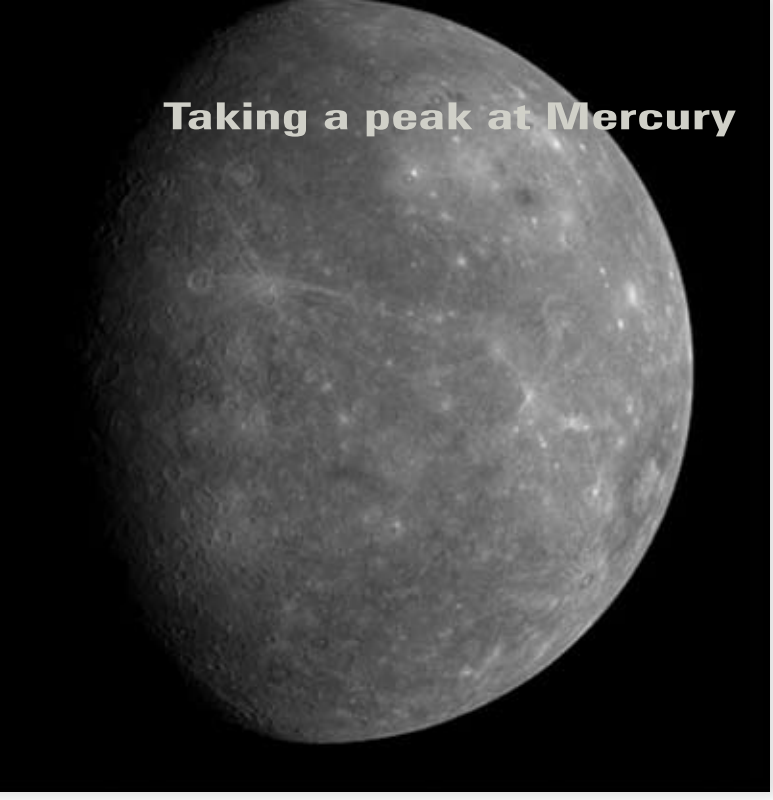

Taking a peak at Mercury

—by Warren E. Leary

The Messenger spacecraft dashed past Mercury on Monday, getting a glance at the solar system's innermost planet, which it will eventually orbit for detailed studies.

The robot spacecraft, the first to visit the planet in more than three decades, passed about 124 miles above Mercury's cratered surface at 2:04 p.m. E.S.T. before continuing on a path that is to bring it back three more times in the next three years before settling into orbit.

"Everything went really well," Eric Finnegan, the Messenger systems engineer, said after the encounter. A faint signal reappeared on schedule when the craft emerged from behind Mercury after the close approach, he said.

During the flyby, Messenger's suite of seven scientific instruments was to take more than 1,200 pictures of areas not photographed before and make measurements of the planet's surface chemical composition, wispy atmosphere and gravitational field.

"We expect many surprises," said Sean C. Solomon of the Carnegie Institution of Washington, the mission's lead investigator. Understanding Mercury's history is pivotal to studying the evolution of the inner solar system and its four rocky planets, including Earth, he said.

Messenger carried out the encounter on automatic pilot, having turned itself and its main antenna away from Earth on Sunday to get maximum protection from the Sun behind its highly reflective sunshade. The craft executed hundreds of computerized commands during the flyby and contacted Earth again on January 15, to send back data from the flyby, scientists said.

The spacecraft, launched by NASA in August 2004, is only about halfway through a 4.9-billion-mile journey needed to maneuver it into orbit. The journey involves more than 15 trips around the sun, including flying by the Earth once, passing Venus twice and three swings around Mercury before slipping into orbit on March 18, 2011.

"The complexity of this mission, with its numerous flybys and multitude of maneuvers, requires close and constant attention," said Peter D. Bedini, project manager at the Johns Hopkins University Applied Physics Laboratory in Laurel, Md., where the craft was designed and built and the mission is controlled.

On January 14, Messenger streaked past Mercury at more than 16,000 miles per hour, but a major goal of the encounter was to use the planet's gravity to slow the craft by 5,000 m.p.h. Two more flybys in October of this year and September 2009 will not only result in more scientific observations but also bleed off enough speed for the spacecraft to orbit the planet.

"It is not at all easy getting into orbit around Mercury," said Marilyn Lindstrom, NASA's program scientist for the $446 million mission. Messenger—short for Mercury Surface, Space Environment, Geochemistry and Ranging—is the first spacecraft to visit the planet since NASA's Mariner 10 made three flybys from 1974 to 1975. Mariner 10 mapped 45 percent of the planet, leaving an entire hemisphere a mystery until now.

Mercury, with a diameter of 3,030 miles, is only slightly larger than Earth's Moon. It is the densest of all planets, indicating it must have an enormous iron core making up more than 60 percent of its mass, and it is the only inner planet other than Earth with a global magnetic field, suggesting a molten core, Dr. Solomon said.

It also has the most extreme temperature swings of any planet, with heat approaching 800 degrees Fahrenheit in the sunlight while the night side can reach 350 degrees below zero. Yet, radar readings from Earth suggest possible deposits of water ice in permanently shaded craters near the poles.

[Photo [above] of the never before mapped half of Mercury taken by Messenger on Jan. 14, 2008. [Source: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington. Warren Leary contributes to the Science section of the *New York Times*.]