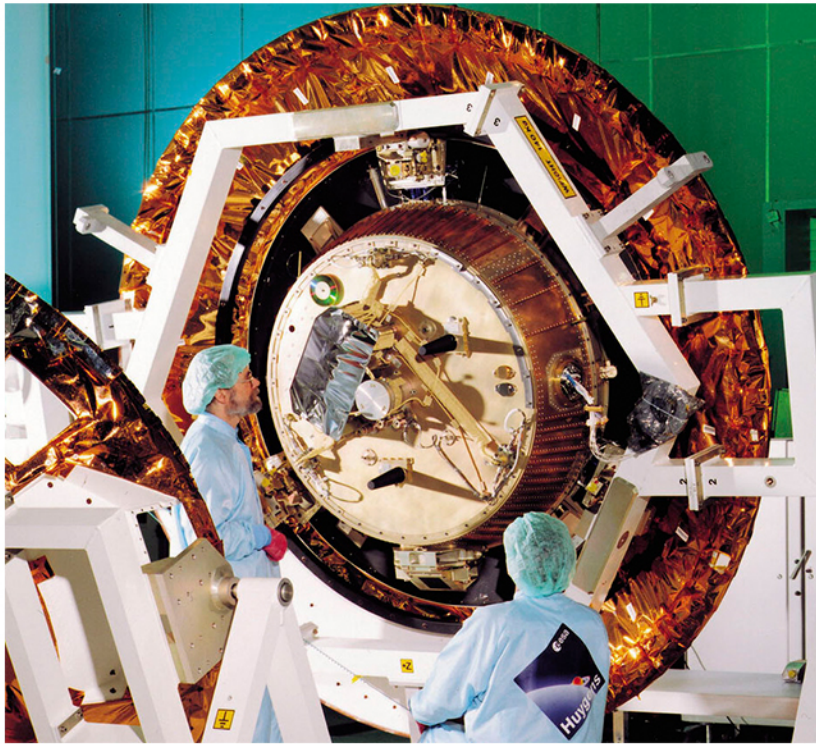


Huygens



Surface of Titan

The European Space Agency's Huygens Probe was a unique, advanced spacecraft and a crucial part of the overall Cassini mission to explore Saturn.

The Huygens probe descended into the atmosphere of Titan, Saturn's largest moon, in 2005. It provided a detailed study of Titan's atmosphere during its 2.5-hour descent to the surface. It relayed data and images from Titan's muddy surface for another hour and 10 minutes. The primary scientific goals of the mission included a diverse set of investigations of Saturn, its moons and its near environment.

Huygens was designed to investigate Titan's atmosphere, including chemical properties, wind, temperature, and pressure profiles from about 100 miles (170 kilometers) down to the moon's surface. The probe was not designed to survive past landing although scientists did not rule out the possibility.

Based on pictures taken by Cassini 1,200 km (750 mi) above Titan, the landing site appeared to be a shoreline. Assuming the landing site could be non-solid, Huygens was designed to survive the impact, splash down on a liquid surface on Titan, and send back data for several minutes under these conditions. If that occurred it was expected to be the first time a human-made probe would land in an extraterrestrial ocean. The spacecraft had no more than three hours of battery life, most of which was planned to be used during the descent. Engineers expected to get at most only 30 minutes of data from the surface.

At the landing site there were indications of pebbles of water ice scattered over an orange surface, the majority of which is covered by a thin haze of methane. Early aerial imaging of Titan from Huygens was consistent with the presence of large bodies of liquid on the surface. The initial photos of Titan before landing showed what appeared to be large drainage channels crossing the lighter colored mainland into a dark sea. Some of the photos suggested islands and mist shrouded coastline.

The temperature at the landing site was 93.8 K (-179.3°C ; -290.8°F) and pressure of 1,467.6 mbar (1.4484 atm), implying a methane abundance of $5 \pm 1\%$ and methane relative humidity of 50% near the surface.

