

Mars Global Surveyor Ka-Band Link Experiment

S. A. Butman, A. P. Mittskus & D. D. Morabito
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California
and
R. R. Davis, W. R. Adams & A. M. McMechen
Lockheed- Martin Astronautics Co
Denver, Colorado

Abstract

NASA's Mars Global Surveyor (MGS), launched on November 7, 1996, includes an experimental 1 W downlink Ka-Band (32 GHz) downlink. This signal along with the primary 25 W downlink at X-band (8.4GHz) are simultaneously transmitted by MGS from a 1.5 m diameter antenna and both are received by a 34 m antenna in NASA's Deep Space Network. That enables a direct performance comparison to be made of the X-band and Ka-band links as both signals traverse the same path and arrive simultaneously. JPL has been tracking both frequencies since December 6, 1996 and receiving telemetry. Performance measurements indicate that operations at Ka-Band would increase the telecommunications capability of deep space missions by at least a factor of three.

This article describes the development and conduct of the experiment. The presentation addresses flight and ground systems design and summarizes results obtained during the cruise phase of the mission.