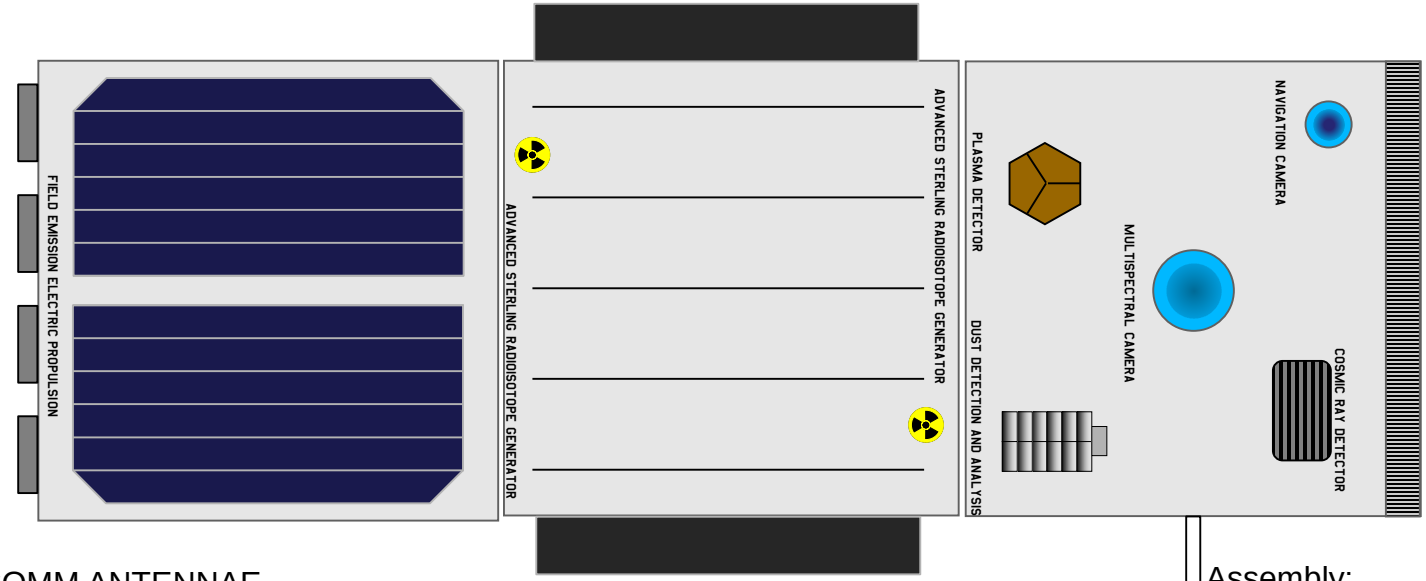
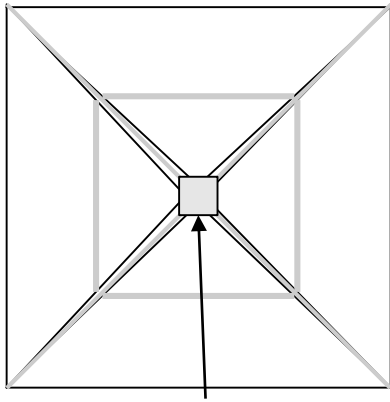
10cm cube basic form factor (3.94”)

