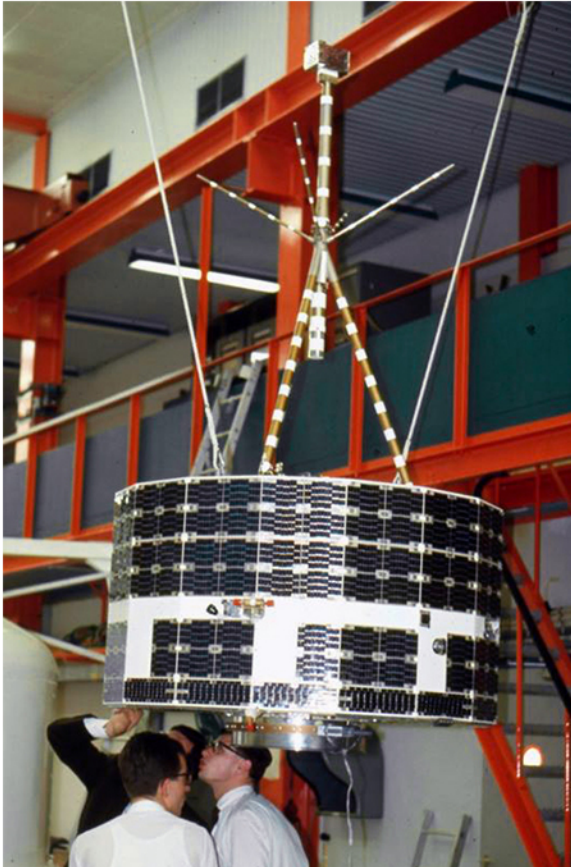


HEOS-1



HEOS-1 (Highly Eccentric Orbit Satellite-1) was the first European spacecraft to venture beyond near-Earth orbit to study the magnetic fields, radiation and the solar wind outside of the Earth's magnetosphere. This required an orbit stretching two-thirds of the way to the Moon and launch during a period of high solar activity. The scientific experiments also demanded a magnetically clean vehicle, another first for Europe and requiring a new facility at ESTEC for testing the integrated satellite.

HEOS-1 performed admirably for seven years, for the first time providing scientists with continuous observations of interplanetary conditions over most of a solar cycle. Precise calibration of the magnetometer meant that these data have been used ever since as a fundamental reference. Another feature – novel at the time – was the magnetometer's memory, which allowed measurements with very high time resolution. HEOS-1 also released a canister of barium and copper oxide on March 18, 1969 some 75 000 km out from Earth – igniting it 40 km from HEOS – in order to trace distant magnetic field lines.

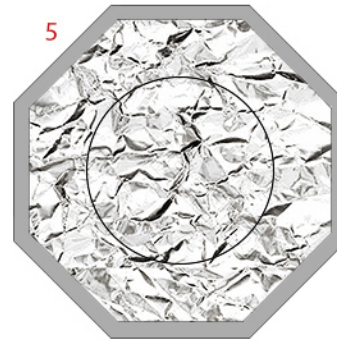
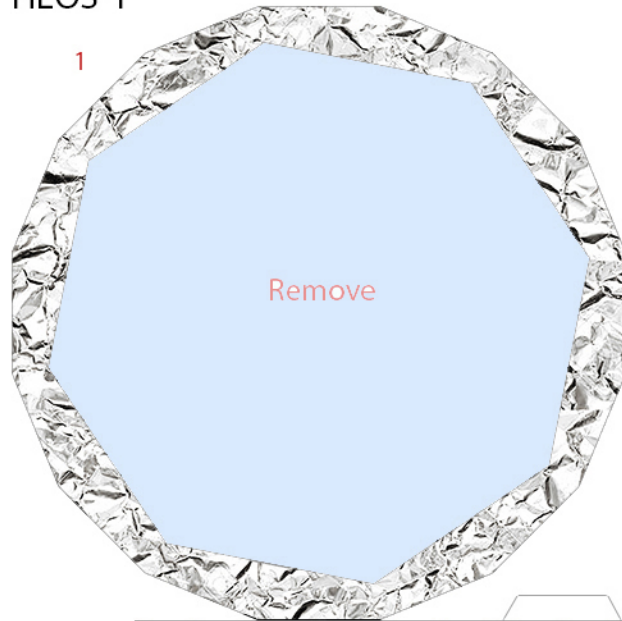
HEOS-1 was launched by ESA on December 5, 1968.

