

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Systems (3)

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STUDY ON THE CONFIGURATION DESIGN OF A NOVEL PUBLIC SPACECRAFT'S PLATFORM

Abstract

Due to the rapid development of relative technologies, it becomes possible to improve the performance and upgrade the capabilities of the spacecraft platform. With reference of the international leading technology, a series of upgrading for the current satellite platform is put forward with the application of a variety of advanced technologies including integrated electronics, efficient thermal control, lithium-ion battery, Xenon-ion propulsion, and so on. By comparison of several varied satellite platforms, the characteristics are analyzed of the "center tube + walls" type, and the design criteria and formula are studied for general satellite platform. Then a novel design mode for the general satellite platform, named "DFH-X", is put forward, which can be applied to the spacecraft design for multi-purposes and different payloads. Based on the "DFH-X" mode, a general satellite platform is given with optional Xenon ion propulsion and chemical propulsion, with optional attitude sensors, which can meet the requirements for communication satellites. And the configuration and layout of the service module and the propulsion module are described in detail including all the units of Telemetry Tele-control subsystem, Electronic Power subsystem, integrated electronics subsystem, attitude and orbit control subsystem, propulsion subsystem, etc. The thrusters' configuration of the general platform is varied with different mass center in height with high station-keeping efficiency. In the harness design, different wires are distributed in different height in the service module and in different routes in the propulsion module, including the power cables, signal cables and EED cables, like Newton's "big Cat go through a big hole and kitten go through a small hole". Finally the 3D models based on the general satellite platform are given for typical communication satellite, also with the photos of the preflight model, which prove the applicability and effectiveness of the general platform.