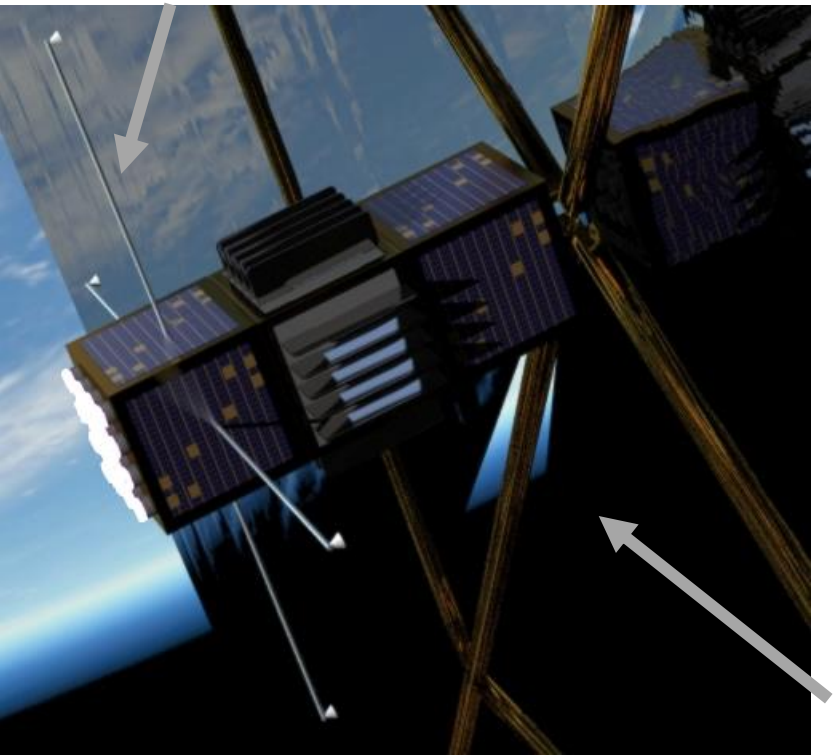


4 PANEL SAIL/REFLECTOR



CUBESAT

COMM ANTENNAE

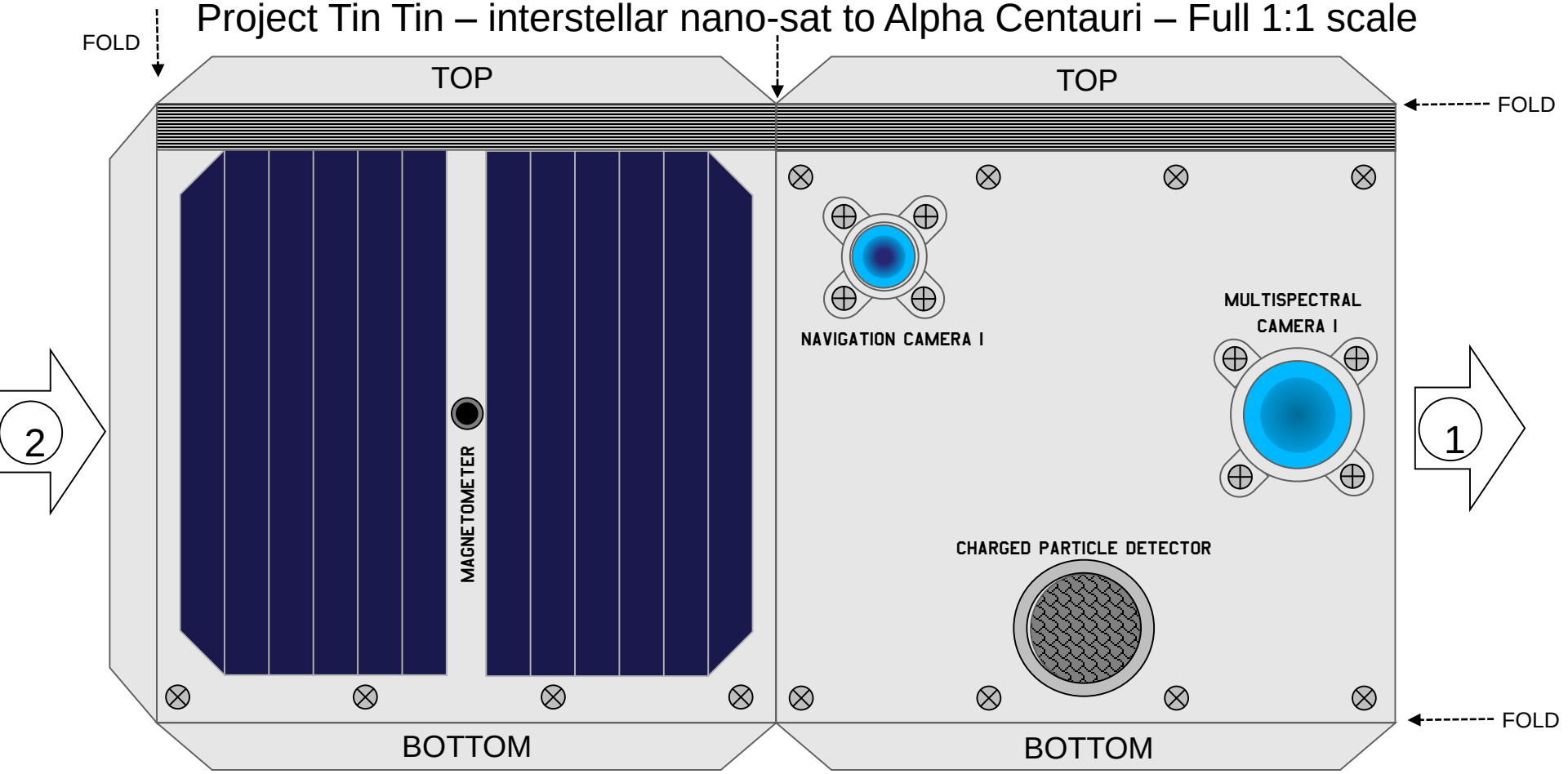


Basic probe is 3x cubesat (3 modules). Latest proposal is for a 9x cube sat. To build it stack 3 propulsion modules, 4 power modules, and 2 payload modules.

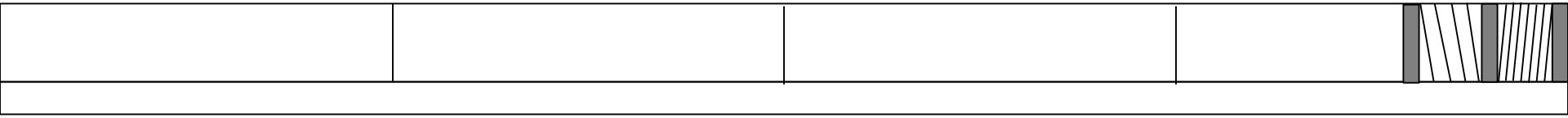
Assembly:
- Glue module faces A/B to C/D, fold into an open box and glue.
- Close each module by gluing on top and bottom.
- Stack modules (see photo left) by gluing together the tops & bottoms.
- Fold and glue radiator fins, then attach to power module.
- Add additional detail if desired: magnetometer probe on payload module, FEEP thrusters and comm antennae on propulsion module.
- Use thin dowels and mylar sheeting to construct light sail/reflector if desired. Baseline sail is a 4 meter (diagonal) square supported by diagonal struts.