Huygens found the brightness of the surface of Titan (at time of landing) to be about one thousand times dimmer than full solar illumination on Earth (or 500 times brighter than illumination by full moonlight)—that is, the illumination level experienced about ten minutes after sunset on Earth, approximately late civil twilight. The color of the sky and the scene on Titan is mainly orange due to the much greater attenuation of blue light by Titan's haze relative to red light.

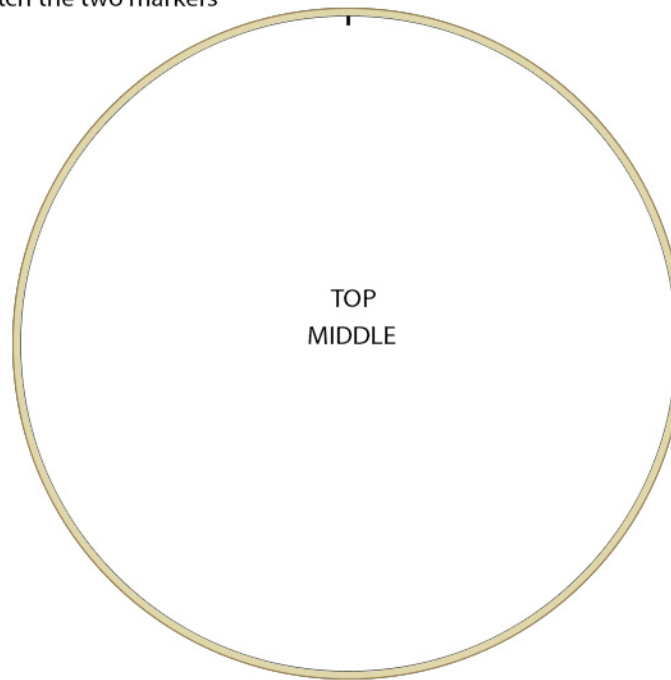
Huygens became the first spacecraft to land on Titan and the farthest landing from Earth a spacecraft has ever made. The probe was named after the 17th-century Dutch astronomer Christiaan Huygens, who discovered Titan in 1655.



Huygens

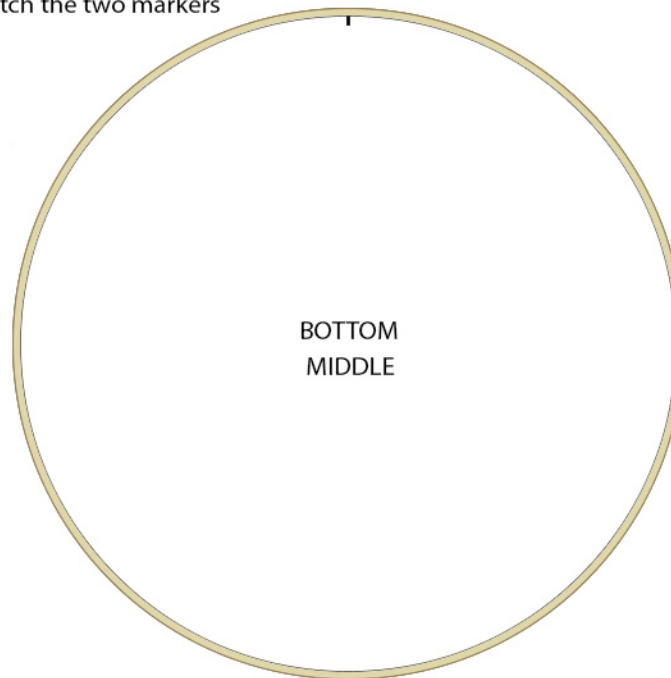
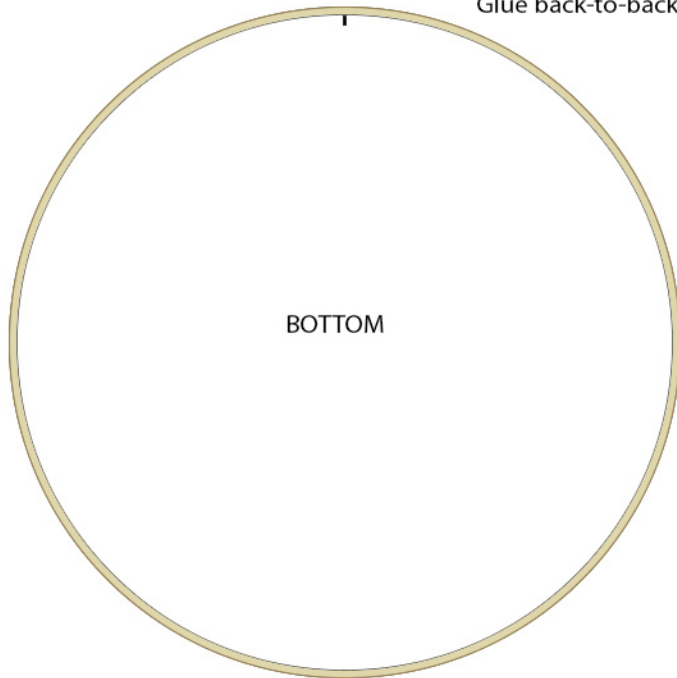
Glue back-to-back, match the two markers

