Once the sample has been gathered and analyzed, the rover can re-inflate the lower air bladder and continue rolling.

The rover will use a small set of instruments and electronics situated at the center of its inflatable spherical hull. The current version is a large beach-ball-like construction, about 1.8 m in diameter and weighing roughly 15 kg. The rover comprises two major parts, an outer spherical hull (split in half at the central disc) and an inner, disc-shaped cylindrical section. The balloons are attached to the bottom and top of the disc. Inside the disc, there are temperature and pressure sensors to keep track of the inner and outer conditions of the rover. A system of pumps and valves is responsible for independently inflating and deflating the balloons as necessary. There are also accelerometers to record the movement, together with a GPS receiver. The data are then sent through a modem to a control station. This work builds upon the project "Tumbleweed rover for planetary exploration," described in the Technical Support Package, as noted below.

*This work was done by Jeffrey P. Nosanov of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).* ***NPO-47648***

## Pneumatic System for Concentration of Micrometer-Size Lunar Soil

A report describes a size-sorting method to separate and concentrate micrometer-size dust from a broad size range of particles without using sieves, fluids, or other processes that may modify the composition or the surface properties of the dust.

The system consists of four processing units connected in series by tubing. Samples of dry particulates such as lunar soil are introduced into the first unit, a fluidized bed. The flow of introduced nitrogen fluidizes the particulates and preferentially moves the finer grain sizes on to the next unit, a flat plate impactor, followed by a cyclone separator, followed by a Nuclepore polycarbonate filter to collect the dust.

By varying the gas flow rate and the sizes of various orifices in the system, the size of the final and intermediate particles can be varied to provide the desired products. The dust can be collected from the filter. In addition, electron microscope grids can be placed on the Nuclepore filter for direct sampling followed by electron microscope characterization of the dust without further handling.

*This work was done by David McKay and Bonnie Cooper of Johnson Space Center. Further information is contained in a TSP (see page 1).* ***MSC-25264-1***