NASA to launch newest Earth-observation satellite

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(AP) -- NASA is set to launch its latest Earth-orbiting satellite on a $424 million mission to analyze airborne grit spewed by volcanoes, forest fires, smokestacks and tailpipes.

The Glory satellite is slated to blast off before dawn Wednesday from Vandenberg Air Force Base aboard a Taurus XL rocket. Once boosted to an altitude of 440 miles, it will join a fleet of satellites that has been collecting climate data for years.

Its main job will be to study fine airborne particles known as aerosols. Smaller than the diameter of a human hair, these ubiquitous specks can track great distances across the globe and are largely responsible for producing hazy skies.

Scientists know very little about aerosols and their effect on climate. A better understanding is critical to improving climate models.

"We need to know these particles much better than we do," said project scientist Michael Mishchenko of the NASA Goddard Institute for Space Studies.

Over the past century, average temperatures have climbed 1.4 degrees Fahrenheit worldwide. Scientists blame carbon dioxide, mostly from the burning of coal, oil and other fossil fuels, as the chief cause of global warming.

Unlike greenhouse gases that linger in the atmosphere for years, aerosols are short-lived - staying aloft for weeks - so it's much harder to measure them than carbon dioxide.

Most of the aerosols - roughly 90 percent - comes from natural sources such as volcanic ash, desert dust and smoke from forest fires. The rest is from human activity.

Aerosols can influence both warming and cooling of the planet depending on their color and chemical makeup. They can result in cooling by scattering sunlight back into space; they also can absorb solar energy, warming the atmosphere.

Dozens of satellites have studied aerosols over the past 50 years. But Glory is designed to make the most accurate aerosol measurements from space by studying how widely distributed they are and their various properties.

Besides tracking aerosols in the atmosphere, Glory will also monitor changes in solar activity to determine the sun's effect on climate.

Glory will be launched aboard a four-stage Taurus XL rocket built by Orbital Sciences Corp. The mission marks Taurus XL's return to flight after a failure in 2009 that resulted in the loss of a NASA global warming satellite.

Glory, which weighs about half of a Volkswagen Beetle, will operate for at least three years. The spacecraft chassis was recycled from a mission that never flew and had to be retrofitted to accommodate the two key instruments.

The mission was supposed to fly last November, but a problem with the solar panels delayed launch by three months. Once in low-Earth orbit,

Glory will join a convoy of satellites already collecting climate information.

The spacecraft's unusual name was derived from an atmospheric phenomenon caused by the scattering of sunlight by water droplets in a cloud.