Skywatchers prepare for rare Venus fly-by

Irene Klotz, Reuters

Transits of Venus happen in pairs eight years apart, with more than a century between cycles. During the pass, Venus appears as a small, dark round spot moving across the face of the sun, like a bug on a dinner plate.

"The Venus transit really brings home to us, in a unique way, how ordinary our sun is. It's just another star," said scientist and author Mark Anderson.

"There's something very humbling out of this experience. We are another planet in orbit around another star in another galaxy in another corner of the universe. It really brings it home to us," Anderson said.

Tuesday's transit, which bookends a 2004-2012 pair, begins at 6:09 p.m. EDT (2209 GMT) and lasts for six hours and 40 minutes. Times can vary by seven minutes depending on the location of the observer.

Skywatchers on seven continents, including Antarctica, will be able to see all or part of the Venus transit, which should only be observed with telescopes outfitted with solar filters to protect the eyes.

The Internet will be a hub of activity, with live video and pictures from an armada of space- and ground-based observatories.

Even astronauts aboard the International Space Station are joining in the event.

"I've been planning this for a while," space station flight engineer Don Pettit said in a NASA interview. "I knew the transit of Venus would occur during my rotation, so I brought a solar filter with me."

It's not all about pretty pictures. Several science experiments are planned, including studies that should help in the search for habitable planets beyond Earth.

MEASURING VENUS' ATMOSPHERE

Telescopes, such as NASA's Kepler space telescope, are being used to find so-called extra solar planets that pass in front of their parent stars, much like Venus will pass by the sun. During the transit, astronomers will be able to measure Venus' thick atmosphere and use the data to develop techniques for measuring atmospheres around other planets.

Studies of Venus' atmosphere also could shed light on why Earth and Venus, which are almost exactly the same size and orbit approximately the same distance from the sun, ended up so different.

Venus has a chokingly dense atmosphere 100 times thicker than Earth's that is mostly carbon dioxide, a greenhouse gas that heats up Venus' surface to a lead-melting 900 degrees Fahrenheit (482 degrees Celsius).

The weather is brutal, with towering clouds of sulfuric acid that jet around the planet at 220 mph, regularly dousing the planet with acid rain.

"A human being transported to this hellish environment would be crushed, suffocate, desiccate, and possibly ignite," wrote Tony Phillips, with Science@NASA.

Scientists are interested in learning more about Venus' climate in hopes of understanding changes in Earth's atmosphere.

During previous transits of Venus, scientists were able to figure out the size of the solar system and the distance between the sun and the planets.

Tuesday's transit is only the eighth since the invention of the telescope, and it will be the last one until December 10-11, 2117. It also is the first to take place with a spacecraft at Venus.

Observations from Europe's Venus Express probe will be compared with those made by several ground and space-based telescopes including NASA's Solar Dynamics Observatory, the joint U.S.-European Solar and Heliospheric Observatory and Japan's Hinode spacecraft.

Armchair astronomers have rich choice of websites to monitor. NASA's compilation will be here [1]

Slooh Space Camera will broadcast 10 real-time feeds of the transit from solar telescopes located in Australia, Japan, New Zealand, Hawaii, Norway, Arizona, and New Mexico. The webcast at events.slooh.com/ [2] begins at 6 p.m. EDT (2200 GMT).

And, of course, there's an app for that. Owners of mobile devices using Apple and Android operating systems can download a free app to learn about the transit, interact with skywatchers and track the transit as it occurs around the world. The app is available at tov2012.esri.com/ [3] and several websites, including (transitofvenus.nl/wp/ [4]) and www.eclipse-maps.com [5].

(Editing by Jane Sutton [6] and Cynthia Osterman [7])

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