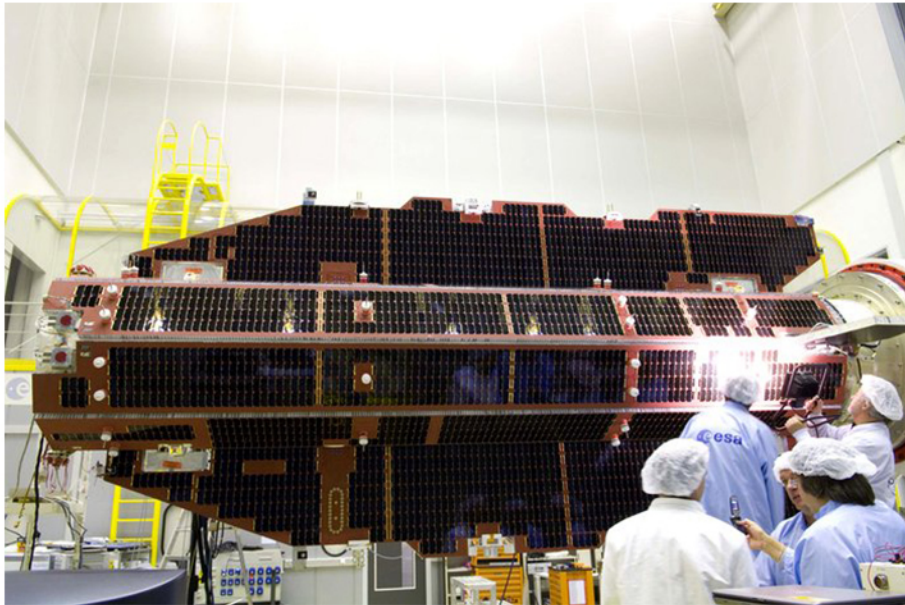


## GOCE (Gravity Field and Steady-State Ocean Circulation Explorer)



The Gravity Field and Steady-State Ocean Circulation Explorer (GOCE) was the first of ESA's Living Planet Programme satellites intended to map in unprecedented detail the Earth's gravity field.

Launched on 17 March 2009, GOCE - dubbed the 'Ferrari of space' - mapped the deep structure of the Earth's mantle and probed hazardous volcanic regions. It brought new insight into ocean behaviour; this in particular, was a major driver for the mission.

By combining the gravity data with information about sea surface height gathered by other satellite altimeters, scientists were able to track the direction and speed of geostrophic ocean currents. The low orbit and high accuracy of the system greatly improved the known accuracy and spatial resolution of the geoid (the theoretical surface of equal gravitational potential on the Earth).

The satellite's unique arrow shape and fins helped keep GOCE stable as it flew through the thermosphere at a comparatively low altitude of 255 kilometres (158 mi). Additionally, an ion propulsion system continuously compensated for the variable deceleration due to air drag without the vibration of a conventional chemically powered rocket engine, thus limiting the errors in gravity gradient measurements caused by non-gravitational forces and restoring the path of the craft as closely as possible to a purely inertial trajectory.

After running out of propellant, the satellite began dropping out of orbit and made an uncontrolled reentry on 11 November 2013.

The first Earth global gravity model based on GOCE data was presented at ESA's Living Planet Symposium, in June 2010.

