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Atmospheric reconstruction from Phoenix entry data

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The Phoenix capsule successfully landed on the Northern plains of Mars in May 2008. During entry, descent and landing (EDL) in the atmosphere of Mars, Phoenix recorded accelerations and angular velocities using accelerometers and gyroscopes housed in an inertial measurement unit (IMU). In addition, radio communications were established between Phoenix and the Mars Odyssey, Mars Reconnaissance and Mars Express orbiters during EDL.

The presentation will be a discussion on trajectory and atmospheric reconstruction, as well as their accuracy and scientific value. Technical highlights include the detailed analysis of the full IMU dataset. Previous studies have reported discrepancies between angles of attack derived from either the accelerometer or gyroscope data. We will revisit the impact of various assumptions and noise reduction methods. Positions and velocities reconstructed from Doppler shifts in the radio signal will be evaluated for comparison. Scientific highlights include the impact of any discrepancies on the atmospheric profiles, the estimated accuracy of those profiles and a comparison between Phoenix profiles and other observations such as entry profiles from other Mars missions and atmospheric measurements from Mars Climate Sounder instrument on the Mars Reconnaissance Orbiter.