Geophysical science results from radio tracking of Mars Pathfinder

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Doppler and range measurements to the Mars Pathfinder lander have been made using its radio communications system. The data have been analyzed and used to estimate the position of the lander and the direction of Mars' pole of rotation. In combination with similar measurements from the Viking landers, Mars' precession rate is estimated to be -7600 ± 100 mas/yr. This represents a factor of three improvement over previous determinations, and implies that the non-hydrostatic component of Mars' polar moment of inertia is due to the Tharsis bulge. Estimates of seasonal variations in Mars rotation have also improved by a factor of three over previous results by including Doppler data from Viking Lander 1.