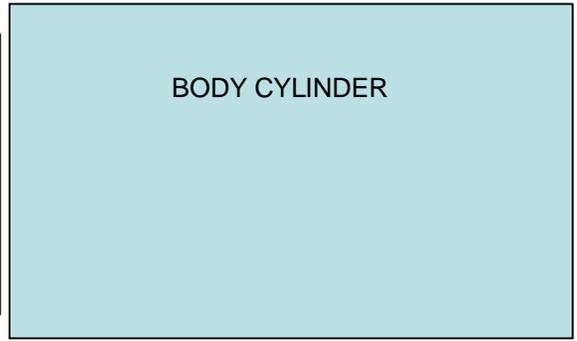
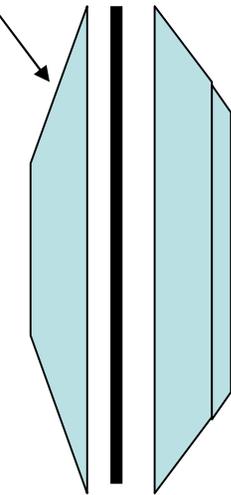
Research Module

(RM has two solar arrays set at 90 degree angle, no radiator, only aft set of narrow equipment boxes)

AFT TRANSITION CONES

NARROW EQUIPMENT CABINETS

WIDE EQUIPMENT CABINETS



# SERVICE MODULE

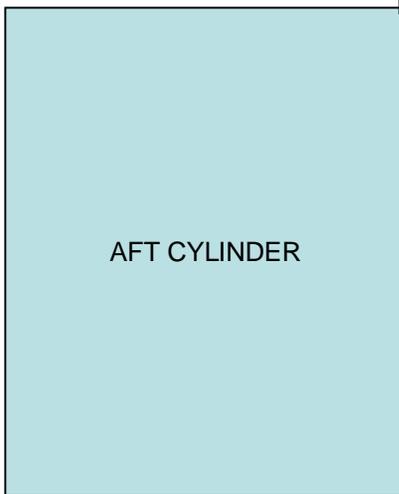
Zvezda

Multipurpose Lab Module

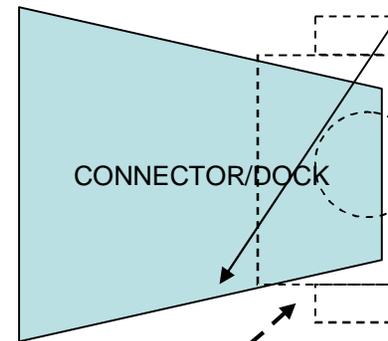
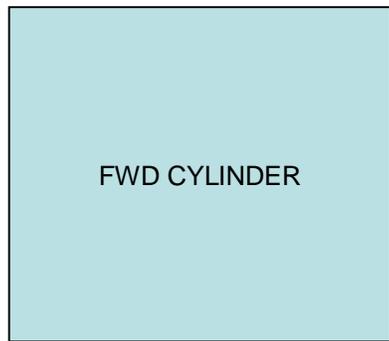
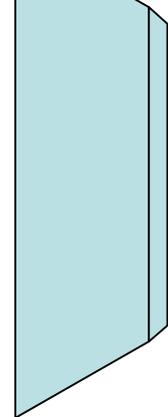
CONIC FORMER

**SEE NASA WEB SITE FOR DETAILS ON POSITIONING OF EQUIPMENT BOXES, RADIATOR, AND SOLAR PANELS.**

AFT CAP



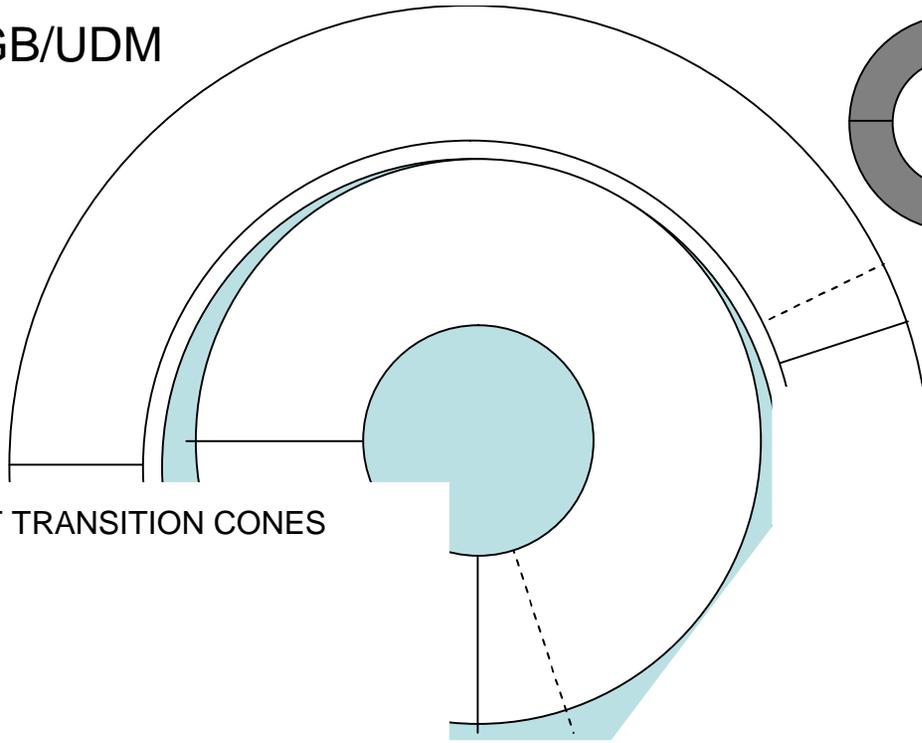
MID-BODY TRANSITION



Cut out circular opening to attach docked spacecraft or modules. Use slip-fit cylinders to form attachments.

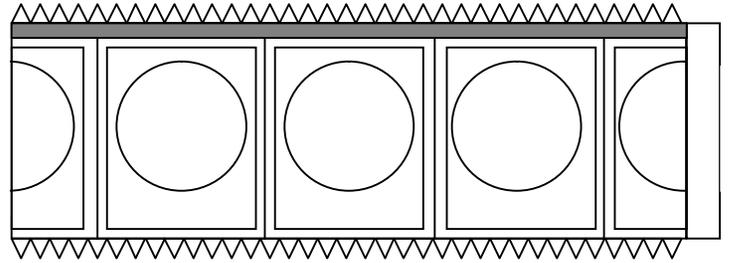
Detailed airlock if used. Use on second set of modules mounted below station, not on main spine. If used on spine modules, enlarge end cap hole to fit armature.

FGB/UDM

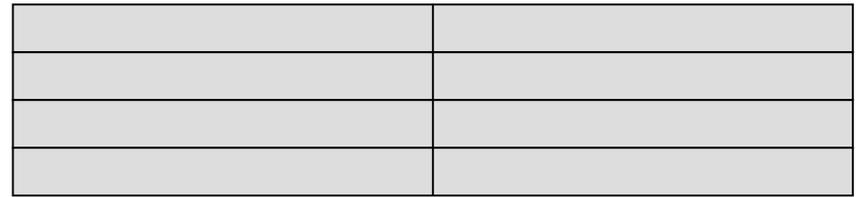


AFT TRANSITION CONES

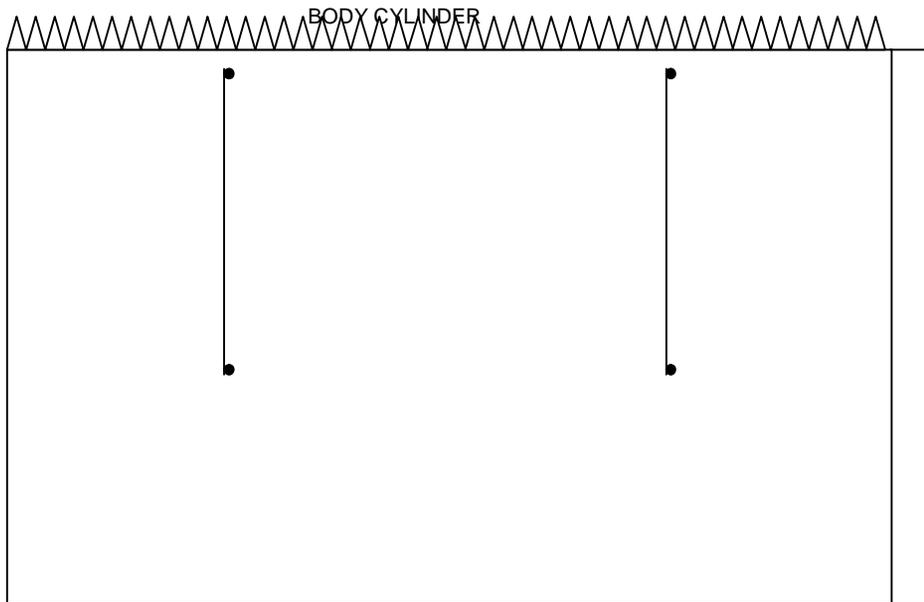
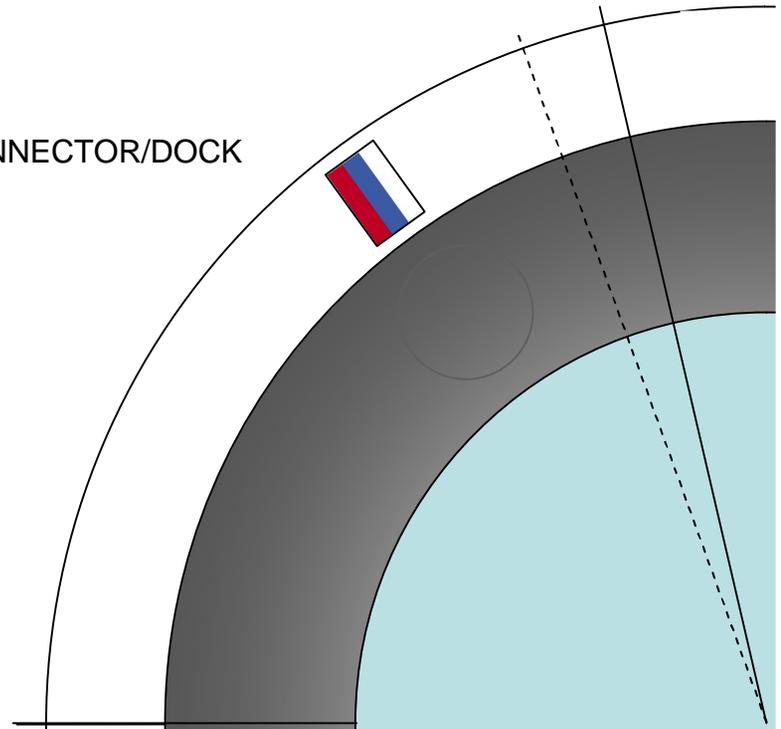
DETAILED AIRLOCK SECTION  
FOR FGB/UDM OR SM



ROLL SLIP CYLINDERS (see page 1) –  
CUT APART ALONG LINES AFTER ROLLING



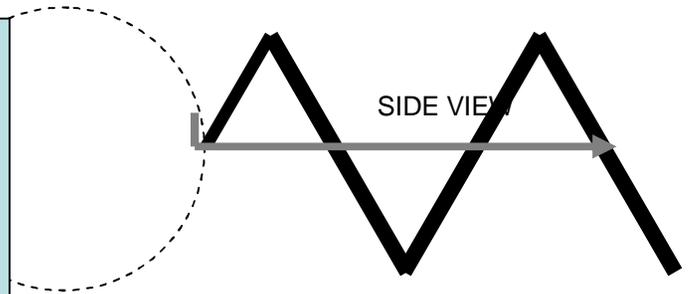
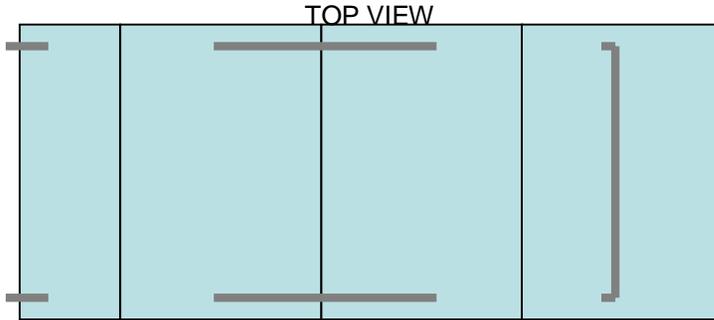
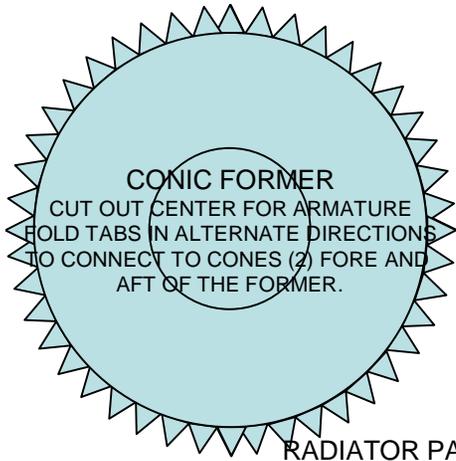
CONNECTOR/DOCK



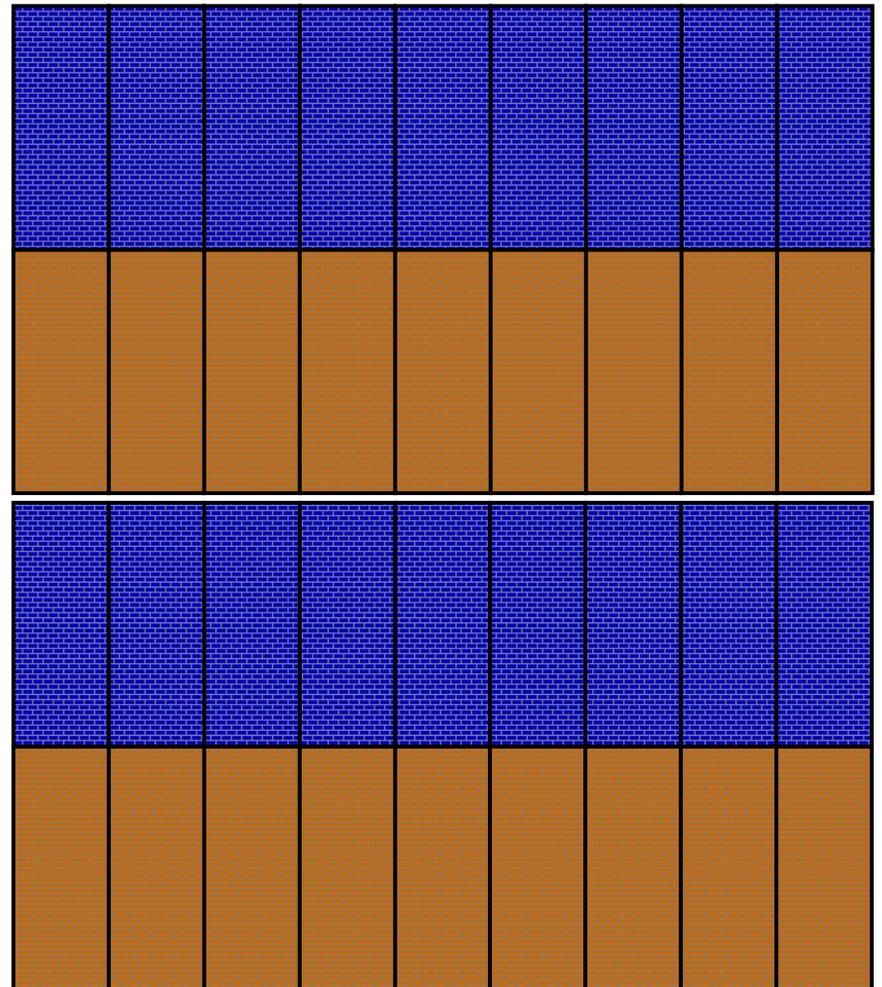
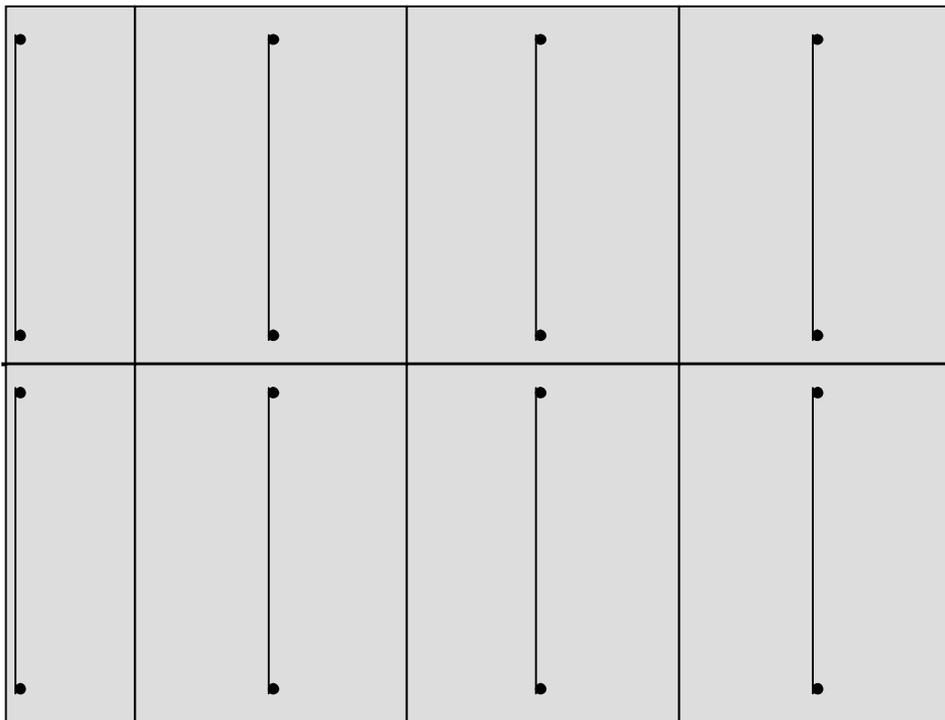
BODY CYLINDER

# FGB/UDM

RUN U-SHAPED COAT HANGER WIRE FOR SUPPORT. BEND UP INNER ENDS TO HOLD ALIGNMENT.



