

Wind River-PrismTech Complete SDR Solution for Wind River Linux Platforms

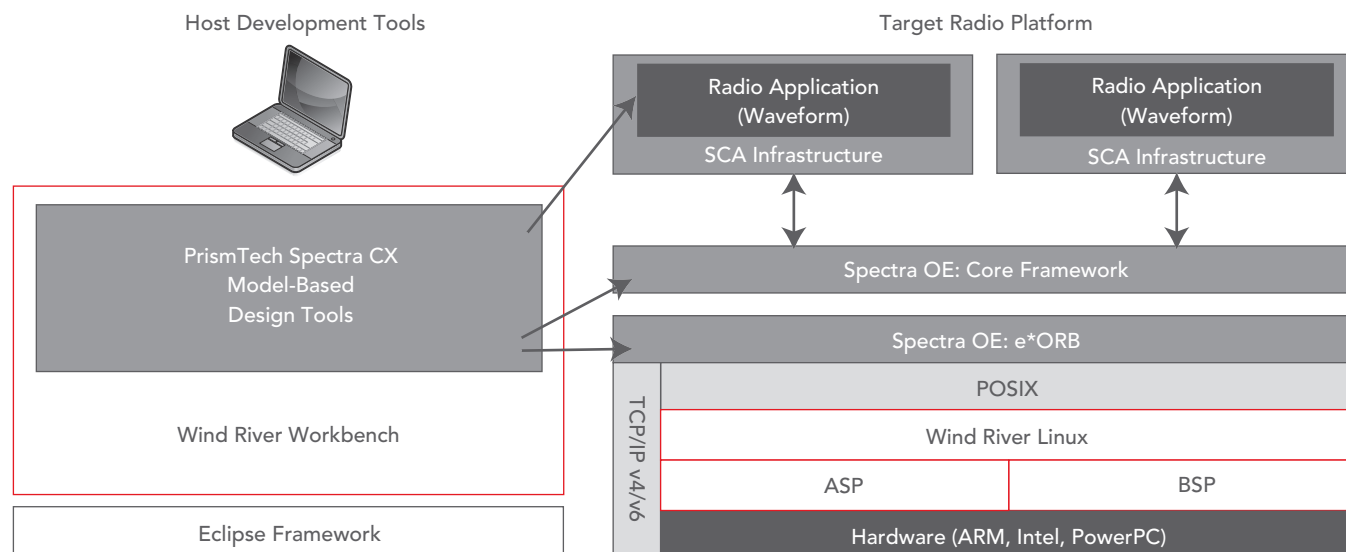
The military, public sector, and commercial mobile device markets demand radios with greater functionality and capacity, in smaller, lower-power packages, and at lower costs for development, acquisition, operation, and technology upgrades. This is driving transition from static, single-use, hardware-based platforms to more flexible and configurable software defined radios (SDR).

Wind River and PrismTech have joined forces to provide a complete, high-performance, commercial off-the-shelf (COTS) SDR solution for worldwide markets that is supported across a wide array of third-party hardware platforms. This solution combines Wind River's high-performance operating systems and Wind River Workbench development environment with PrismTech's Spectra CX SDR development platforms for rapid radio deployment and waveform porting and development. This COTS solution includes the Wind River Linux operating system with POSIX libraries and a complete SDR operating environment (OE) from PrismTech. It includes PrismTech's Software Communications Architecture (SCA) small form factor (SFF) core framework and embedded ORB (object request broker) to create a tightly integrated, optimized software radio stack.

The Wind River-PrismTech complete SDR solution supports leading third-party COTS hardware platforms, enabling the rapid integration of platforms proven in the global marketplace to speed time-to-market and reduce program risk.

The Wind River-PrismTech complete SDR solution includes the following powerful capabilities:

- Very small form factor, high performance, SCA 2.2.2 Spectra operating environment
- Standard Linux POSIX libraries for rapid SDR component integration
- Market-leading Spectra CX advanced SDR SCA waveform and platform development tool supporting model-driven engineering
- C and C++ language support for optimized, portable radio software development and deployment
- Spectra e*ORB-optimized CORBA library
- Wind River Advanced Networking Technologies stack, supporting both VxWorks and Wind River Linux
- Support for Wind River Linux operating system platforms, available on a wide range of industry-leading COTS board vendors using high-performance commercial semiconductors
- Award-winning Wind River Workbench Eclipse-based development environment



Wind River-PrismTech host and target SDR solution components

Software Communications Architecture

Military radios are leading the transition to next-generation software defined radios. To support global standardization and interoperability of military radios, the U.S. Department of Defense Joint Tactical Radio System (JTRS) program and the industry created the Software Communications Architecture (SCA). This architecture assists in the development of interoperable SDR communication systems, capturing the benefits of recent technology advances that are expected to greatly enhance radio capabilities while reducing development and deployment costs.

