Statistical data and reliability analysis of on-orbit anomalies and failures of satellite solar array

Yang Qian, Xue Peiyuan

(Beijing Institute of Space Scientific and Technological Information, Beijing 100086, China)

Abstract: For the analysis of on-orbit anomalies and failures of the satellite solar arrays and their reliabilities, 114 sets of satellite in-orbit solar array anomalies and failures between January 2000 and September 2012 are studied, and of particular interest is the Kaplan-Meier estimator of on-orbit solar array failures of GEO satellites. The following results are obtained: the most frequently happened failures are the SAO failures; the number of GEO satellite failures are the largest; the first year in the orbit is the failure season; the electrical failures are the commonest; the system fault or the common problems of certain satellite buses could be involved. Some suggestions are made to improve the simulation model, the validation test before delivery or the redundancy design, which may help to improve the reliability of satellite solar arrays.

Key words: in-orbit failures; solar array; statistical analysis; Kaplan-Meier estimator; reliability design

（编辑：肖福根）

航天快讯

航天科技集团公司总结“天宫一号”在轨飞行任务

9 月 30 日，中国航天科技集团公司召开“天宫一号”目标飞行器在轨飞行任务系统级评审会，审议通过了《天宫一号在轨飞行任务总结》，认为“天宫一号”在两年寿命期内飞行结果满足工程总体要求，在轨飞行任务取得圆满成功。

会议就“天宫一号”的飞行任务执行情况和主要技术成果等方面进行了汇报，总结了“天宫一号”的发射及在轨测试阶段主要飞行事件及执行情况、平台功能验证等。“天宫一号”探索并建立了适应多飞行器在轨并行管理、技术状态新、接口关系复杂、协同性高、决策实时性强等要求的联合飞控管理模式，实现了在轨运营全过程“统一组织、统一调度、统一监视、统一决策、统一确认”，为空间实验室和空间站的研制奠定了坚实的基础，标志着我国实现了载人航天“三步走”战略的第二步第一阶段任务目标。

（摘自 2013-10-09《中国航天报》1 版）