LIGHT SAIL/COMMUNICATION REFLECTOR

Project Tin Tin – interstellar nano-sat to Alpha Centauri – Full 1:1 scale



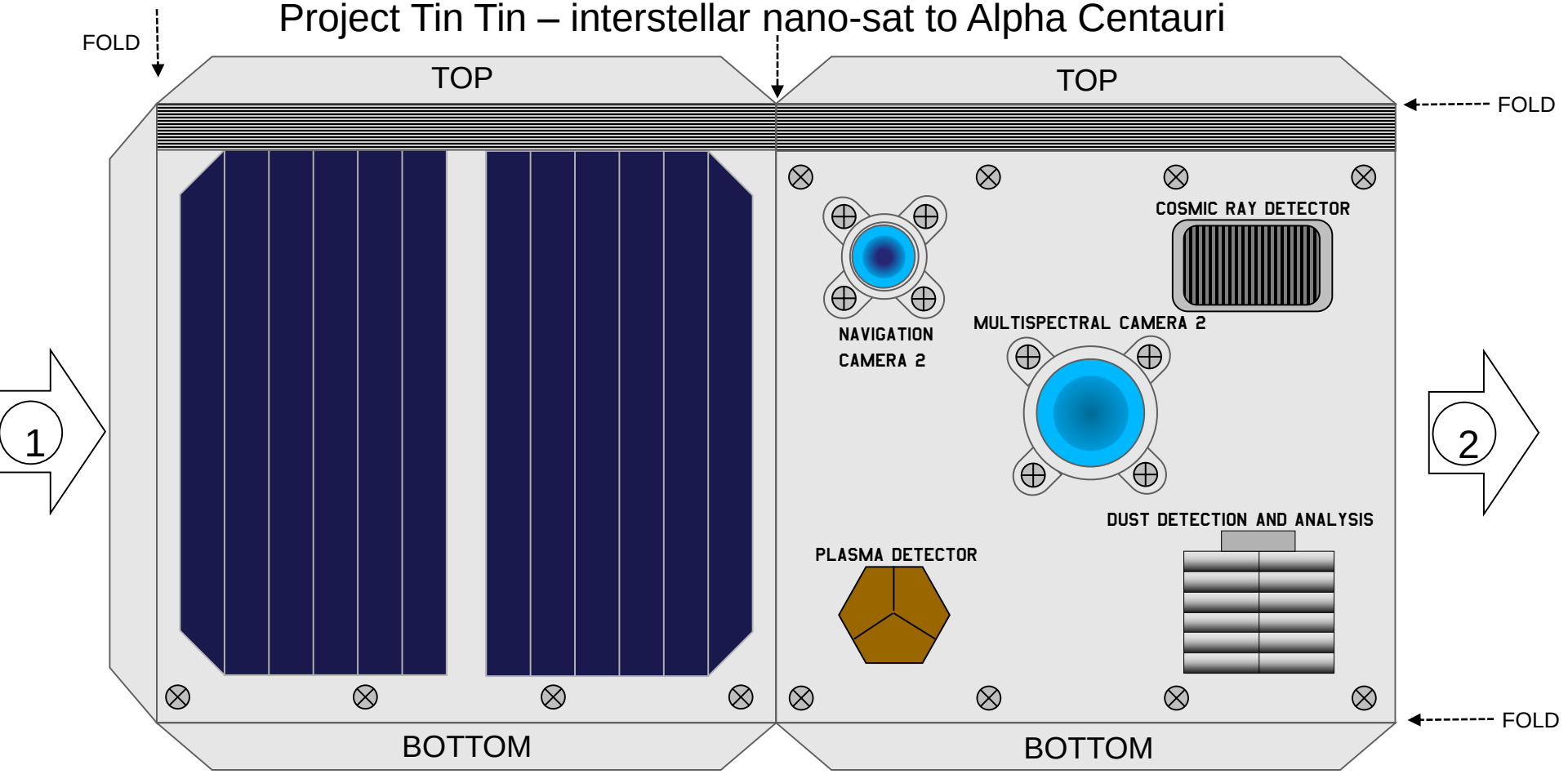
Icarus Interstellar Starship Congress on project Tin Tin briefing at:
http://www.youtube.com/watch?v=Wkfw2ZirAMY&feature=c4-overview&list=UUjJdNqYgYW7WL5U7oEtJRZA#t=37m35s
Starts at 00:37:50
Project paper available at http://www.icarusinterstellar.org/wp-content/uploads/2012/01/Tin-Tin-IAC-paper-v1.8.1.pdf



Roll into a long cylinder for extended magnetometer probe

Payload - Side A, B

Project Tin Tin – interstellar nano-sat to Alpha Centauri



Currently there are no interstellar exploration missions planned or in progress. Even the Voyager spacecraft will not pass close to a neighboring solar system for tens of thousands of years. The pursuit of deep space and interstellar exploration studies has recently become a matter of critical debate, with Icarus Interstellar and the 100 Year Star Ship (100 YSS) program drawing attention to the merits of pressing the boundaries of current and near future technologies towards such goals. Project Tin Tin is a mission profile and spacecraft design feasibility program which aims to establish the science, propulsion, communications, power and materials which will be used to build interstellar precursor missions using cubesats. The mission objectives are (a) to establish a program of utilizing space systems miniaturization technologies, (b) to create a template mission and spacecraft package for space-proofing interstellar systems and (c) to launch the first ever interstellar spacecraft to Alpha Centauri. In this paper and presentation we establish that an interstellar journey to our nearest star is feasible within 25,000 years using current technology, cutting Voyager's best time to a nearest star by a factor of 1/3, with reasonable room for improvements.

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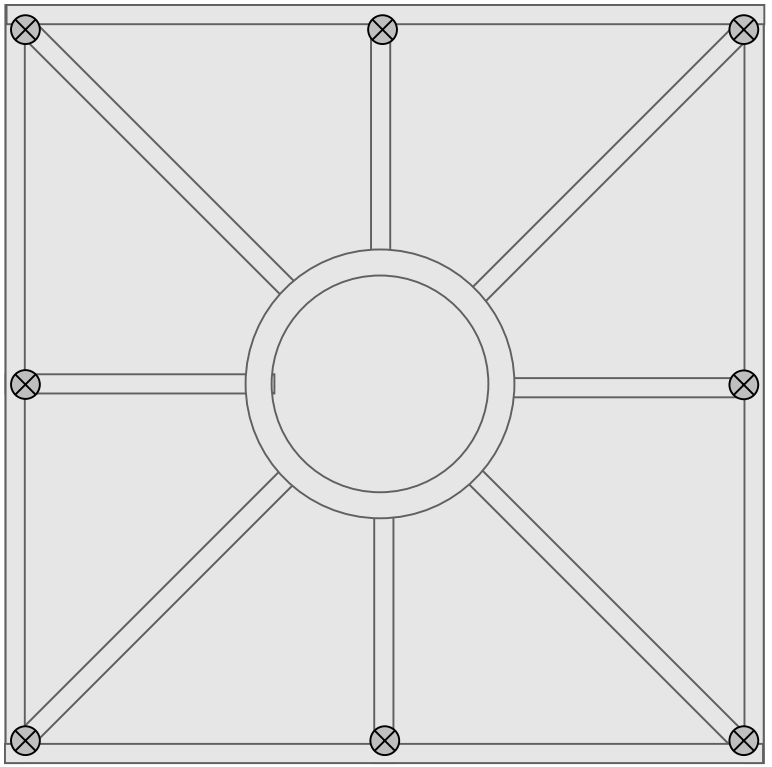
Mr. Konstantinos Konstantinidis†, Mr. Adam Crowl‡
‡ Icarus Interstellar, Australia, acrowl@icarusinterstellar.org