1



Glue back-to-back, match the two markers

2



10 Outside



11 Inside



12



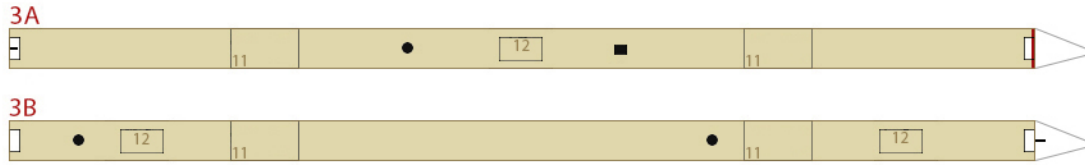
Color backside same color

13



Color back black

Huygens



Poke pin holes on the three black dots

Prepare three plastic broom straws or similar material the same length as the line below for the antennas.

4

Former
 Glue to cardstock

Glue to the bottom of parts 3A - 3B

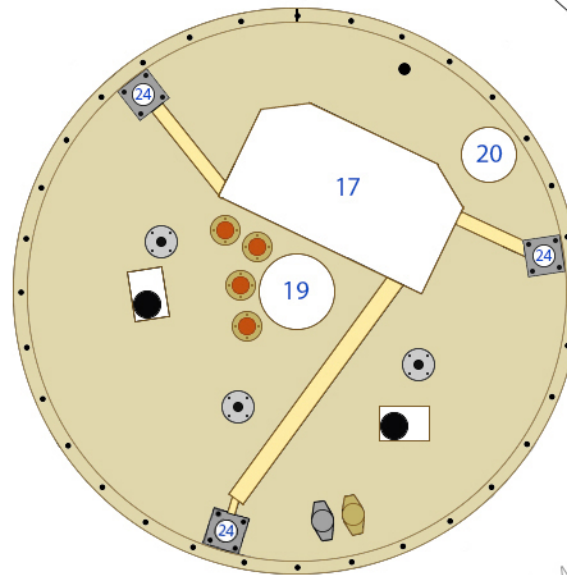
5

Top cone locator

Glue to cardstock

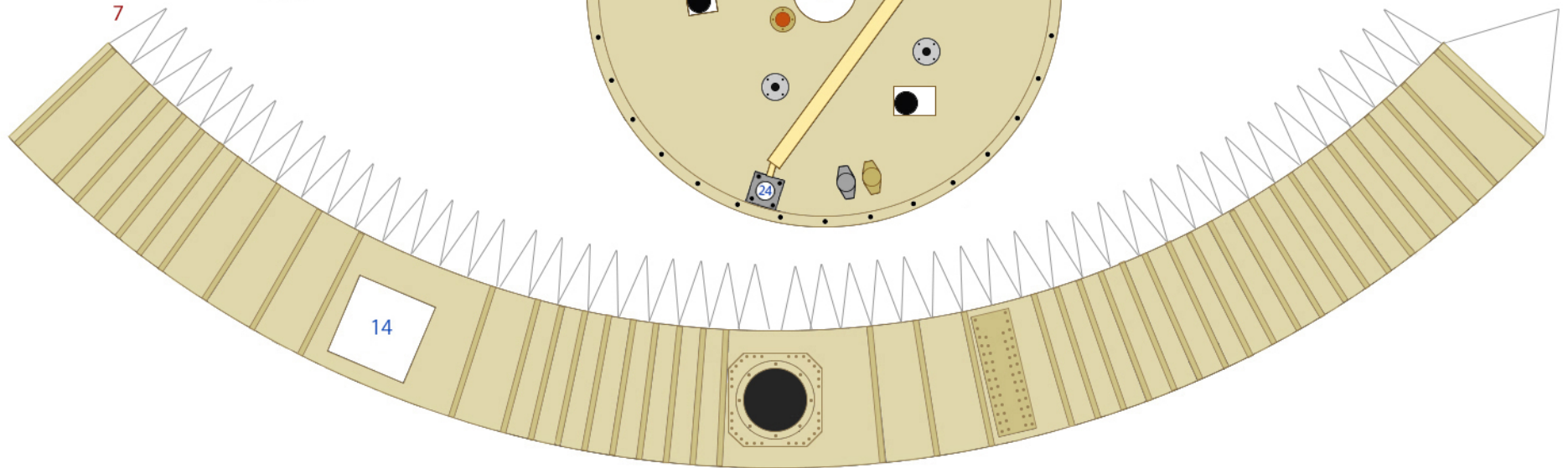
Glue to "TOP" of parts 1

6 Top

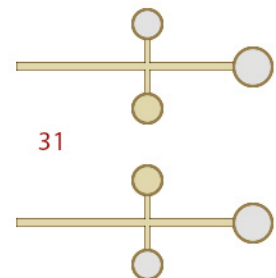
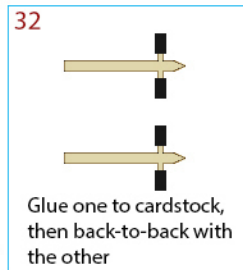
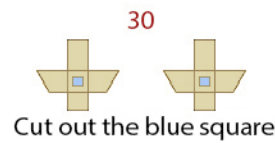
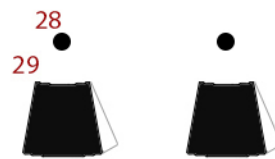
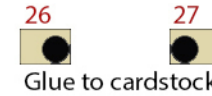
