



CASE STUDY

Powering Next-Gen Direction Finding through Generative AI

Testimonial

“Epiq Solutions products just work the way they’re supposed to, even in unprecedented situations.

They have mature interfaces, efficient RF transport, state-of-the-art hardware geared towards the future, and a reputation for quality and support.

The most exciting thing is not what we’ve done but where we’re going.”



Tim O’Shea
CTO, DeepSig

In the world of Radio Frequency (RF) sensing and spectrum awareness, Epiq Solutions empowers our customers with proven, low SWaP platforms that enable new RF detection systems with advanced capabilities. One such example is our recent collaboration with DeepSig.

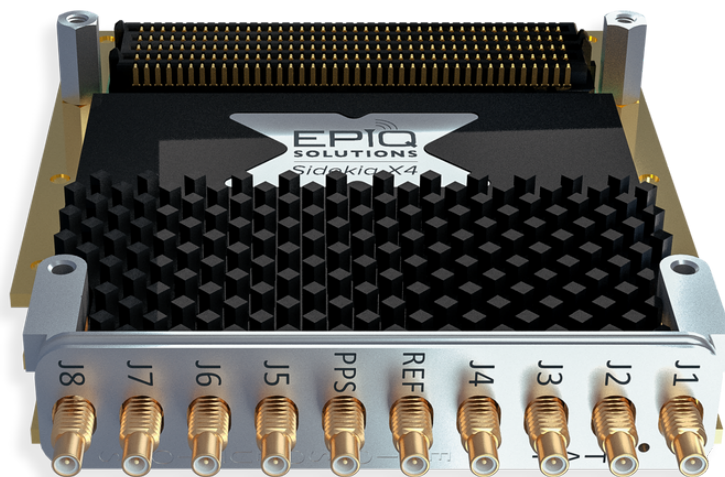
DeepSig, a trailblazer in applying Machine Learning (ML) to spectrum awareness, incorporated Sidekiq™ NV100 and Sidekiq™ X4 into its groundbreaking software solutions. This allows DeepSig to build on the robust capabilities and proven reliability of Epiq Solutions’ software-defined radios (SDRs)—and use ML to bring enhanced capabilities to RF sensing and spectrum awareness missions.



The Challenge

DeepSig is a product-centric technology company that develops innovative wireless processing solutions. In response to a U.S. Special Operations Command requirement, DeepSig began an ambitious project: developing a neural network that would recognize the phase arrival of RF signals powered by ML.

Pioneering technology comes with obstacles. DeepSig had many technical challenges to work through, which meant they needed a strong engineering partnership to ensure seamless navigation through potential technical impediments. To accomplish their audacious plans, DeepSig sought a 4-channel, phase-coherent SDR solution with tight tolerances, mature APIs, and efficient RF signal transport. They also needed a partner who could provide compact, high-performance RF solutions with the flexibility and reliability to support their advanced software—they turned to Epiq Solutions.



The Solution

Epiq is well known for making high-quality, mission-proven hardware and RF spectrum/collection expertise. This reputation, combined with our outstanding customer support, led DeepSig's engineering team to handpick Sidekiq™ X4 as the radio where they would build their new ML-powered DF system. They wanted to involve Epiq in the development process as much as possible, and our team was thrilled to play a part in empowering DeepSig's groundbreaking innovation.



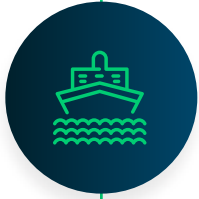
The Sidekiq™ X4 is a high bandwidth, multi-channel RF transceiver designed for advanced RF applications. Built to accelerate development cycles and simplify integration, it's a flexible, high-capacity transceiver with up to four phase coherent channels—and it was that last feature that proved most instrumental in DeepSig's project.

Throughout the development, testing, and live demo process, the Sidekiq™ X4 proved its worth. It became the backbone of DeepSig's ML-enabled DF platform, OmniSIG DF®, and performed to the high standard demanded in every situation. Epiq's engineering team was always available to support and answer hardware-related questions as development proceeded. It was this combination of high-quality engineering and dedicated customer support that allowed for the smooth, accelerated pace of DeepSig's development and the proven success of its new network in field deployments.



