SPACE CUBE 2 SOFTWARE DESIGN KIT (SDK)

Session: SpaceWire test and verification,

Short Paper

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ABSTRACT

SpaceCube2 is a core control node in medium size satellites as ASTRO-H as well as our small satellites, which are based on SpaceWire communication networks.

Since several subsystems accommodate SpaceCube2, versatile application development environment including software development kit (SDK) is required, and is developed. The SDK consists of T-Kernel real-time operating system (RTOS), middleware, software tools, and some equipments for assisting software development. T-Kernel RTOS is the advanced successor of TRON operating system. Single source T-Kernel reference code is provided as open source, which leads to wide user community including academies and commercial software industries as well as space system industries. These communities are becoming large incubator for advanced software technologies. Standard middleware is developed by Japanese space system community which includes JAXA/ISAS, academies and space system industries. The standard middleware is based on Space Monitor & Control Protocol (SMCP). SMCP has been developed by JASA/ISAS, which aims at unifying building method of commands, telemetry messages, and sequence for all satellites and onboard

equipments. Dedicated complier for HR5000 radiation hardened processor is also developed by JAXA. Various software tools and equipments, which include low cost In-Circuit Emulator (ICE) for HR5000, are developed by commercial industries as well as space system industries. These tools are integrated on Eclipse framework and commercial version of SpaceCube2 is provided for desk-top space-use program development.

This SDK is developed among space system community which includes universities, so multi-lingual text books are also provided for widening space system community.