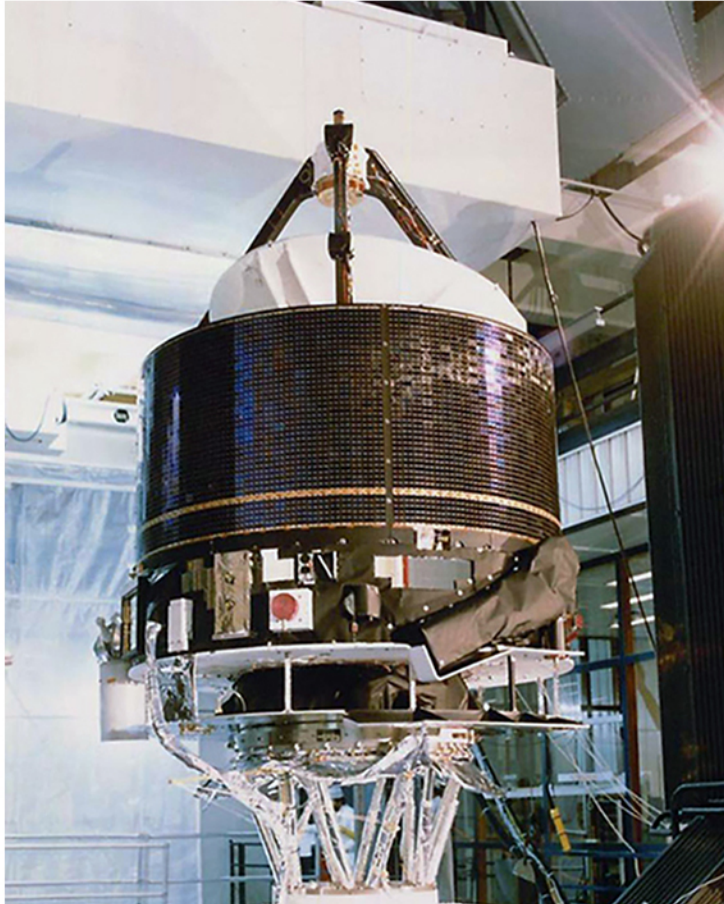


Giotto



Giotto was ESA's first deep space mission, part of an ambitious international effort to solve the mysteries surrounding Comet Halley.

The mission was given the go-ahead by ESA in 1980, and launched on an Ariane 1 rocket (flight V14) on 2 July 1985 from Kourou, French Guiana.

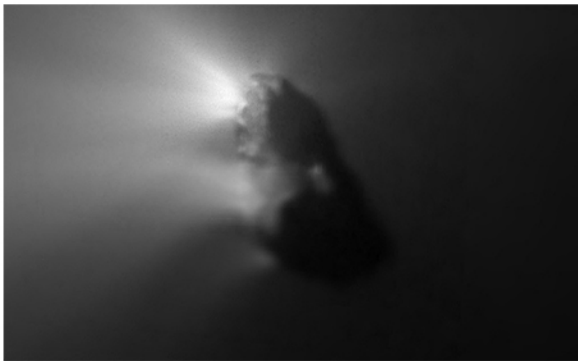
The Giotto mission was designed to study Comet P/Halley. The major objectives of the mission were to: (1) obtain color photographs of the nucleus; (2) determine the elemental and isotopic composition of volatile components in the cometary coma, particularly parent molecules; (3) characterize the physical and chemical processes that occur in the cometary atmosphere and ionosphere; (4) determine the elemental and isotopic composition of dust particles; (5) measure the total gas-production rate and dust flux and size/mass distribution and derive the dust-to-gas ratio; and, (6) investigate the macroscopic systems of plasma flows resulting from the cometary-solar wind interaction.

The spacecraft encountered the comet on March 13, 1986, at a distance of 596 km from Halley's nucleus (and 0.98 AU from the Earth) and in doing so became the first spacecraft to make close up observations of a comet.

The historic encounter ended 15 March when Giotto's experiments were turned off.

The Soviet Vega 1 started returning images of Halley on 4 March 1986, and the first ever of its nucleus, and made its flyby on 6 March, followed by Vega 2 making its flyby on 9 March. Vega 1 closest approach to Halley was 8,889 km.

The spacecraft still had 60 kilograms of fuel available, so the option was open to continue Giotto's voyage of exploration. A series of three small orbital corrections ensured that it would return to Earth almost exactly five years after launch.



Halley's nucleus from Giotto-March 14, 1986.