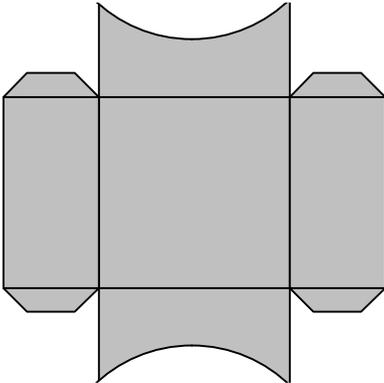
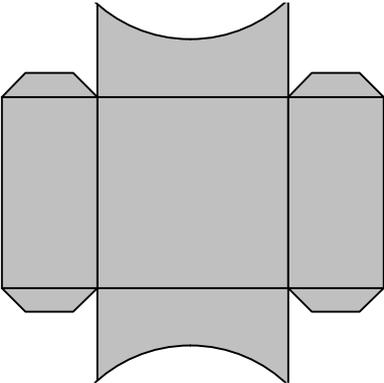
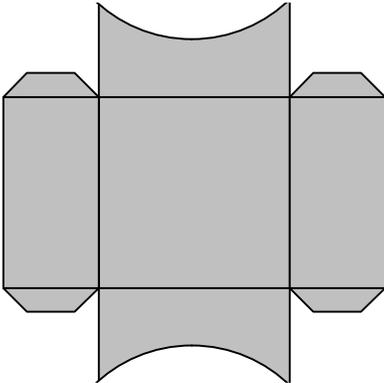
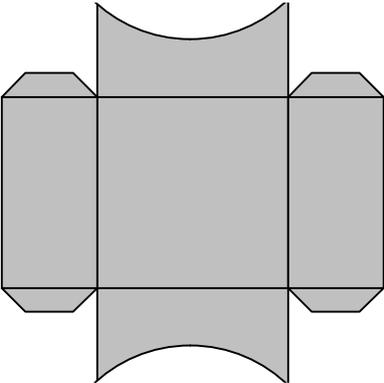
RADIATOR PANELS – CUT DOWN CENTER TO MAKE 2



RESEARCH MODULE VARIANT – SOLAR ARRAYS

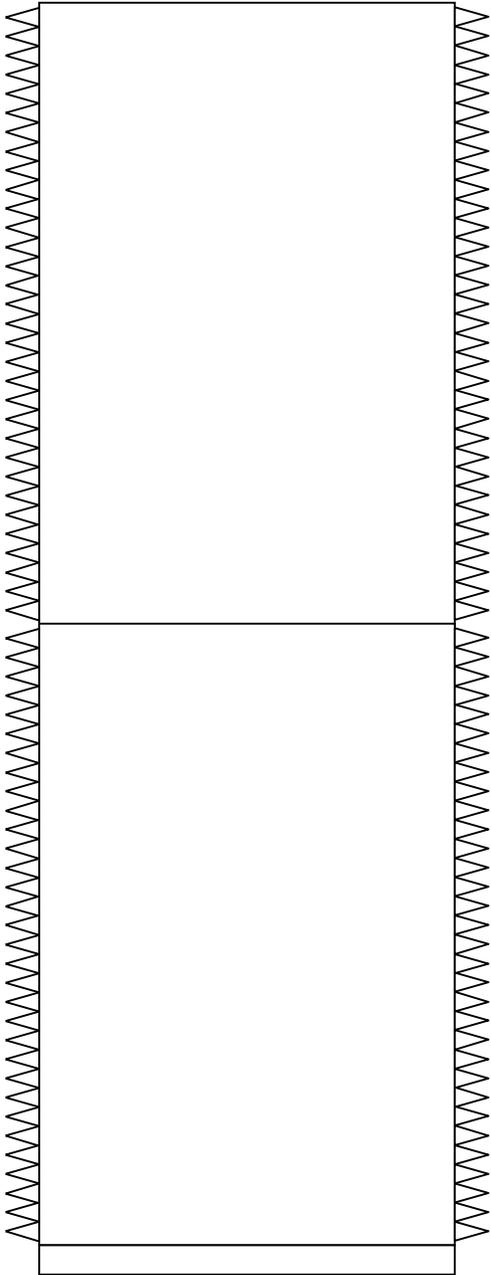
FGB/UDM

EQUIPMENT CABINETS

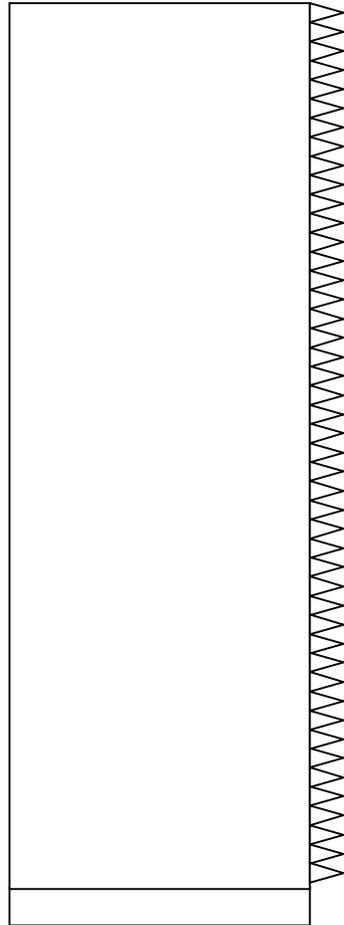


# SERVICE MODULE

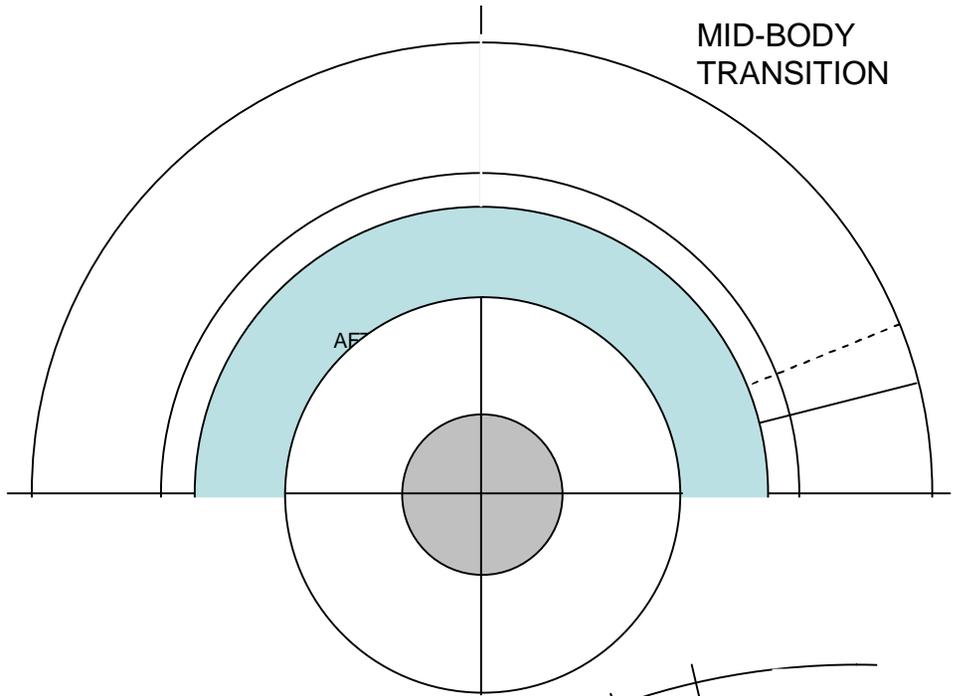
AFT CYLINDER



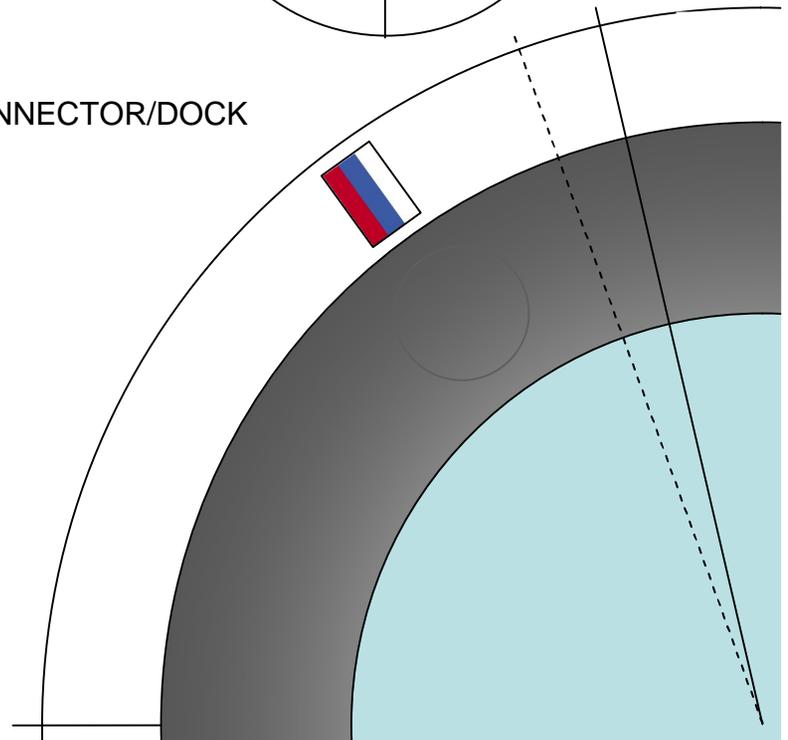
FORWARD CYLINDER



MID-BODY  
TRANSITION



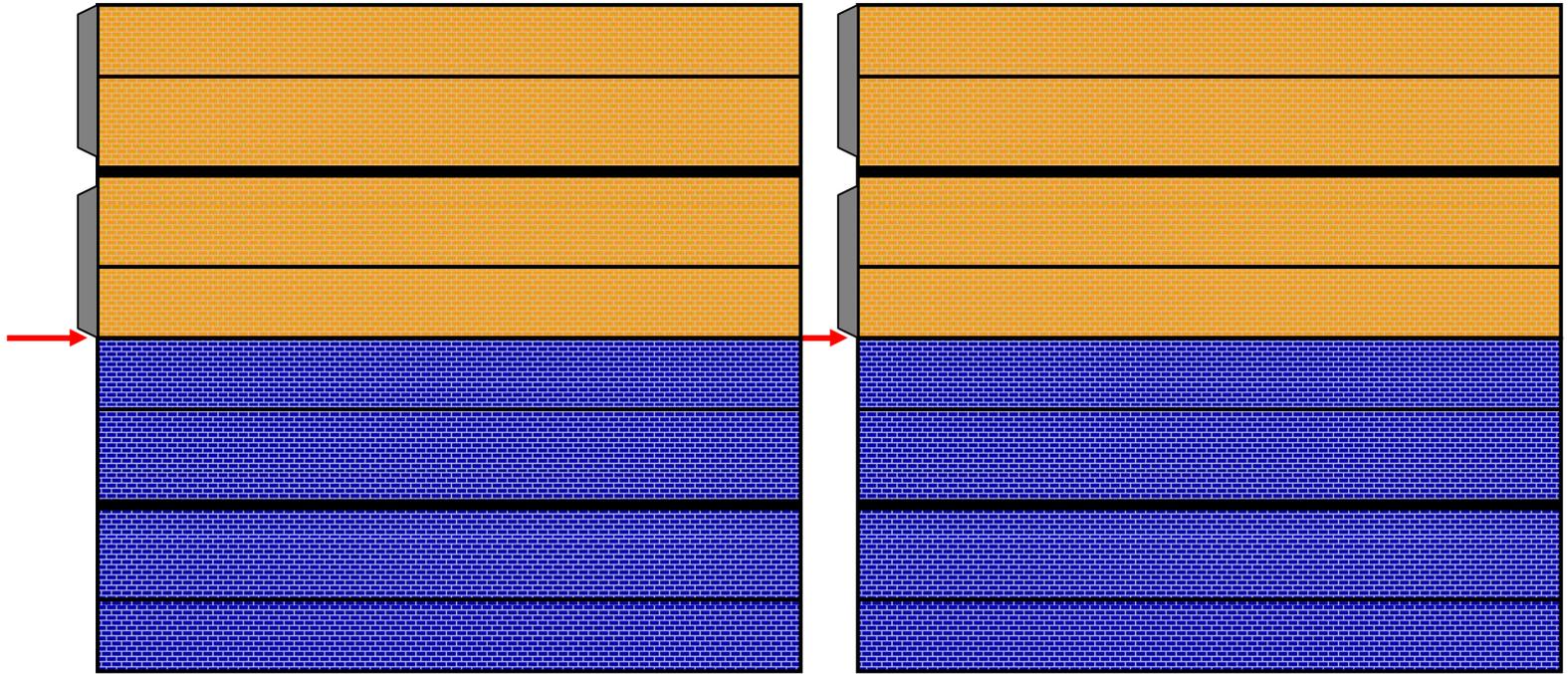
CONNECTOR/DOCK



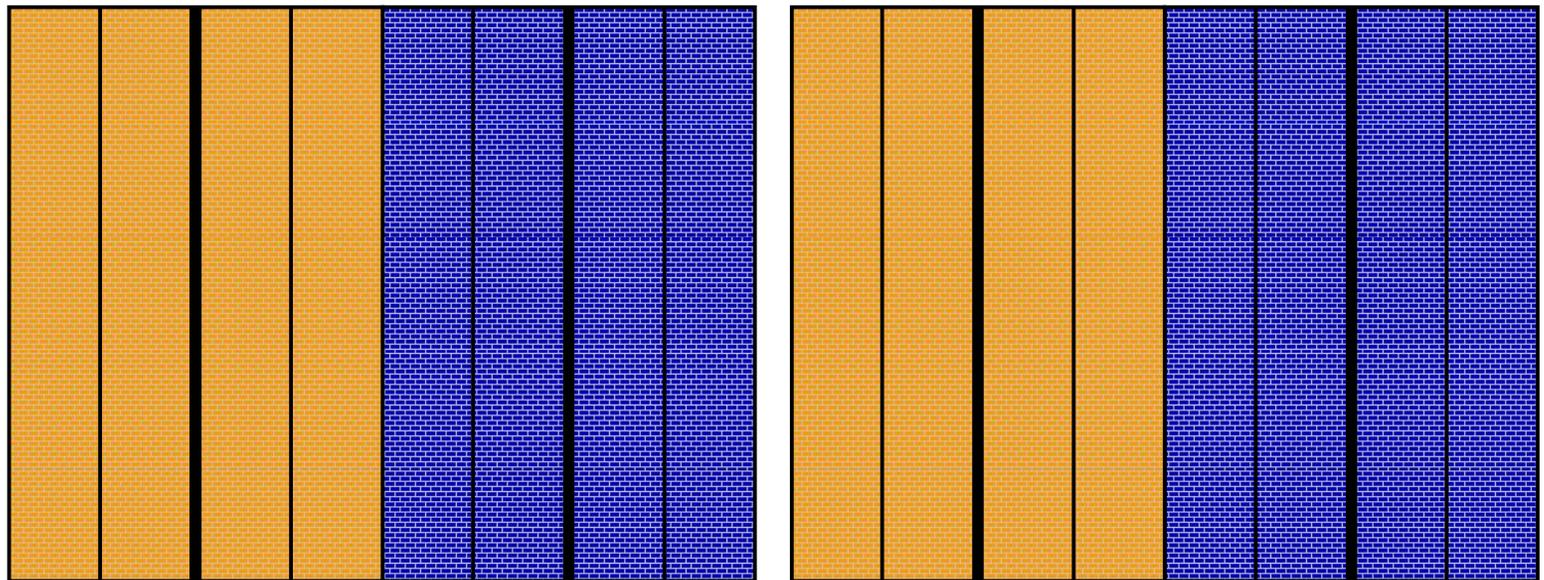
SERVICE MODULE

INNER SOLAR PANEL

PRINT ON PLAIN PAPER



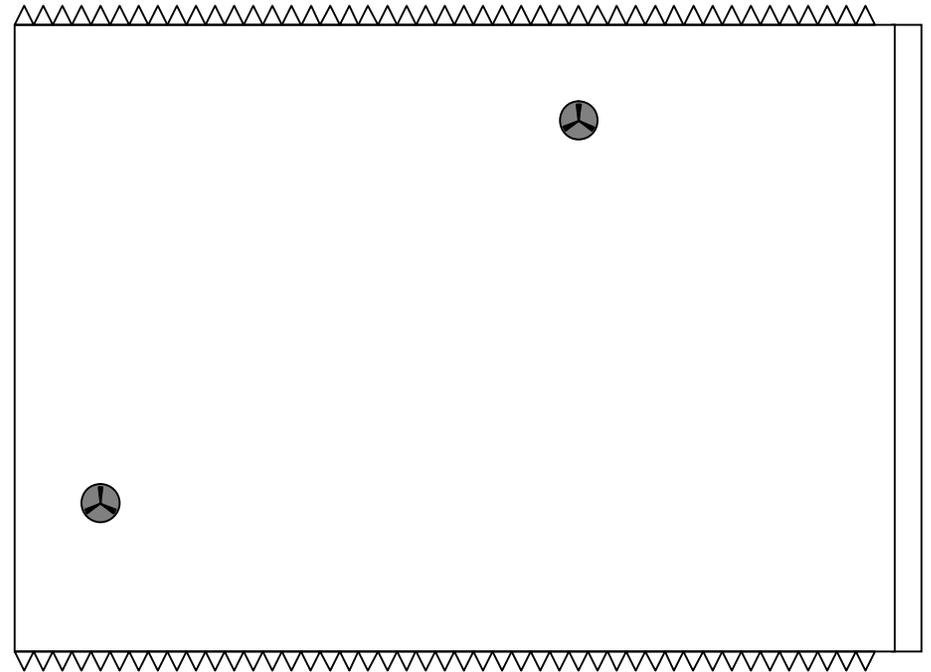
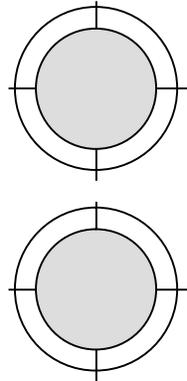
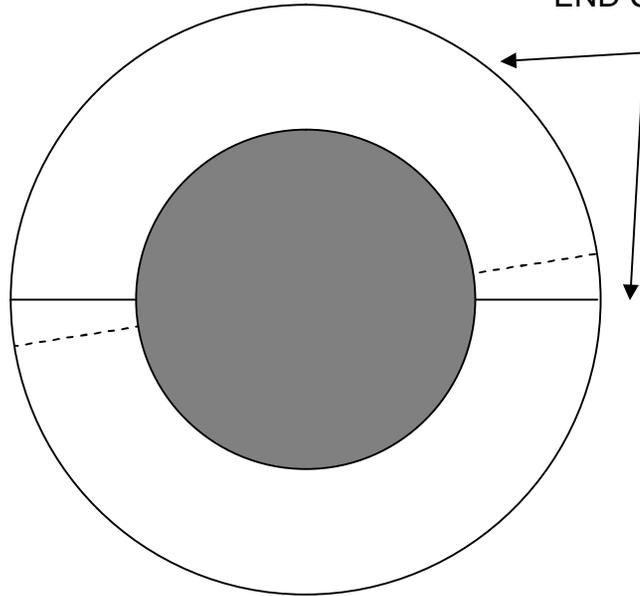
OUTER SOLAR PANEL