On November 20, 2013, the HEOS-1 space mission was commemorated in a Symposium held in the European Space Research and Technology Centre (ESTEC) in Noordwijk, The Netherlands. The Symposium reunited about twenty of the engineers and scientists who had worked on the HEOS spacecraft. They were joined by the current Director of Science and Robotic Exploration, Prof. Alvaro Giménez and Dr Franco Ongaro, Director of Technical and Quality Management of the European Space Agency (ESA) and other senior staff of the Agency. In the Symposium, different aspects of the HEOS mission were presented, followed by reviews of current scientific programme of the Agency and its activities for developing new technologies and techniques, looking forward to the next decades of scientific space projects.

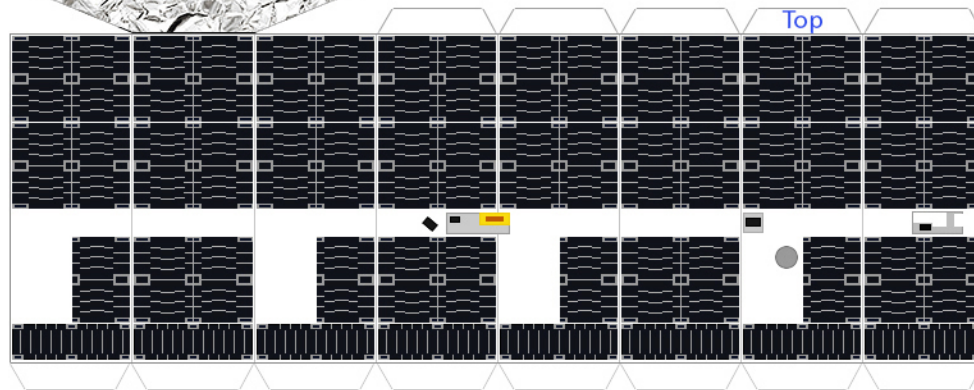
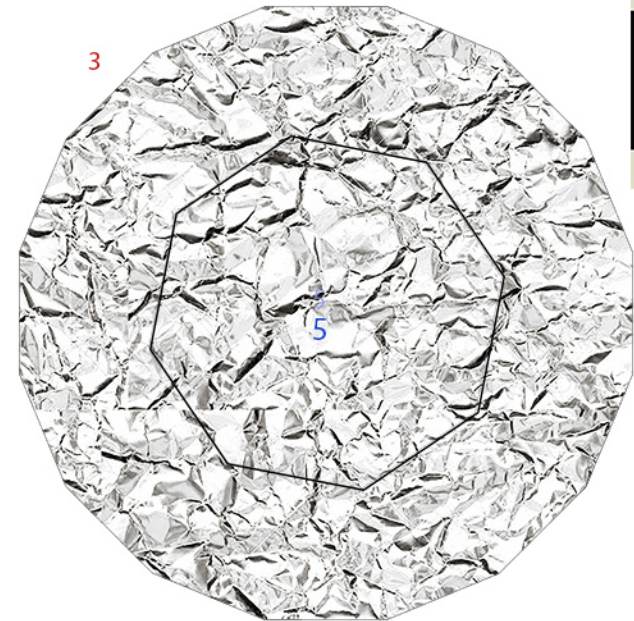
The main objective of the mission was to make measurements of energetic particles associated with solar flares and their effects in the near-Earth space environment. Numerous scientific papers were published on this topic by the Imperial College investigators and their collaborators.

