

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

Author: Mr. Sun-Won Kim

Korea Aerospace Research Institute (KARI), Korea, Republic of, sunwkim@kari.re.kr

Mr. Gi-Nam Gil

Korean Air, Korea, Republic of, gngil@koreanair.com

Dr. Jin-Hee Kim

Korea Aerospace Research Institute (KARI), Korea, Republic of, kimjh@kari.re.kr

Dr. Juhun Rhee

Korea Aerospace Research Institute (KARI), Korea, Republic of, jrhee@kari.re.kr

Dr. Do-Soon Hwang

Korea Aerospace Research Institute (KARI), Korea, Republic of, dshwang@kari.re.kr

Dr. Ik-Min Jin

Korea Aerospace Research Institute (KARI), Korea, Republic of, imjin@kari.re.kr

SATELLITE SIMULATOR DEVELOPMENT FOR GROUND TEST OF LAUNCH VEHICLE

Abstract

This paper shows the satellite simulator development for ground test with launch vehicle. Korea Aerospace Research Institute, KARI is recently developing the LEO earth observation satellite. To reduce the risk due to interface between satellite and launch vehicle, KARI and Korean Air develop the satellite simulator and it will be provided to launch vehicle test site. The interference test, static and dynamic vibration test, functional test and measurement of the shock loads will be carried out on launch vehicle test site. The main purpose of the simulator development is generally to verify the interface design of satellite and launch vehicle. In order to be coincident with the purpose, the simulator is designed with the following critical requirements. Overall dimensions, mechanical and electrical interfaces and location of handling operations with the simulator should comply with those of flight model. Mass, center of gravity and inertia moment shall correspond to those of flight model with the specific tolerance. Minimum natural frequency of the simulator should be not less than flight model. Margin of safety for structure strength shall be greater than zero. It is verified by the analysis and test whether the requirements are satisfied or not. The simulator consists of two parts. One is a load bearing structure for mechanical test and the other is a removable structure for checking the interference of satellite and L/V fairing inside. The load bearing structure has the spacecraft adapter, handling parts, steel frames and panels. Spacecraft adapter has the same shape and material as flight model. Each part is welded except spacecraft adapter bolted. The removable structure built with light material is assembled with load bearing structure only during interference test. Structural analysis and test are carried out at several steps. In conclusion, it can be stated that design requirement of the simulator are fully satisfied.