

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 3 (3C)

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AN AUTONOMOUS GLIDER FOR MARS EXPLORATION

Abstract

Comprehensive Mars exploration is the logical next step for space science and is necessary before a manned mission can take place. Robotic exploration is currently limited to ground based mobile robots which provide detailed analysis of a small local area and orbiting observational satellites which provide a lower resolution but complete survey of the planet. A low altitude middle ground between these extremes is not currently available. An autonomous glider and sensing payload would fill this deficiency in Mars exploration, enabling the acquisition of high resolution data over an extended area.

This paper presents the development of an autopilot for such a glider. The final design is lightweight and small, allowing multiple gliders to be dispatched. This increases the coverage area, increases probability of mission success and allows graceful system degradation. Of particular importance is the software auto-generation which facilitates the development of robust, error free software for reliable operation. A series of successful terrestrial flight tests verified the functionality of the system.