On 2 April 1986, the spacecraft was placed into hibernation in the hope that it could be successfully revived and dispatched on another mission. 1,419 days later, in February 1990, the signal was sent to reawaken Giotto.

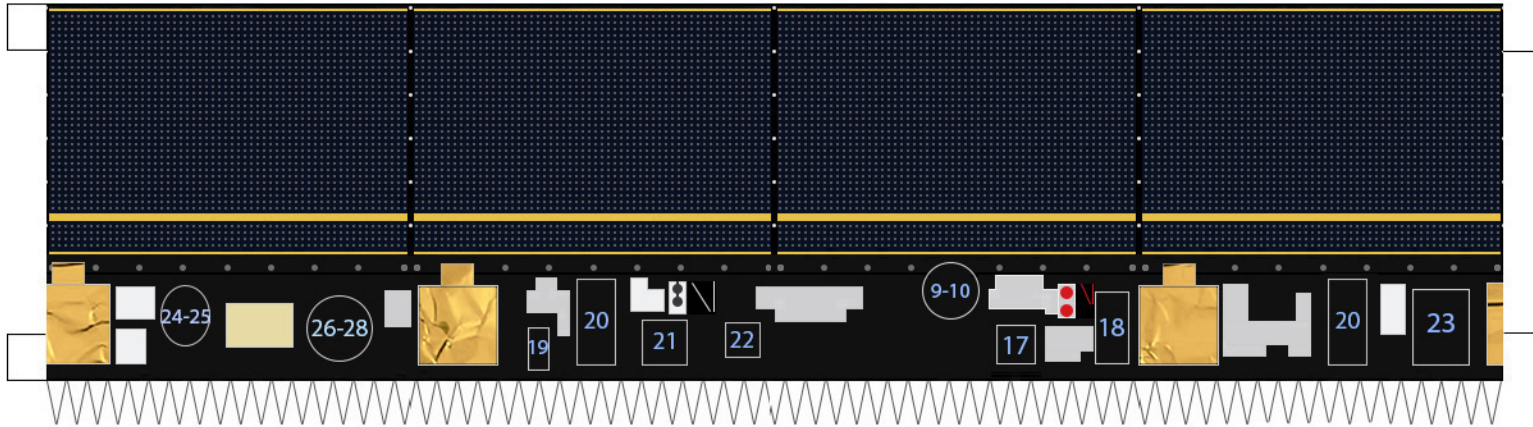
On 2 July 1990, Giotto's orbit was altered as it flew past the Earth, just 22,730 kilometres above the cloud tops. **This was the first time a spacecraft coming from deep space had used the Earth for a gravity-assist.** During the fly-by, observations were made of the Earth's magnetic field and energetic particle environment. This will sling shot Giotto to its next cometary encounter. The probe then flew by the Comet Grigg-Skjellerup on 10 July 1992 which it approached to a distance of about 200 km. Afterwards, Giotto was again switched off on 23 July 1992. In 1999 Giotto made another Earth flyby but was not reactivated.

Spacecraft achievements

- ☒ Giotto made the closest approach to Halley's Comet and provided the best data for this comet.
- ☒ Giotto was the first spacecraft to provide detailed pictures of a cometary nucleus.
- ☒ Giotto was the first spacecraft to make a close flyby of two comets. Comet Halley and 26P/Grigg-Skjellerup.
- ☒ Giotto was the first spacecraft to return from interplanetary space and perform an Earth swing by.
- ☒ Giotto was the first spacecraft to be re-activated from hibernation mode.

Giotto

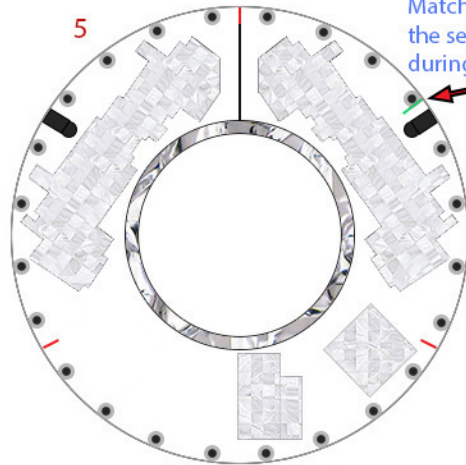
1



2

Former, glue to cardstock.
GLue inside at the bottom.

