

A balloon borne telescope for planetary observations

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In order to study various time-dependent phenomena in planetary atmospheres and plasmas, continuous observation is important. However, machine time of ground-based large telescopes is limited and good seeing and good weather are not necessary guaranteed during observation time slot. We have been developing a balloon-borne telescope for planetary observations from the polar stratosphere where a planet can be observed continuously.

In this system, a Schmidt-Cassegrain telescope with a 300-mm clear aperture is mounted on a gondola whose attitude is controlled by control moment gyros, an active decoupling motor, and attitude sensors. The gondola can float in the stratosphere for periods longer than 1 week. Pointing stability of 0.1"rms will be achieved by the cooperative operation of the following three-stage pointing devices: a gondola-attitude control system, two axis telescope gimbals for coarse guiding, and a tip/tilt mirror mount for guiding error correction.

The first experiment of the balloon-borne telescope system was conducted on June 3, 2009 at Taikicho, Hokkaido targeting Venus. However, the balloon experiment failed due to trouble with an onboard computer. The balloon borne telescope was re-designed for the second experiment in August in 2012, when the target planet is Venus.

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