

Foundry Pursues Custom Path

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The SkyWater 200mm foundry in an office park outside the Mall of America in Bloomington,

Minnesota, shows avenues for growth making semiconductors at 90nm and larger nodes, far from the bleeding-edge pursuit of Moore's law.

Built in 1986 by Control Data and purchased by Cypress in 1991, the facility first opened to outside work under the Cypress name in 2008. [A year ago](#), the fab was sold for \$30 million to a private equity firm, creating the independent foundry.

SkyWater's fab produces about 45,000 wafers per quarter, compared to 80,000 per month for the 300mm Fab 8 at GlobalFoundries. It has tools on-site for 65nm production, but has no near-term plans for the finer process.

As a private company, SkyWater doesn't disclose its finances, but Thomas Sonderman, its president, said the foundry's revenues are measured in the "hundreds of millions" of dollars annually. That's roughly two orders of magnitude below foundry leader TSMC, but at a 30 percent CAGR SkyWater is outpacing the industry median of 1-2 percent growth for 200mm fabs and 8 percent for 300mm fabs.

Cypress remains SkyWater's biggest customer, making automotive and IoT chips here. A new growth area is in custom work.

SkyWater wants to enable chip designers to use non-standard elements, unique structures or large format stitched chips. In the world of modern leading-edge foundries, the goal is to avoid customization at any turn; SkyWater welcomes it.

Today development centers such as MIT Lincoln Labs can create a custom process for research but not mass production. SkyWater aims to do both in technology areas such as superconducting, photonics, medical electronics and radiation-hardened devices for customers who might only need 10,000 chips total. Bigger foundries lack the flexibility to make such products profitably.



Inside the 90nm 200mm fab in Minnesota. (Image: SkyWater)

Much of the core technology that underlies the ability to build silicon superconductors was designed in-house at the fab in Minnesota. [D-Wave announced in 2015](#) that it had migrated to the fab (then still part of Cypress) for its quantum computing products, with improved yields in its first run.

Sonderman wouldn't name specific customers, but he said the fab has built more than 10,000 wafers for DNA sequencing chips. These devices typically use microfluidics to detect changes electrically based on a DNA specimen stored on the chip. Future products may include chips that monitor diabetes or manage release of drugs.

In addition, SkyWater builds and has patents for a non-volatile memory type called SONOS it licenses to UMC. It builds infrared imaging sensors for military and commercial applications such as autonomous driving and heads-up displays.

U.S. government contracts currently make up 15 percent of SkyWater's revenue, a slice it aims to grow. It's much larger rival, GlobalFoundries, has similar aims, but Sonderman believes SkyWater's capabilities and lack of overseas ownership will give him an edge.

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