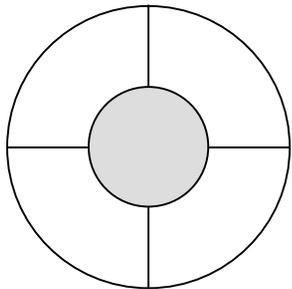
**RESEARCH MODULE  
DOCKING/STORAGE  
MODULE (future)**

END CAP FOR CONIC  
IF NEEDED – COVER  
WITH HATCH IF EXPOSED

END CONES

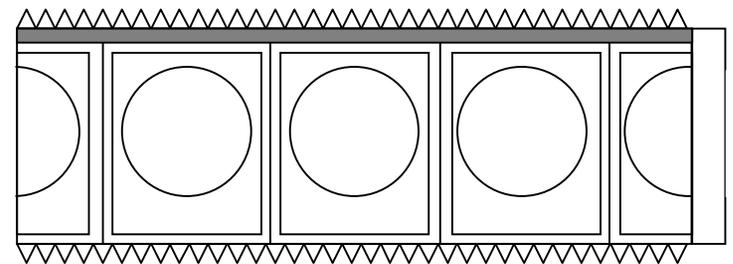
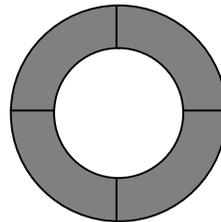


OPTIONAL FLAT END CAP

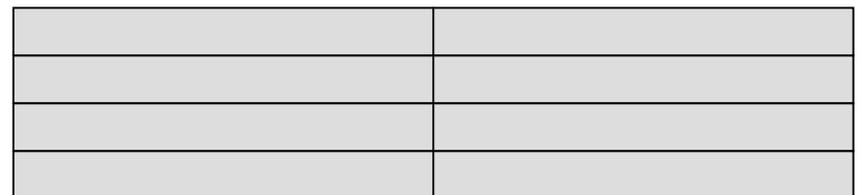


**SERVICE MODULE**

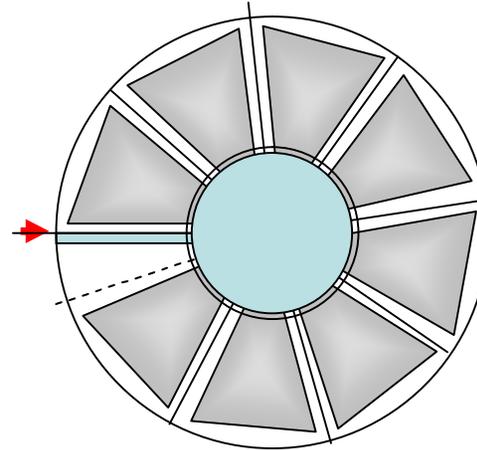
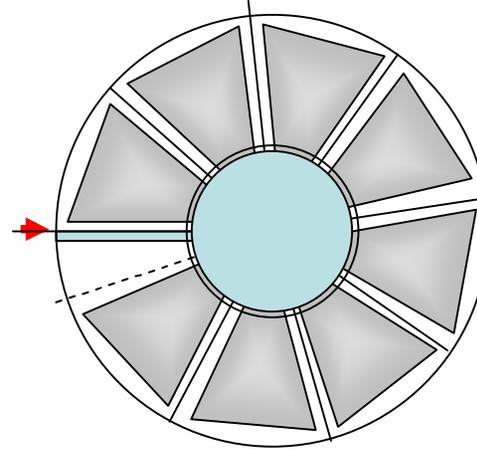
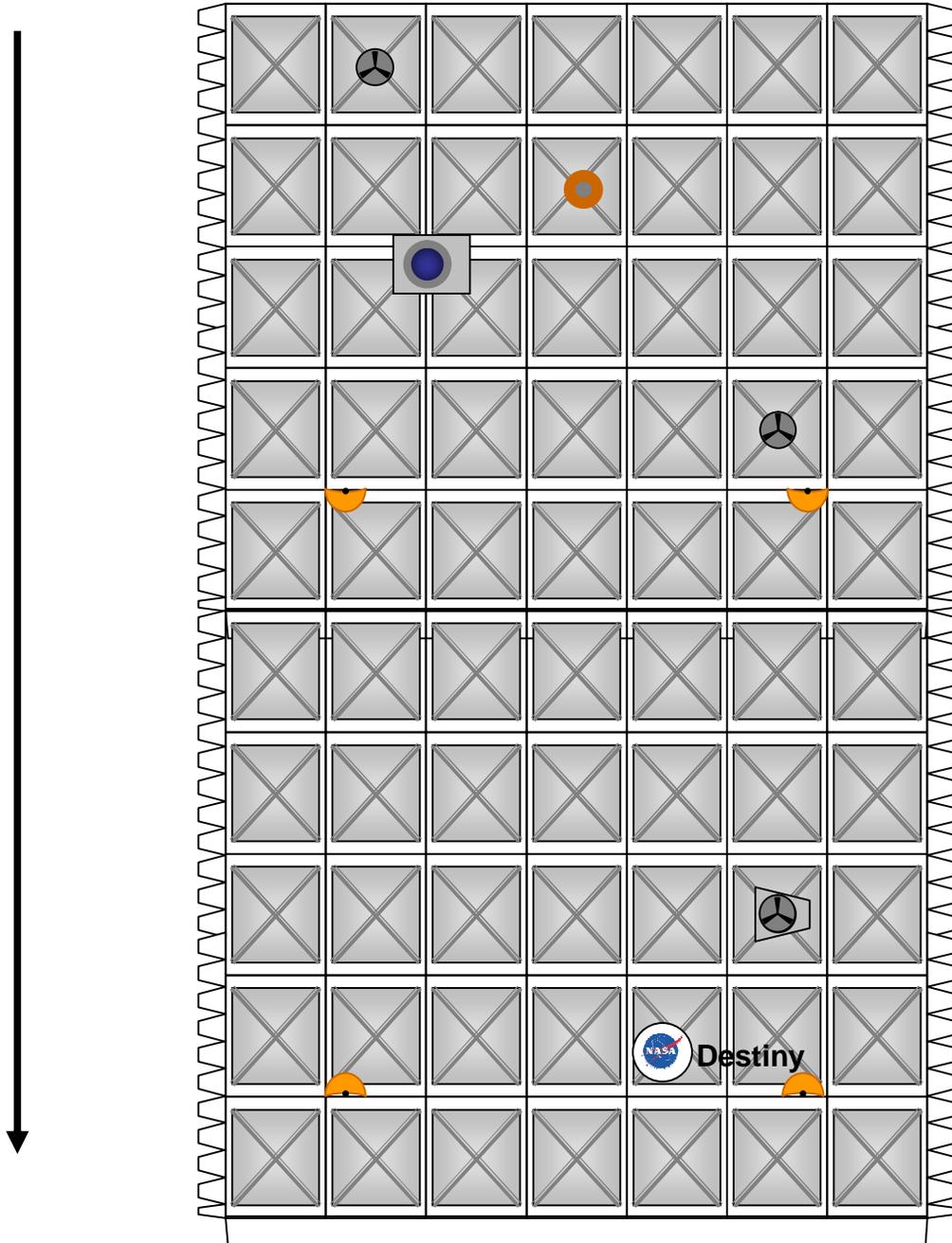
DETAILED AIRLOCK SECTION  
FOR FGB/UDM OR SM



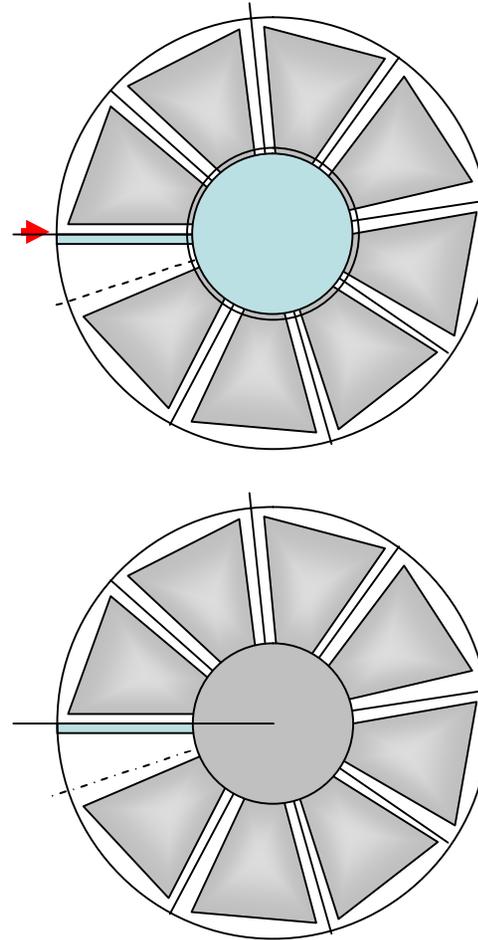
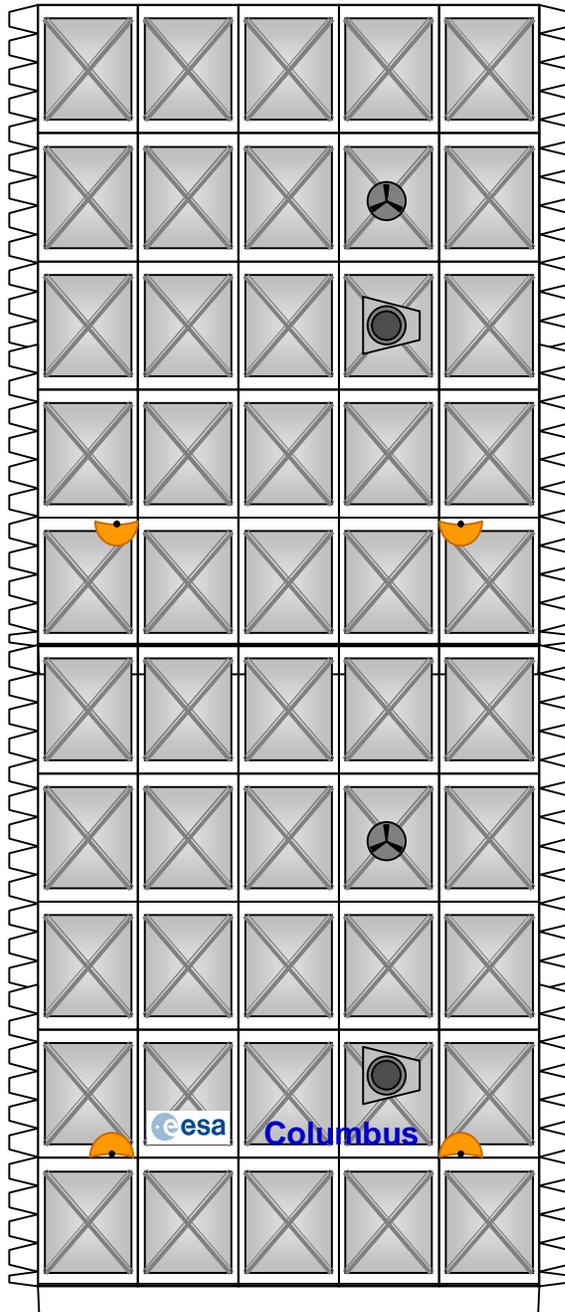
ROLL SLIP CYLINDERS (see page 1) –  
CUT APART ALONG LINES AFTER ROLLING



# DESTINY LAB

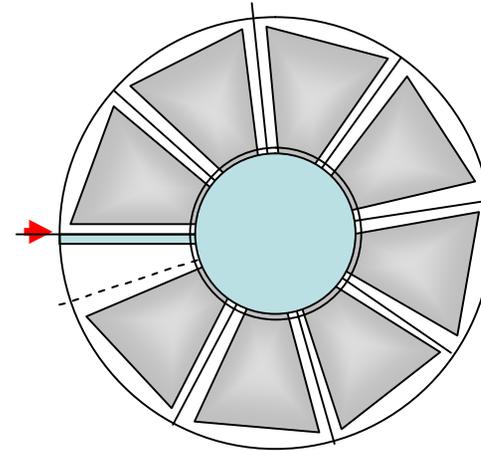
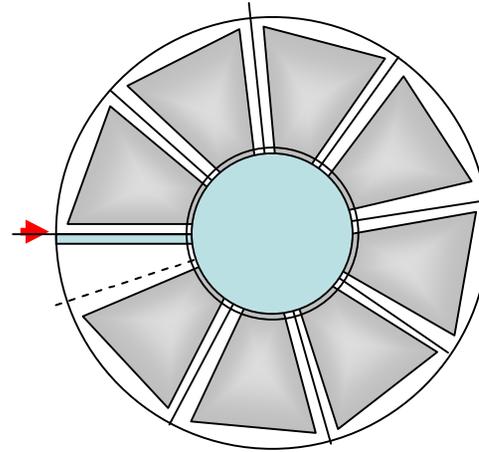
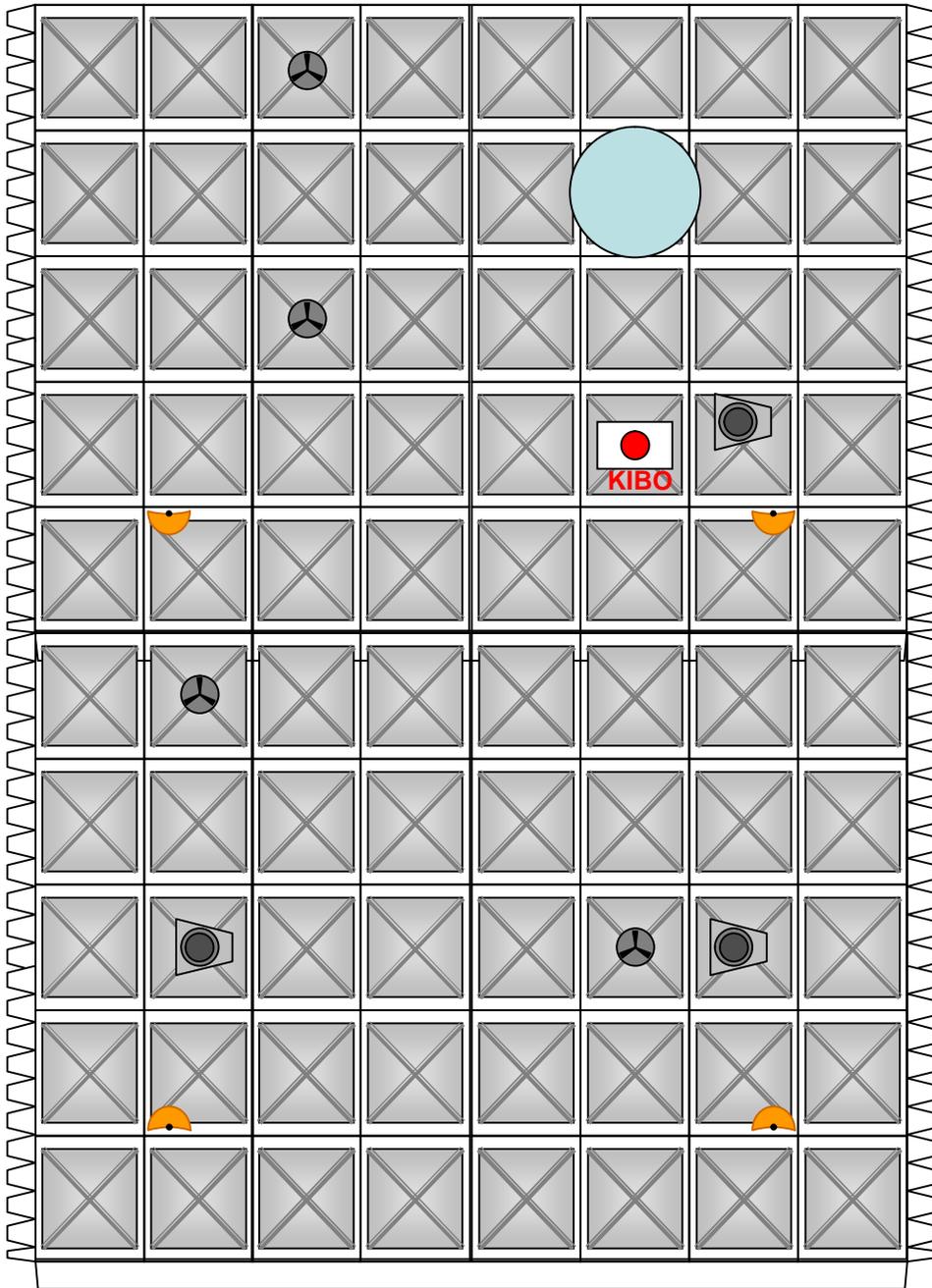


