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MODULAR CDHS HARDWARE DEVELOPMENT

Abstract

Advances in technology have made space missions more aordable for small satellites. CubeSats provide the opportunity for organizations to create their own satellite missions at relatively lower cost. It also opens the avenue for research for the software and hardware appropriate for the CubeSats. The Command and Data Handling System (CDHS) facilitates the handling of data in the satellite. The CDHS is generally referred to as the brain of the satellite. It processes all the data sent and received by the CubeSat, including scientic data, and also handles spacecraft and payload operations. It autonomously manages the satellite based on instructions received from ground station or decisions based on board data processing. The CDHS software is executed on specic CDHS-Hardware (CDHSHW). Hence, to develop an ecient CDHS software, a compatible and best-t hardware needs to be selected such that the hardware allows maximum hardware level abstraction, advanced features and capabilities to support various satellite operations such as Fault Detection, Isolation and Recovery (FDIR), support for watchdog timers, support for range of different hardware components and I/O peripherals. The CDHS-HW also needs to be radiation hardened such that provides protection from the radiation and it needs to be energy ecient as the power source is limited for CubeSats. There are many such criteria for a hardware to be t for space applications. Therefore, this research aims to do an engineering analysis to develop the requirements and specications for CDHS-HW based on a modular and exible architecture that would allow re-usability in UAE's growing space sector.