Payload - Side C, D

TOP SIDE SHIELDING
FOIL WHIPPLE SHIELD



BOTTOM

Payload - Top, Bottom

TOP

ADVANCED STERLING RADIOISOTOPE GENERATOR

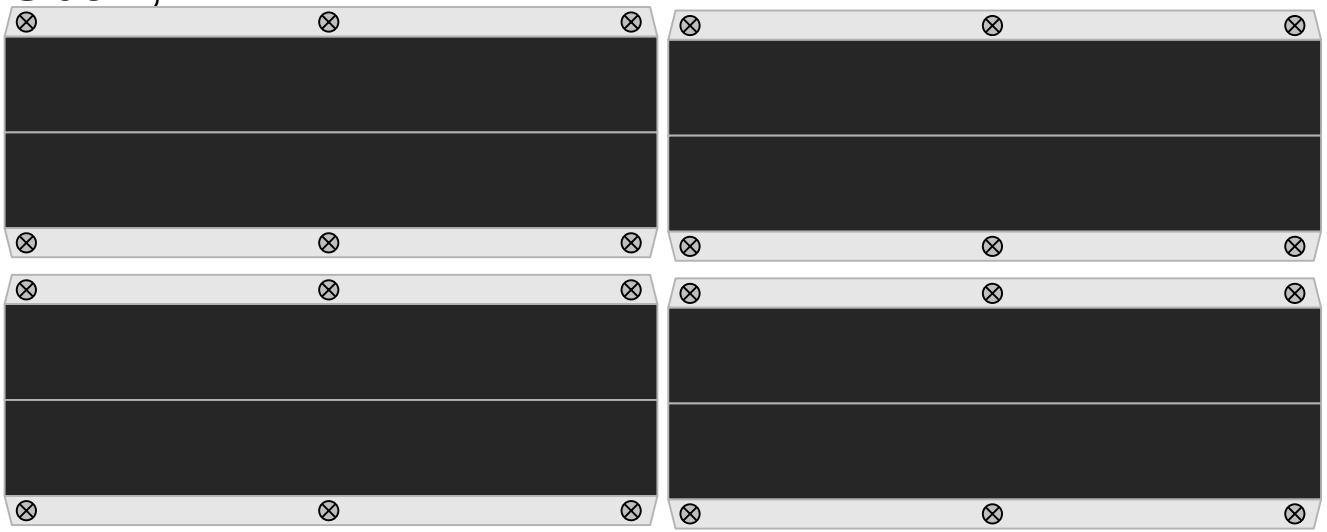
BOTTOM

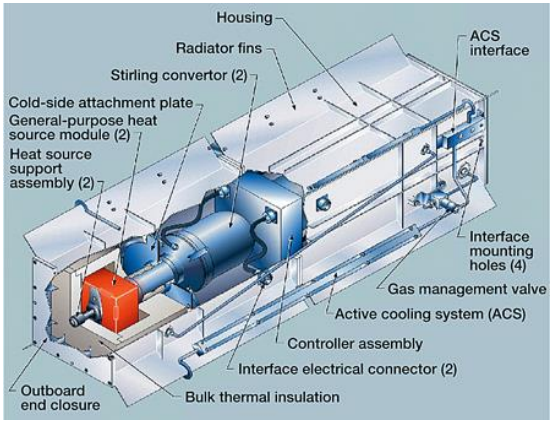
TOP

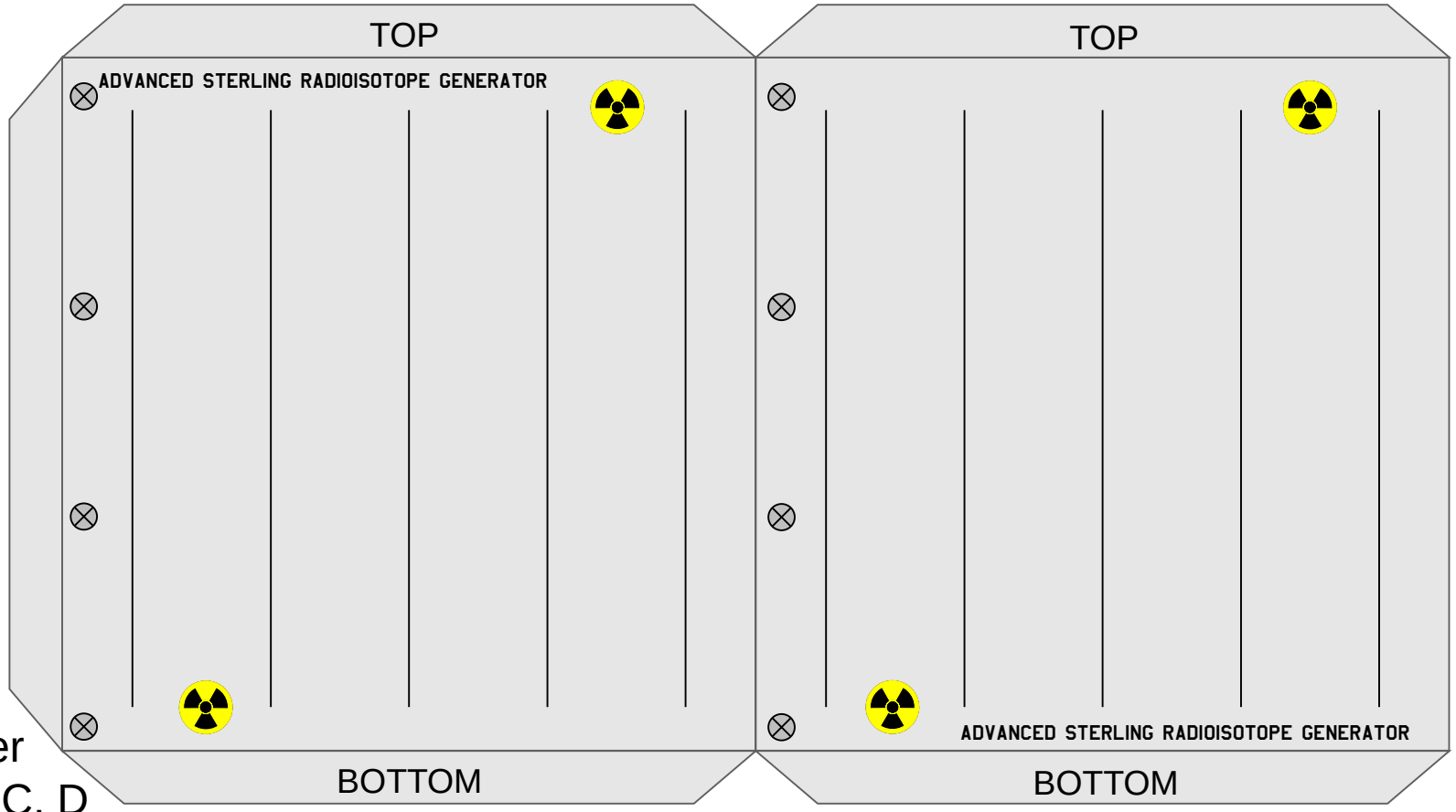
ADVANCED STERLING RADIOISOTOPE GENERATOR