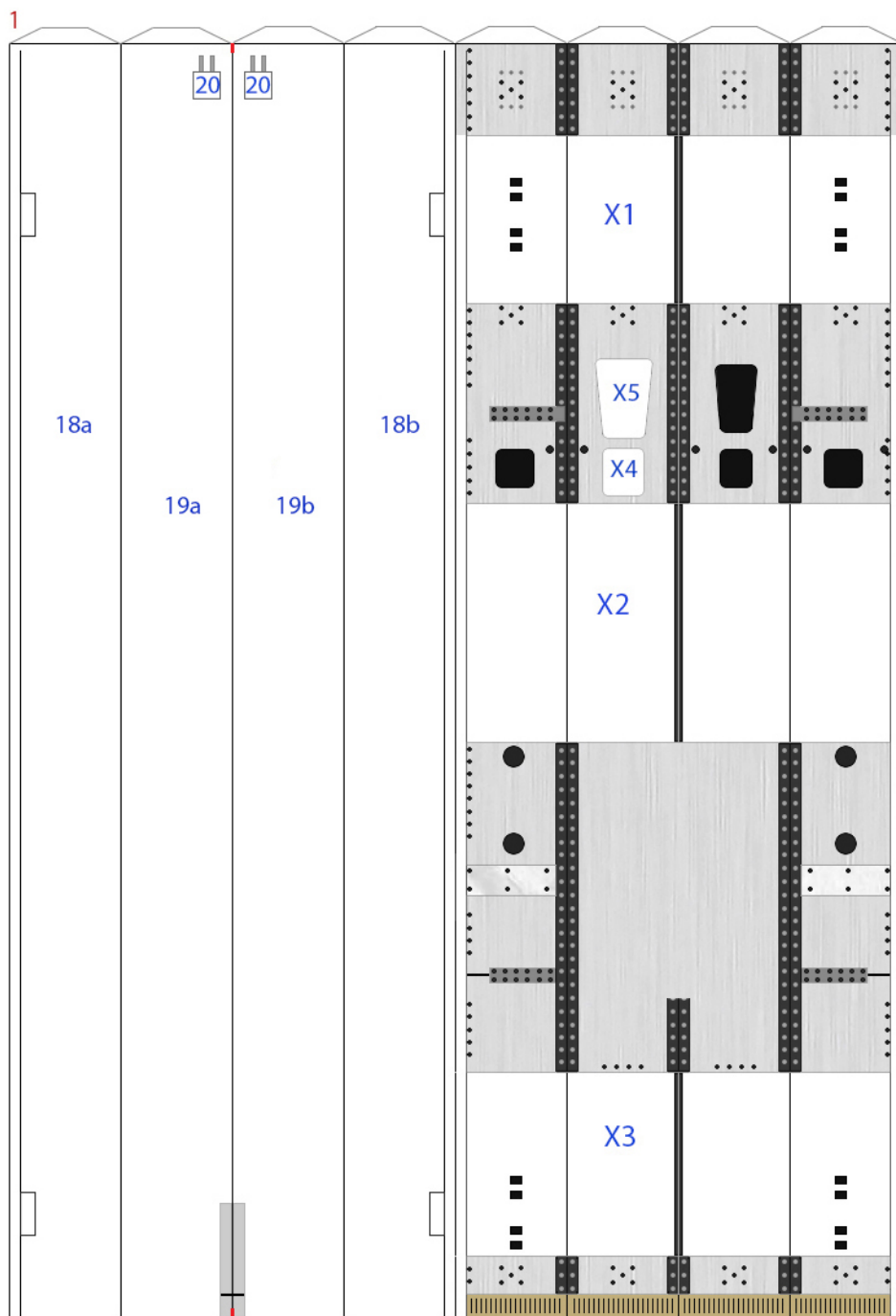
Maps produced from the GOCE data show ocean currents in much finer detail than had been available previously. Even very small details like the Mann Eddy in the North Atlantic were visible in the data, as was the effect of Hurricane Igor in 2010. [14] Detailed analysis of GOCE's thruster and accelerometer data serendipitously revealed that it had detected the infrasound waves generated by the 2011 Tōhoku earthquake (whereupon it inadvertently became the first seismograph in orbit).

Later results from the GOCE data exposed details in the Earth's mantle including mantle plumes, ancient subduction zones, and remnants of the Tethys Ocean.

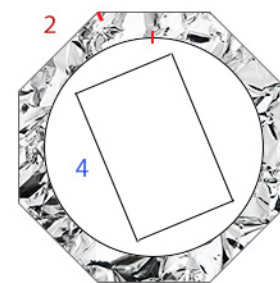
Subsequent analysis of GOCE data has also provided new information about the geological makeup of the Antarctic continent, including the detection of ancient continent remnants and at least three cratons beneath the Antarctic ice.



