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DESIGN OF GUI FOR COST-EFFECTIVE ATTITUDE ANALYSIS OF SATELLITE

Abstract

As the size of satellites gradually become miniaturized, the budgets devoted to the development of each nanosatellite are also shrinking. However, regardless of the size of satellites and the development budgets, mission analysis is an essential and crucial process in satellite design. Through that, key parameters and requirements of users for each field such as FSW (Flight Software), attitude control and determination, thermal control and structure are determined. Then, the engineer selects devices to be mounted on the satellite by results of mission analysis. This process consumes a lot of time and money to coordinate opinions by development fields. In order to reduce costs in this process, the analytical GUI for each field has been introduced, focusing on efficiency. This GUI, which integrates the functions of the STK using C proposed in this suggestion, is being developed for ease analysis of attitude control in the mission scenario. It has basic functions for mission analysis and major functions for analyzing attitude control. First, the basic functions are to create a list of the ground station to contact with the satellite, to schedule attitude information between the satellite and ground station and to check visibility through sensors mounted on the satellite. Next, the major functions are the analysis of disturbance torques – Atmosphere drag, SRP(Sun Radiation Pressure), Gravity Gradient, Magnetic Field – and momentum dumping analysis. The results of the analysis through the GUI provide the user with the judgment criteria of the devices required for attitude control and determination such as Reaction wheel, Magnetometer. After developing the GUI in the part of attitude analysis and successfully validating it in simulation, it will be started developing the GUI for analysis of other fields in mission analysis. If the GUI of all fields related mission analysis is developed and integrated, it is expected that it will not only be cost-effective in the mission analysis but will also allow better coordination and decision-making among developers.