

From the **Wichita Business Journal**

:<http://www.bizjournals.com/wichita/blog/techflash/2013/08/kansas-startups-technology-could.html>

Aug 27, 2013, 9:58am CDT

Kansas startup's technology could improve the performance of your next smartphone



[Emily Behlmann](#)

Web producer- *Wichita Business Journal*

[Email](#) | [Twitter](#) | [Google+](#) | [LinkedIn](#)

Your future smartphone could have a longer battery life and be less susceptible to dropped calls, thanks to a technology under development in Kansas.

[Alexei Nikitin](#), founder of the Lawrence-based startup Avatekh Inc., says improving smartphone performance is just one of the potential applications for algorithms he developed to reduce electronic noise and interference in communication channels.

For instance, Nikitin is also discussing with BAE Systems, a London-based defense and security company, how the same technology could improve military communications.

But the smartphone application is perhaps the most relatable, says [Tim Sobering](#), director of **Kansas State University's** Electronics Design Laboratory. Sobering is turning Nikitin's algorithms into working prototypes.

"There are a million applications for this if it's successful," Sobering says. "And it looks like we're going to be. I've got some working hardware simulations that are looking pretty promising."

Nikitin has created and patented algorithms for analog signal filters that work in real time, preventing interference from other nearby signals. The alternative, typically used now, attempts to get rid of wayward signals by processing them after they've been digitized.

That simply doesn't work as well, Nikitin says.

"It's too late to deal with it when the signal is already converted to digital," he says.

In the smartphone example, devices have transmitters and receivers for Wi-Fi, Bluetooth, GPS and cellular signals. Each occupies a different part of the wireless spectrum, but because the device is so compact, the signals can interfere with one another, the researchers say.

Other man-made electrical noise, such as that from nearby electronics, can also disrupt outgoing and incoming signals, hurting the phone's performance.

Sobering says that without Nikitin's technology, smartphone manufacturers have a couple of less desirable alternatives. Shielding the receivers from offending signals makes a phone large and heavy. Boosting the power output on each transmitter for better performance takes a lot of power, shortening battery life.

The Avatekh technology he's working to implement, called adaptive nonlinear differential limiters, can mitigate the noise with less power, he says.

"The future phone could have a better battery life," Sobering says.

The researchers say the same concept could be used in navigation devices or to help the military overcome intentional jamming of communication systems.

The Kansas State University work is funded with the help of a \$150,000 **National Science Foundation** grant.

In addition to the K-State collaboration, Nikitin says he's been working for more than a decade on his technology with Ruslan Davidchack, a professor at the University of Leicester in England.

It's not yet clear how long it would take for Avatekh's technology to be implemented in devices on the consumer market. Nikitin estimates that if prototyping is successful — Sobering says he has about three months left to build the first system — it could still be three to five years before the filtering system is installed on smartphones. However, if the startup can raise capital to hire more staff, the process could happen faster, Nikitin says.

Emily Behlmann oversees the website and other digital projects at the WBJ.