One of the Imperial College experiments on HEOS-1 was the magnetometer, which yielded the largest number of scientific results from the mission; together with the Italian instrument on board that measured the solar wind, the magnetic field observations led to one of the first detailed mappings of the boundaries of the magnetosphere, the Earth's magnetic bubble that protects us from some of the worst effects of solar outbursts.

HEOS-1

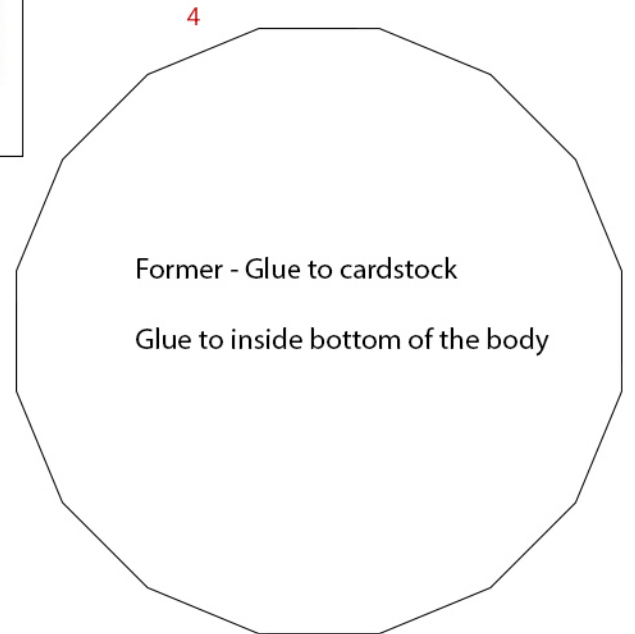
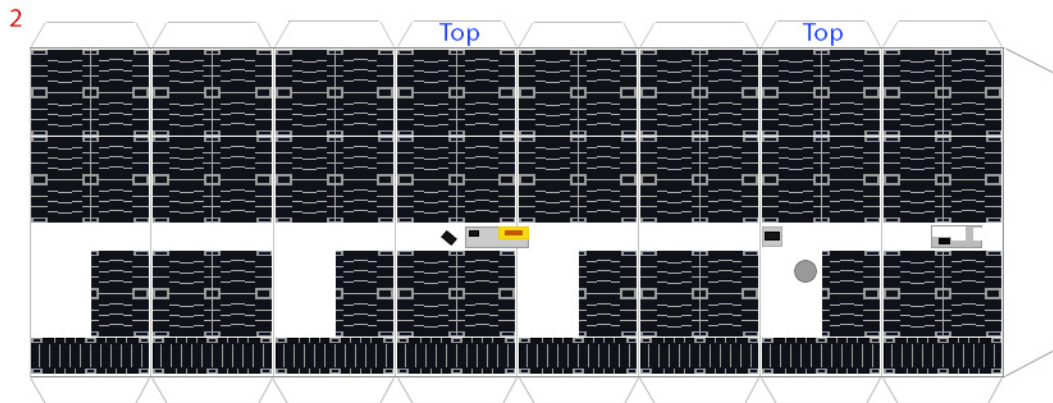


