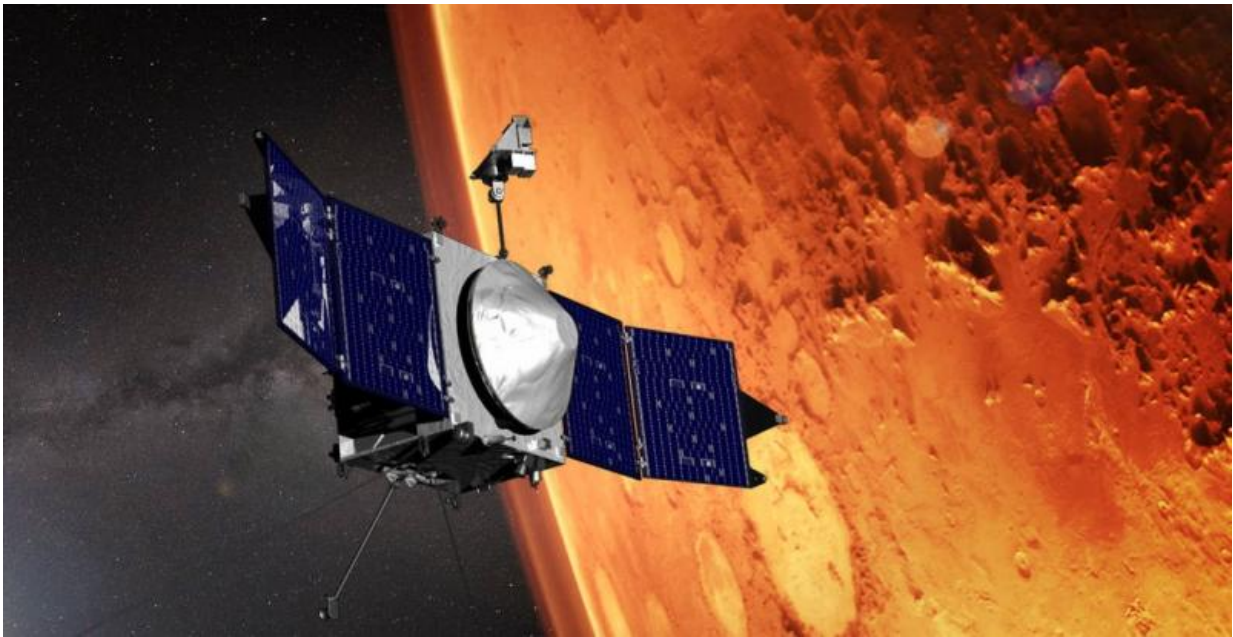


MAVEN spacecraft gears up to observe global dust storm on Mars

August 23 2016, by Tomasz Nowakowski, Astrowatch.net



Credit: NASA

NASA's Mars Atmosphere and Volatile Evolution Mission (MAVEN) orbiter will have a front-row seat to watch a marvelous dusty spectacle in late 2016. The spacecraft, nearing its second anniversary in Martian orbit, has already gathered a wealth of scientific data about the Red Planet's atmosphere and is expected to provide crucial insights on the nature of intense dust storms occurring periodically on Mars.

MAVEN's goal is to explore the planet's [upper atmosphere](#), ionosphere, and interactions with the sun and [solar wind](#). It has observed Mars in different states, returning [scientific data](#) regarding various phenomena.

"We are continuing to observe Mars, and part of our goal is to observe the planet under a wide variety of different conditions and see what happens. We have seen cometary dust impact, solar storms, changing atmospheric conditions. One thing that we have not observed is the effects of a global dust storm. We are now entering 'dust storm season' on Mars, and waiting to see what Mars will throw at us," Bruce Jakosky, MAVEN's principal investigator from the University of Colorado's Laboratory for Atmospheric and Space Physics in Boulder, told Astrowatch.net.

When solar heating warms the Martian atmosphere and causes the air to move, dust lifts off the ground, forming a dust storm. These storms could be very powerful when Mars reaches its perihelion, as the sunlight striking the planet will be 20 percent more intense than the annual average. While planet-wide [dust storms](#) on Mars are difficult to predict exactly, scientists forecast that we could hope for severe dusty events in late October 2016, when the Red Planet will be at its closest point to the sun.

Dust storms could help researchers better understand the processes taking place in the tenuous Martian atmosphere. This is MAVEN's main task, in particular— investigating the loss of the planet's atmosphere to space.

MAVEN's data proved that the sun and solar wind are able to strip gas from the atmosphere and remove it to space. The spacecraft's measurements allowed the scientists to conclude that over the history of the planet, this was likely the dominant mechanism for driving the changes in climate.

"We have been able to observe the energy inputs from the sun and solar wind, the response of the upper atmospheric structure and composition, and the ability to drive loss of gas to space. This represents a major advance in our understanding of the behavior of the upper atmosphere," Jakosky said.

He added that it is becoming clear that one cannot consider any aspect of the history of Mars in isolation as the planet's environment is an intricately coupled system of complex processes spanning from the deep interior to the upper atmosphere and the interactions with the solar wind.

"MAVEN has begun to fill in the gap of the top of the atmosphere, and is showing how processes there can affect the planet's climate, geology, and habitability," Jakosky noted.

Currently, the MAVEN spacecraft and all of the science instruments are operating nominally and science observations are continuing. The orbiter has just been approved for a two-year extended mission that will carry it into late 2018.

"We have enough fuel that we can continue to operate for perhaps as long as another decade. Of course, nothing is guaranteed, and we are trying to take each week as it comes to get the most out of it," Jakosky said.

MAVEN began its primary science mission on Nov. 16, 2014, and is the first spacecraft dedicated to understanding Mars' upper [atmosphere](#). NASA's Goddard Space Flight Center manages the MAVEN project for the principal investigator at the University of Colorado, Boulder, and for the NASA Science Mission Directorate, Washington. Lockheed Martin built the spacecraft and is responsible for mission operations.

Provided by Astrowatch.net

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