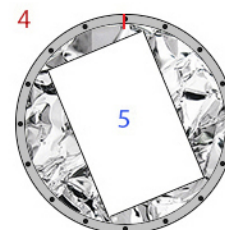
# GOCE (Gravity Field and Steady-State Ocean Circulation Explorer)



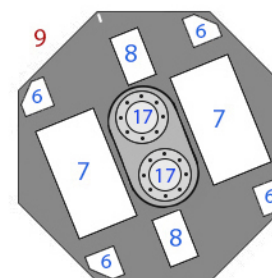
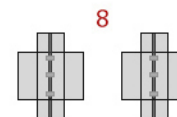
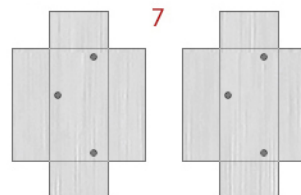
Part 1 connector



Former - glue to cardstock

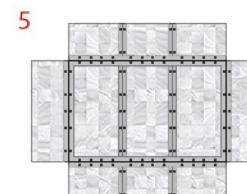
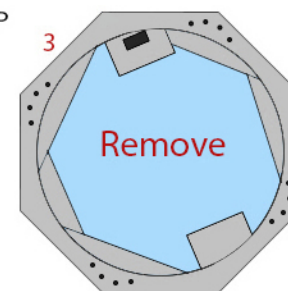


Glue to two (2) layers of cardstock



Former - glue to cardstock

TOP

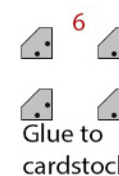


X5

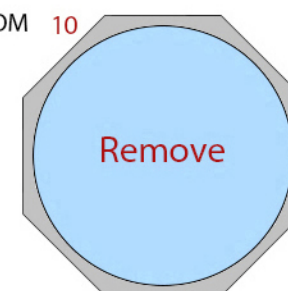
X4

Glue these to cardstock

X1



BOTTOM



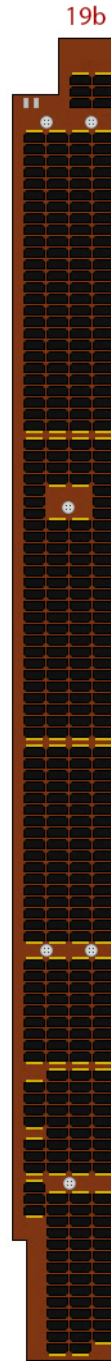
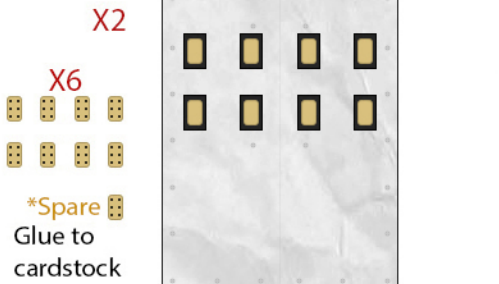
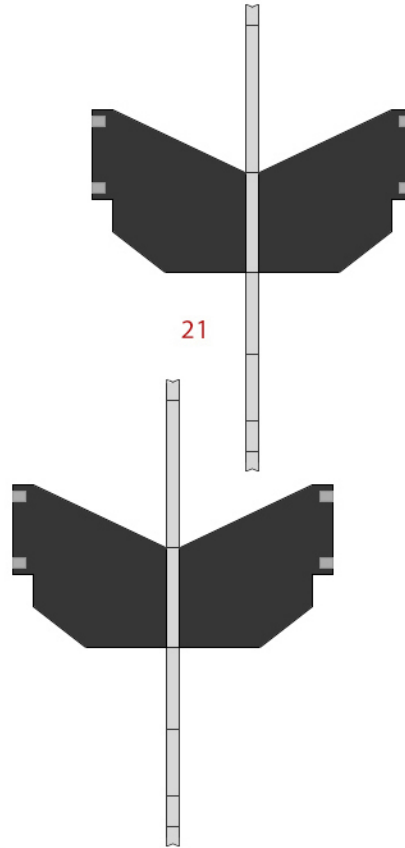
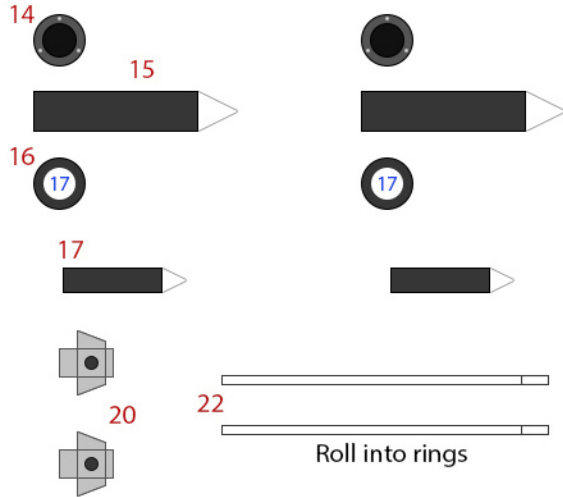
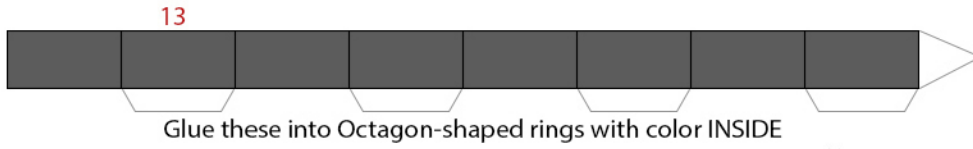
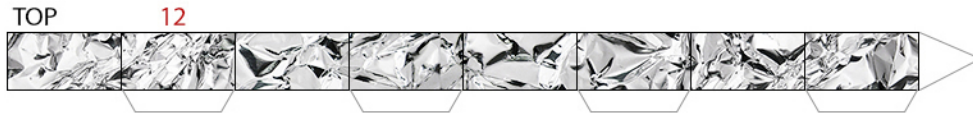
11



