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A MARS SURFACE DETECTING FLYING BLANKET BASED ON FLEXIBLE PRINTED CIRCUIT BOARD

Abstract

A kind of flying-blanket-like Mars detector is proposed in this paper. Its main structure is a thin large-scale flexible printed circuit board integrating all of the on-board control circuits. And it is covered with large-scale flexible solar cells as the main power energy supply for the detector. Piezoelectric actuators and sensors are also mounted on the thin large board to control the flight of flying blanket, thus it can suspend in the air above the Mars surface, and thrust force can be generated to control its horizontal motion. When it is powered on, some part of the flying blanket surface begin to shrink and other part begin to expand, making it bend into a moving-wave-like shape. The wave pushes forward the air between the flying blanket and the surface of Mars, and when the flying blanket is pushed contrarily, it may stay in the air. The ripple effect of air fluctuation can make the flying blanket detector move forwardly at a speed of several centimeters per second, which is obviously faster than that of Mars rover moving on the surface of Mars. As on Mars the air is thinner and the gravity is smaller than that of on Earth, by using the flying blanket principle the detector can move freely above the Mars surface. Therefore, the flying blanket detector proposed in this paper is very fit for detecting task of Mars surface. Through more than two years' effort, our team has solved related key technologies, and simulation experiment also demonstrates the feasibility and effectiveness of the proposed design scheme of flying blanket. The novel means of the surface detecting of the Mars, i.e. flying blanket detector proposed in this paper, has great significance will be very promising in the future for the Mars detecting task.