

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Vehicles – Mechanical/Thermal/Fluidic Systems (7)

Author: Dr. Bum-Seok Hyun

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

Ms. Hui-Kyung Kim

Korea, Republic of, hary@kari.re.kr

Mr. Jang-Joon Lee

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

Dr. Myoung-Jong Yu

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

THERMAL DESIGN OF EARTH OBSERVATION SATELLITE (KOMPSAT-3 AND 5) USING
GROUND TEST DATA

Abstract

Verification of thermal design for the satellite development requires extensive ground tests, such as thermal vacuum tests at system level. Using these test data, thermal design is confirmed or modified along with the correlation of related thermal model. Korea Aerospace Research Institute (KARI) is developing Korea Multi Purpose Satellite (KOMPSAT)-3 and 5 for the purpose of the Earth observation. KARI developed structural thermal models (STM) of KOMPSAT-3 and 5, and performed thermal vacuum tests at system level. During the tests, special attentions were paid to the thermal behavior of the sensor brackets and heater capabilities. The materials of sensor bracket were chosen to be aluminum and invar, respectively, to compare thermal stability of the sensor's thermal interface to satellite during the test. Heaters utilizing radiation heating were designed for high stability structure where contact heating method was prohibited. Also, heater capabilities to massive components were monitored. After analyzing the ground test data, the heater system design for the invar bracket was modified in order to prevent local heating area under current the design. Performance of radiation heater loosely wrapped around the high stability structure was confirmed by showing the capability to heat up the structure effectively. The number of heater and its location for massive components were revisited and updated. Final verification of thermal design will be performed at system thermal vacuum test for the flight models.