The Defense Business Accelerator, or DBX, Microelectronics Challenge aims to revolutionize how the Department of Defense (DoD) drives the development of dual-use technology, which can be used for both civilian and military applications. (Learn more about the challenge following the story.)

DBX Awardee Story:

SiliconCore Chip Innovation Provides Channel to More Realistic Displays

The world's first four-channel driver chip for direct view light-emitting diode (dvLED) displays is reaching the market years earlier than expected due to a nearly $1.7 million DBX Award that is enabling its developer SiliconCore to turn the virtual world into more life-like reality for military and commercial applications.

The dvLED displays are brighter, richer and more life-like than mainstream LED displays, which use LCD panels that are lit by LED backlights. In dvLED displays, the LEDs are viewed directly. It's like looking out the window without a piece of glass in front of you.

An established leader in dvLED displays, SiliconCore is taking the technology to the next level through its development of a new driver chip, which puts out electrical impulses to light up a display's LEDs. Current driver chips have three channels that target red, green and blue LEDs, with these three colors blending together to create a display's image.

"We're creating a driver chip with a fourth channel that enables us to add a color or infrared," said Jim Wickenhiser, SiliconCore's chief operating officer. "This expands a display's color gamut from a triangle to a trapezoid, enabling us to produce more colors than ever before. There's no other driver chip like this in the world."

What's added to the fourth channel can be customized to the application. Cyan, which is between blue and green, would expand the display's color gamut. Yellow could reduce the device's overall power draw. Infrared would be ideal for military simulations using night-vision goggles.

"For the first time, we're able to show red, blue, green and infrared on a single display simultaneously," Wickenhiser said. "These displays are so much brighter and offer higher

contrast than projection, giving the warfighter a much more realistic field environment. After a simulation demonstration with the Navy, we were told the technology exceeded expectations."

Commercial applications would also benefit from the fourth channel's flexibility. Computer monitors, for example, could incorporate a blue shade that doesn't shift circadian rhythms like current blues do.

"When we started lifting the hood on what this additional channel brings, there were all kinds of applications that we hadn't anticipated," Wickenhiser said. "We're already seeing some that are really revolutionary and can pave the way for future technology that is mind-blowing."

Pitch-perfect Process

Quickly reaching that future state got a boost when SiliconCore received a $1,675,000 DBX Award. Created by the Department of Defense and managed by the U.S. Partnership for Assured Electronics (USPAE), the awards are directed toward transformative technology that can be used by both commercial and government customers.

The four-channel driver chip fit the award criteria perfectly, and an application was sent soon after SiliconCore's CEO learned of the program through an email.

"I've never pitched for more than $1 million in five minutes before," laughed Wickenhiser. "It was a very innovative process and pretty exciting as well. I was very impressed with the industry experts who were on the selection panel. Having people with technical and commercial experience really focused the conversation on the goals that DBX had, with the panelists asking smart and challenging questions. I've also never experienced such a fast turnaround in getting funding. We had money in the bank within days of being selected."

That funding allowed SiliconCore to shave years off the four-channel driver chip's development, with commercialization now expected in 2025.

"If we didn't receive the DBX Award, we would have had to self-fund the chip's development," Wickenhiser said. "It would have been a slow and painful process for a small company like ours. The award allowed us to not only accelerate our own capabilities but also those of industry and the military. It serves as testament to our technology's viability, giving potential customers added confidence to move forward with us."

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What is the DBX Microelectronics Challenge?

The challenge was created by the DoD Manufacturing Capability Expansion and Investment Prioritization (MCEIP) office and is administered by the U.S. Partnership for Assured Electronics (USPAE). It provides monetary awards intended to help accelerate the commercialization of vital, next-generation capabilities that also have defense applications. With the additional funding from a DBX Award, companies can get the

resources needed to overcome critical manufacturing or technology development hurdles to reach full-scale production more quickly.

With the DBX Award, DoD and USPAE are helping companies build a sustainable business to ensure the supply of essential hardware for both commercial and defense needs.

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