ASTRODYNAMICS SYMPOSIUM (C1)
Mission Operations (3)

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DESIGN AND IMPLEMENTATION OF THE FLIGHT DYNAMICS SYSTEM FOR COMS SATELLITE MISSION OPERATIONS

Abstract

The first Korean multi-mission geostationary Earth orbit satellite, Communications, Ocean, and Meteorological Satellite (COMS) will be launched in 2009 by Ariane 5 launch vehicle. COMS satellite has three payloads including Ka-band communications, geostationary ocean color imager, and meteorological imager. Although the COMS spacecraft bus is based on the Astrium Eurostar 3000 series, it has only one solar array in the south panel because all of the imaging sensors are located in the north panel. In order to maintaining the spacecraft attitude with 5 wheels and 7 thrusters, COMS should perform twice a day wheel off-loading thruster firing operations which affect on the satellite orbit. COMS flight dynamics system provides the general on-station functions such as orbit determination, orbit prediction, event prediction, station-keeping maneuver planning, station-relocation maneuver planning, and fuel accounting. All of orbit related functions in flight dynamics system consider the orbital perturbations due to wheel off-loading operations. There are some specific flight dynamics functions to operate the spacecraft bus such as wheel off-loading management, oscillator updating management, and on-station attitude reacquisition management. In this paper, COMS flight dynamics system is presented based on the design and implementation. An object oriented analysis and design methodology is applied to the flight dynamics system design. Programming language of C on Microsoft .NET framework is used for the implementation of COMS flight dynamics system on Windows XP based personal computer.