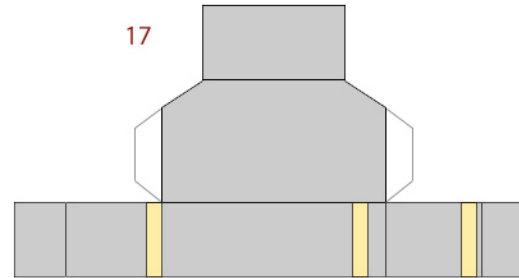
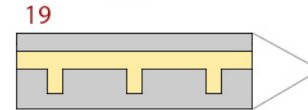
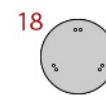
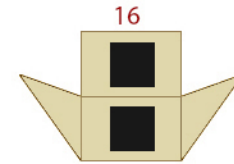
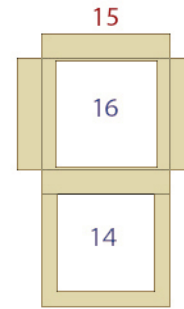
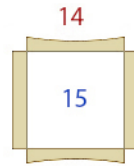
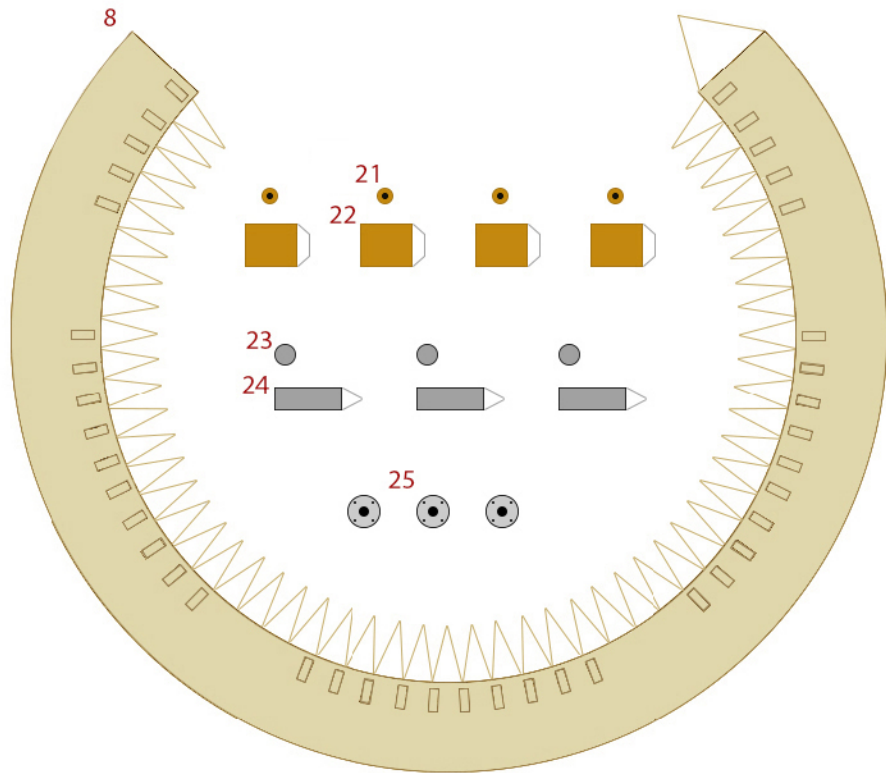
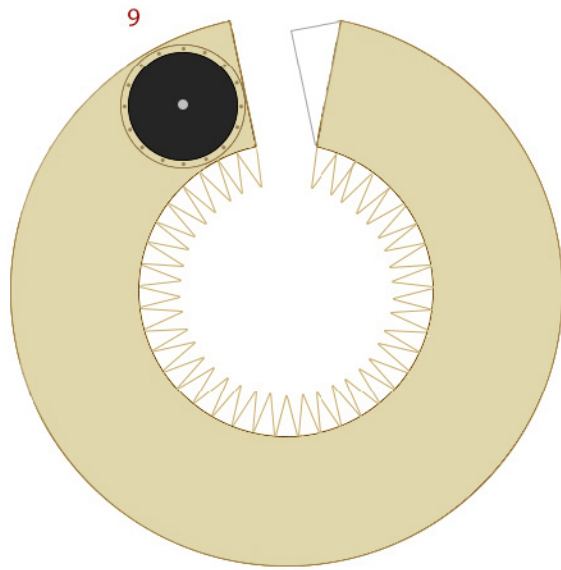
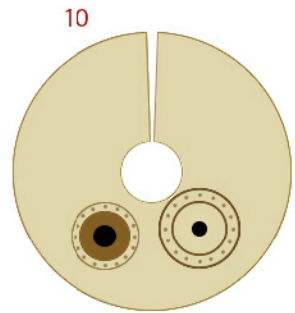


