results is designed and developed. The main components of the HIL simulator which we focused on are the thruster system to attitude control and automatic mass-balancing for elimination of gravity torques. To control the attitude of the spacecraft simulator, 8 thrusters which using the cold gas (N2) are aligned with roll, pitch and yaw axis. Also Linear actuators are applied to the HIL simulator for automatic mass balancing system to compensate for the center of mass offset from the center of rotation. Addition to the thruster control system and Linear actuators, the HIL simulator for spacecraft attitude control includes an embedded computer (Onboard PC) for simulator system control, Host PC for simulator health monitoring, command and post analysis, wireless adapter for wireless network, rate gyro sensor to measure 3-axis attitude of the simulator, inclinometer to measure horizontality and battery sets to independently supply power only for the simulator. Finally, we present some experimental results from the application of the controller on the spacecraft simulator.

[VI-2-2] Unscented Kalman Filtering for Spacecraft Attitude and Rate Determination Using Magnetometer

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An Unscented Kalman Filter(UKF) for estimation of attitude and rate of a spacecraft using only magnetometer vector measurement is presented. The dynamics used in the filter is nonlinear rotational equation which is augmented by the quaternion kinematics to construct a process model. The filter is designed for low Earth orbit satellite, so the disturbance torques include gravity-gradient torque, magnetic disturbance torque, and aerodynamic drag. The magnetometer measurements are simulated based on time-varying position of the spacecraft. The filter has been tested not only in the standby mode but also in the detumbling mode. To stabilize the attitude, linear PD controller is applied and the actuator is assumed to be thruster. A Monte-Carlo simulation has been done to guarantee the stability of the filter performance to the various initial conditions. The UKF performance is compared to that of EKF and it reveals that UKF outperforms EKF.

[VI-2-3] Interference analysis on Japanese radio source for KOMPSAT TT&C ground system

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This paper presents the impact of Japanese radio source on the S-Band communication between KOMPSAT-2 satellite and TT&C ground system. Major specifications such as transmitting EIRP (Effective Isotropic Radiated Power) and location of Japanese terrestrial station were informed from Radio Research Laboratory in Korea Communication Commission. To estimate path loss in S-Band, the distance between Japanese station and TT&C ground system was obtained by using COTS (Commercial Off-The-Shelf) software. After that the signal strength of Japanese radio source placed at the TT&C ground system was calculated from link parameters such as transmitting EIRP, path loss, and receiving antenna gain. Consequently, this paper shows that the degradation caused by Japanese radio source is acceptable to TT&C ground system for satellite operation.

[VI-2-4] Study on Triaxiality Velocity of COMS induced by Wheel Off-loading

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KARI (Korea Aerospace Research Institute) is going to launch a Communication, Ocean and Meteorological Satellite (COMS) at summer of 2009. It will be first thing to be developed for a geostationary satellite through domestic technology. Of course, KARI has performed this development program with EADS Astrium in France since 2005. COMS has the non-symmetric configuration that the solar array is only attached on the south panel. Due to the configuration, momentum of satellite will be rapidly accumulated induced by solar pressure and then 3 wheels of large momentum are located on roll-yaw plane for attitude control. Therefore, to prevent the saturation of wheel momentum, wheel off-loading will be performed two times per day during 10 minutes for each one. At the moment, translation movement on 3-axes direction appears because of using thrusters. In this paper, strategy of the wheel off-loading and triaxiality which is the translation effect on 3-axes are introduced. Consequently, the result of optimized triaxiality considering the wheel off-loading strategy is summarized.

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[VIII-2-1] Status Report of Korean Large Telescope Project

Byeong-Gon Park, Sang Chul Kim, Young-Soo Kim, Ho-Il Kim, Hyun-Il Sung, Sang-Hyun Ahn,