Aerospace and Defense Embedded Software Solutions

Wind River is a global leader of embedded software solutions for the aerospace and defense industry, providing mission-proven platforms for the most demanding systems that require certified safety, security, reliability, and high performance. Our technology is used every day in many of the most advanced and innovative embedded systems deployed around the world.

Visionary companies trust Wind River as the foundation for their challenging land, sea, military and commercial aviation, and space programs. By collaborating closely with customers and partners, Wind River delivers complete vertical solutions with unique advantages for the complex requirements of programs such the Boeing 787 Dreamliner, the Mars exploration rovers, astute-class submarines, and unmanned systems, multilevel secure (MLS) systems, and C4ISR and advanced wireless systems such as software defined radio (SDR).

Device Software Challenges

The transformation of the aerospace and defense industry into an agile, efficient, fully connected, information-driven machine is disrupting the supplier infrastructure for both military and commercial A&D systems.

Proprietary, isolated, single-source, federated systems, long the mainstay of both military and airborne platforms, are now transitioning to highly integrated platforms consolidating multiple applications on a common computer, with increased capabilities and open communications.

This transformation spans a wide range of solutions, from advanced sensing and communications systems for global warfighters to next-generation machine-to-machine (M2M) platforms for manned and unmanned vehicles to controllerless air traffic control (ATC) systems based on automatic dependent surveillance-broadcast (ADS-B). These network-centric systems invite new integration challenges in functional performance, security, and safety. This shift toward highly integrated systems means that companies can no longer afford proprietary systems and must base future designs on open commercial off-the-shelf (COTS) technology and industry standards and rely on an ecosystem of partners to produce competitive products.

Wind River is uniquely positioned to help system integrators succeed in a network-centric environment and overcome three fundamental challenges:

1. Delivering integrated systems-of-systems architectures built on commercial multi-core processors that enable legacy application reuse while meeting functionality and performance objectives
2. Meeting safety and security requirements, using proven COTS technology in a collaborative multi-vendor systems-of-systems design
3. Supporting a wide range of applications, from enterprise-class solutions to new mobile applications, across a wide range of computing devices, on demand

To develop and deploy these advanced embedded systems, engineers need tools that enable choice and flexibility, using open standards to ensure rapid integration and reliable, long-term global support delivered locally.
Wind River VxWorks

Wind River VxWorks has been serving the needs of federated aerospace and defense systems for more than 25 years. The following are its key features:
- Safety certified to FAA RTCA DO-178B and EUROCAE ED-12B Level A
- Comprehensive multi-core hardware usage with AMP, SMP, and hypervisor support
- Wind River Advanced Networking Technologies with full IPv6 conformance
- Conformance to industry standards such as POSIX PSE52 and SCA 2.2.2

Wind River Linux

Wind River Linux is the leading commercial embedded Linux platform and the first to bring companies in aerospace and defense the following capabilities:
- Full traceability to all source code and build facilities
- Flexible, extensible cross-build system for all packages
- NSA/NIAP CCEVS evaluation to EAL4+ for ARM, Intel, PowerPC, and Texas Instruments devices
- Integrated Carrier Grade Linux (CGL) and U.S. National Security Agency (NSA) Security-Enhanced Linux (SELinux) capability

Wind River Hypervisor

Wind River Hypervisor brings a wide level of flexibility to the development of embedded systems and is ideal for transitioning simple federated platforms into integrated platforms that reduce space, weight, and power (SWaP). By consolidating processing hardware it allows developers to utilize multiple operating systems in a single device while facilitating the adoption of multi-core processors with hard real-time, priority-preemptive performance. The following are key Wind River Hypervisor capabilities:
- Support of VxWorks, Linux, and Windows XP guest OSes
- Abstract of hardware configuration in technology refreshes
- Type 1 hypervisor with single and multi-core processor support
- Integrated of hardware configuration in technology refreshes

Wind River VxWorks 653 Platform

When consolidated systems need to meet high levels of safety certification, Wind River VxWorks 653 Platform delivers the stringent Integrated Modular Avionics (IMA) foundation aerospace and defense suppliers need to address the safety requirements of mission-critical applications as well as the portability and reusability requirements of noncritical applications. VxWorks 653 Platform is a complete ARINC 653 Part 1, Supplement 2–conformant applications executive (APEX) and expands the ARINC 653 XML configuration capabilities to enable a truly open multivendor platform that supports independent RTCA DO-297 and EUROCAE ED-124 IMA supplier sourcing. The following are key capabilities of VxWorks 653 Platform:
- Complete RTCA DO-178B and EUROCAE ED-12B Level A certification evidence
- Simultaneous support for ARINC 653 APEX, VxWorks, and POSIX partitions
- Full support for DO-297 IMA supplier roles and separation
- Use in more than 190 programs by more than 110 customers on more than 45 aircraft

