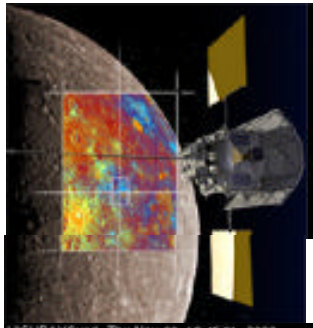
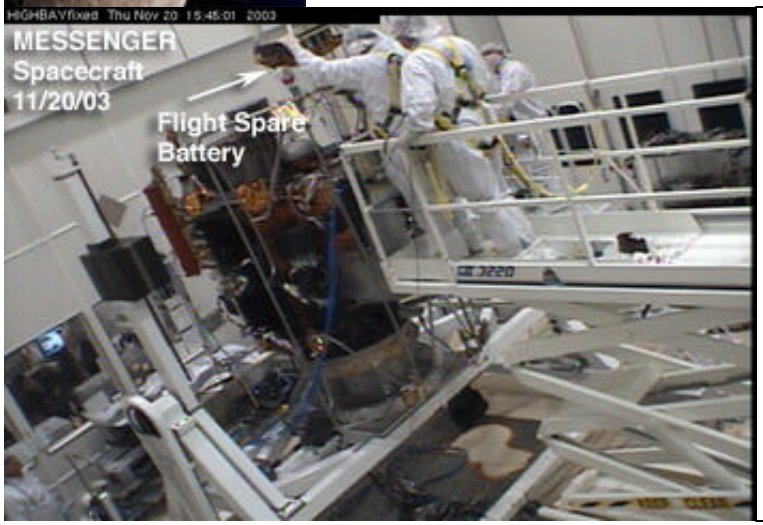


MESSENGER

MErcury Surface, Space ENvironment, GEochemistry, and Ranging



MESSENGER engineers install the spare flight battery, which will provide power to the spacecraft's systems and instruments through the next several months of operational and environmental testing at the Applied Physics Laboratory and NASA's Goddard Space Flight Center.

MESSENGER is a scientific investigation – by spacecraft – of the planet Mercury. The name comes from "MErcury Surface, Space ENvironment, Geo-chemistry, and Ranging," highlighting the project's broad range of scientific goals.

MESSENGER is designed to answer six broad scientific questions:

- Why is Mercury so dense?
- What is Mercury's geologic history?
- What are the structure and state of Mercury's core?
- What is the nature of Mercury's magnetic field?
- What are the unusual materials at Mercury's poles?
- What volatiles are important at Mercury?

The mission begins during a launch window that opens May 11, 2004. The first of three Venus flybys is scheduled to occur about six months later, when the spacecraft approaches the planet from its night side on November 2, 2004. MESSENGER dashes past the day side of Venus on August 28, 2005, then again on October 22, 2006.

MESSENGER is mainly powered by its solar array, which includes two solar panels covering a total area of 5 square meters. The panels are made of materials rated to withstand high temperatures – 250 degrees Celsius or 482 degrees Fahrenheit – but the system is designed to keep the panels from facing the Sun directly, making the nominal operational temperature 135 C.

The power produced by the solar array is stored in a nickel-hydrogen (NiH_2) battery, then distributed from the battery to the spacecraft subsystems.

The Mercury flybys on October 16, 2007, and July 7, 2008 provide the first close-up looks at Mercury in more than 30 years. On both flybys the spacecraft approaches Mercury near the terminator (the day-night boundary) and departs with sunlit views of the planet, taking pictures of the half not seen by Mariner 10. This early science return will be invaluable in planning observation strategies for MESSENGER's historic yearlong orbit mission, which begins in July 2009.

MESSENGER's 12-month orbit covers two Mercury solar days; one Mercury solar day, from sunrise to sunrise, is equal to 176 Earth days. The first solar day is focused on obtaining global map products from the different instruments, and the second focuses on targeted science investigations.

Source: http://messenger.jhuapl.edu/