BOTTOM

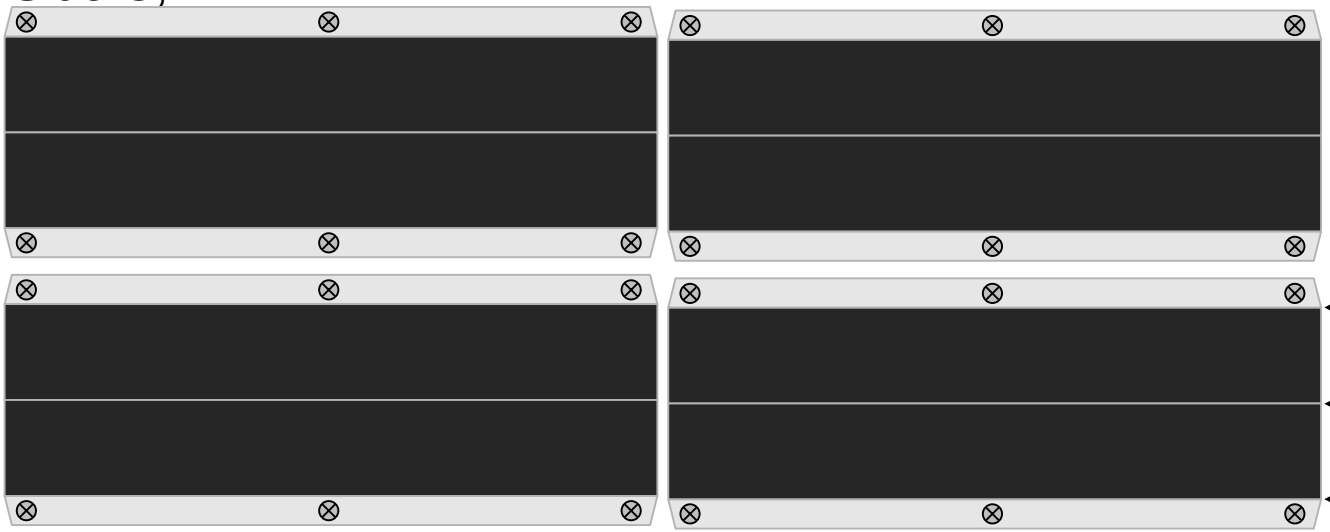
Power
Side A, B



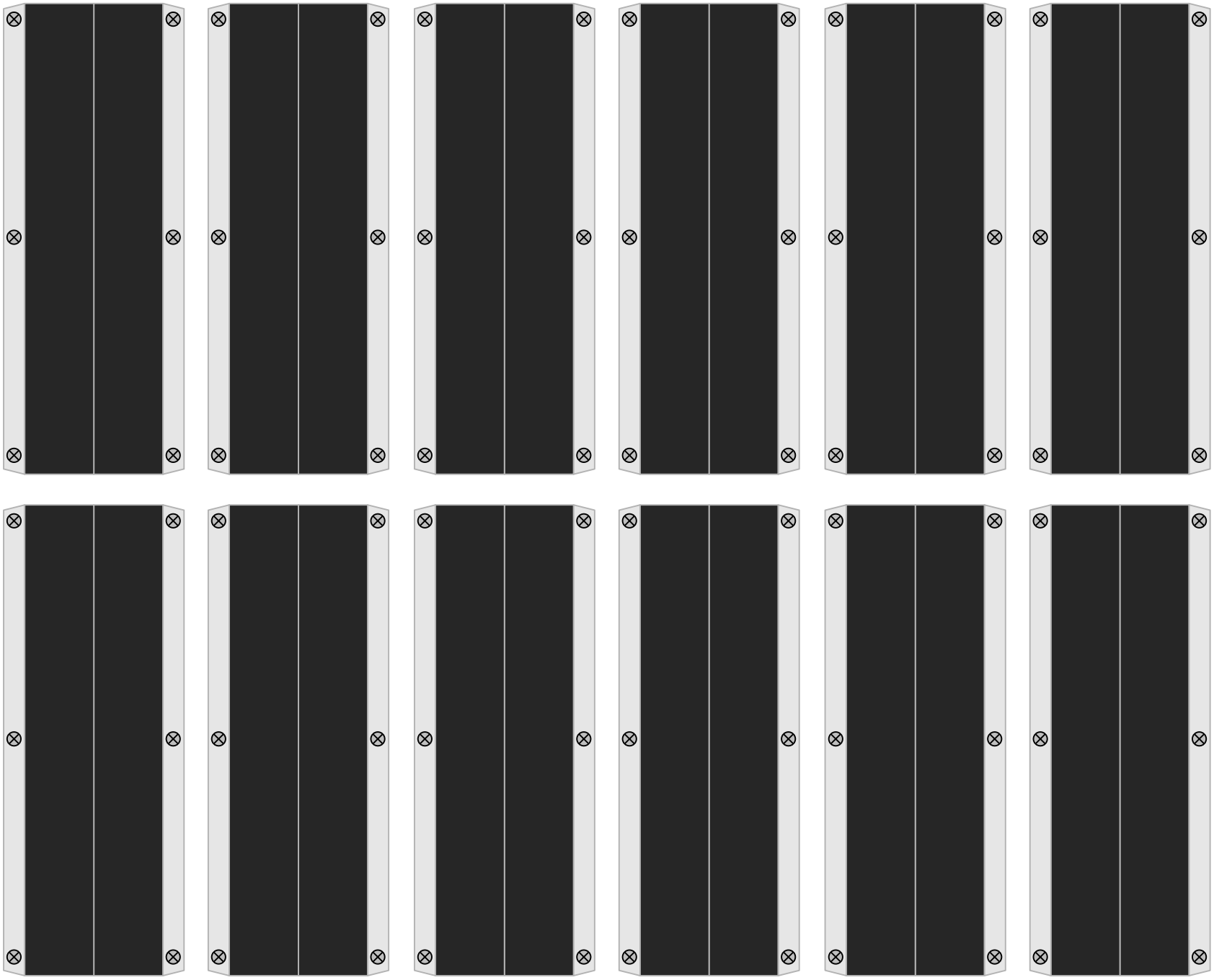




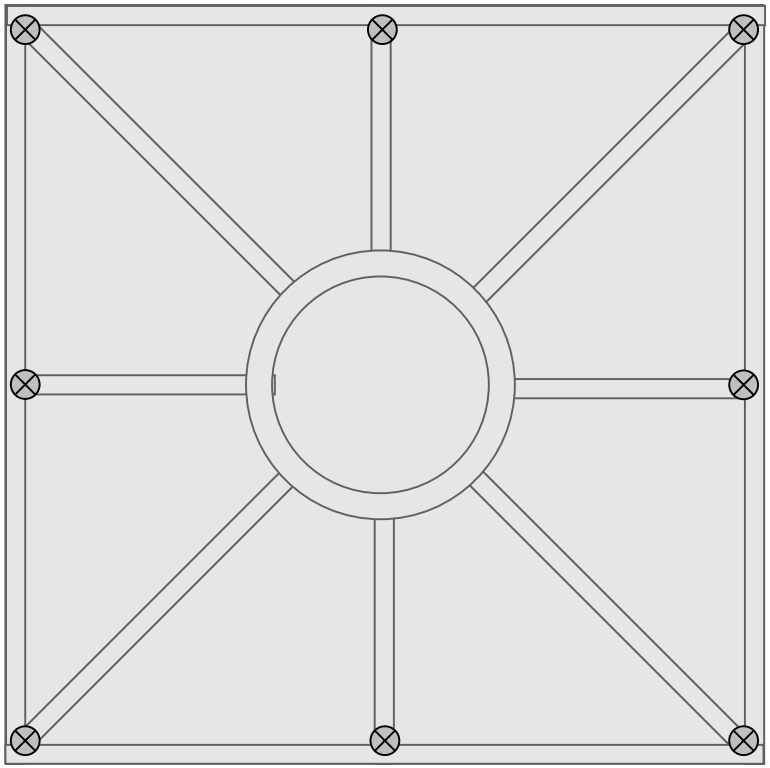
Power
Side C, D