# COLUMBUS LAB

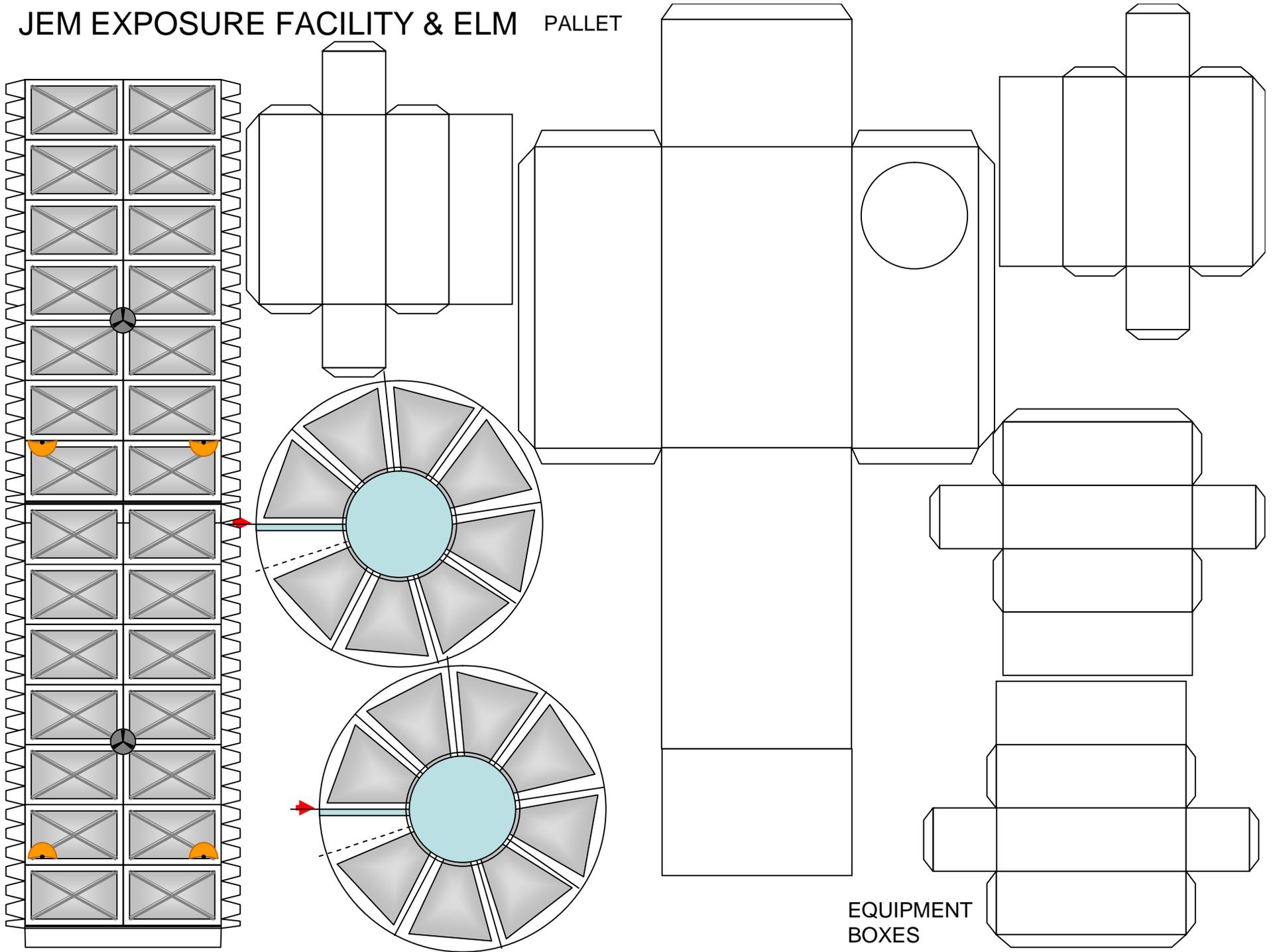


Columbus lab is also logistics module, typically dismounted after loading/unloading and lands with Shuttle.

# JEM LAB



# JEM EXPOSURE FACILITY & ELM PALLET

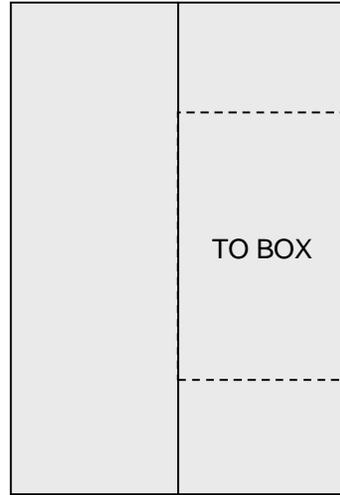


EQUIPMENT  
BOXES

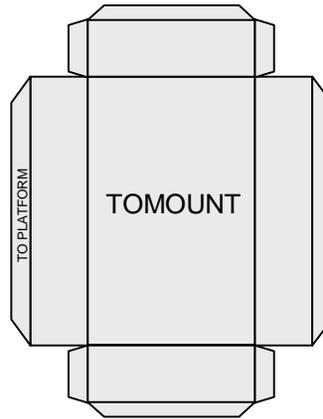
# MOBILE TRANSPORTER/BASE

GLUE TO NARROW, FORWARD FACE OF S0, S/P1, S/P2, OR S/P3 TRUSS SECTION.

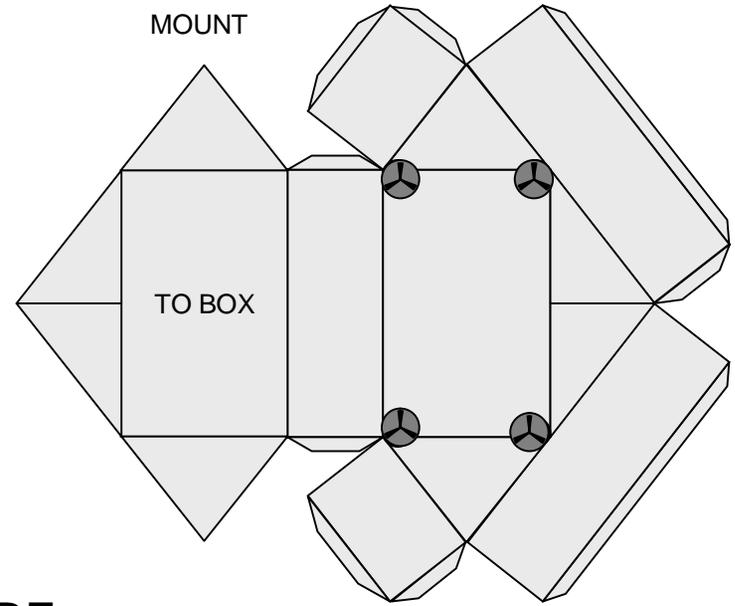
MOUNTING PLATFORM – GLUE TO BOX, THEN ATTACH TO TRUSS



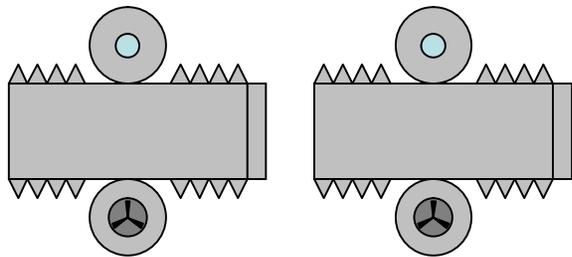
BOX



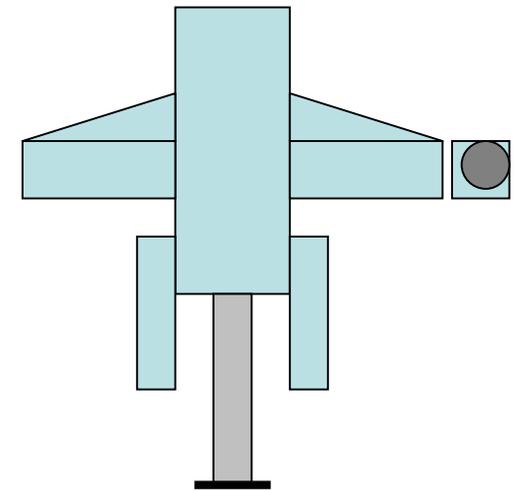
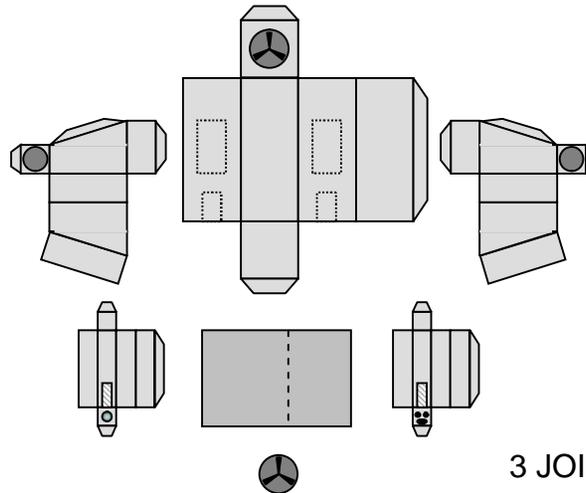
MOUNT



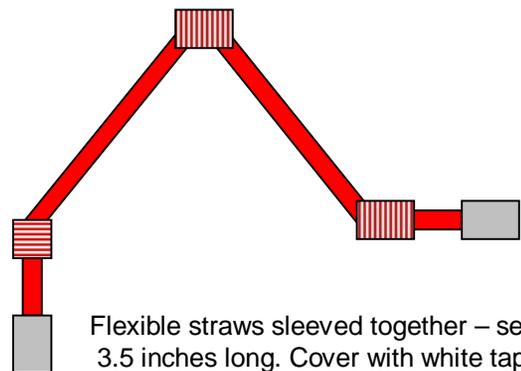
ROBOT (CANADARM) ARM END FITTINGS



## CANADARM DEXTRE

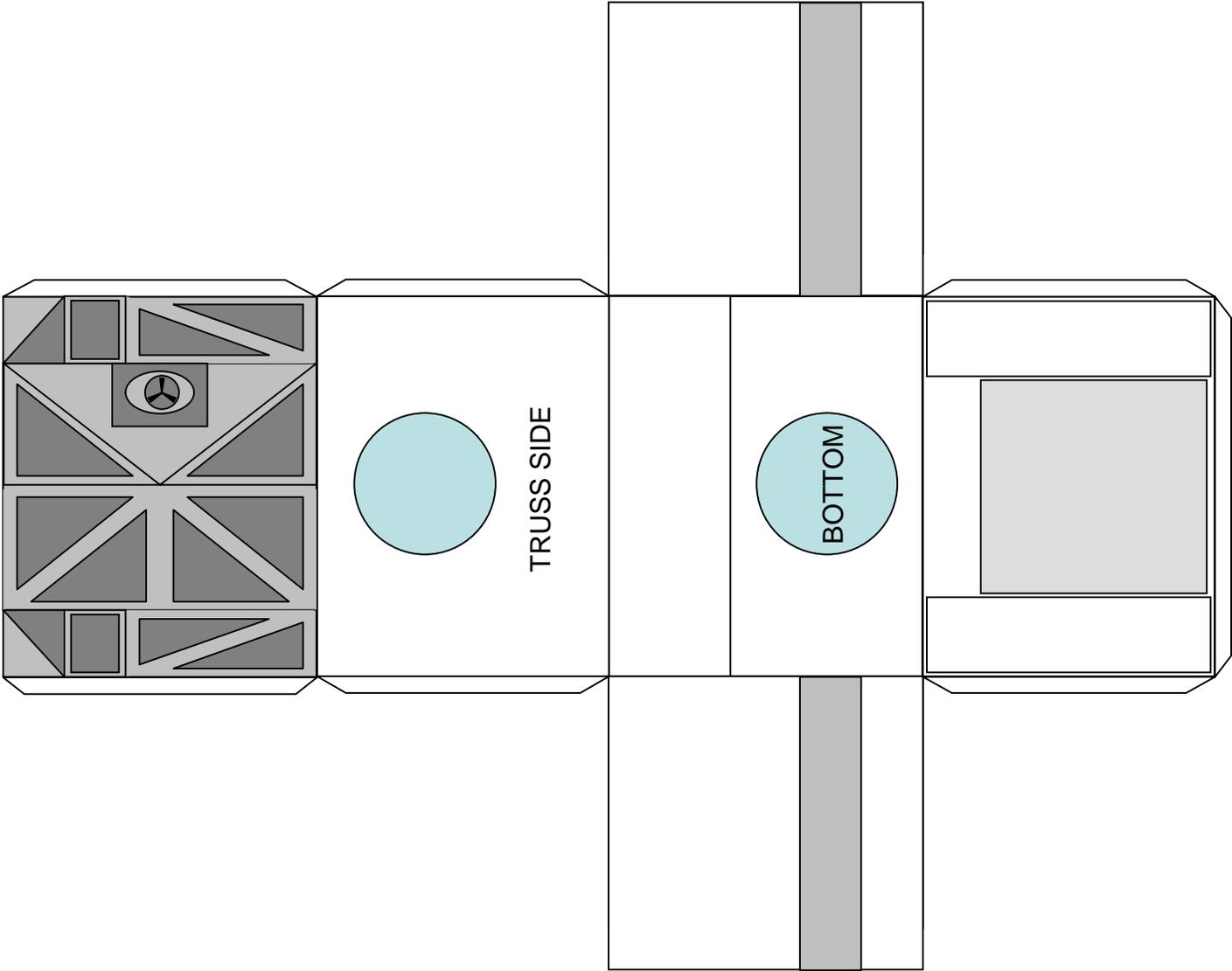


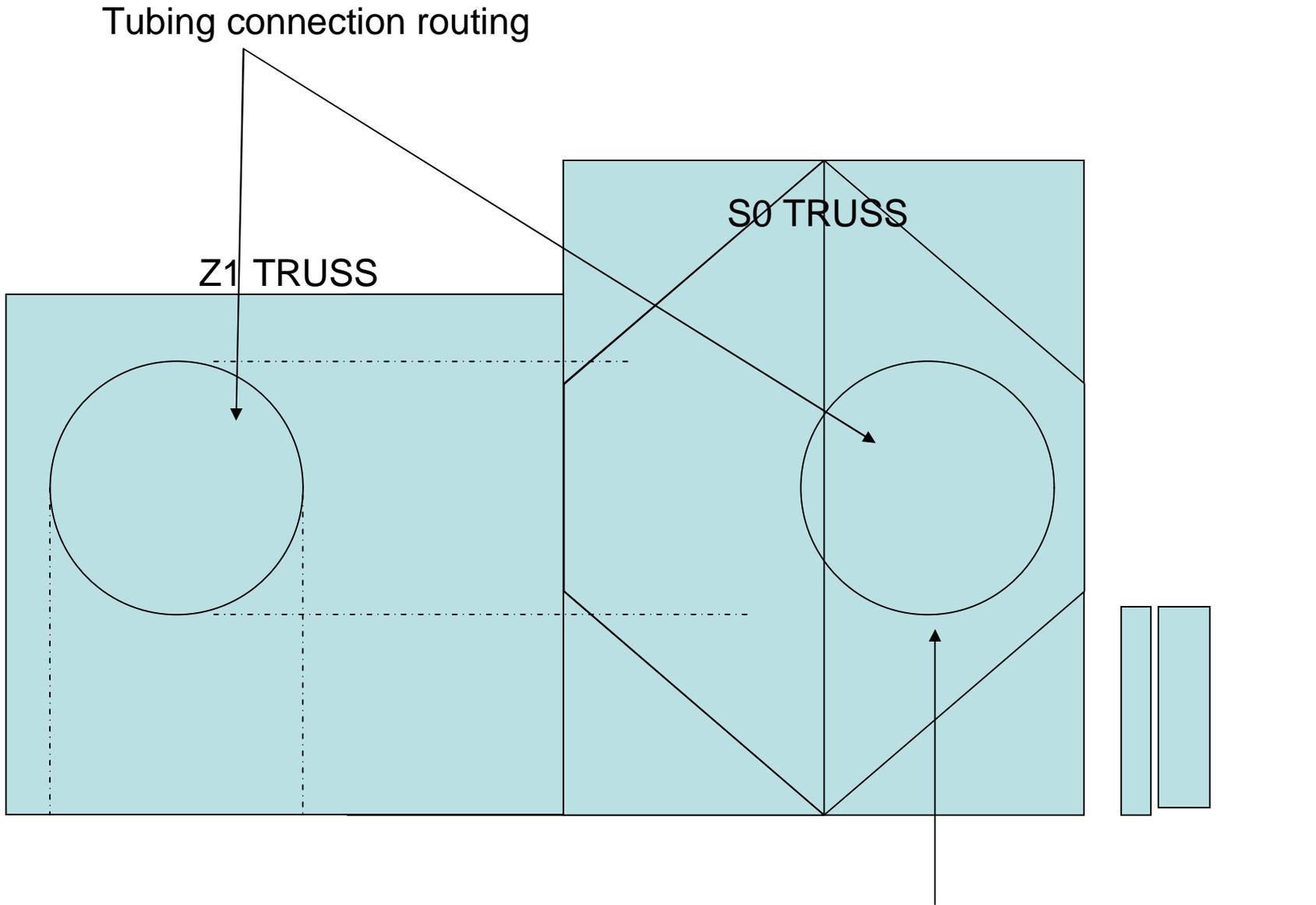
3 JOINTS – 1/2" ARM SECTIONS



Flexible straws sleeved together – sections about 3.5 inches long. Cover with white tape or paint.

