New Frontiers SAGE Mission Abstract

B. Bienstock, G. Burdick
JPL
Bernard.Bienstock@jpl.nasa.gov
Garry.Burdick@jpl.nasa.gov

In December, 2009, NASA selected the Surface and Atmosphere Geochemical Explorer (SAGE) mission to Venus as one of the three missions funded to submit a Phase A Concept Study Report. The reports are due in January, 2011, with selection of a single mission to go forward with implementation scheduled in the Spring of 2011.

Venus, our evil-twin closest neighboring planet, has long been a source of fascination for those interested in the formation history of our Solar System. Located closer to the sun than Earth, the Venus surface conditions exhibit the effects of the runaway greenhouse condition that has been predicted to be the ultimate fate of Earth. At the bottom of a thick, CO_2 atmosphere lies a surface at a near constant 735 K (462 °C), under an oppressive atmospheric pressure of 92 bars.

Although there have been many past missions to Venus, as well as the currently-operating ESA Venus Express mission, none have unlocked all of the many mysteries of this fascinating world. From previous missions, we know the surface is pock-marked with volcanoes and the atmosphere obscured from our visible observations by a constant cloud layer that includes sulfuric acid droplets at 60 km altitude. During descent via a Pioneer Venus-like sequence of staging events, a host of Lander instruments will analyze the Venus atmosphere and image its surface. Landing is targeted on the flanks of a possibly active volcano known as Mielikki Mons, which is about 322 km across and 1.5 km in altitude. On the surface, a host of instruments including a combined Raman/Laser-Induced Breakdown Spectrometer will spend 3 hours remotely probing the surface and subsurface to determine its composition.