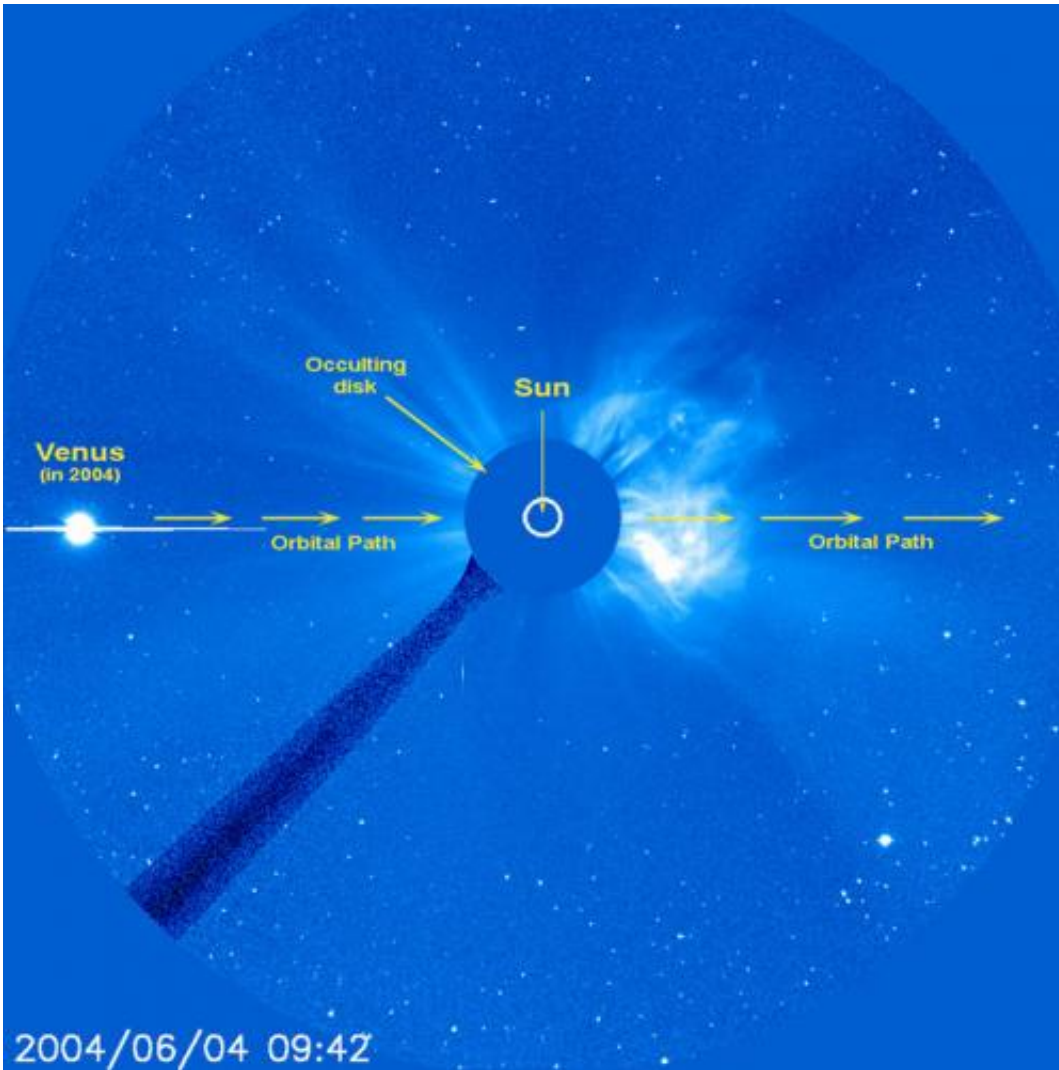


ESA missions gear up for transit of Venus

June 4 2012



The path that Venus will take as it approaches the Sun in SOHO's field of view. The image is from the transit of Venus in 2004, but a similar path will be taken during the transit of 2012. Credits: SOHO/ESA/NASA

(Phys.org) -- ESA's Venus Express and Proba-2 space missions, along with the international SOHO, Hinode, and Hubble spacecraft, are preparing to monitor Venus and the Sun during the transit of Earth's sister planet during 5-6 June.

ESA's [Venus](#) Express is the only spacecraft orbiting Venus at the moment and while the transit is being watched from Earth, it too will use light from the [Sun](#) to study the planet's atmosphere.

As sunlight filters through the atmosphere it reveals the concentration of different gas molecules at different altitudes.

This technique is also used to probe the atmospheres of planets outside our Solar System – exoplanets – to determine their potential habitability.

Simultaneous measurements are planned during the transit from ground-based observatories around the world to compare with the Venus Express results.

Exoplanet scientists can then test their techniques for looking at the characteristics of rocky Earth-sized planets.

Because Venus Express is in orbit around the planet, it will not notice any difference while the transit is being observed from Earth. But the spacecraft will be watching the Sun setting through the atmosphere of Venus, and its data will be compared to measurements made at the Earth at the same time.

These will include data from ESA's Proba-2 microsatellite and Japan's Hinode solar satellite, which will have ringside seats in low-Earth orbit to watch as Venus passes in front of the Sun.

“Proba-2 is expected to see a dip in the solar brightness as soon as the

thick atmosphere of Venus makes first contact with the solar disc, which is an important measurement for exoplanet scientists,” says Joe Zender, ESA’s Proba-2 mission manager.

There is also the possibility that if Venus passes exactly in front of an active region on the Sun we can obtain information about the energy emitted by that region.

“This is important for space weather studies that help us to understand the Sun and its influence on Earth.”

Hinode will be watching the transit in visible, X-ray, and ultraviolet wavelengths to study phenomena such as the ‘black drop effect’ – the small black teardrop shape that appears to connect Venus to the limb of the Sun just after it has fully entered the solar disc and again later, when it begins to leave the disc.

It will also observe the aureole, an arc of light seen around the planet’s disc during the first and last minutes of the transit.

“The most spectacular images and movies should come from Hinode’s Solar Optical Telescope, which has by far the highest resolution of any solar instrument in space,” says Bernhard Fleck, ESA’s Hinode and SOHO project scientist.

“Unfortunately, SOHO will not be well placed to observe the transit. However, it has one thing that no other spacecraft can provide: views of Venus as it approaches the Sun days before the actual transit, and then moves away from the Sun for several days after the [transit](#).”

Meanwhile, NASA/ESA’s Hubble Space Telescope will use the Moon as a giant mirror to capture diffuse, reflected sunlight: a small fraction of that light will have passed through the atmosphere of Venus en-route to

the Moon.

This will test techniques aimed at measuring the atmospheres of Earth-sized rocky exoplanets that could potentially reveal traces of life on planets outside our Solar System.

Provided by European Space Agency

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