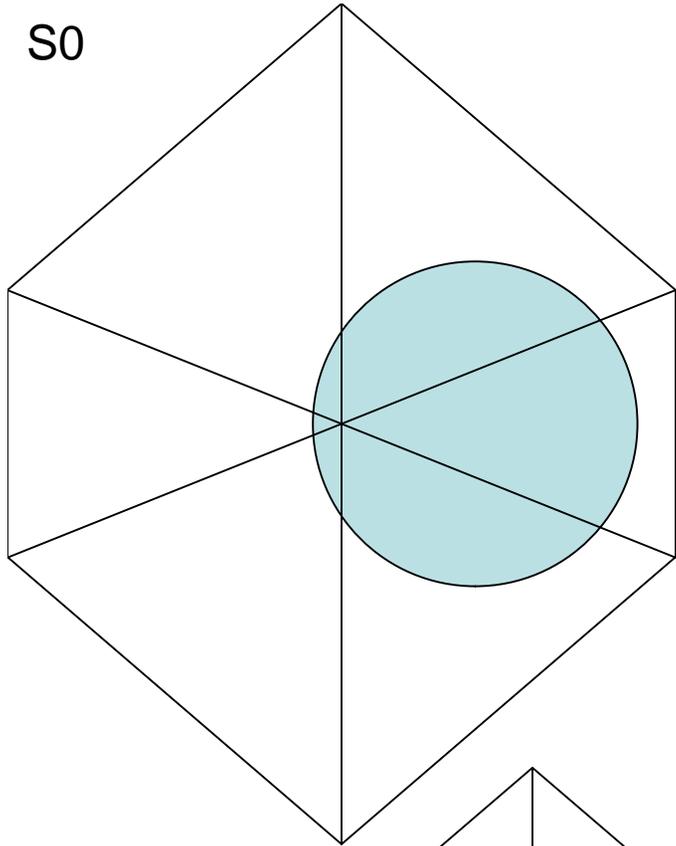
# Z1 TRUSS



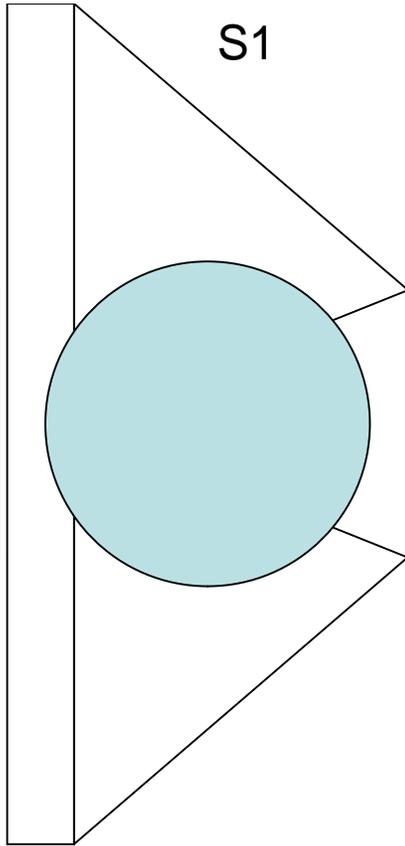


Alternate connection – dowel from spine, through Destiny Module, into truss armature.

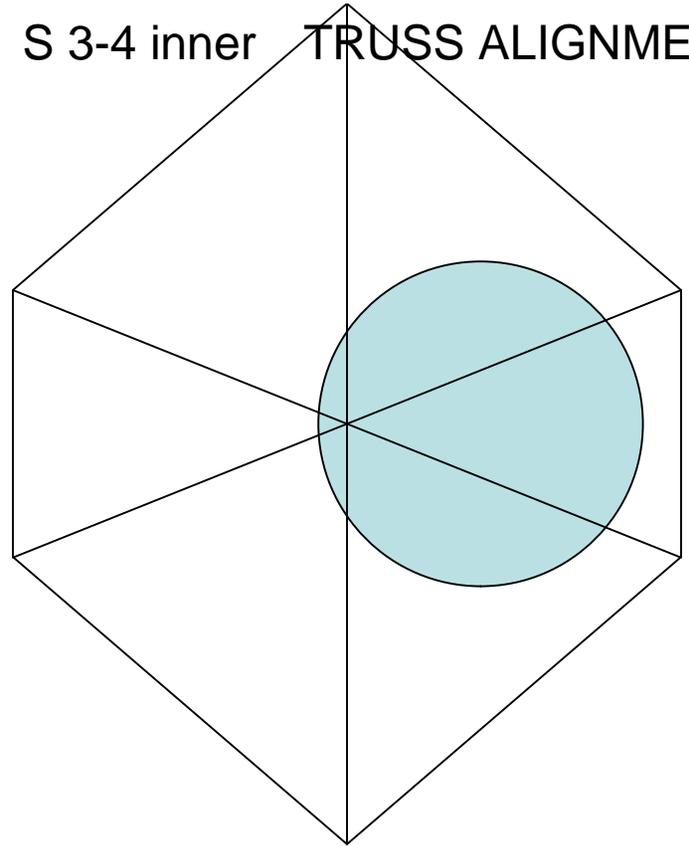
S0



S1

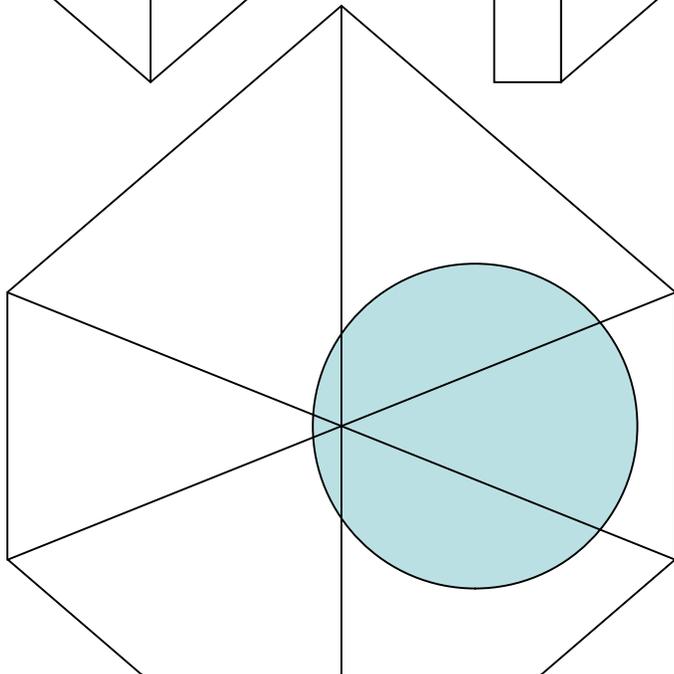


S 3-4 inner

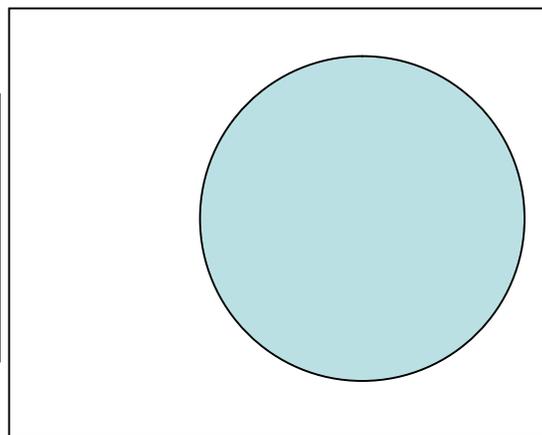


TRUSS ALIGNMENT

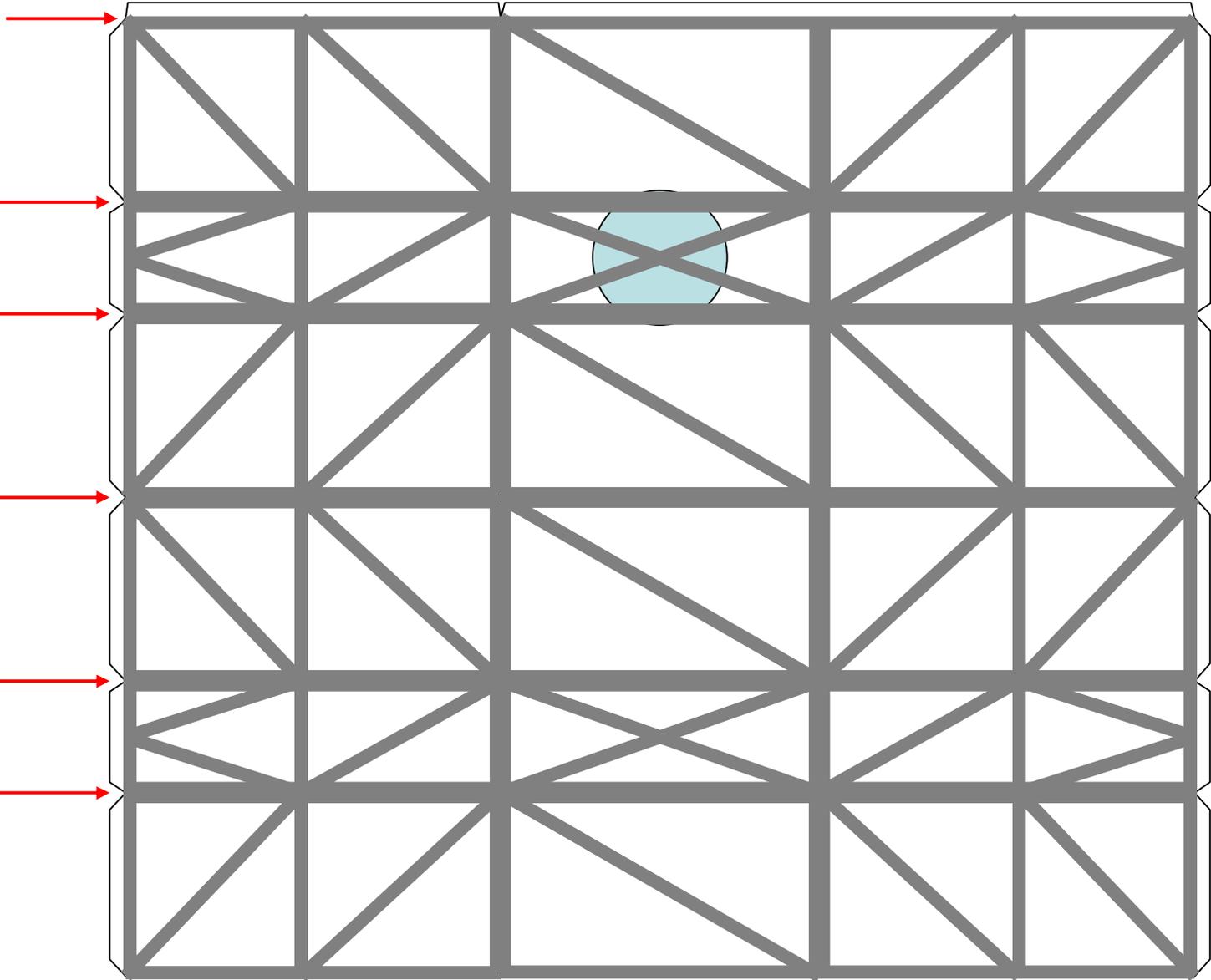
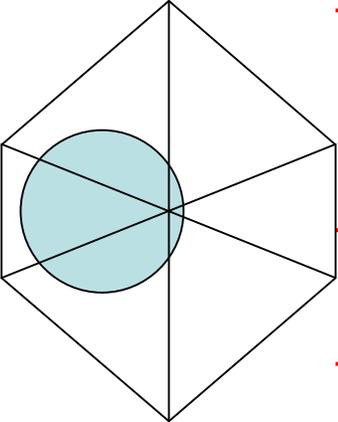
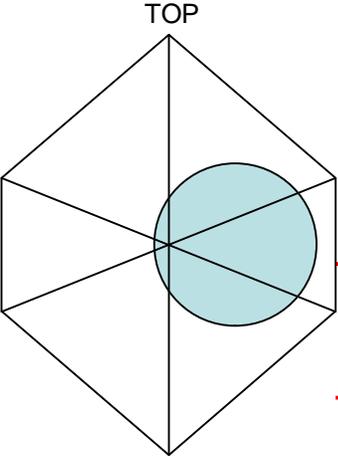
S 3-4 i



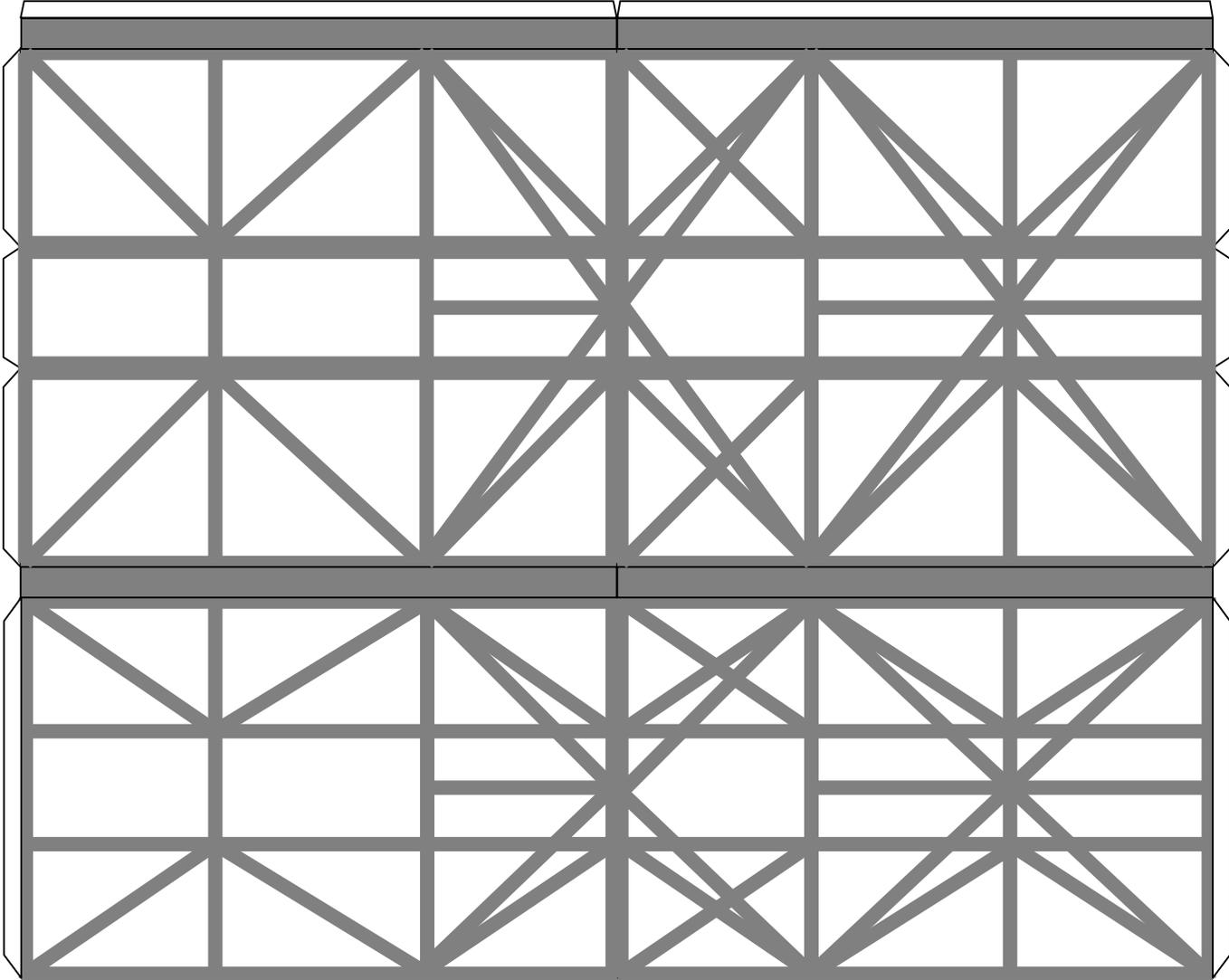
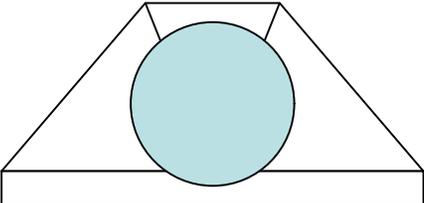
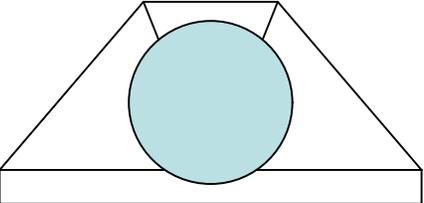
S 3-4 outer/S 5-6