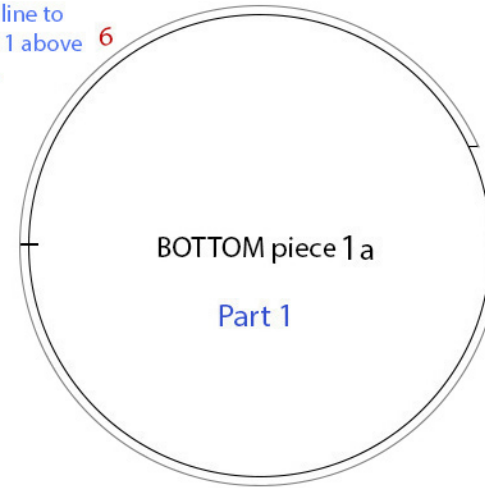
5



TOP piece, **glue to cardstock.**
Glue inside.

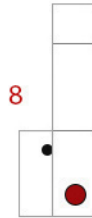
Match this green line to
the seem on part 1 above
during assembly.

6



BOTTOM piece 1 a
Part 1

8



9



10



10a



3

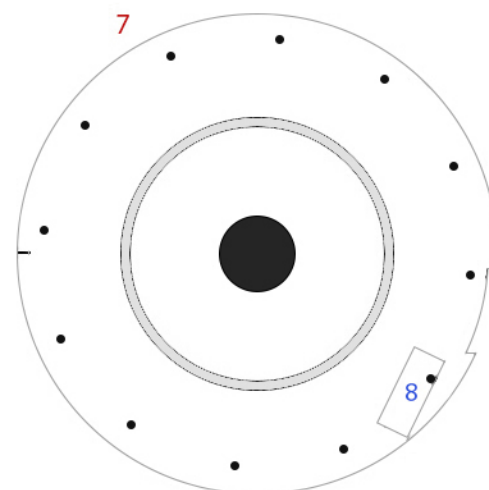
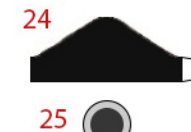
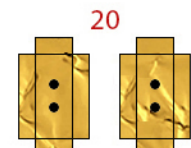
Inside support 1



