On-Board Perception System For Planetary Aerobot Balloon Navigation

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NASA's Jet Propulsion Laboratory is implementing the *Planetary Aerobot Testbed* to develop the technology needed to operate a balloon **Aero** vehicle **Robotic** (Aerobot) system. This earth-based system would be the precursor for aerobots designed to explore Venus, Mars, Titan and other gaseous planetary bodies.

The on-board perception system allows the aerobot **to** localize itself and navigate on a planet using information derived from a variety **of** celestial, inertial, ground-imaging, and radiometric sensors. This paper discusses the various sensing modalities available **to** the aerobot, their applicability **to** different planetary лил; моли:+, and the outline of a perception architecture suitable for whole planet aerobot operation. The implementation **of** an initial sensor suite **f.,** the Planetary Aerobot Testbed will be discussed in some detail. This initial implementation includes inertial sensors for attitude, attitude rate and lateral motion estimation, as well as a sun-sensor for direct attitude determination. It also includes a **[')101** und imaging system for ground-track velocity estimation. GPS and magnetic compass data is used **to** determine ground truth information.