

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

Author: Mr. Jen-Chueh KUO
National Space Organization, Taiwan, China, kuo@nspo.narl.org.tw

Mr. Chi-Wei Chou
National Space Organization, Taiwan, China, cwchou@nspo.narl.org.tw

Mr. Chan-Peng Chang
National Space Organization, Taiwan, China, peng@nspo.narl.org.tw

Mr. Heng-Chuan Hung
National Space Organization, Taiwan, China, robinhung@nspo.narl.org.tw

FORMOSAT-5 SATELLITE STRUCTURE DEVELOPMENT AND DYNAMIC LAUNCH
ENVIRONMENT VERIFICATION

Abstract

FORMOSAT-5 (FS5) is the first indigenous satellite program being developed at Taiwan. The primary mission of FS5 is to continue to serve the global imagery users' community of FORMOSAT-2 (FS2) program as well as to build up Taiwan's self-reliant space technology on remote sensing instrument (RSI) and satellite bus. It is to be operated at 720 km altitude with 98.28 degree inclination angle in a sun synchronous orbit and provides 2 meter resolution panchromatic (PAN, black white) and 4 meter resolution multi-spectral (MS, color) images. FS5 satellite has been successfully integrated in 2014 and all the necessary tests are completed in 2016. FS5 satellite is planned to be launched by Falcon-9 launch vehicle at Vandenberg launch base of America in the near future.

This paper will introduce FS5 satellite structure design configuration, stiffness analysis, static analysis, dynamic analysis, as well as launch vehicle coupled load analysis results. Besides, due to higher satellite structure stability request during RSI taking images on orbit, FS5 satellite structure is designed to isolate the disturbance transferred from reaction wheels to RSI. The RSI pointing stability analysis is thus made and shows acceptable conclusions. After RSI being integrated with satellite bus, four kinds of dynamic launch environment test (sine vibration test, acoustic vibration test, random vibration test, and separation shock test) were conducted on FS5 satellite. The dynamic launch environment test results will be described in this paper. From different dynamic test results and satellite function verification, the satellite health is proven to be well maintained and more confidence is made on FS5 satellite launch and future mission life.