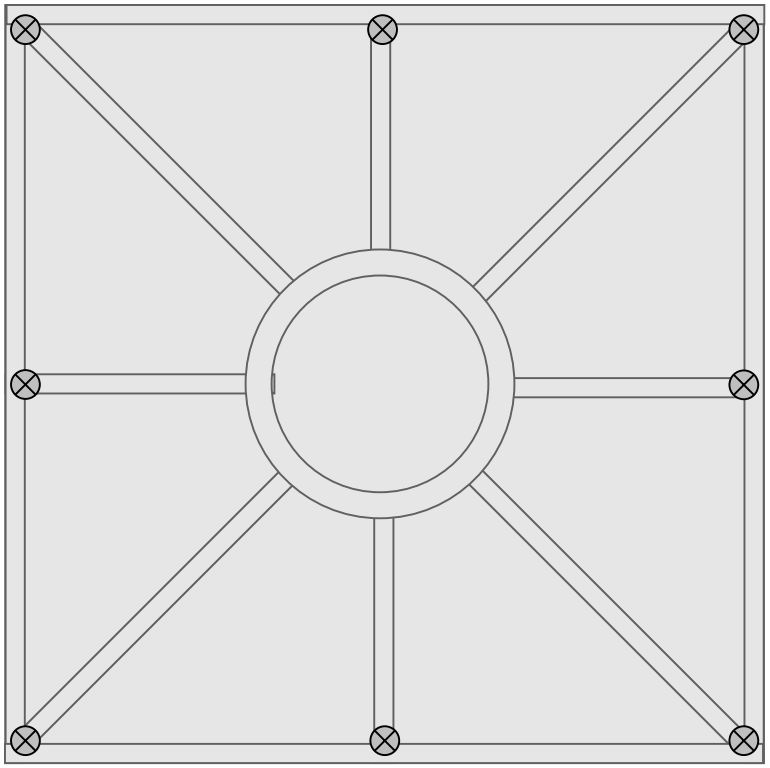
Score and fold radiator fins, glue together unprinted sides of fin. Glue to lines on each side of module using the small tabs.



