Accelerating Multicore DO-178C Certification:

Wind River & Rapita Systems Joint Solution

ONE PLATFORM. ONE PROCESS. ONE PATH TO MULTICORE CERTIFICATION.

Multicore certification remains one of the biggest barriers to program success for today's modern avionics platforms. Fragmented toolchains, disconnected suppliers, and a lack of lifecycle support lead to increased risk, unpredictable costs, and prolonged certification timelines.

The Wind River and Rapita Systems joint solution delivers the industry's first fully integrated off-the-shelf platform designed to guide DO-178C multicore certification end to end. By combining Wind River's certifiable operating system, hypervisor, board support packages (BSPs), and simulation with Rapita's industry-leading multicore timing and interference analysis, tools, and MACH178 evidence, we provide a single process and an accountable partner from SOI-1 through SOI-4 certification.

THE CHALLENGE: MULTICORE COMPLEXITY

Avionics programs adopting multicore processors face challenges that go well beyond traditional certification.

- Timing, interference, and contention effects must be measured and analyzed, and mitigations must be verified.
- Certification activities span the operating system, the hypervisor, BSPs, software verification (timing analysis), tools, methods, and artifacts.
- Supply chains are fragmented across multiple vendors, with unclear ownership.
- Program teams need predictable schedules and long term evidence maintenance.

Multicore certification introduces system-level interference complexity across shared resources, requiring multiple analyses and coordination across platform, software, and safety domains.

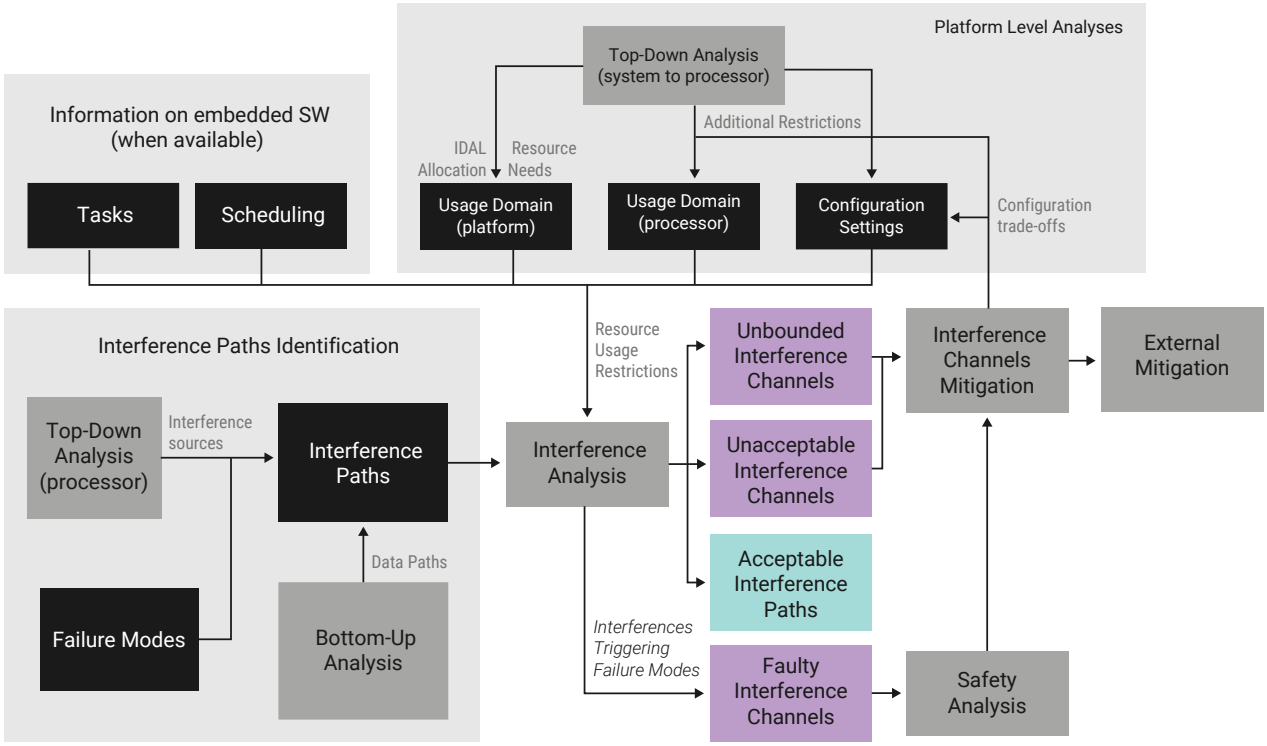

Figure 1. Example of an interference-aware safety process for multicore systems, adapted from FAA Technical Center guidance (DOT/FAA/TC-16/51)

Current approaches force customers to stitch together platforms, tools, and services that often contain interdependencies — creating audit risk, integration complexity, and schedule uncertainty.

THE SOLUTION: AN INDUSTRY FIRST END TO END MULTICORE CERTIFICATION PLATFORM

Wind River and Rapita Systems together deliver a fully integrated multicore certification solution that unifies a platform, tooling, methods, and services into a single offering.

This joint solution is the first of its kind to provide:

- An off the shelf certifiable multicore platform
- Integrated timing and interference analysis
- Certification quality artifacts aligned to MACH178
- A guided path through all four stages of involvement (SOI 1 to SOI 4)

What Wind River Provides

- Wind River® Helix™ Virtualization Platform with VxWorks® as the certifiable multicore foundation
- Certification ready BSPs and device drivers for Arm® Cortex A72 (DAL A) and Cortex A53 (DAL B) architectures
- Intel® Simics® models for NXP LX2160A and AMD/Xilinx Zynq UltraScale+
- RTnet real time networking and Information Assurance Foundation for secure, deterministic operation
- Certification services on optional hardware resources

What Rapita Systems Provides

- MACH178 Foundations (processes, documents, and templates) and Rapita Verification Suite toolchain for multicore certification objectives and timing analysis
- Tool qualification kits, hardware event monitor libraries, and qualifiable interference generators (RapiDaemons)
- Interference channel analysis, characterization testing, and certification quality evidence
- Processor specific multicore artifacts (e.g., LX2160A)
- Support, maintenance, and training to accelerate customer onboarding and certification readiness

By adopting the Wind River and Rapita Systems joint solution, avionics programs gain:

- Lower technical and certification risk
- Faster progression from SOI 1 through SOI 4
- A simplified supplier landscape with one accountable platform
- Greater schedule and cost predictability
- Long term lifecycle support for evolving certification needs

WIND RIVER AND RAPITA SYSTEMS

Wind River and Rapita Systems bring decades of combined expertise in avionics software, multicore systems, timing and interference analysis, and DO-178C and A(M)C 20-193 certification. Together, our teams work closely with customers to integrate certifiable platforms, apply proven multicore methods, and complete end-to-end certification activities from SOI-1 through SOI-4.

From platform configuration and analysis setup to artifact development and audit support, Wind River and Rapita Systems help reduce risk, compress schedules, and ensure certification readiness for complex multicore avionics programs.

Contact your Wind River account manager or visit *www.windriver.com/contact* to learn more.

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