Satellites to see Mercury enter spotlight on May 9

May 4 2016, by Sarah Schlieder

It happens only a little more than once a decade and the next chance to see it is Monday, May 9, 2016. Throughout the U.S., sky watchers can watch Mercury pass between Earth and the sun in a rare astronomical event known as a planetary transit. Mercury will appear as a tiny black dot as it glides in front of the sun s blazing disk over a period of seven and a half hours. Three NASA satellites will be providing images of the transit and one of them will have a near-live feed.

Although Mercury zooms around the sun every 88 days, Earth, the sun and Mercury rarely align. And because Mercury orbits in a plane that is tilted from Earths orbit, it usually moves above or below our line of sight to the sun. As a result, Mercury transits occur only about 13 times a century.

Transits provide a great opportunity to study the way planets and stars move in space—information that has been used throughout the ages to better understand the solar system and which still helps scientists today calibrate their instruments. Three of NASA's solar telescopes will watch the transit for just that reason.

The May 9 Mercury transit will occur between about 7:12 a.m. and 2:42 p.m. EDT. Mercury is too small to see without magnification, but it can be seen with a telescope or binoculars. These must be outfitted with a solar filter as you can't safely look at the sun directly.

Astronomers get excited when any two things come close to each other

in the heavens said Louis Mayo, program manager at NASA s Goddard Space Flight Center in Greenbelt, Maryland. This is a big deal for us.

Mercury transits have been key to helping astronomers throughout history: In 1631, astronomers first observed a Mercury transit. Those observations allowed astronomers to measure the apparent size of Mercury s disk, as well as help them estimate the distance from Earth to the sun.

Back in 1631, astronomers were only doing visual observations on very small telescopes by today s standards said Mayo.

Since then, technological advancements have allowed us to study the sun and planetary transits in greater detail. In return, transits allow us to test our spacecraft and instruments.

Scientists for the Solar and Heliospheric Observatory, or SOHO (jointly operated by NASA and ESA, the European Space Agency), and NASA s Solar Dynamics Observatory, or SDO, will work in tandem to study the May 9 transit. The Hinode solar mission will also observe the event. Hinode is a collaboration between the space agencies of Japan, the United States, the United Kingdom and Europe led by the Japan Aerospace Exploration Agency.

SOHO launched in December 1995 with 12 instruments to study the sun from the deep solar core all the way out to the sun's effects on the rest of the solar system. Two of these instruments the Extreme ultraviolet Imaging Telescope and the Michelson Doppler Imager will be brought back into full operation to take measurements during the transit after five years of quiescence.

For one thing, the SOHO will measure the sun s rotation axis using images captured by the spacecraft.

Instruments on board SDO and SOHO use different spectral lines, different wavelengths and they have slightly different optical properties to study solar oscillations, said SOHO Project Scientist Joseph Gurman. "Transit measurements will help us better determine the solar rotation axis."

Such data is another piece of a long line of observations, which together help us understand how the sun changes over hours, days, years and decades.

It used to be hard to observe transits, Gurman said. If you were in a place that had bad weather, for example, you missed your chance and had to wait for the next one. These instruments help us make our observations, despite any earthly obstacles.

SDO will be able to use the transit to help with instrument alignment. Because scientists know so precisely where Mercury should be in relationship to the sun, they can use it as a marker to fine tune exactly how their instruments should be pointed.

The transit can also be used to help calibrate space instruments. The utter darkness of the planet provides an opportunity to study effects on the observations of stray light within the instrument. The backside of Mercury should appear black as it moves across the face of the sun. But because instruments scatter some light, Mercury will look slightly illuminated.

It s like getting a cataract " you see stars or halos around bright lights as though you are looking through a misty windshield, said SDO Project Scientist Dean Pesnell.We have the same problem with our instruments.

Scientists run software on the images to try and mitigate the effect and check whether it can remove all of the scattered light.

For those of us down on the ground, it is worth trying to find a local astronomy club with a solar telescope to see if you can witness this rare event. Alternatively, a near-live feed of SDO images will be available at http://www.nasa.gov/transit.

Provided by NASA's Goddard Space Flight Center