Power - Radiators



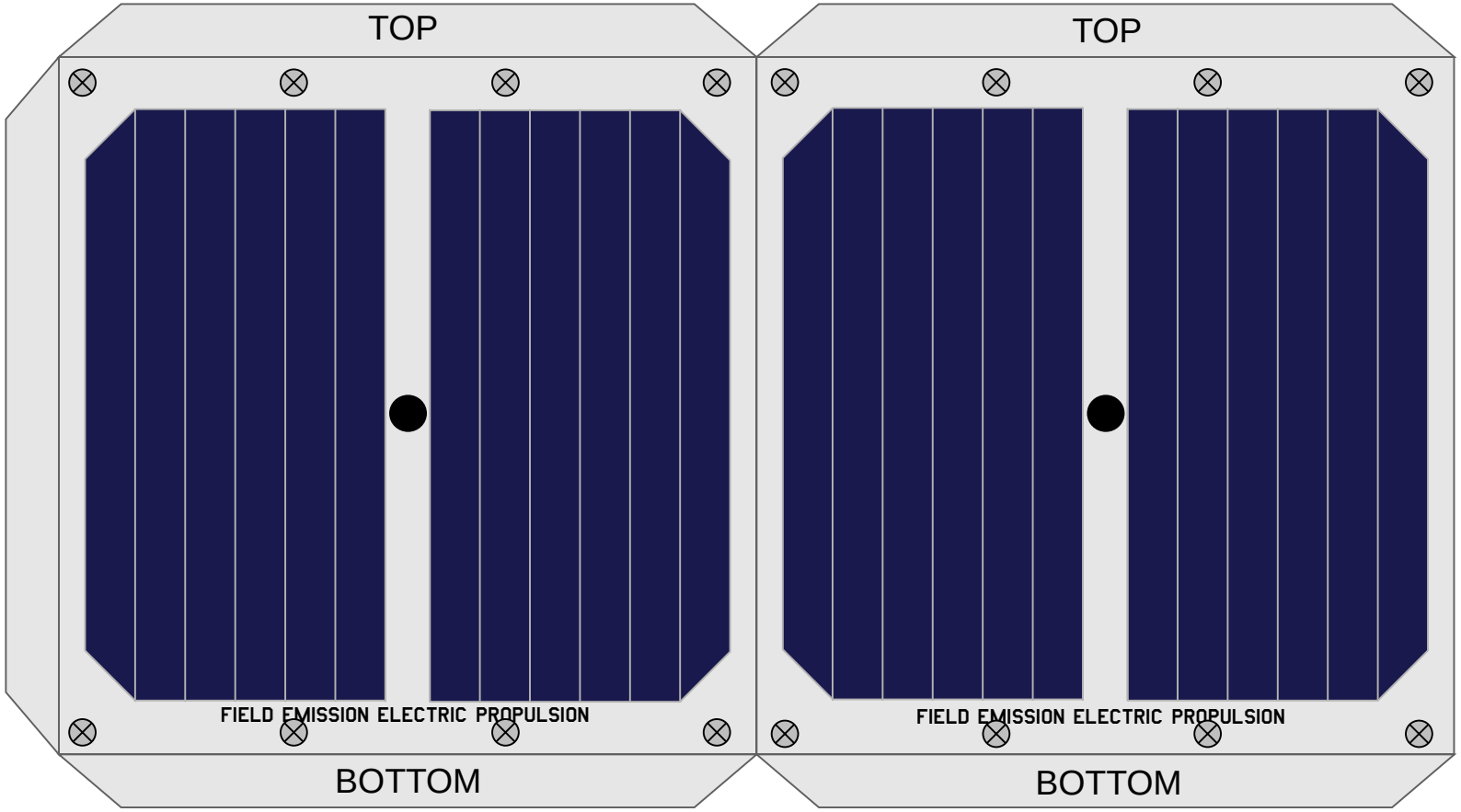
BOTTOM



TOP

Power - Top, Bottom

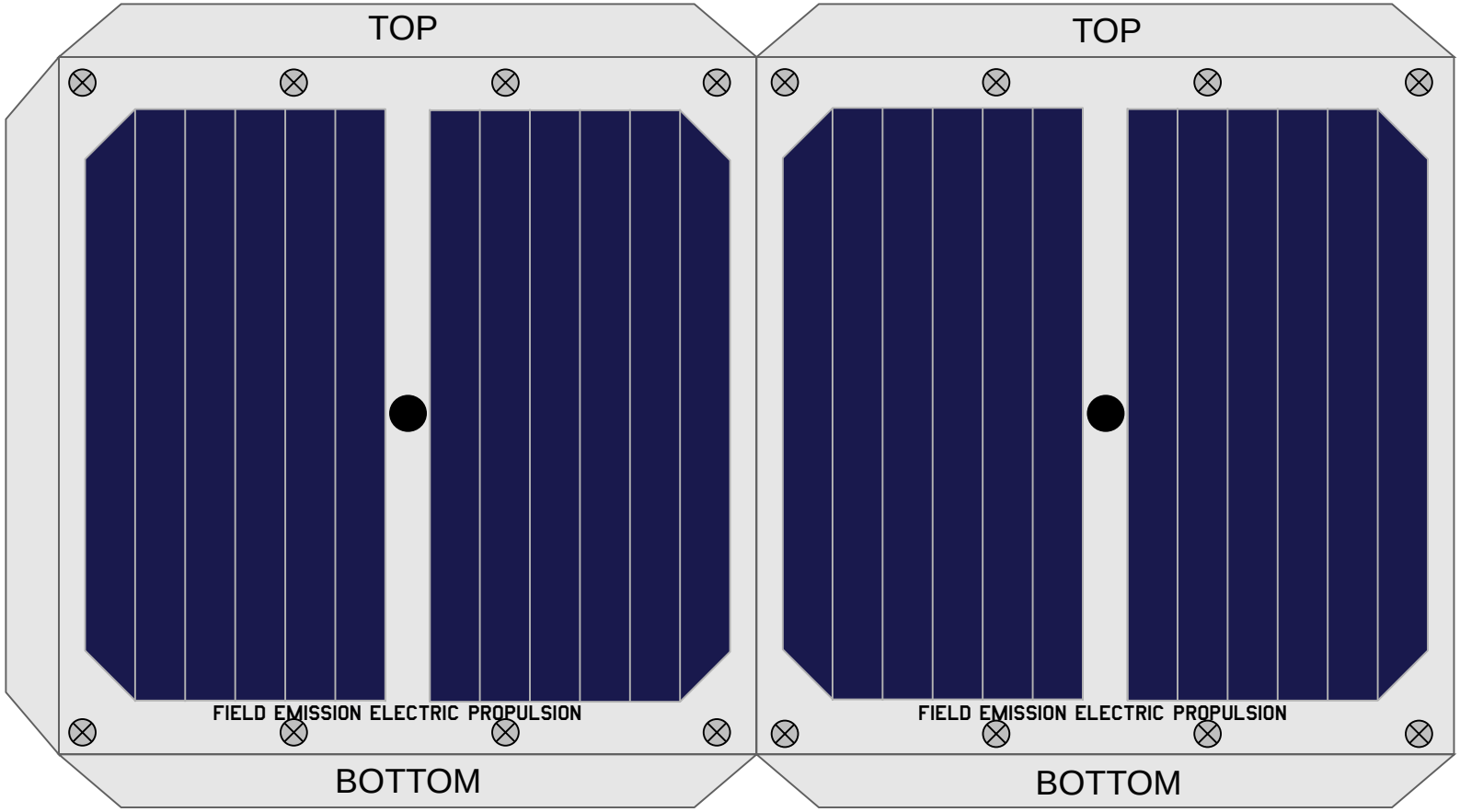
Propulsion - Side A, B



Optional comm emitters, roll into cones and glue to ends of comm booms

Optional comm antenna booms, roll into long cylinders and glue to center of faces

