

Determination of upper atmospheric properties on Mars and other bodies using satellite drag/aerobraking measurements

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I will discuss three techniques for using satellite drag to measure upper atmospheric densities: orbital decay, aerodynamic torques, and aerodynamic forces. These techniques have been used on Venus, Earth, Mars, and Titan. Continuous onboard measurements of aerodynamic forces, or drag deceleration, can be used to determine atmospheric density along the spacecraft trajectory. Pressures, temperatures, and possibly winds can be derived from density data. Measurements from multiple aerobraking passes can be used to build up a picture of atmospheric conditions at a range of altitudes, latitudes, longitudes, and local times. Observable upper atmospheric properties are sensitive to changes in the solar wind and solar photon flux.