Sample acquisition and handling will be important elements of future landed missions. Sample manipulation
technologies are needed to enable handling and transfer of unstructured samples from a sampling device to
instruments and sample processing systems. Shallow core, rock, and regolith samples may be variable in size and
composition so a sample manipulation system needs to be flexible enough to handle the sample variability. Core
samples will be on the order of 1 cm diameter and up to 10 cm long. Soil and rock samples will be of similar
volumes. Actual samples to be analyzed in instruments will likely be small subsamples so the means for
subsampling and manipulation of the original sample and subsamples needs to be developed. Minimal size and
mass components and systems have the greatest benefit.

Mobility technology is needed to enable access to difficult-to-reach sites such as distant locations or access
through steep terrain. Many scientifically valuable sites are accessible only via terrain that is too steep for state-of-
the-art planetary rovers to traverse. Sites include crater walls, canyons, and gullies. Tethered systems and
marsupial systems are two examples of mobility technologies that are of interest. Tether technology could enable
new approaches for deployment, retrieval and mobility. Innovative marsupial systems could allow a pair of vehicles
with different mobility characteristics to collaborate to enable access to challenging terrain, e.g., a primary vehicle
could provide long traverse to the vicinity of a challenging site and then deploy a smaller vehicle with steep mobility
access capability for access to the site. Innovative low-mass, low-power, and highly modular systems and
subsystems are of particular interest.

The program is also interested in new sensors such as small, low-power lidar for more robust navigation.

Examples of planetary robotics system are shown at [http://robotics.jpl.nasa.gov](http://robotics.jpl.nasa.gov).