7

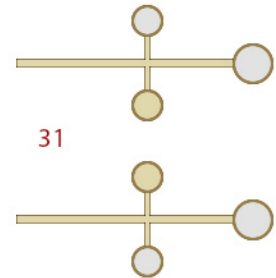
14



Huygens

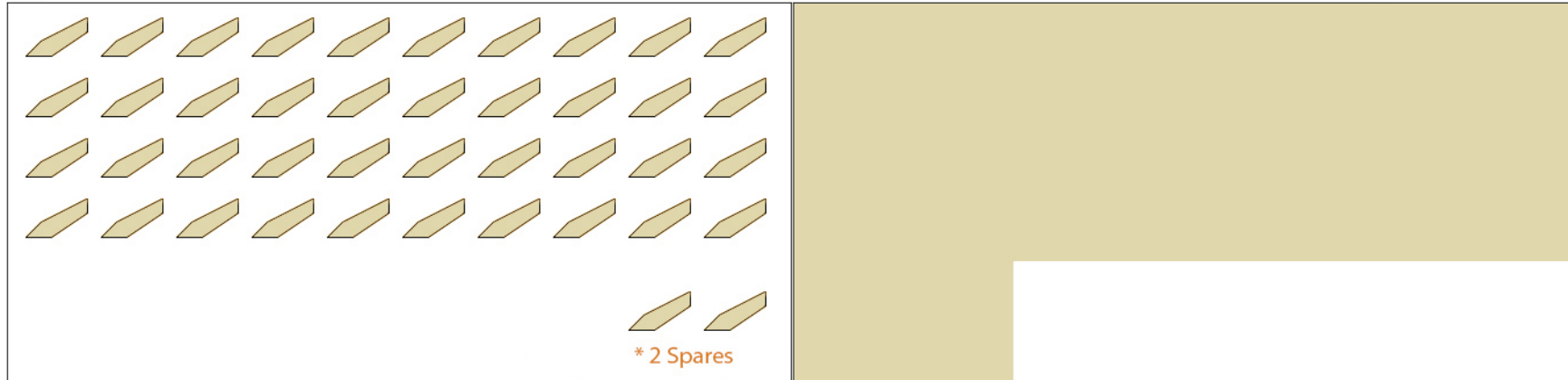


Glue one from each pair to cardstock, then back-to-back with the other



Huygens

33



Fold-glue back-to-back



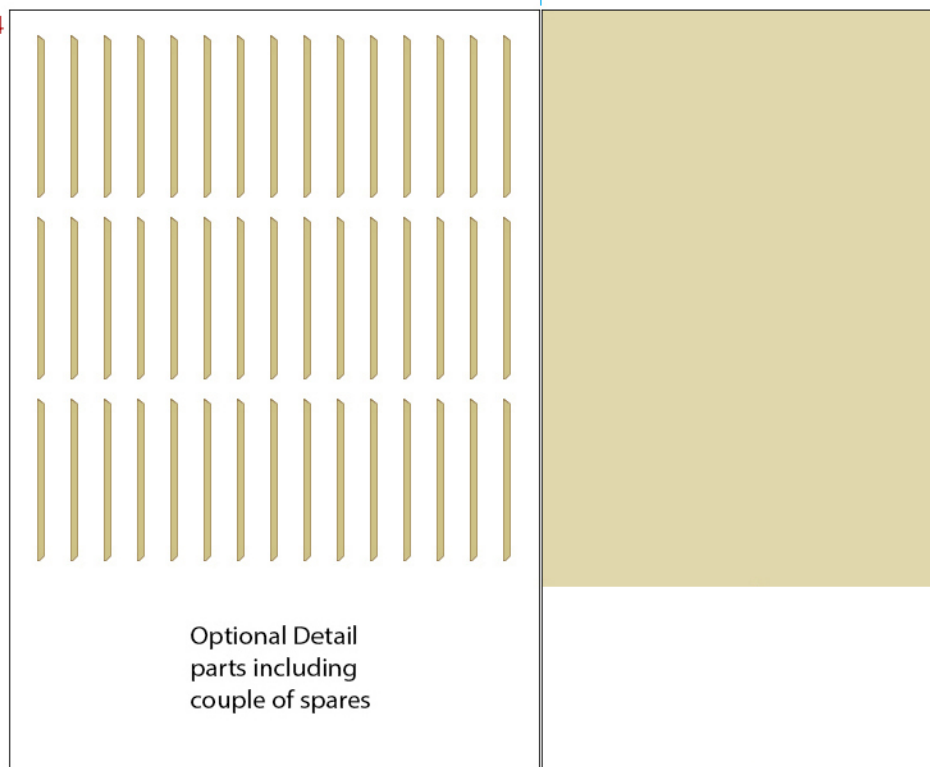
X

PART 7 top former

Glue to cardstock

Glue to inside TOP of part 7 using
the glue tabs.

34



Fold-glue back-to-back