S0 TRUSS

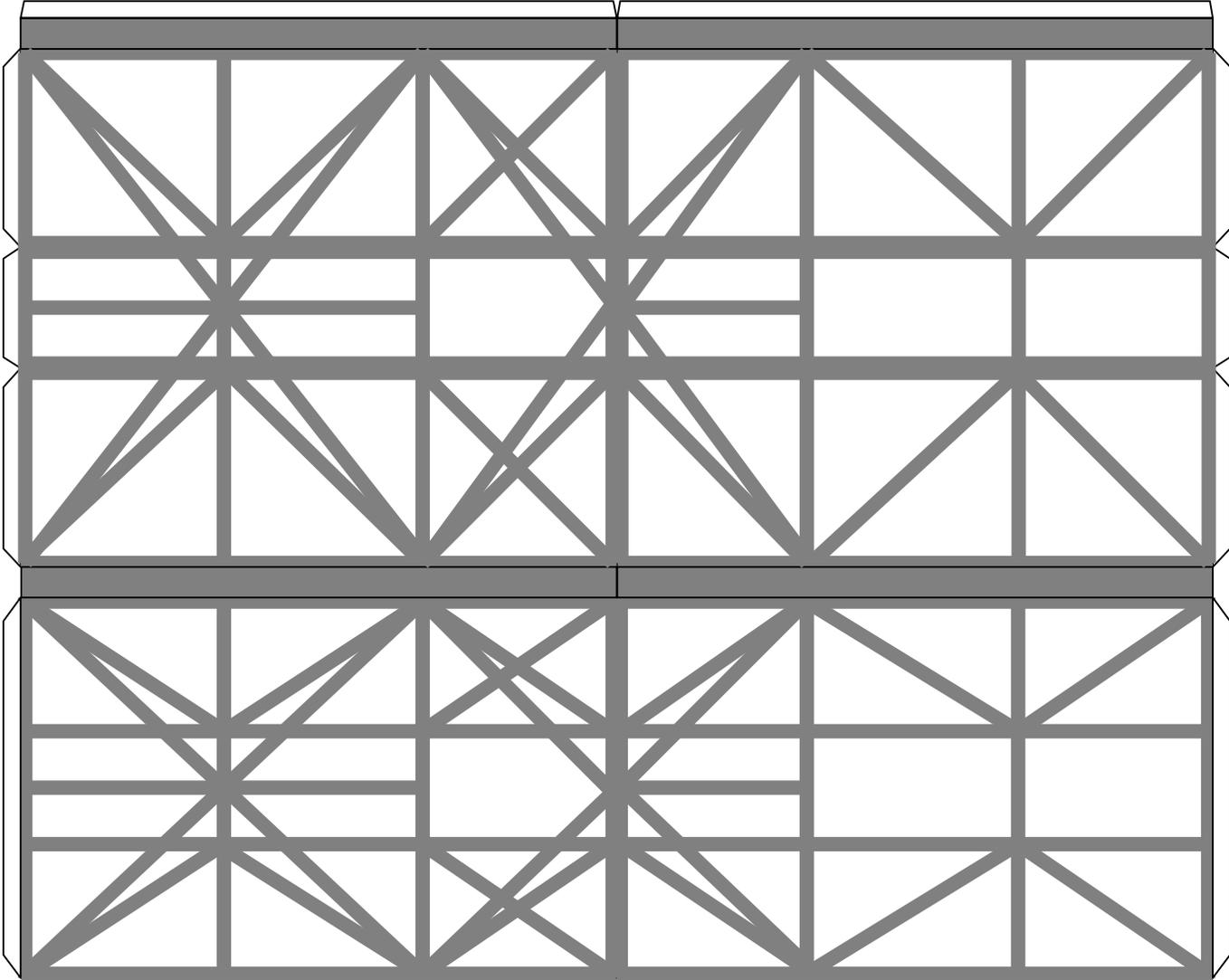
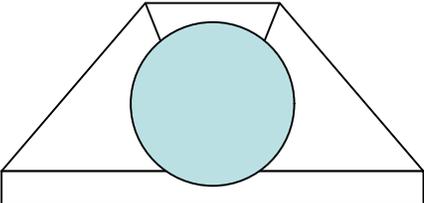
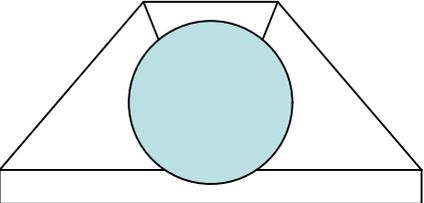


S1 TRUSS



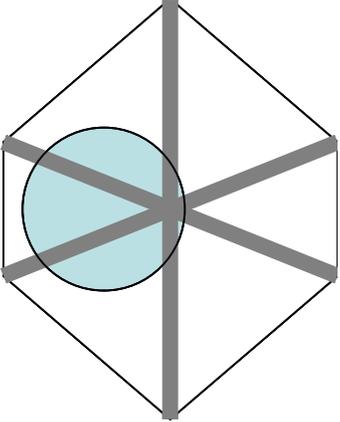
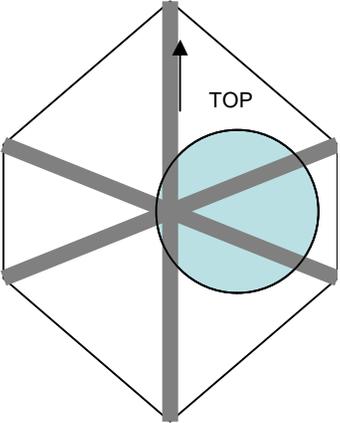
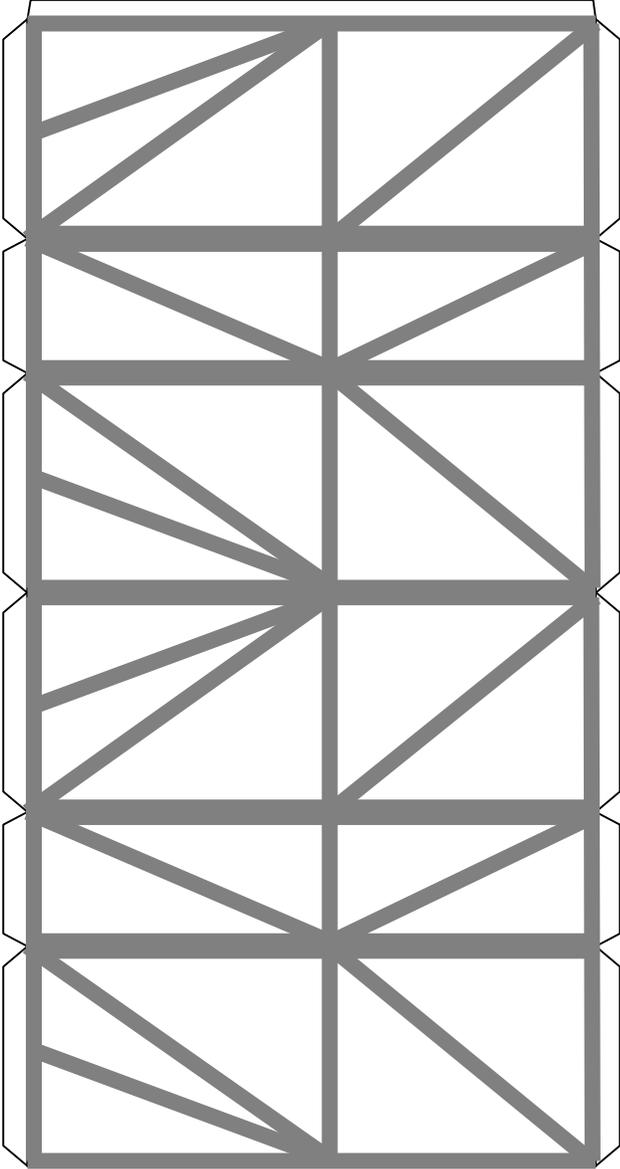
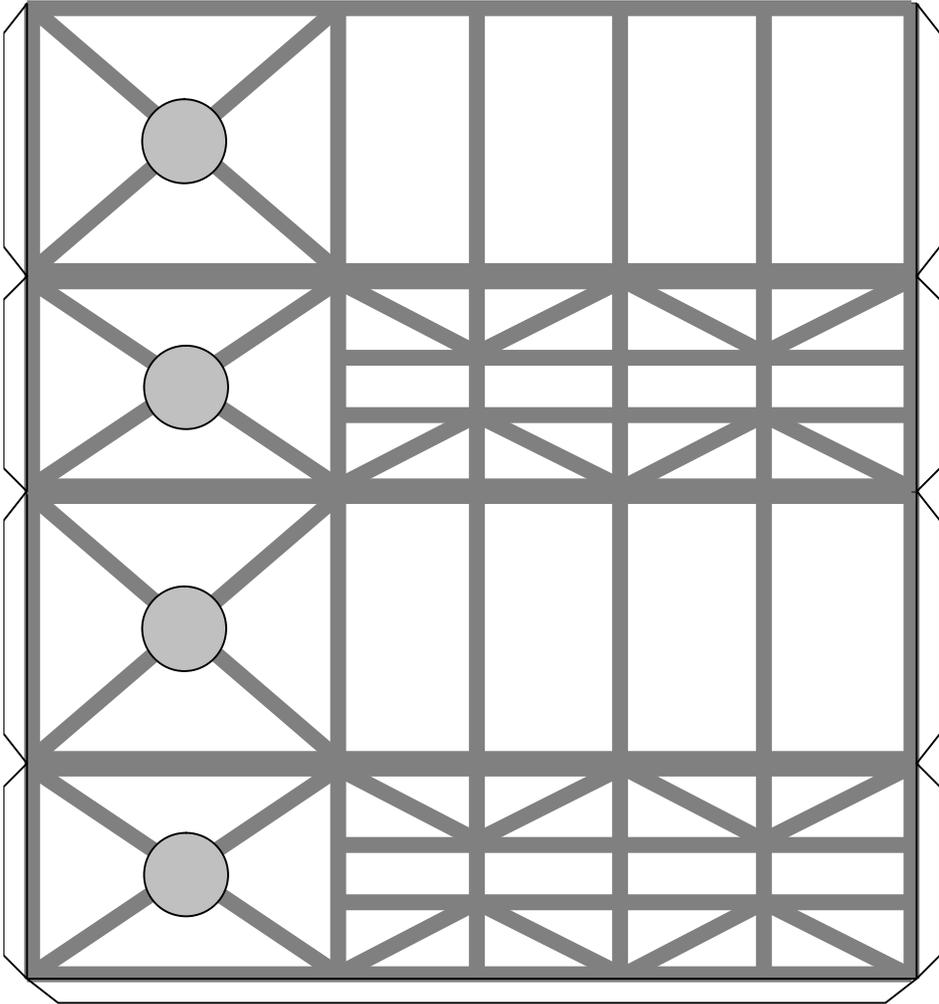
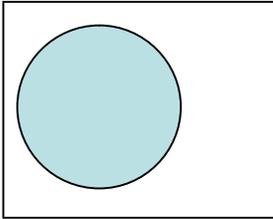
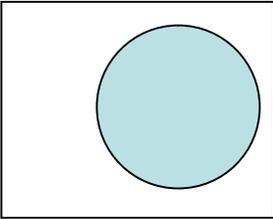
← OUTBOARD

P1 TRUSS



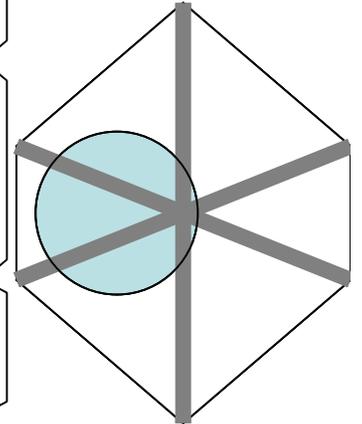
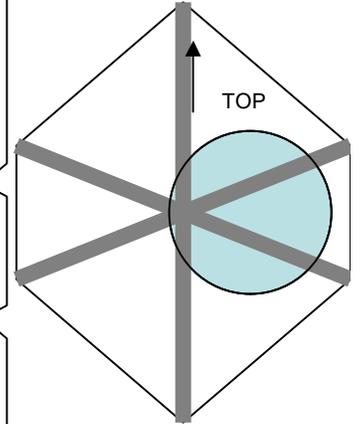
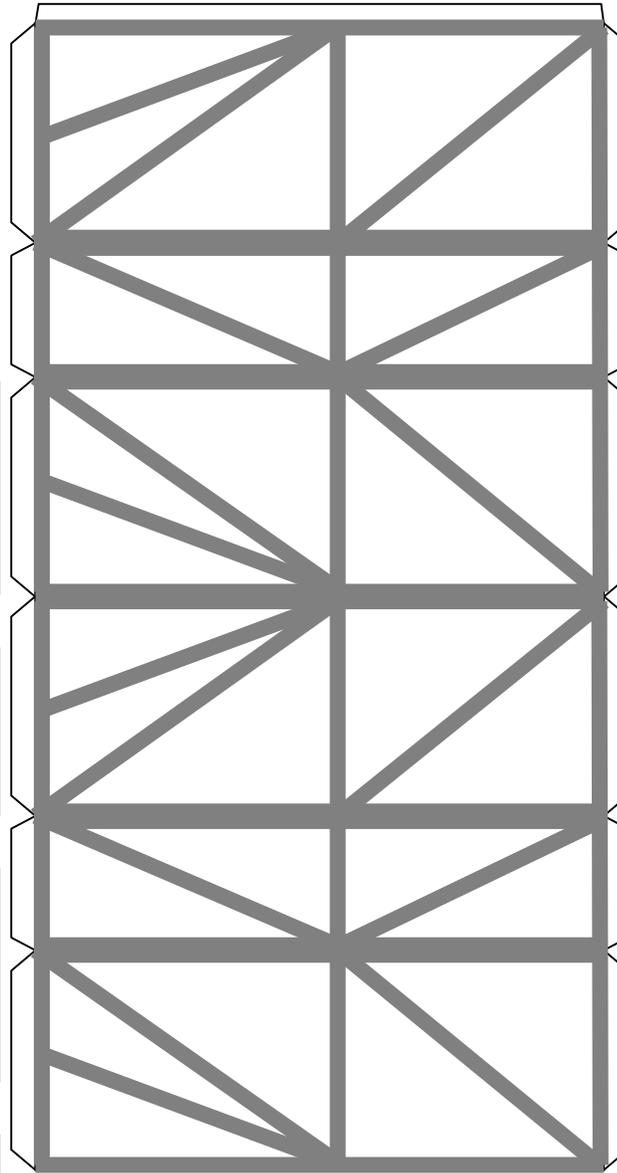
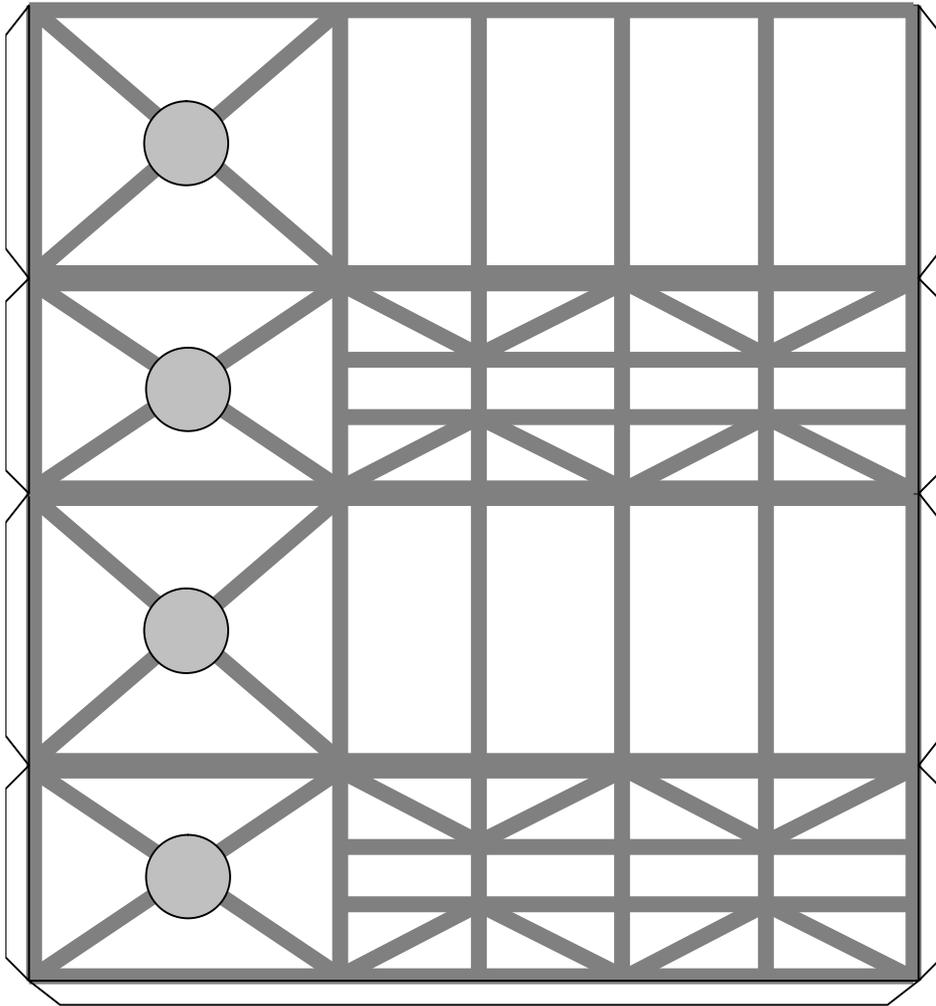
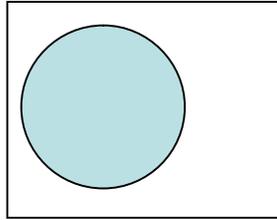
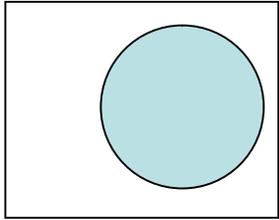
OUTBOARD →

