

NASA'S PLANS FOR MARS SAMPLE RETURN

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Mars Surveyor is a continuing program of Mars exploration employing investigations conducted from landed and orbiting platforms. The program focuses on the themes of life, climate and resources. Although in situ analysis and remote sensing are the primary means of obtaining information from Mars Surveyor, access to a sample of Mars for laboratory studies is highly desirable. NASA has recently taken the first steps in examining the feasibility of returning a sample of Mars to Earth within the constraints of the Mars Surveyor program. This paper describes our preliminary studies of focused science objectives and low-cost mission scenarios which might be consistent with an effort to return a sample utilizing the 2005 launch opportunity. A series of low-cost sample return missions would follow the first "trailblazer" mission. NASA's approach to a first sample return builds upon the precursor missions in the Mars Surveyor program. The first mission in the program is the Mars Global Surveyor (MGS), an orbiter to be launched in 1996 which recovers much of the science lost with the failure of Mars Observer. MGS has a strong component of atmospheric science. In the 1998 opportunity, a lander will be placed on the layered terrain of the south polar region of Mars. Its investigations focus on understanding the form, quantity and behavior of surface volatiles. In orbit in 1998 will be an atmospheric sounder and cameras which will map the structure of the atmosphere, and the sources of surges of volatiles. Mars Surveyor mission plans also include an orbiter and lander launched in 2001 and a joint NASA/ESA mission which would in 2003, provide a small network of three landers. Experiments on landers in the 2001 or "2001" opportunities may include measurements of the abundance of minor, trace and isotopic gases. In addition to encouraging technology development in support of the 1996 to 2003 missions, the Mars Surveyor program will support silt and sample type selection for the sample return mission. Our understanding of Mars from precursor missions may be sufficient for a simple system to acquire a low mass, scientifically significant sample by 2005.

Submittal information

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