

TRANSCEIVERS SPEED DEVELOPMENT OF NEW MILITARY AND FIRST-RESPONDER COMMUNICATION SOLUTIONS

Police, fire, and emergency medical personnel arrive at a small tornado-ravaged town. U.S. Special Forces, unmanned aerial vehicles, and naval vessels are deployed halfway around the world. In both scenarios, communication is vital but often impeded by the different devices these groups use, which don't always interoperate.

Software-defined radio (SDR) solves that problem by making it possible to rapidly define a device's application using software-programmable capability. That capability potentially saves lives during battles, natural disasters, and other crises by enabling key personnel to share vital information in real time. By replacing special-purpose radio equipment, programmable radio-frequency (RF) transceivers can limit the need for additional hardware while accelerating new product development for those situations and many others.

However, with 100 billion connected devices in use worldwide and spectrum availability becoming scarce and congested, RF component manufacturers are under pressure to build high-performance systems that operate robustly in many different scenarios.

RF Transceivers and Development Tools Can Fuel or Hinder Innovation

Among the biggest challenges facing solution providers is reducing weight and size while adding more features to new devices and improving their performance.

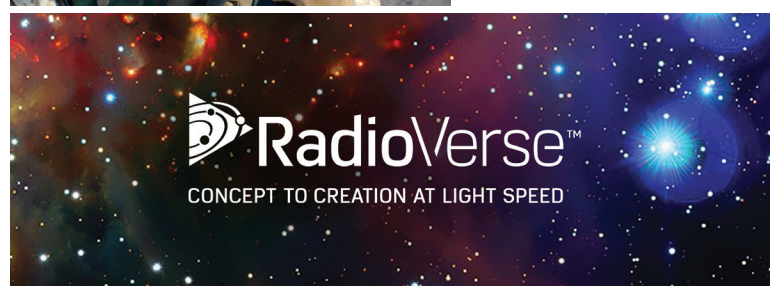
For example, soldiers need mobile devices that allow them to communicate seamlessly, reliably, securely, and in real time over varying terrains, while supporting different frequencies and bandwidths via various airborne, satellite, and terrestrial links.

Radio manufacturers have nominally solved this problem by purchasing and cobbling together several discrete components from multiple chip vendors to build new mobile devices.

While that approach meets some of the military's demands, using so many different components reduces battery life and increases the size and weight of soldiers' communications packs.

"The number of discrete components and band-specific filters also slows development time," explains Kim Boucher, marketing director for radio transceivers at Analog Devices, Inc. (ADI). "It's a direct hit to R&D efficiency."

Some devices contain 20 or more components, Boucher adds, which can inflate and fracture product teams—forcing engineers to focus on discrete elements rather than having a unified vision of the end product. Using several designs also makes it difficult to create prototypes and identify the sources of technical problems, compromising quality control and limiting innovation opportunities. Multiple components add administrative overhead for inventory control, supply management, and procurement, Boucher says.



RadioVerse Development Platform and Ecosystem

Recently, ADI launched both its new 12mm x 12mm AD9371 transceiver and RadioVerse, a development platform and ecosystem. Together, these solutions enable product developers to dramatically streamline time to market. The AD9371, which features a 300-MHz to 6-GHz frequency range, "is frequency-band agnostic and reduces the number of components needed from as many as 20 to 1," Boucher says.

In addition, solution providers don't have to redesign their products or add multiple components to support different frequencies or bandwidths because that capability is built into the AD9371.

"It's capable of scanning a wide frequency range and is easy to implement, allowing solutions vendors to eliminate many of the hardware components they have used in the past," Boucher says.

Instead, vendors can develop their new products in software and thus have more time to fine-tune them using RadioVerse's common-design platform, including prototyping tools that support multiple applications and standards. "RadioVerse allows engineers to try out 'what-if' simulations in software," Boucher says.

In addition to speeding up product development, the AD9371's programmability also allows easy customization and upgrades. The transceiver's size and weight also allow myriad new applications such as multi-band base stations and systems mounted on buildings, light poles, and office walls, as well as long-range high-definition video links from unmanned terrestrial and aerial vehicles. The compact, low-power, rugged AD9371 can also support massive antenna array applications. Such a system built with multiple components would be problematic due to weight, size, and coverage limitations, Boucher explains.

RadioVerse gives radio communication providers the technology and tools needed to make a difference for military personnel, first responders, and others who save and protect lives.

RadioVerse and the AD9371 help address another common problem.

"It's increasingly difficult to recruit hardware engineers with RF expertise. Meanwhile, a growing number of software engineers are graduating every year," Boucher says. "RadioVerse provides a software-based development platform that minimizes the need for deep RF hardware expertise. It's easy to use and learn, and is a great environment for software and system engineers to develop their products."

The military and other communication-infrastructure markets are under pressure to optimize mobile voice and data services, Boucher says: "Our common development platform supports flexible product design, rapid prototyping, and innovation, making users of the RadioVerse platform compete more effectively in the market."

Choosing the Right Technology Partner

To meet and exceed customers' demands, solution developers must choose technology partners carefully. Some chip manufacturers are moving beyond simply providing components and becoming inventors and collaborators. In this role, manufacturers can be ideal technology partners by anticipating market shifts (for example, moving from hardware- to software-based engineering) and providing deep knowledge about the requirements and demands of vertical markets. The best technology partner works closely with product teams to offer the long view, understand end-user needs, and avoid dead-end designs.

In Boucher's opinion, that kind of approach gives birth to innovations such as RadioVerse and gives radio providers the tools needed to make a difference for military personnel, first responders, and others who save and protect lives.

For more information, visit www.analog.com/radioverse.