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THE RESEARCH OF SOLAR WING DEPLOYMENT SUPPORT MECHANISM BASED ON THE  
TAPE SPRING**Abstract**

Tape spring is kind of component with support and locking feature both, which has advantages of light quality, simple structure and high reliability. In recent years, the performances, material selection and processing methods of tape spring have been investigated more and more deeply in many countries. And the tape spring has been widely used in small and micro satellite development field. In this paper, combined with some satellite engineering practice, a kind of solar wing deployment support mechanism based on the tape spring was developed. The characteristic of high bending stiffness of components before buckling deformation was adopted to support deployable solar wing, which would improve the solar panels deployment system stiffness, fundamental frequency and damping ratio, meet the requirements, and still could be resumed stable as soon as possible even under the condition of solar wing vibration. The modal measurement test of solar wing deployment support mechanism prototype based on the tape spring was carried out in this paper. It was demonstrated that the mechanism has great effect on the solar wing stiffness and promotion of fundamental frequency. Then three groups of tests were taken on mechanism scale prototype launch state, which included vacuum low temperature deployment test below - 170 , sine vibration test, and random vibration test. Through these tests, it was proved that deployment support mechanism studied in this paper could bear poor launch conditions and on-orbit deployment conditions.