

DESIGN AND DEVELOPMENT OF INDIGENOUS REAL TIME OPERATING SYSTEM FOR AIRBORNE COMPUTER

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Abstract

A Real Time Operating System (RTOS) is a critical constituent in modern avionics computers since it manages all the hardware resources and guarantees real-time execution of applications in a fault-tolerant manner. MCSRDC-HAL had taken up the development of an indigenous RTOS for airborne applications as a Strategic Technology Development program. The HAL RTOS has been developed based on ARINC-653 standard. Its key features include address space and time partitioning, health monitoring, priority preemptive process scheduling, inter-process and inter-partition communication etc. Advanced features like ARINC-653 Part-2 File System and Network Stack are also available as add-on modules. DO-178B based guidelines and MISRA C-2004 coding standards are followed during RTOS software development to enable its certification for avionics applications. Extensive verification & validation have been carried out on HAL RTOS. This includes Formal Methods based Verification by Indian Institute of Technology Kharagpur as well as Conformance testing based on ARINC 653 Part-3 standard.

Keywords: RTOS; Avionics; Partitioning; PowerPC; ARINC 653; DO-178B