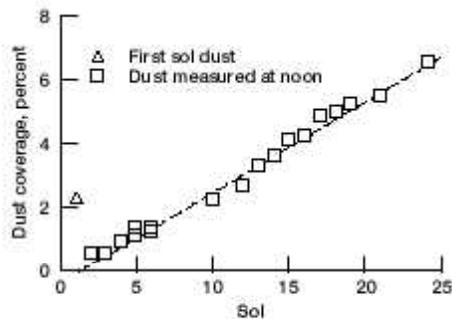


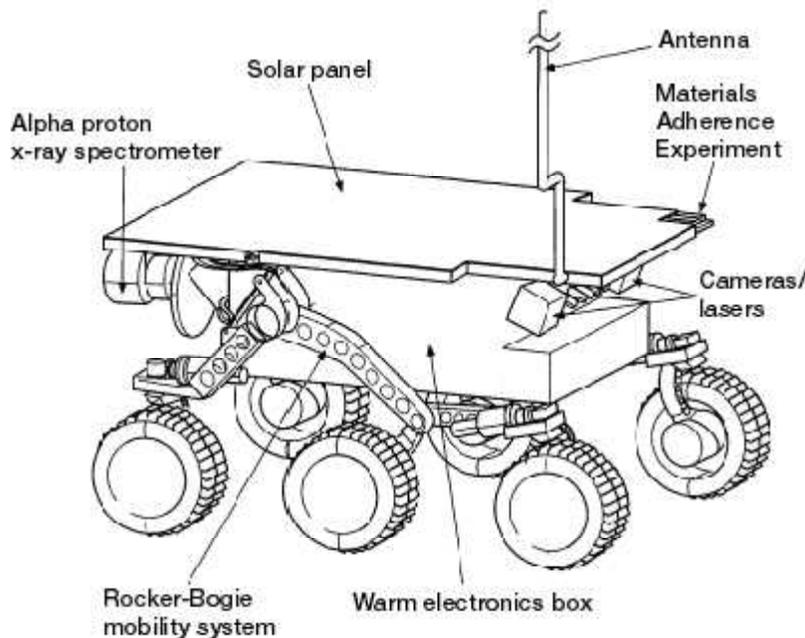
Measuring Dust on Mars

Mars is a dusty planet. Will dust accumulation on solar arrays be a problem for large solar power systems used on long-duration future missions on Mars? NASA Lewis Research Center's Materials Adherence Experiment (MAE) on the Mars Pathfinder Sojourner rover was designed to find out. It measured the dust deposited on the rover's solar array by measuring the change in transparency of a movable glass cover as dust settled on it. This graph shows the results from the first 2 ½ weeks of operation on Mars.



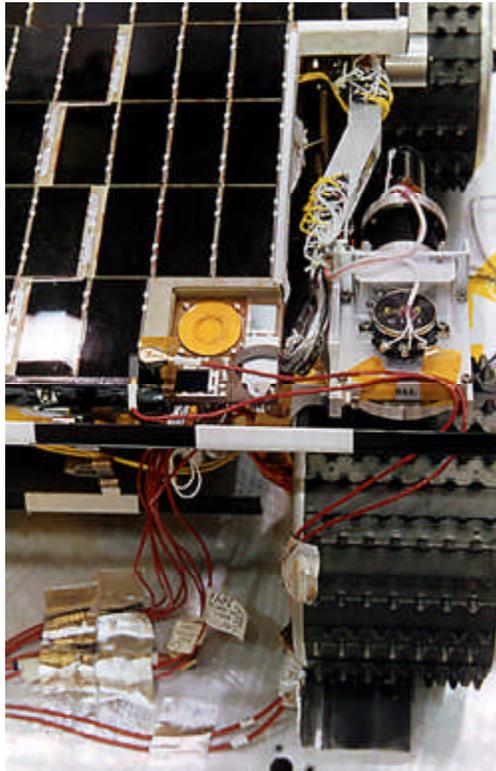
Dust deposition on the Sojourner rover. Slope, 0.28 percent per day.

The rover solar array accumulated dust at a rate of about a quarter of a percent of coverage per day (see the graph). This is very close to the coverage of 0.22 percent predicted before the mission (ref. 1). The deposition rate seemed to be the same on the sols (Martian "day") when the rover was in motion as it was on sols when the rover remained in place, indicating that the deposition was probably due to dust settling out of the atmosphere, not dust kicked up by the Sojourner Rover's motion.



Sojourner Rover showing location of the Materials Adherence Experiment.

The illustration shows the location of the MAE on the Sojourner rover, and the photo shows the experiment mounted on the corner of the rover during a prelaunch test. Information on the new design of lightweight nitinol actuator used for the experiment can be found in a paper describing the experiment (ref. 2). The MAE solar cell experiment was built by Geoffrey Landis of the Ohio Aerospace Institute and Phillip Jenkins of Essential Research, Inc.



Materials Adherence Experiment shown mounted on the Sojourner rover.

References

1. Landis, G.A.: Dust Obscuration of Mars Solar Arrays. *Acta Astronaut.*, vol. 38, no. 11, 1996, pp. 885-891.
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