Color back light grey or silver



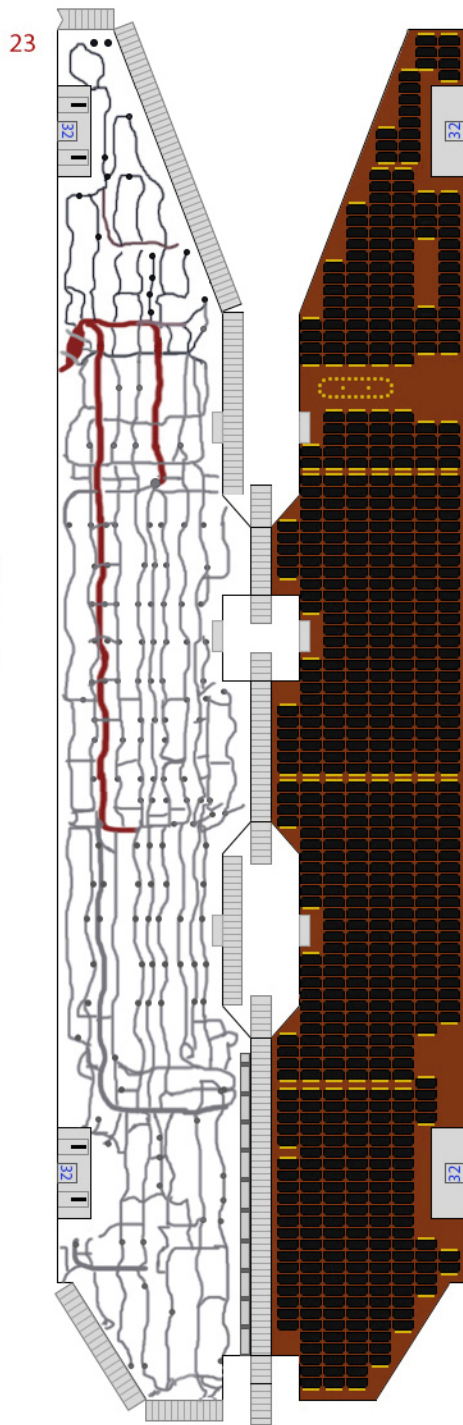
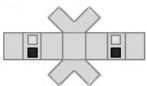
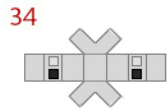
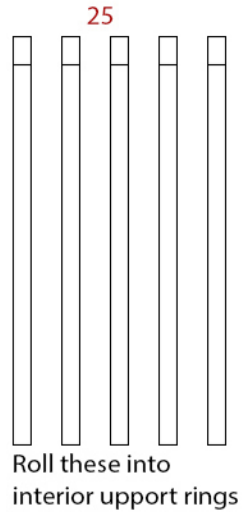
# GOCE (Gravity Field and Steady-State Ocean Circulation Explorer)



