

皮卫星在轨能量平衡仿真及实验

作者: 辜渝嘉, 金小军, 赵翔宇, 金仲和

单位: 浙江大学信电系微电子与光电子研究所

基金项目: 教育部新世纪优秀人才支持计划资助项目

摘要:

以往对皮卫星的能量平衡分析, 都仅仅建立在仿真的基础上。针对皮卫星的实际情况以及特点, 改进了电源系统的仿真建模, 建立了分流器件的真实模型, 实算太阳能电池阵、蓄电池和负载的在轨工作参数以及分析实时的电压平衡和能量平衡, 得出了真实的能量平衡仿真模型。为了给能量平衡分析提供更加有力的依据并验证能量平衡仿真, 提出了一种基于实物的能量平衡实验方法, 并设计出太阳能电池模拟器。通过对卫星母线电压、锂离子电池电量的仿真结果和实验结果对比, 使能量平衡分析得到了验证, 也表明浙江大学皮卫星的能量条件可以保证整星的能量平衡。

关键词: 皮卫星; 电源系统; 能量平衡; 太阳能电池模拟器

On-orbit energy balance simulation and experiment of pica-satellite

Author's Name:

Institution:

Abstract:

The analysis of the energy balance of Zheda pico-satellite before was based only on simulations. The power system model was improved based on the practical condition and features of the pico-satellite, The real model of the shunt device was designed. The on-orbit running parameters of the solar array, the battery and the load were calculated in real time, and the real-time voltage balance and energy balance were analyzed, which led to the practical simulation model of energy balance. In order to consolidate the analysis of the energy balance and prove the result of the energy balance simulation, a method of energy balance experiment based on the solar emulator presented. The results of simulation and experiment show that the satellite can attain energy balance under the practical condition.

Keywords: pica-satellite; power subsystem; energy balance; solar emulator

投稿时间: 2010-01-01