

NASA's Mars Exploration Program over the Next Decade

Michael Meyer

Lead Scientist, Mars Exploration Program

Over the past year, the community has developed possible Mars architectures that offer exciting science return and moves us closer to returning a sample from the red planet. Currently, we have two Mars Exploration Rovers, Spirit and Opportunity, and the Mars Scout lander, Phoenix, and three orbiters, 2001 Mars Odyssey, Mars Reconnaissance Orbiter and the ESA mission, Mars Express. On May 25th, Phoenix landed in the northern polar terrain and literally explored Mars within arms reach, for evidence of more clement climates than the polar regions of today. The Mars Science Laboratory (MSL), in development for a 2009 launch, will include an analytical laboratory on a very capable roving platform. It is this mission, designed for longevity, exploration, and analytic capability, which will determine the past and present habitability of the landing site region. MSL is a strategic flagship mission coming into the next decade and it represents the opportunity for the measurement and potential characterization of organics that may be in the martian near-subsurface. Although mineralogy and elemental composition are critical to understanding the environmental history of the particular region being explored, it is the measurement of organics that remain the brass ring of determining the biological potential of the red planet. To gain a better understanding of the evolution of martian atmosphere, the next Scout mission will be an aeronomy mission to be launched in 2013. Also in 2013 is the ESA rover, ExoMars, in which NASA has a substantial investment in two organic detection instruments. Coming into the later half of the next decade, NASA is considering another lander, capable of properly caching samples, a Mars Science Orbiter focused on measuring trace gases and providing a telecommunications relay, a possible network mission, and culminating in an international sample return. It is the expectation that substantial progress will be made in understanding the evolution of Mars and its potential for past or present life that has spurred these missions and leads us to concluded that it is time for Mars sample return in the coming decade.