Glue to cardstock

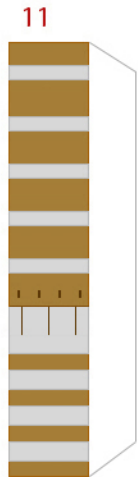
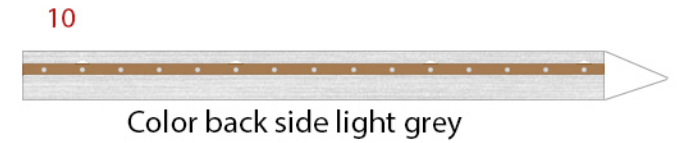
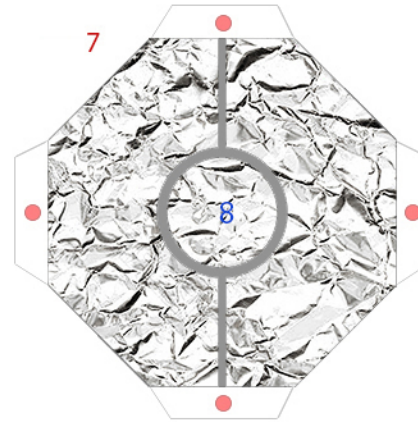
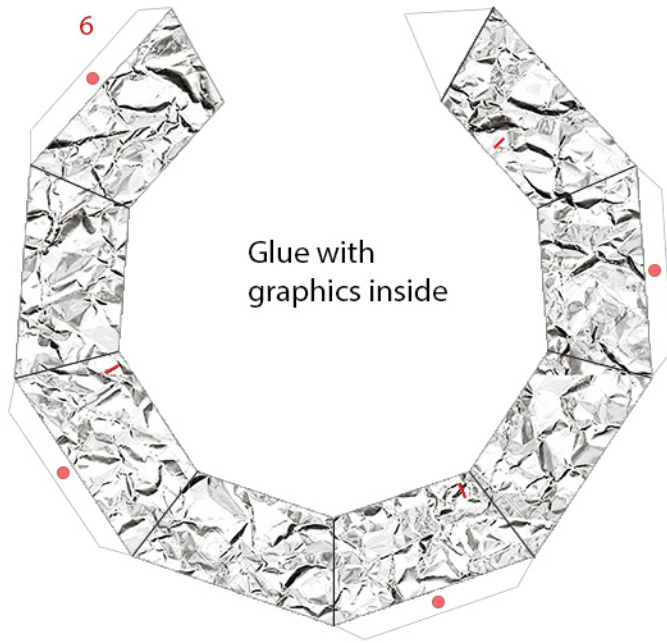


Glue Part 1 here
 Glue Part 2 here

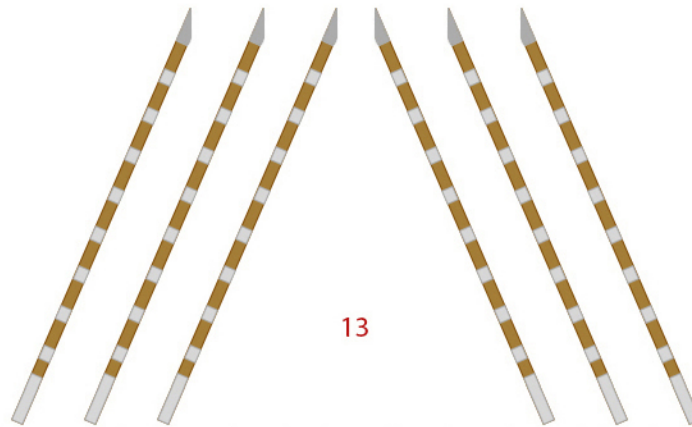
1 to 2
 Connector



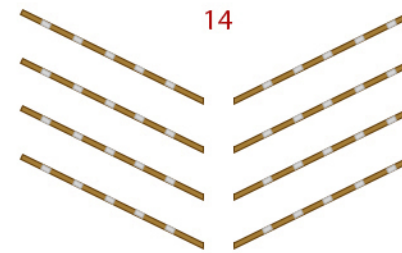
HEOS-1



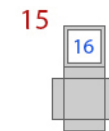
12 ●



Glue one side to cardstock, then glue the otherside back-to-back
For a more realistic look to your model, use the parts on the next page.

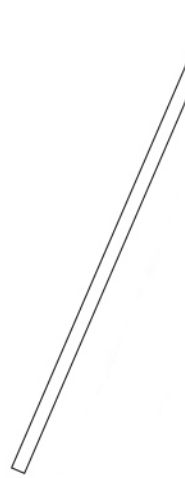
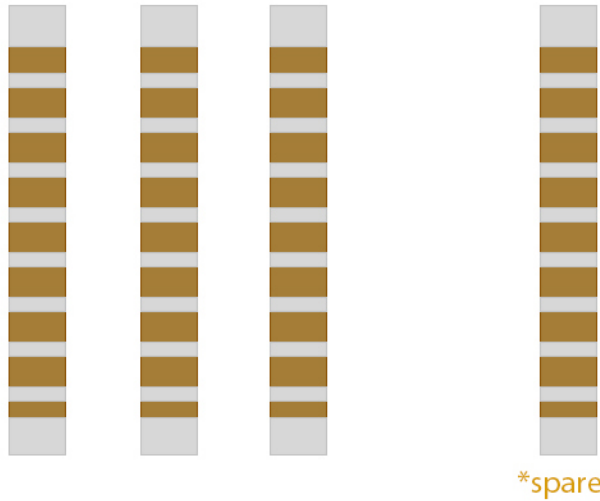


