Mars Exploration Program at JPL: The 1996 Missions

Abstract:
The Jet Propulsion Laboratory is going back to Mars for the first time since 1976. This return to Mars is planned with a small fleet of missions comprised of Orbiters, Landers and Rovers. It is anticipated that the decade long survey of the Red Planet will culminate with a Sample Return Mission. Many Space Fairing Nations such as Russia, France, Germany, Italy and Japan are involved in the effort.

The plan is to fly at least two robotic missions to Mars every launch opportunity, about every 26 months, from 1996 through 2005. The program is known as the Mars Surveyor Program. The Mars Surveyor Program is an ambitious but tightly cost-constrained program to explore Mars over the aforementioned decade.

The first objective of the Mars Surveyor Program is the recovery of the science lost along with Mars Observer. This paper will describe the strategy and science of the first Surveyor mission, designated the Mars Global Surveyor, launched on November 7, 1996 aboard a Delta II Rocket. Mars Global Surveyor, an Orbiting spacecraft, carries a duplicate of the Mars Observer Camera, Laser Altimeter, Thermal Spectrometer, and Magnetometer along with an atmospheric measurement instrument. It is estimated that 70% of Mars Observer Science will be acquired at 25% of its original cost.

The second Mars Mission, Mars Pathfinder, part of the NASA Discovery Program, will be addressed in this paper. Mars Pathfinder, launched on December 4, 1996, aboard a Delta Launch Vehicle, will demonstrate a low cost delivery system to the surface of Mars for future Mars Surveyor and Discovery Landers. Mars Pathfinder requires fuel only to navigate to Mars. Upon arrival at Mars, it will aerobrake into the Martian Atmosphere, deploy a parachute and air bags to cushion its touchdown.

The major objective of Mars Pathfinder is to demonstrate its entry-decent -landing scenario. It carries a small rover equipped with an Alpha Proton X-ray Spectrometer to determine the elemental composition of the soil and rocks.