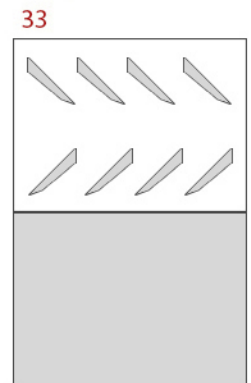
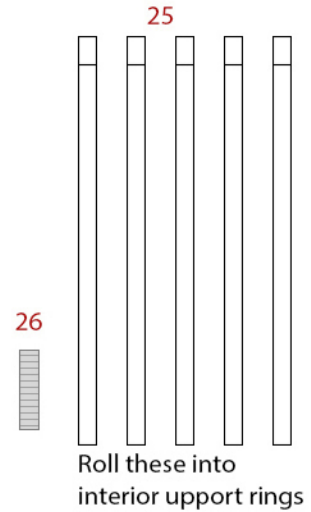
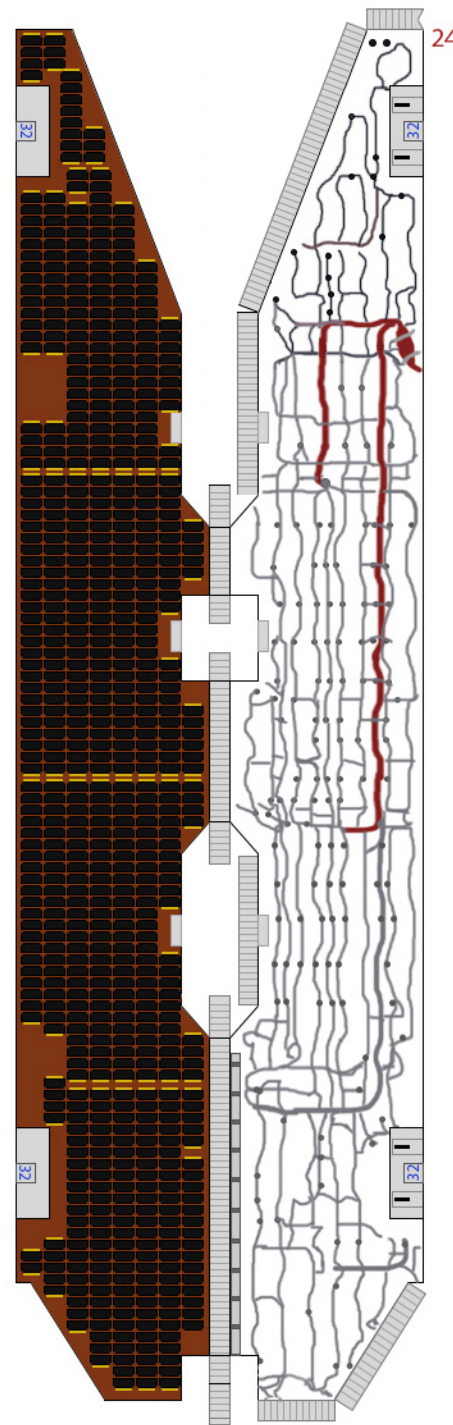
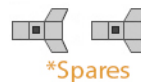
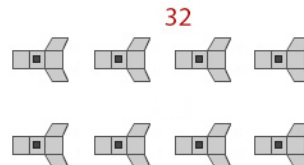
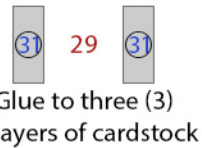
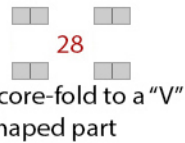
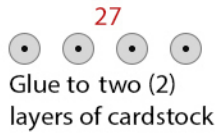
Glue all four to two (2) layers of cardstock



# GOCE (Gravity Field and Steady-State Ocean Circulation Explorer)



Cut four (4) pieces of plastic broom straw or similar material the same length as the line below, colored light grey or silver



Fold-glue back-to-back at the center line and cut out the 8 struts.