



國立中央大學太空科學與工程學系
*Department of Space Science and Engineering,
National Central University*

專題演講

Flight Software and Firmware Design of IDEASSat/INSPIRESSat-2

Speaker : 戴子雅

(本系碩班生)

Time : 110 年 11 月 26 日 星期五 11:00-12:00

Place : 健雄館(科四館) S4-817-1 教室

摘要/Abstract :

The Ionospheric Dynamics Exploration and Attitude Subsystem Satellite (IDEASSat/INSPIRESSat-2) is a 3U CubeSat developed to provide in-situ measurements of the Earth's ionosphere to quantify both global scale ionospheric variability and small-scale irregularities. The spacecraft is currently operating in space, with delivery in December 2020, and was successfully launched through SpaceX's Falcon 9 Block 5 (mission name: Transporter-1) on January 24th, 2021. Commands were uplinked to the spacecraft to replay flight data stored by the on board computer (OBC), which successfully completed this task, verifying that the OBC is Technological Readiness Level (TRL) 9.

IDEASSat has been funded in part by the Taiwan National Space Organization and developed by National Central University (NCU), Taiwan. The spacecraft subsystems are a combination of commercial off the shelf (COTS) components, and self-developed components.

The thesis will mainly introduce and discuss the assessment and design of the flight software of IDEASSat. Key challenges include high precision pointing requirements of science payload, the limited power and downlinkable data volume, reliability of self-developed flight software, and the efficient integration of each subsystem of flight software. We present the concept of software architecture, software logic design, FPGA design, as well as challenges and lessons learned in the development of IDEASSat flight software.

The indigenous development of small satellite design and implementation capacity from the IDEASSat mission is also serving future small satellite missions being developed at National Central University, while also providing people with a better appreciation of the relation between space physics and the spacecraft operational environment.

※歡迎聽講※

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