Reunion with Mercury

The planet Mercury and I go way back. In 1973, when NASA launched Mariner 10 to pay it a visit, I was a Caltech undergrad working for the head of the mission's imaging team. So I was on hand at the Jet Propulsion Lab when the first-ever close-ups of Mercury came in the following year.

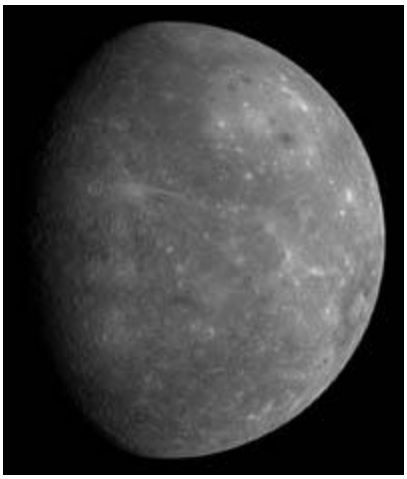
A few months later I left California to join the staff of *Sky & Telescope.* Mariner 10 would fly past the planet two more times, in September 1974 and March 1975, and my first-ever bylined article in *S&T* was a pictorial writeup following the second flyby. (If you've got the November 1974 issue, look it up!)

What amazed me then, as now, is how Mercury looks superficially so like the Moon — they both have scads of craters, giant impact basins, and broad lava plains — and yet are so very different. Scientists estimate that Mercury's metallic core takes up 75% of its radius and nearly half its volume. How this "iron planet" came to exist remains one of the great mysteries of planetary science.

The control room at Johns Hopkins University's Applied Physics laboratory buzzed with activity during Messenger's first flyby of Mercury on January 14, 2008.
S&T: J. Kelly Beatty

Fast forward to yesterday. NASA's Messenger spacecraft was making the first return visit to Mercury in nearly 33 years (a third of a century, I remind myself), and I just had to be on hand for the reunion. So I took a predawn flight from Boston to Baltimore, then dashed over to the mission control center at Johns Hopkins University's Applied Physics Laboratory for a ringside seat.

I'm thrilled to report that the flyby was 100% "nominal." At 2:04:39 p.m. Eastern time (19:04:39 Universal Time), out of view from both the Sun and Earth, Messenger swept over the planet's night-side equator at an altitude of just 126 miles (a mile or so higher than planned).



Taken by Messenger from about 17,000 miles away, this view of Mercury shows about half of the area not photographed by Mariner 10 in 1974–75. The heavily cratered landscape is reminiscent of other areas previously seen. The broad circular plain at upper right, appearing brighter than its surroundings, marks the interior of Caloris basin, a huge impact scar more than 800 miles across. Click on the image for a full-resolution view.
NASA / JHU-APL / Carnegie Inst. of Washington

Three minutes later it emerged from hiding, reestablished contact with NASA's tracking stations, and then sped off in blazing sunlight on a slightly altered trajectory that will bring it 'round again on October 6th and yet a third time in September 2009. During their fourth and final meeting, in March 2011, Messenger will fire its braking rocket and settle into orbit.

Messenger stands for MErcury Surface, Space ENvironment, GEochemistry, and Ranging — an acronym of sorts no doubt created by NASA's super-secret think tank for mission names. In any case, Messenger carries an impressive array of scientific instruments — and all seven of them were hard at work yesterday. You'll see the eye-popping results here and at the mission's website in the days and weeks ahead.

Back in the mid-1970s, Mariner 10 left us with many unanswered questions about Mercury. Why does it have a magnetic field? What's the source of the tenuous atmosphere that envelops it? And are there really deposits of ice at its poles?

Topping the list of questions is how Mercury came to be so iron-rich. (In fact, after adjusting for compression effects, it's actually denser than Earth.) Something happened at the dawn of solar-system history that set this innermost planet distinctly apart from its terrestrial siblings. As mission leader Sean Solomon confided to me yesterday, "I want to learn how Mercury got put together."

So do I, Dr. Solomon — so do we all.

Posted by Kelly Beatty, January 15, 2008
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