Glue each of the four pairs
back-to-back



17
Glue to two layers
of cardstock

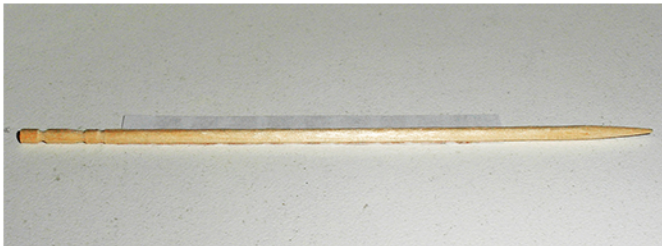
Print this page on regular print paper



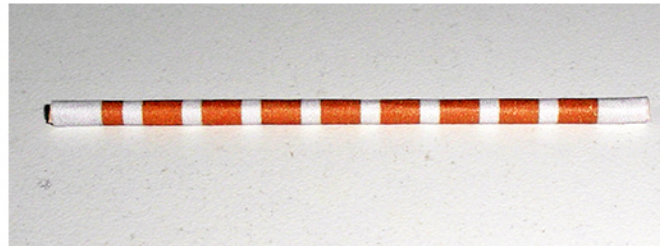
Use this as a guide, lay each leg on this guide and trim the top to match this angle.

Align the X-Acto knife with the line on the guide and carefully cut down.

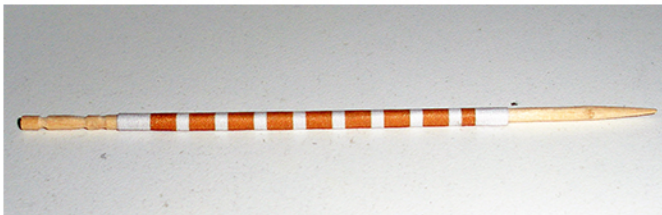
For a better, more realistic look for your model, wrap each of these around a long tooth pic.



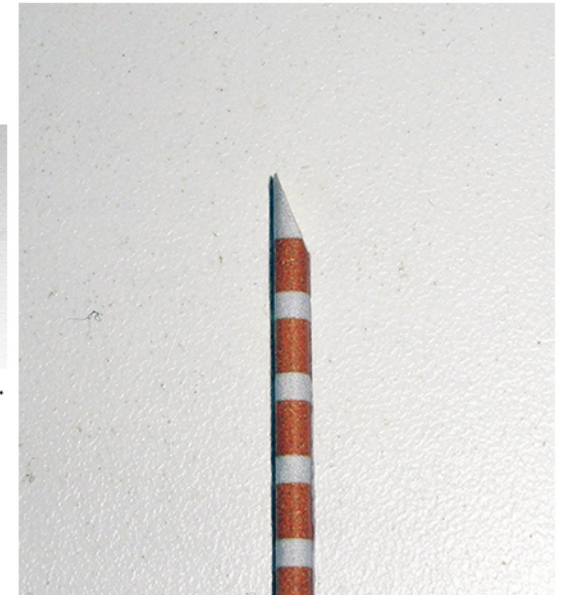
Add glue to the back edge, place the tooth pic on the edge and let dry.



Cut off the ends of the tooth pic extending out from the leg.



Roll around the tooth pic and roll this through your fingers several times, then glue the other edge onto the tooth pic



Cut the top at this angle using the guide above