# S 3-4 TRUSS



← OUTBOARD

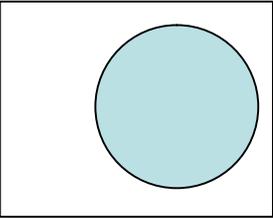
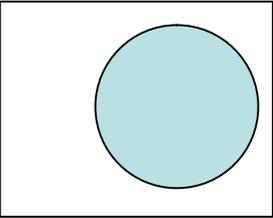
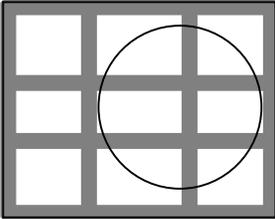
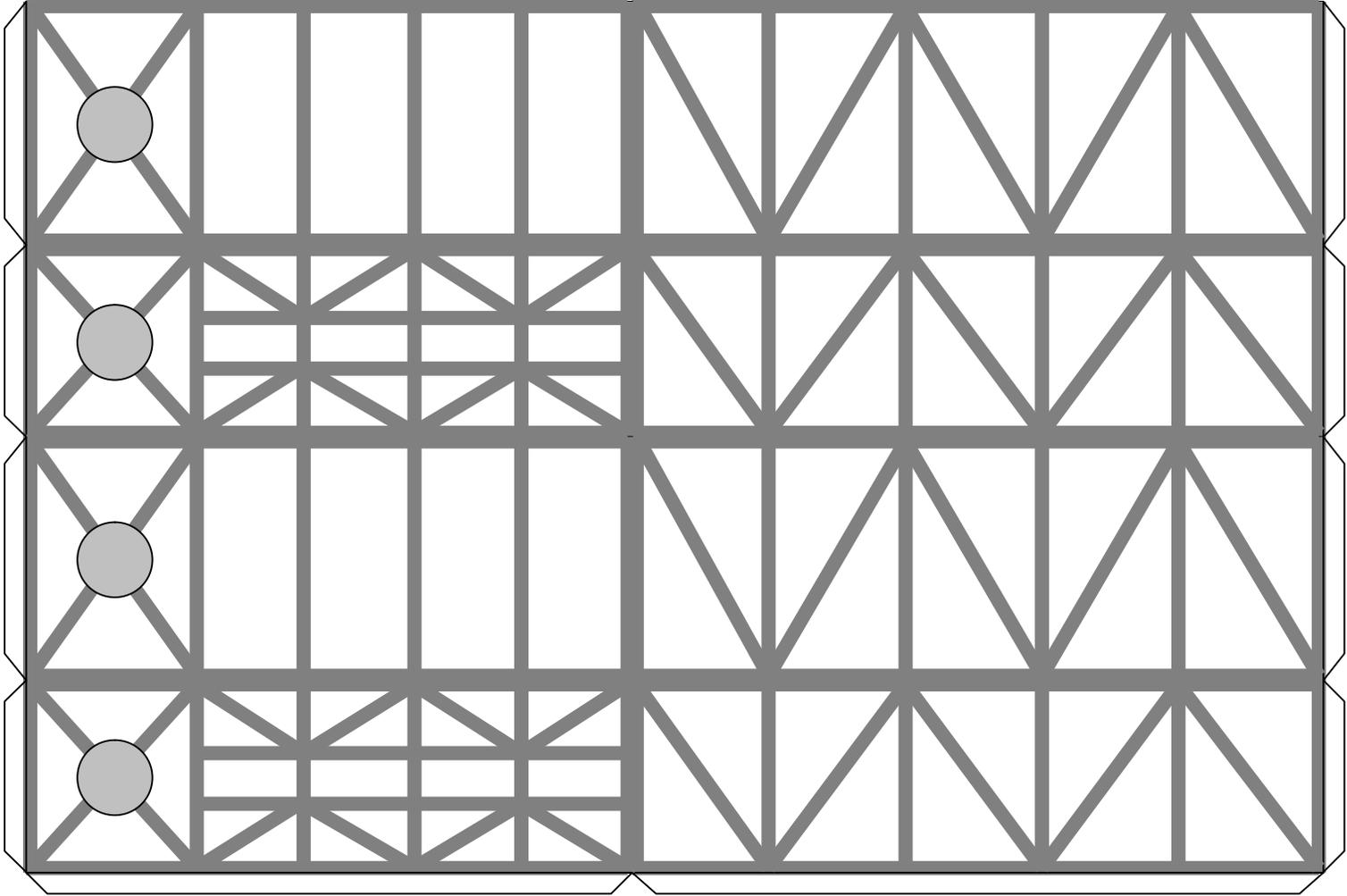
# P 3-4 TRUSS



← OUTBOARD

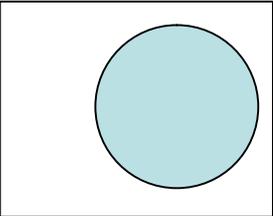
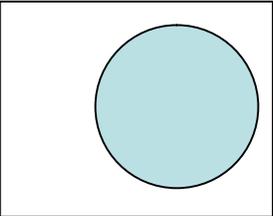
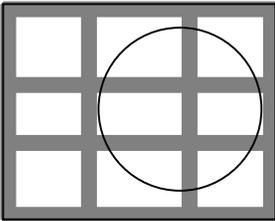
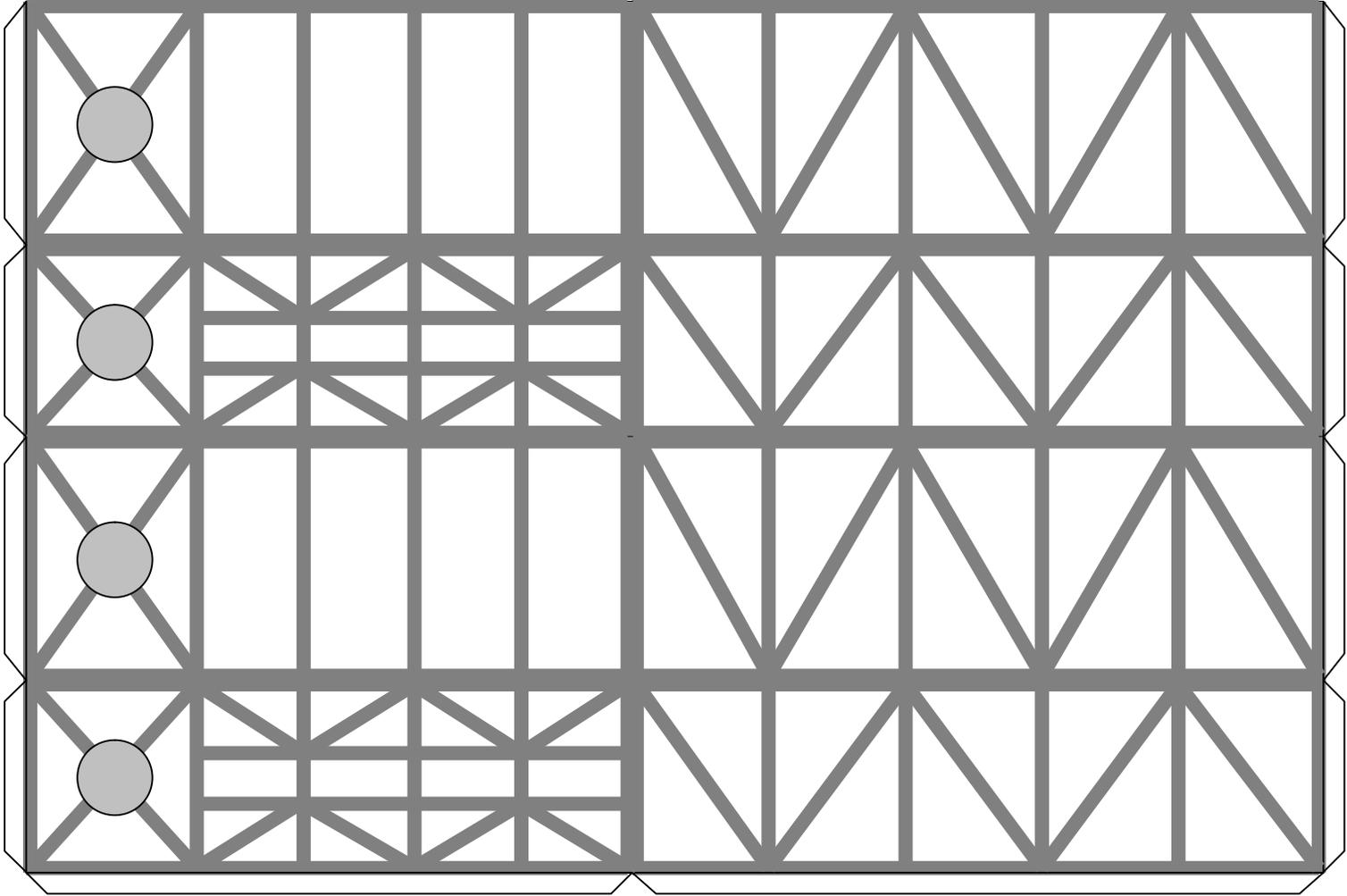
# S 5-6 TRUSS

← OUTBOARD



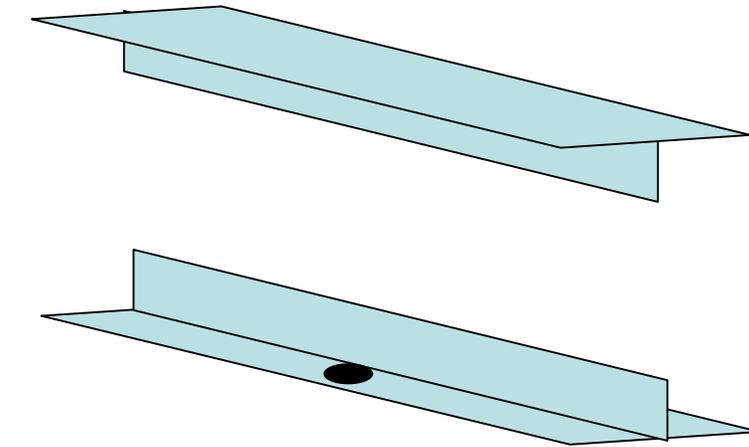
P 5-6 TRUSS

← OUTBOARD



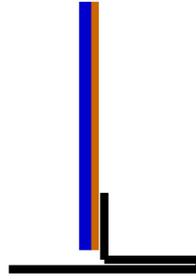
# MAIN SOLAR PANELS – PHOTO-VOLTAIC ARRAY (PVA)

“GOLD” SIDE VIEW

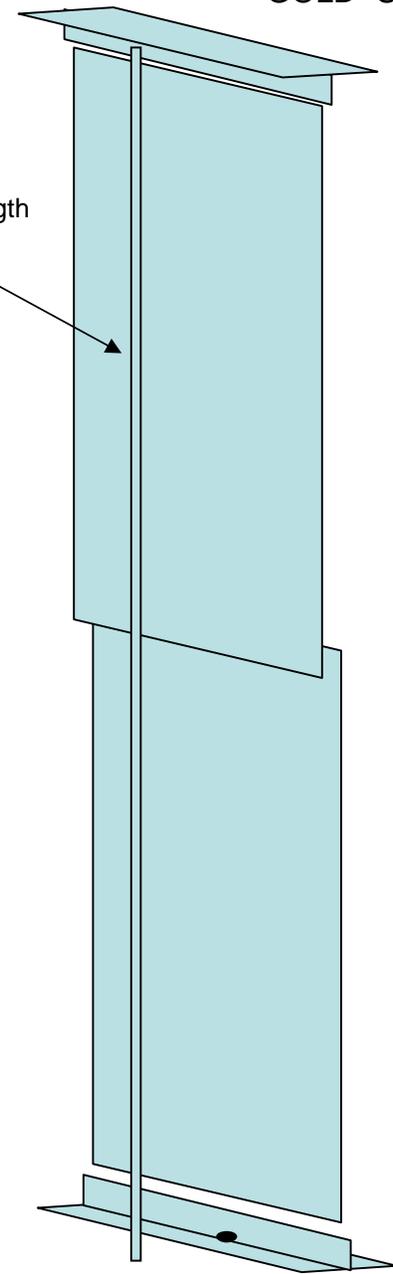


Glue up reinforcing beams from card stock rectangle sized to match width of solar array.

Mounting rod – 36" plus length to insert into truss.



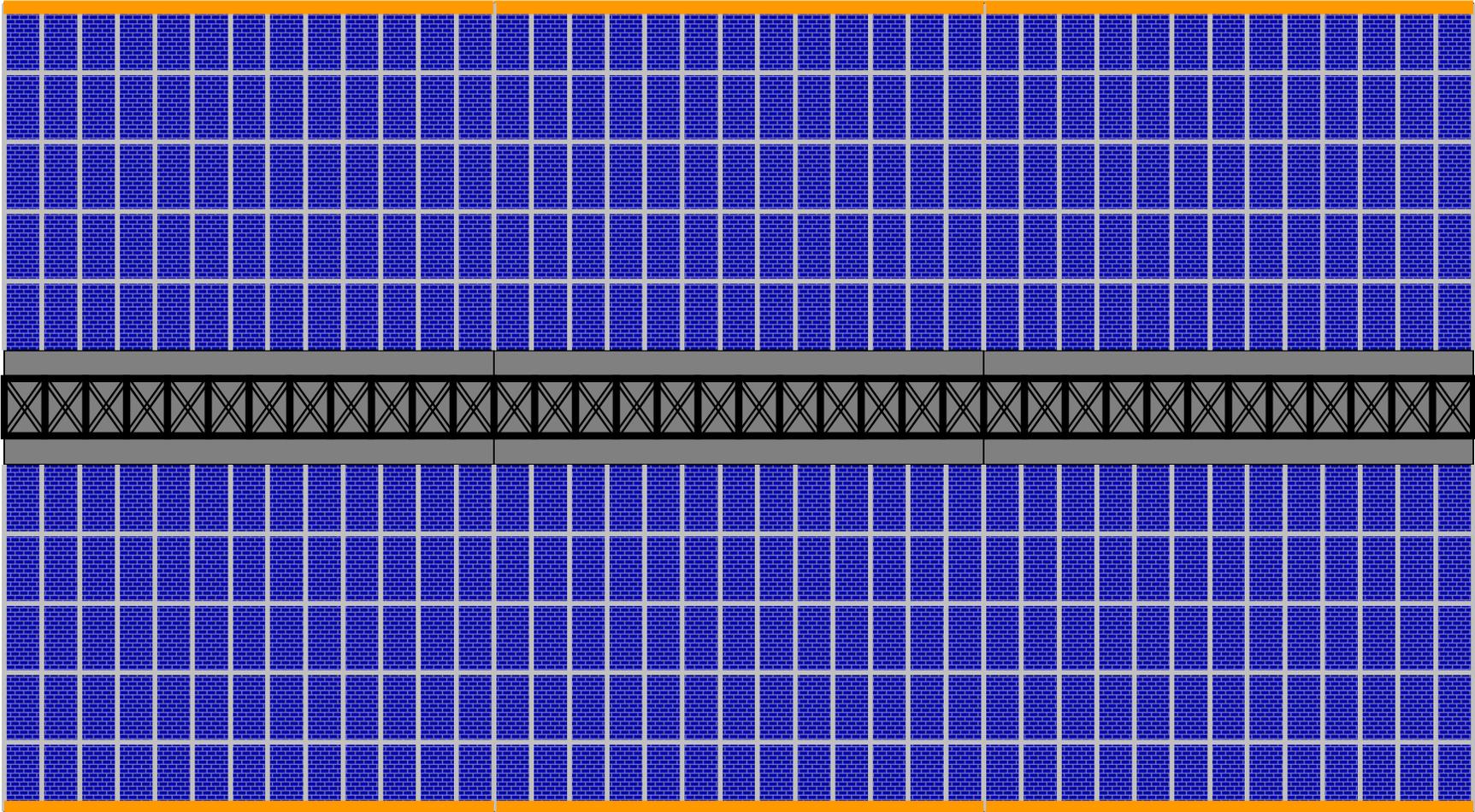
Beam profile – about 1/2" wide.



Glue reinforcing beams at ends to gold side; cut hole to run mounting rod through bottom beam; butt-glue rod to top beam to support array

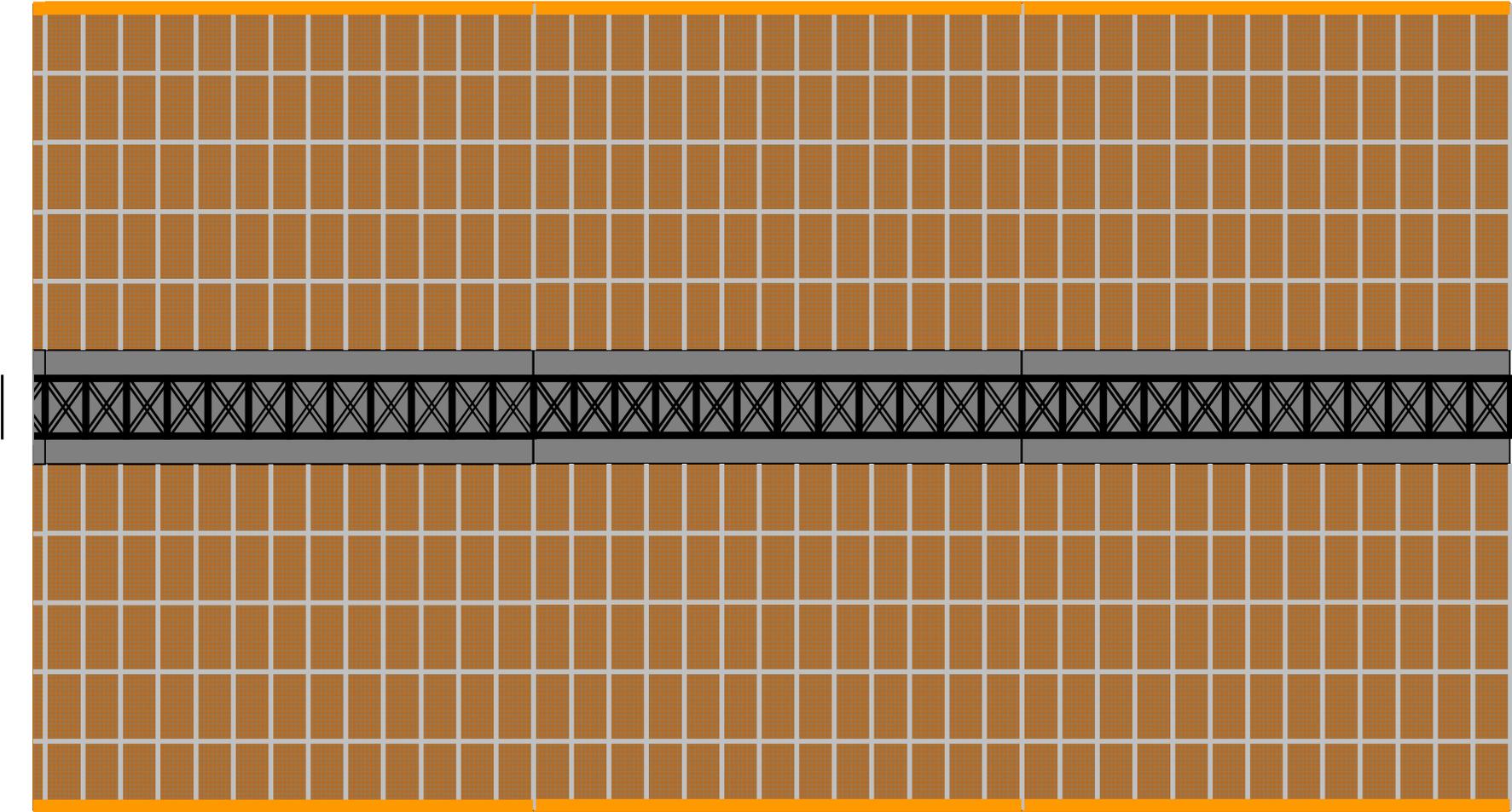
SOLAR PANEL – FRONT; ONE OF TWO PER ARRAY;  
EIGHT ARRAYS TOTAL. (16 PAGES)