The SCA has been structured to do the following:

- Reduce software development time through the ability to reuse model-based designs
- Provide portability of radio applications (waveforms) software among different SCA implementations
- Leverage commercial standards and frameworks to reduce development costs

The SCA is specifically designed to meet both military and commercial application requirements. Since the SCA is intended to become a self-sustaining standard, a wide cross-section of the industry electronics suppliers has participated in the development and validation of the SCA.

Challenges of Creating SDRs Using SCA

The SCA mandates an operating environment that includes a core framework, CORBA middleware, and a POSIX-subset-conformant operating system (OS).

OE software components are available from a variety of vendors, radio manufacturers, and system integrators. Historically radio manufacturers acquired or developed these disparate OE components in-house and then integrated and validated the combined OE stack, along with any available tools. Radio manufacturers then took these single-use stacks plus tooling and developed the required core radio functions to SDR program requirements, budgets, and delivery schedules.

The development of the single-use, proprietary OE stack is one of the highest risk areas for SDR manufacturers and presents the following challenges:

- **Managing risk and cost:** Single-purpose, one-off custom software developments are prone to high development, production, and tech refresh costs. Driving these costs are the development of some components and integration of these and other components from multiple vendors, creating a cohesive development environment for these disparate OE elements and maintaining this environment by a highly skilled professional staff over the life of the program.
- **Use of proven COTS SDR products:** SDR developers have historically not had the advantage of leveraging proven COTS SDR products to increase the program efficiency and achieve the cost benefits of utilizing validated, integrated, highly functional commercial solutions for the industry.

- **Need for exportability:** Radios containing software developed with U.S. DoD funds cannot be easily exported to global security partners; yet, to be financially viable, U.S. manufacturers need to leverage their technology investments on global SDR programs.
- **Minimizing size, weight, and power (SWaP) requirements:** SCA platform optimization is a critical factor to ensure radios require the smallest possible footprint in terms of SWaP, while maximizing data transmission speed and minimizing both startup and shutdown times.
- **Maximizing productivity:** The SCA is a complex specification with many requirements involving many advanced technologies. The efficient production of SCA-compliant applications and operating environments is extremely difficult without advanced tools and integrated COTS software platforms.
- **Ensuring SCA compliance:** SCA compliance is increasingly mandated by the U.S. DoD and other military radio users to ensure interoperability. Therefore developers are required to meet SCA compliance requirements as validated by the JTRS Test and Evaluation Laboratory (JTEL).

The Wind River-PrismTech complete SDR solution solves the following SDR challenges:

- The Wind River-PrismTech complete SDR solution is based on proven SCA-conformant run-time components to reduce the risk of not meeting compliance requirements.
- SCA software development increases productivity with advanced tooling for modeling, code-generation, and compliance validation.
- SWaP requirements are readily reduced with COTS SCA platform optimization that maximizes throughput, reduces startup/shutdown times, and minimizes resource utilization.
- COTS SDR products enable commercial-grade economies of scale and provide proven channels for professional support not available with custom developments, reducing total life cycle and support costs.

Industry-Leading Services Accelerate, Optimize SDR Platforms

A full range of integration, acceleration, and optimization services is available from both Wind River and PrismTech to complement our COTS SDR solutions. Our professional teams can accelerate the adoption of our COTS SDR solution from design and advisory services to full-scale development services in areas such as certification, COTS OE migration and platform optimization, waveform porting, and legacy code migration. Our teams have industry-leading domain expertise and can work independently or as a complementary adjunct to your in-house team as required. Training is available for all aspects of our joint solution.

Note: The Wind River-PrismTech complete SDR solution is commercial off-the-shelf software and is not subject to International Traffic in Arms Regulations (ITAR) or Joint Tactical Radio System (JTRS) export restrictions.