A Turnkey Safety Certified Solution Addressing Device Complexity, Developmental Risk, and Certification Cost

Mentor® Embedded Nucleus® SafetyCert™ is a safety certified real-time operating system (RTOS) and middleware package targeting high-performance, next-generation applications. The SafetyCert package is designed to meet the stringent safety and regulatory requirements for aviation, industrial, medical, and automotive devices. With Nucleus SafetyCert, Mentor Embedded shortens the path to regulatory certification with a complete certified solution that includes all the necessary documentation and artifacts required for software developers to develop mission-critical applications.

A Complete Solution for Devices Requiring Safety Certification and Regulatory Approval

A robust and certified solution, Nucleus SafetyCert has been documented to meet the certification requirements for products requiring DO-178C Level A, International Electrotechnical Commission (IEC) standards 61508 SIL 3 and 62304 Class C, and ISO 26262 ASIL Level D certification.

The Nucleus SafetyCert offering includes a certified version of the Nucleus RTOS kernel with Nucleus process model support for memory space partitioning, runtime libraries, connectivity middleware, networking, and data storage. The Nucleus SafetyCert documentation and artifacts have clear traceability across the safety lifecycle, and are hyperlinked for ease of navigation to streamline audits and reviews.

Based on Mentor’s Proven Development and Quality Processes with Test and Documentation

Nucleus SafetyCert is designed to handle safety critical code to create safety certifiable devices. Based on Mentor’s disciplined quality control processes

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and supported by Mentor’s dedicated safety engineering team, developers have a proven platform to give them confidence as they move forward through the regulatory approval process.

The SafetyCert certification package includes the test harness, all test cases, and a complete process plan to enable users to augment the documentation and artifacts. With Nucleus SafetyCert test kit, users can build BSPs which can be verified, tested, and documented when testing on their own custom board.

**Process Model for Memory Partitioning**

For increased and added system reliability, the Nucleus SafetyCert process model can be used to create spatial partitions of memory for both critical and non-critical functions. Nucleus process model implements a lightweight framework that utilizes the memory management unit (MMU) or memory protection unit (MPU) to separate and isolate critical code.

This approach partitions memory without virtualization to maintain deterministic real-time performance. The memory separated regions protect the critical code sections from the non-critical sections by isolating faults that can occur in a non-critical software subsystem. Safety applications are given runtime execution priority to ensure deterministic responses and guaranteed access to system resources. Using the Nucleus process model for mixed-criticality systems greatly reduces overall software design complexity, testing, and costs for regulatory certification.

**Integrated Development Environment**

With Nucleus SafetyCert developers can leverage the full spectrum of development tools available to all Nucleus RTOS developers. Certified applications are developed using the same Eclipse-based Mentor Embedded Sourcery™ CodeBench environment with GCC/G++ tools. This includes the Nucleus project creation, build, and debug management environment, along with graphical control of the project options and build parameters. Full integration with the standard flow of BSP-based project creation means that developing a certified Nucleus application is performed with the same ease and flow as all non-certified Nucleus applications.

**More about Mentor Embedded**

Mentor Graphics® Embedded Systems Division comprises the Mentor Embedded™ family of products and services, including embedded software IP, tools, and professional services to assist developers and silicon partners to optimize their products for design and cost efficiency.

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