**PRINT ON PLAIN PAPER –  
back to back with next page, use  
“gold side” to guide cutting.**



SOLAR PANEL – BACK; ONE OF TWO PER ARRAY  
(16 PAGES)

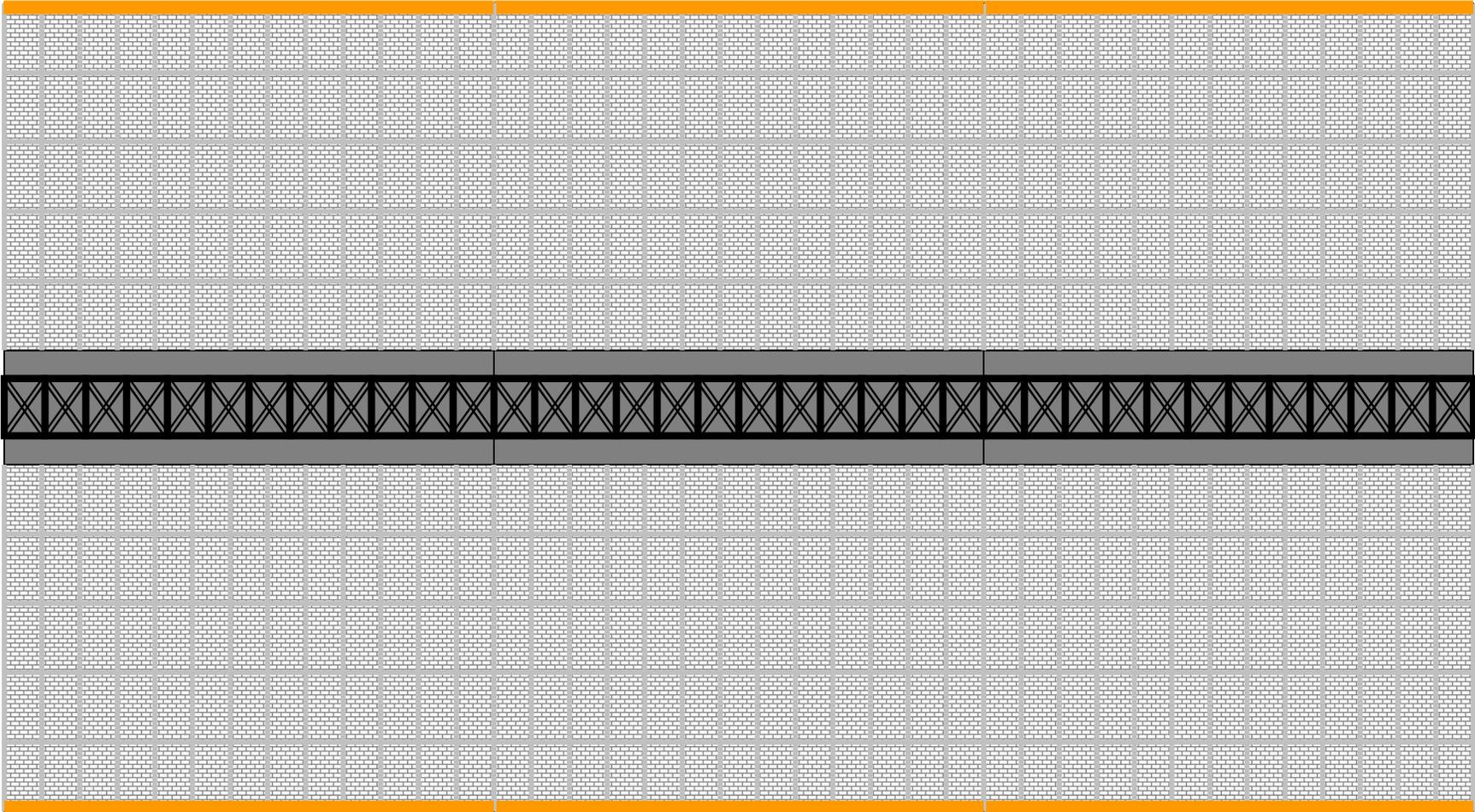
PRINT ON PLAIN PAPER – cut  
out panel from this side.



Use overlap on bottom edge to connect to next segment

SOLAR PANEL – FRONT; ONE OF TWO PER ARRAY;  
EIGHT ARRAYS TOTAL. (16 PAGES)

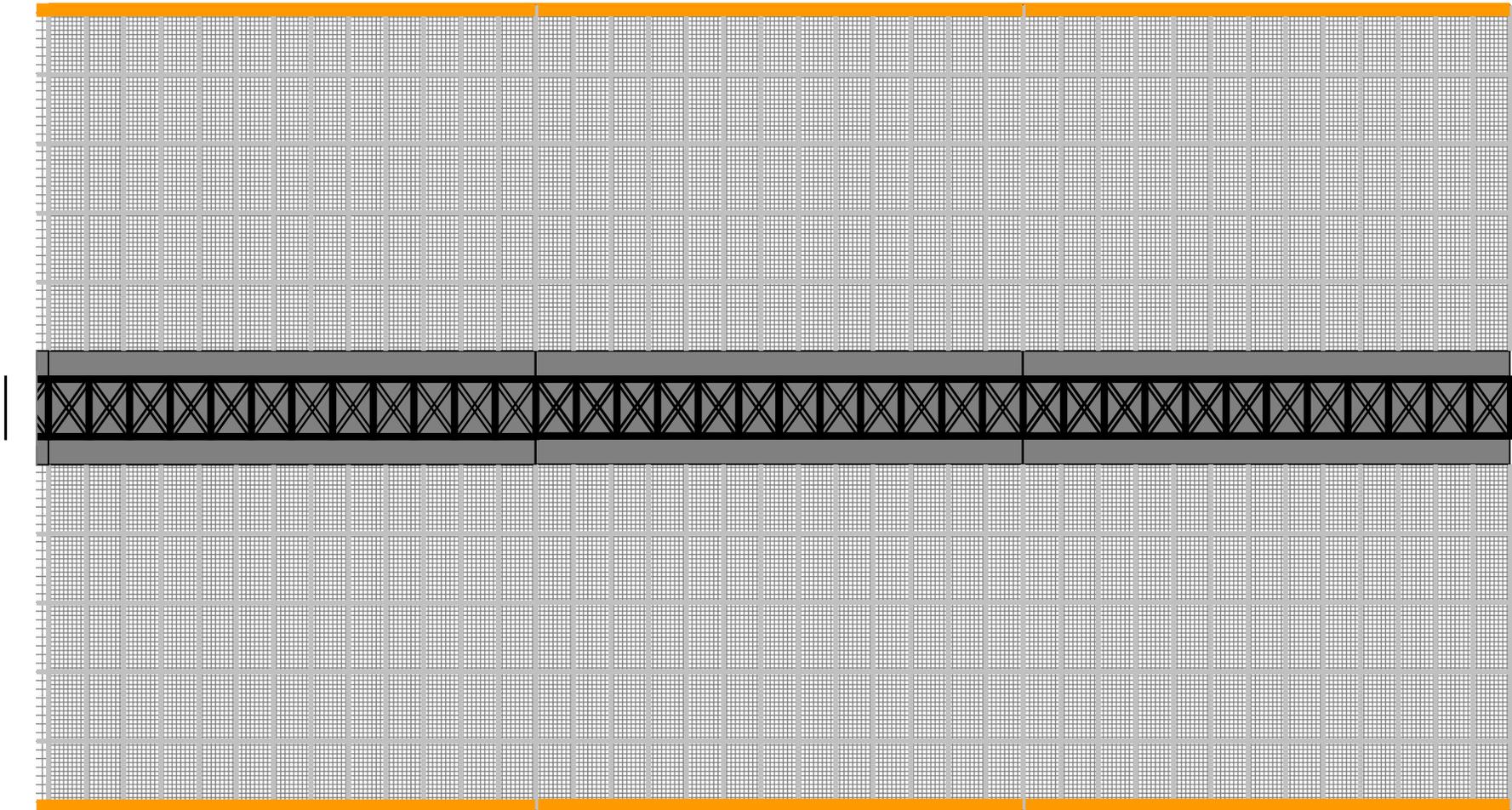
**PRINT ON BLUE PLAIN PAPER –  
back to back with next page, use  
“gold side” to guide cutting.**



ALTERNATE B/W PANEL FOR PRINTING ON COLORED PAPER

**SOLAR PANEL – BACK; ONE OF TWO PER ARRAY  
(16 PAGES)**

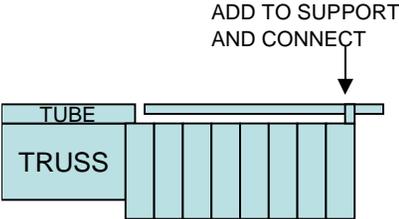
**PRINT ON GOLD/YELLOW PLAIN PAPER – cut  
out panel from this side.**



**ALTERNATE B/W PANEL FOR PRINTING ON COLORED PAPER**

Use overlap on bottom edge to connect to next segment

# SOLAR PANEL – RADIATOR. ONE PER ARRAY AXLE. TRUSS 4&6.



ATTACH TO BACK SIDE OF TRUSS								
ATTACH TO BACK SIDE OF TRUSS								
ATTACH TO BACK SIDE OF TRUSS								
ATTACH TO BACK SIDE OF TRUSS								

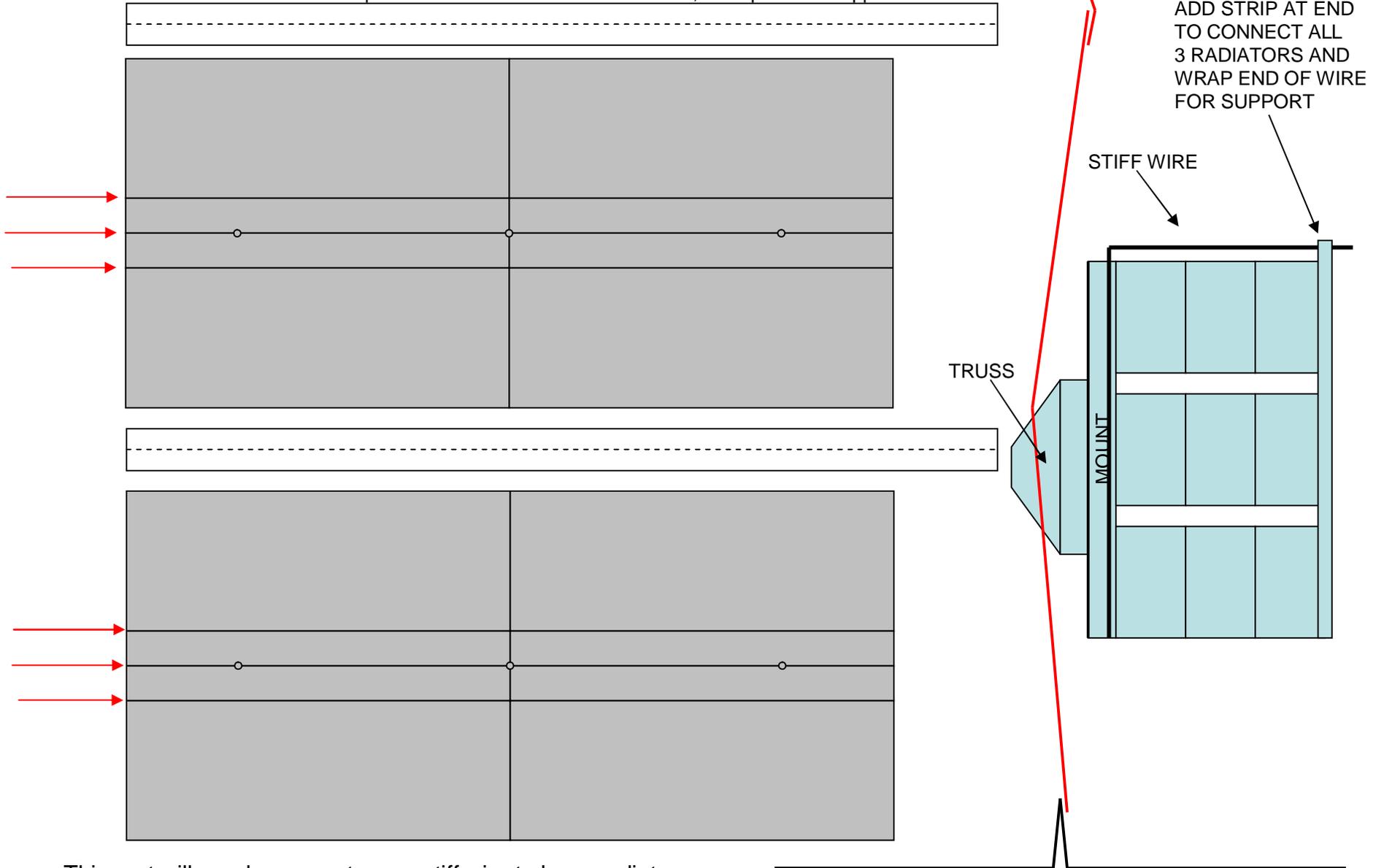
THERMAL RADIATOR. TWO PIECES PER STRING; THREE STRINGS  
PER TRUSS; MOUNT ON TRUSS 1. (print page 3 times total)

**PRINT ON PLAIN PAPER**

CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR

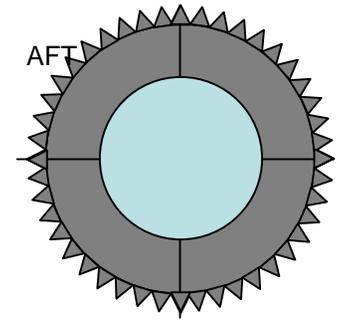
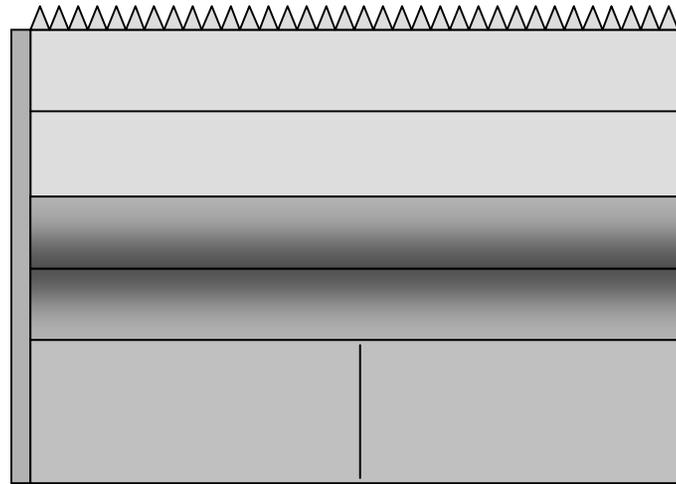
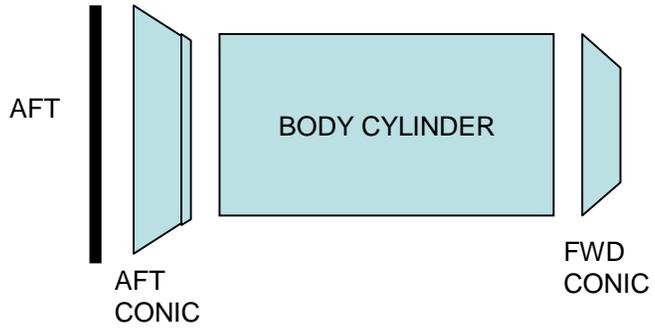
# THERMAL RADIATOR MOUNT. TRUSS 1 MOUNT.

Radiator end connector strip – fold over ends of all three radiators, roll top around support rod.

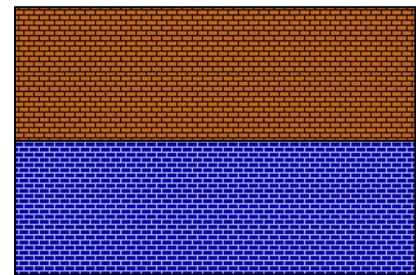
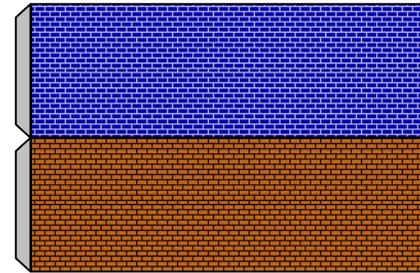
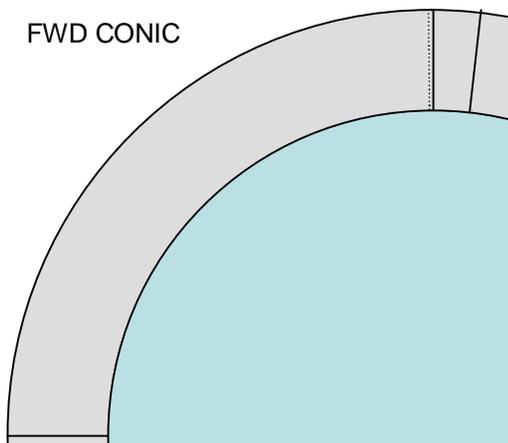


This part will need a support – use stiff wire to hang radiators.  
Base of each radiator set attaches to mount. Mount attaches to truss (see NASA website for detail).

# PROGRESS



BODY CYLINDER



PROGRESS ARRAYS

