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Educational Pico and Nano Satellites (4)

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DESIGN AND DEVELOPMENT OF AN ADCS EDUCATIONAL PLATFORM FOR EDUCATIONAL SMALL SATELLITE

Abstract

The APSCO-SSS project is initiated by the Asia-Pacific Space Cooperation Organization (APSCO). This project consists of 1 micro-satellite (SSS-1) and 2 cube-satellites (SSS-2A and SSS-2B), and it is implemented for different missions, such as the demonstration of the deployment of the coilable mast, the ADS-B technology and the remote sensing. In addition, most importantly, the purpose of this project is to provide an educational platform for the students from different countries. As we know, the attitude determination and control subsystem (ADCS) is not only an important part of the satellite system, but also the most typical teaching content. Up to now, as an educational small satellite, SSS-1 will be launched in October 2021; meanwhile, it is very important to design and develop an ADCS educational platform based on SSS-1, through which the students can master testing methods of the satellite and improve the ability of satellite design. However, the design and development of an ADCS educational platform is not a simple matter, and it involves a lot of issues and faces challenges. For examples, 1) how to design control strategies and methods suitable for engineering applications? 2) how to develop a stable and reliable software with basic functions? and 3) how to implement the hardware-in-loop (HIL) test of ADCS platform? Thus, the objective of this paper is to solve these issues and provide an ADCS educational platform for teaching and education.