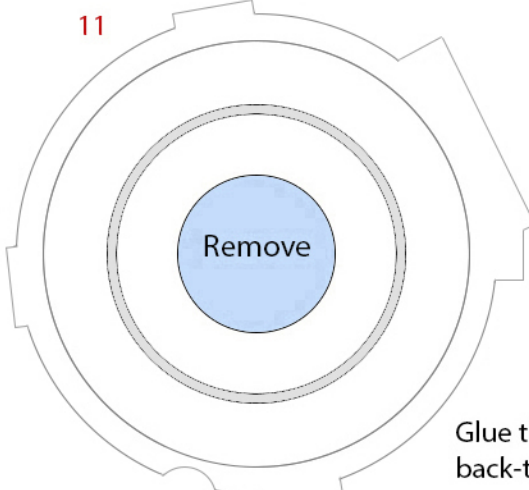
Giotto



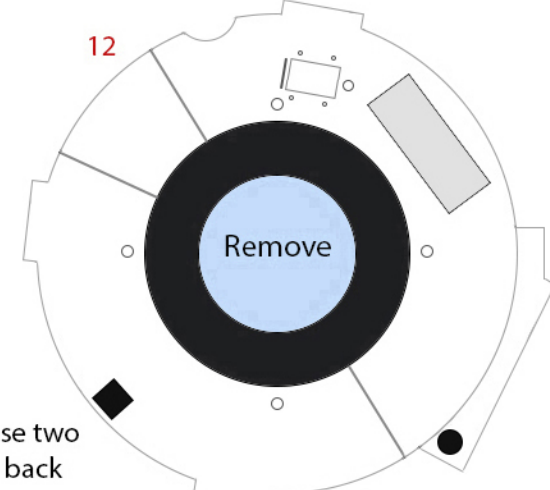
Color back side of these Black



BOTTOM piece 1 b



BOTTOM piece 2 a

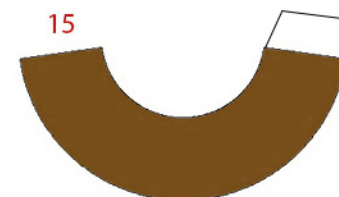


BOTTOM piece 2 b

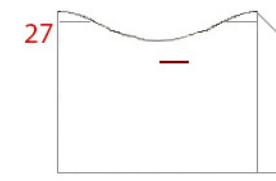
Glue these two back-to-back



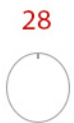
Color back Black



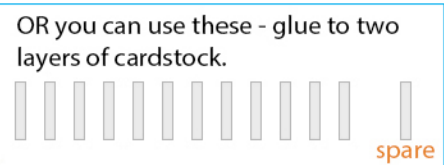
Color back Black



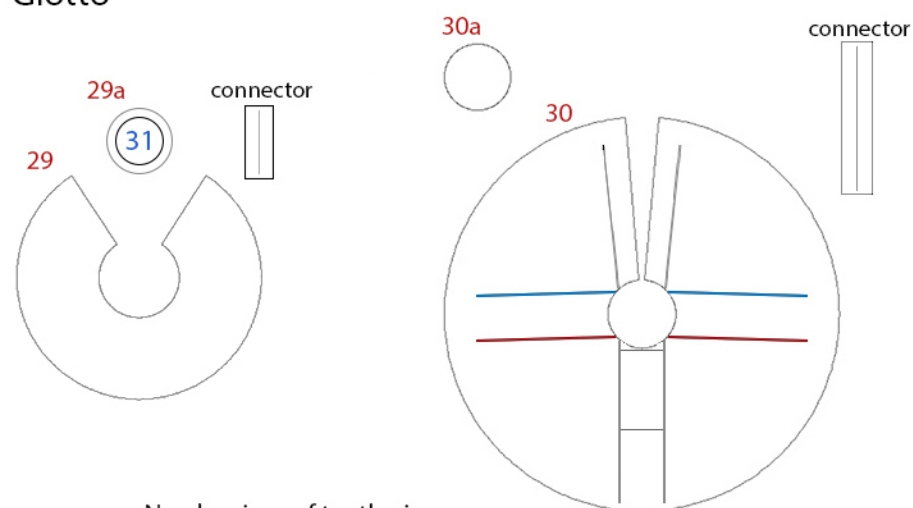
Color back Black



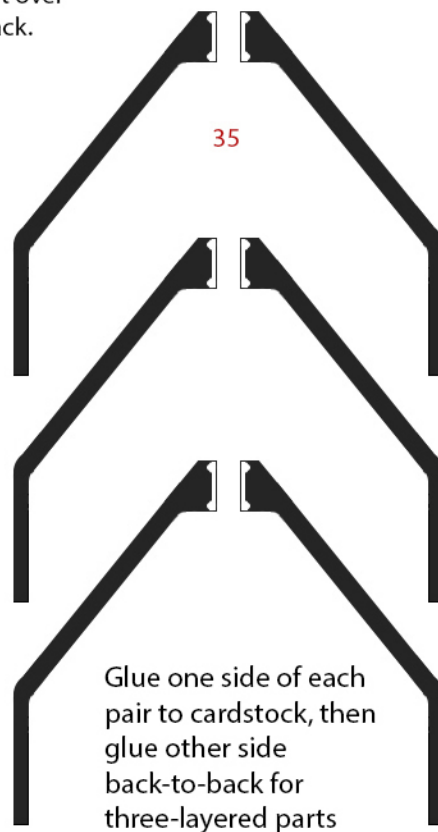
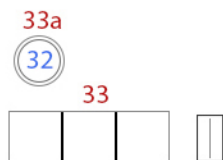
Need 12 plastic broom straws or Acrylic Rods (around 1/16 or 1.6mm diameter), colored white or light grey, cut at the same length as the line above



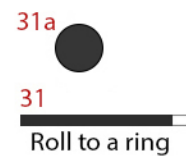
Giotto



Need a piece of tooth pic or similar material around the same diameter, cut just over 2mm long, colored black.



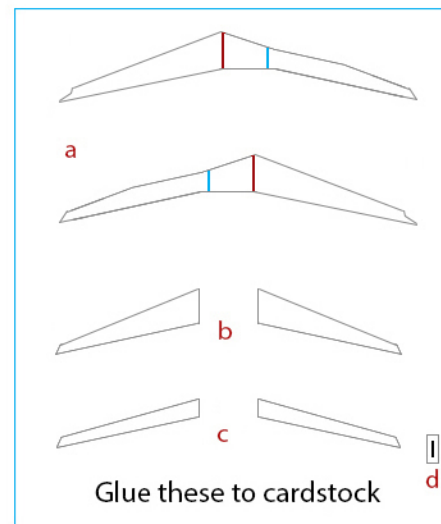
Glue one side of each pair to cardstock, then glue other side back-to-back for three-layered parts



31a

31

Roll to a ring



Glue these to cardstock

