Development of Precision Attitude Determination System for KOMPSAT-2

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KARI precision attitude determination system has been developed for high accurate geo-coding of KOMPSAT-2 image. Sensor data from two star trackers and a IRU are used as measurement and dynamic data. Sensor data from star tracker are composed of QUEST and unit vector filter. Filter algorithms consists of extended Kalman filter, unscented Kalman filter, and least square batch filter. The type of sensor data and filter algorithm can be chosen by user options. Estimated parameters are Euler angle from J2000 frame to optical bench frame, gyro drift rate bias, gyro scale factor, misalignment angle of star tracker coordinate frame with respect to optical bench frame, and misalignment angle of gyro coordinate frame with respect to optical bench frame. In particular, ground control point data can be applied for estimating misalignment angle of star tracker coordinate frame. Through the simulation, KPADS is able to satisfy the KOMPSAT-2 mission requirement in which geo-location accuracy of image is 80 m (CE90) without ground control point.