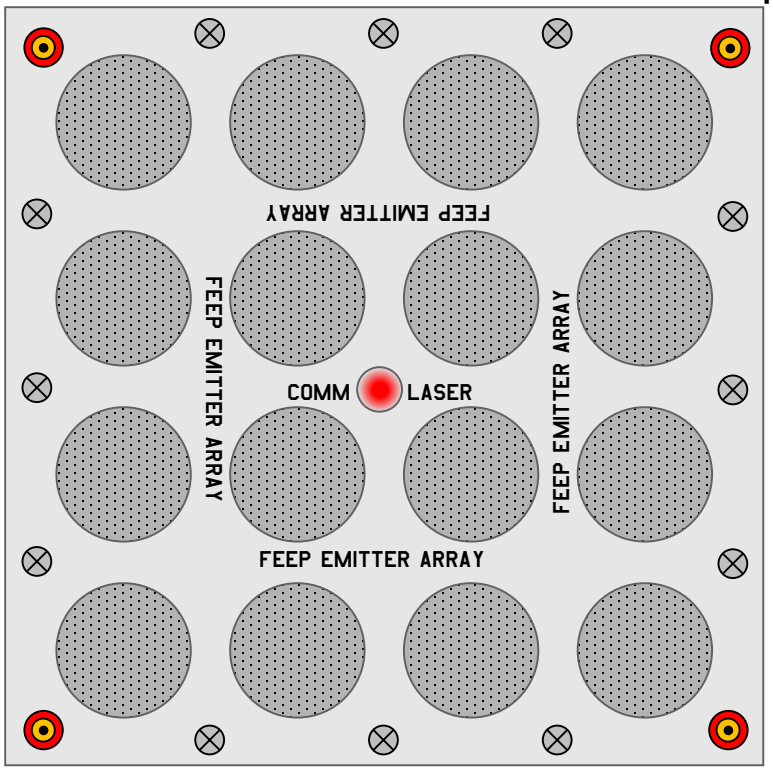
Propulsion - Side C, D



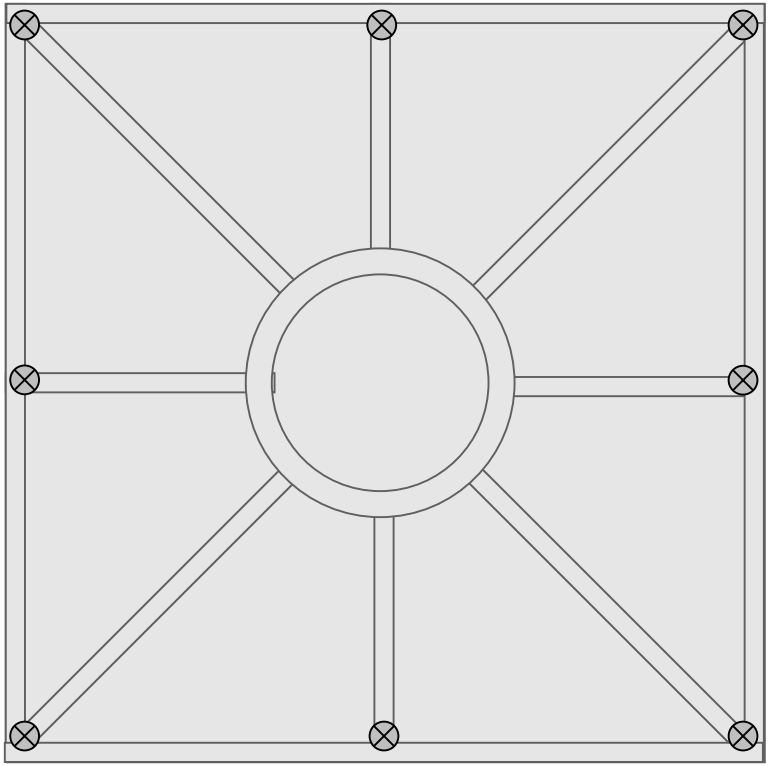
Field-emission electric propulsion (**FEEP**) is an advanced electrostatic space propulsion concept, a form of ion thruster, that uses liquid metal (usually either caesium, indium or mercury) as a propellant. A FEEP device consists of an emitter and an accelerator electrode. A potential difference of the order of 10 kV is applied between the two, which generates a strong electric field at the tip of the metal surface. The interplay of electric force and surface tension generates surface instabilities which give rise to Taylor cones on the liquid surface. At sufficiently high values of the applied field, ions are extracted from the cone tip by field evaporation or similar mechanisms, which then are accelerated to high velocities (typically 100 km/s or more).
A separate electron source is required to keep the spacecraft electrically neutral. Due to its very low thrust (in the micronewton to millinewton range), FEEP thrusters are primarily used for microradian, micronewton attitude control on spacecraft, such as in the ESA/NASA LISA Pathfinder scientific spacecraft.

Optional comm antenna boom, roll into long cylinders and glue to center of faces			

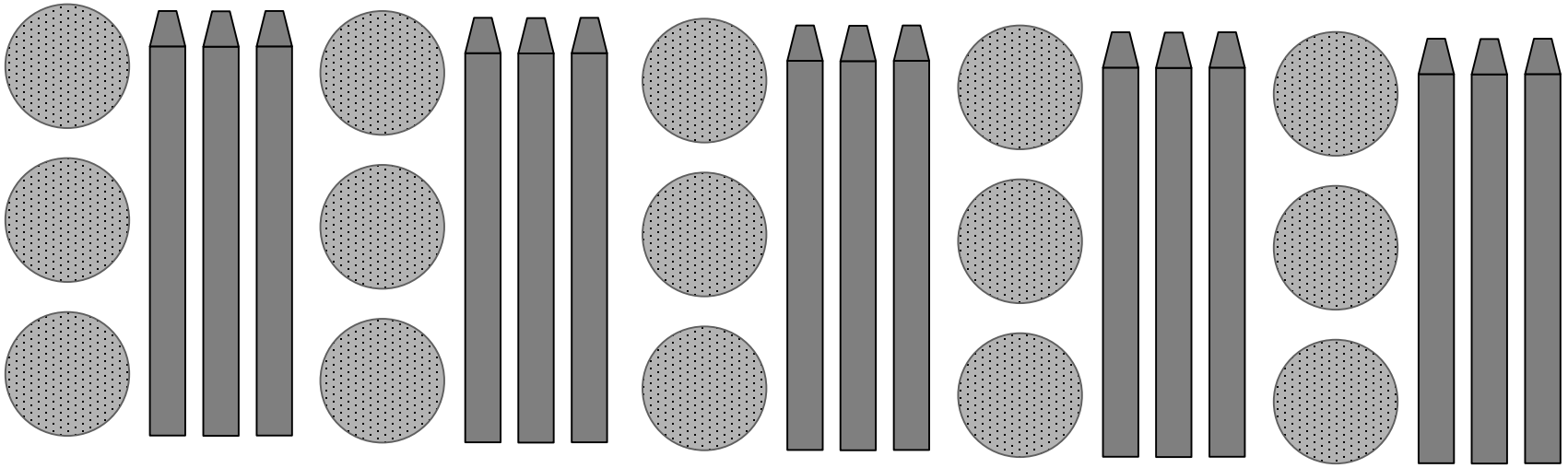
Propulsion - Top, Bottom



BOTTOM



TOP



FEEP thrusters (optional), roll band into a ring, glue disk to one side, glue to propulsion module over graphics