The Center for In Situ Exploration and Sample Return (CISSR)
Speaker Series

presents

Speaker: Andrew E. Johnson

Topic: Scanning LIDAR Algorithms for Safe and
           Precise Landing on Mars

Date: Friday, March 8, 2002
Time: 1:30 - 3:00 p.m.
Location: JPL Bldg. 306-302

Abstract:

Future Martian landers will employ a safe and precise soft-landing
capability to enable exploration of areas on Mars that were
inaccessible during previous Mars lander missions. To enable
this capability a scanning laser radar (LIDAR) is being developed
at JPL that provides 3D measurements of surface topography. Using
LIDAR data as input, algorithms for hazard detection and avoidance
and accurate surface relative navigation are also being developed.
These technologies are components of a proposed safe and precise
landing system for NASA's Mars 2009 Smart Lander. This system will
map the landing zone, identify hazards, and accurately guide the
vehicle to a safe landing site, all during the terminal descent
phase.

During this talk, Andrew Johnson will present an overview of the
proposed safe and precise landing system and describe in detail
algorithms for LIDAR-based hazard detection and avoidance, surface
relative velocity estimation, and surface relative position and
attitude estimation. Results from data collected during two field
tests will also be presented to quantify algorithm performance.
The first field test was conducted to verify LIDAR terrain sensing
and hazard detection algorithm performance at typical Mars descent
speeds. In this test an instrumented rocket sled was accelerated