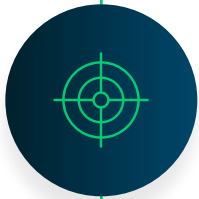
Because of the Sidekiq™ X4's high quality and advanced capabilities, DeepSig was also able to create a new ML-enabled RF signal DF option for US Special Operations Command, along with multiple options for future security and defense customers.

The Results



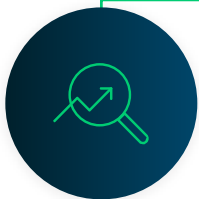
SUPPORTING NAVAL OPERATIONS EFFICIENCY

OmniSIG DF® powered by the Sidekiq™ X4 has already proven successful in several Naval operations, including two different Naval Special Warfare Trident Spectre exercises, one on a small vessel at sea, and multiple U.S. Special Operations Command test events, including DF accuracy testing at the Navy's RF test range.



HIGHER ACCURACY

Thanks to the Sidekiq™ X4, DeepSig achieved 3* Root-Mean-Square Error (accuracy) on fast frequency hopping signals.



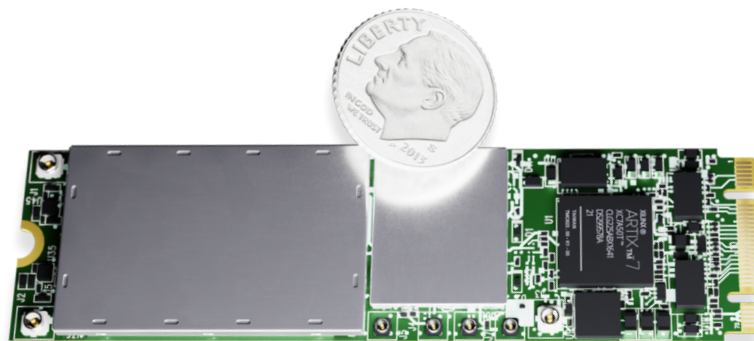
HIGHER PERFORMANCE

The Sidekiq™ X4 also gave DeepSig's new neural network the ability to offer consistently high performance in a heavily congested spectrum, as measured in several field tests.

Conclusion

Epiq Solutions' mission is to empower companies with versatile RF solutions that redefine industry standards. OmniSIG DF® software, developed around the Sidekiq™ X4, allows DeepSig to continue offering evolving solutions to their security and defense customers, who demand low SWaP applications capable of high-quality signal collection at the tactical edge. Collaboration between Epiq and DeepSig opens the door to advanced RF spectrum awareness from individual soldiers, small unmanned vehicles, maritime platforms, and manned aircraft.

Furthermore, the latest release of the 2-channel phase coherent Sidekiq NV100 brings immense potential to making small-form-factor AI-powered signal collection/DF systems.



About Epiq Solutions

Epiq Solutions' mission is to empower companies with versatile RF solutions that redefine industry standards. OmniSIG DF® software, developed around the Sidekiq™ X4, allows DeepSig to continue offering evolving solutions to their security and defense customers, who demand low SWaP applications capable of high-quality signal collection at the tactical edge. Collaboration between Epiq and DeepSig opens the door to advanced RF spectrum awareness from individual soldiers, small unmanned vehicles, maritime platforms, and manned aircraft.

About DeepSig

DeepSig Inc. is a product-centric technology company that is trailblazing the field of Radio Frequency Machine Learning (RFML). Our unique software utilizes neural network architectures to enhance signal detection, classification, spectrum awareness, and digital force protection. We offer customizable solutions tailored to diverse applications, drawing from extensive industry experience and numerous patents. Our team of experts in Machine Learning, Digital Signal Processing, and software development has successfully harnessed deep learning for signals analysis, contributing to the evolution of next-generation wireless systems and processes.