Wind River VxWorks MILS Platform

When embedded platforms need to consolidate multiple security domains onto single systems, Wind River VxWorks MILS Platform delivers the robust multilevel security foundation for Common Criteria EAL6+ certified systems. The following are key capabilities of this MILS platform:
- Type 1 hypervisor separation kernel, in evaluation under NIAP CCEVS for EAL6+
- Compliance to SKPP version 1.03 for support of thin client devices
- Support for VxWorks, Linux, and high assurance partitions
- Robust support of MILS (multiple independent levels of security) architecture

Wind River Workbench

The Wind River Workbench development environment is based on the Eclipse platform and enables a wide spectrum of tools to accelerate time-to-deployment for developers building embedded systems components. Workbench offers an end-to-end open-standards-based collection of tools for device software design, development, debugging, test, and management that support the entire range of Wind River operating systems. Workbench was selected as the core platform for Boeing’s System of Systems Common Operating Environment (SOSCOE) Future Combat Systems. Key features of Workbench include the following:
- Support for multiple target operating systems, including VxWorks, Wind River Linux, Wind River Hypervisor, VxWorks 653, and VxWorks MILS
- Support for debugging multiple target connections, multiple processes, multiple tasks, and multiple threads using an open industry platform
- Support for broad range of host and CPU target architectures for program flexibility

Wind River Simics

Wind River Simics is ideal for simulating hard to procure or duplicate environments, such as space, control, and weapons management systems. The following are key features of the Simics simulation environment:
- Assistance with DO-178B and other critical testing, including fault injection
- Use in numerous A&D programs including Boeing 787, NASA Orion, Navy MUOS
- Scalability from a single board to an entire systems-of-systems environment

World-Class Partner Ecosystem

Wind River’s world-class aerospace and defense partner ecosystem ensures tight integration between our core technologies and those of the premier hardware and software companies we’ve chosen to build out our solutions. Our partners help to extend the capabilities of Wind River’s development and run-time platforms by offering out-of-the-box integration and support for key technologies in the complex aerospace and defense market.
Aerospace and Defense Services Practice

Wind River Aerospace and Defense Services Practice provides outsourcing and consulting services specifically designed to help aerospace and defense customers meet strict market deadlines while keeping development costs down. Our team of technical experts is qualified to assist with a variety of architecting and engineering activities, including ITAR-restricted development. Services include device design, board support package (BSP) and driver optimization, software system and middleware integration, legacy application and infrastructure migration, and real-time best practices.

Wind River Aerospace and Defense Customers

BAE Systems  L-3 Communications
Barco       Lockheed Martin
Boeing      MBDA
Cobham      MHI
Dassault Aviation  NASA
EADS        Northrop Grumman
Elbit       Orbital Sciences
Eurocopter  Raytheon
Finmeccanica Rockwell Collins
General Dynamics  Saab
General Electric  Safran
Honeywell   SpaceX
IAI         Terma
JPL         Thales
KHI         United Technologies

Strong Support of Industry Standards

All Wind River aerospace and defense solutions are integrated with Wind River Workbench, the industry-leading open device software development environment based on Eclipse, offering deep capability for developers across the development process in a single integrated suite.

Aerospace and Defense Customer Programs

Abrams  HIMARS
Aegis    Ilyushin II-9
Airbus A3xx  ISS
ARES     JTRS
Astute   KC-767
BAMS     KDX-I
Boeing 747-8  Mars Rovers
Boeing 787  MLRS
Bowman   NASA ST8
Bradley  nEUROn
C-130    Odyssey
Challenger Pathfinder
Columbus  Patriot
DDG-1000  Phalanx
EGNOS   PROBA
Falcon 9  Tomahawk
FTB1     Typhoon
Global Hawk  U212
Halifax   V-22
HIMARS  WAAS
HIMARS  X-47 UCAS-D

Wind River is a leader in embedded and mobile software. We enable companies to develop, run, and manage device software faster, better, at lower cost, and more reliably. www.windriver.com

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