

38th STUDENT CONFERENCE (E2)
Student Conference III (3)

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PLATE-ROD STRUCTURE INTEGRATED DESIGN OF MICRO-SATELLITE

Abstract

The paper introduces the plate-rod structure integrated design concept. This concept is used in BUAA student micro-sat (BUAA Sat) to achieve the goal of light weight, small volume, low cost, easy processing, and convenient fixing. BUAA Sat, a gravity-gradient stabilized satellite, consist of primary-satellite and sub-satellite which are connected by coilable mast on orbit. The sub-satellite is a cylinder with a 100 mm height and it is compacted inside the primary-satellite before it is released. The primary-satellite is a 300*300*500mm rectangular parallelepiped. Plates used for equipments installation are series connected by eight round rods and each storey height is sustained by sleeves. On the lateral surface of the primary-satellite are four panels that are used for structure protection and body mounted solar array installation. On-board equipments and devices are all directly integrated on the satellite structure without individual shell sustain. In addition, thermal control is considered in the structure design and high integration of the structure and thermal control has been realized. Duralumin alloy, which is low-cost with good processability, is chose as BUAA Sat structure's main material of. It has been verified through the vibration test that the structure can withstand the severe mechanical environment during the launch process. The plate-rob structure, used in BUAA Sat as a new style micro-satellite structure platform, shows us that this kind structure can meet the task demands of micro satellites and has good performance on reducing weight and volume, lessening cost, enhancing processability and installation capability.