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New software streamlines factory floors

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Longtime Camarillo manufacturing advisor DeHart Consulting has launched a spinoff venture with a new technology that aims to simplify decision-making for manufacturers on their factory floors.

When the loops and crisscrossing workflows for products like semiconductors or custom aerospace and defense parts begin to snarl like last year's Christmas lights, keeping the ball moving without hitting a snag requires complex scheduling systems. Enter Equation1, a new venture that hopes to automate a decades-old system that streamlined production processes and adapt it for the complexity of modern manufacturing.

"It's a huge cost reduction for companies because it takes a lot of their scheduling overhead out of the picture," said CEO and co-founder Dale DeHart.

Waiting to produce one stage of a product until the next stage is ready for it is a time-tested method to avoid bottlenecks and monitor quality. It was pioneered by Toyota in the 1960s. At many modern factories, though, a wide variety of products will compete for the same floor space, making it more difficult to keep lead times low. Additionally, products like semiconductors can re-enter the same workflow dozens of times, making it harder to keep track of which products should get priority.

The Equation1 system, called Vortex, simplifies the decision-making by looking not at

volume, but time. When one station expects to be free in an hour, the software scans for a product with the highest priority that will fit the timeframe and gives it the green light to start production.

"We can have three different work centers, or five, or 25, all feeding into this one work center," DeHart said. The software "doesn't care about what kinds of units, so you can apply this method to high-mix manufacturing or these complex situations. ... It's completely workflow and product agnostic."

The formulas the software relies on evolved over the course of several years, said Tamma Davis, head of sales and business development at the company. An extensive patent process yielded Equation1 a patent in September, allowing the six-person team to pivot to a commercial launch.

Early on, the company also engaged researchers at Cal Poly San Luis Obispo to help build models of how the product would work on the factory floor.

The software has the potential to address and adapt to different priority systems companies use, said Eric Olsen, a professor of industrial technology and packaging at Cal Poly. Companies can customize whether they want to follow a "critical ratio" that prioritizes the product's due date, organize batches by the shortest operation, follow a "first-in-first-out" policy, or a combination of all three.

"They're looking at the right thing," Olsen said. "The community understands that time is the thing we need to manage here."

Among more straightforward manufacturing lines, though, "there's still a place for simplicity," he said.

"One of the parameters we're sort of interested in understanding is, how complex does the system need to be in order to benefit from the technology? Using simplicity to combat complexity is a proven strategy," he said, but "in certain high-velocity, complex systems, the more powerful system might win."

Vortex integrates with current enterprise software for the manufacturing industry, Davis said. As it receives data from the ERP systems and production line, it can then begin to adjust to the patterns it finds and make predictions.

"All of these systems are turning out data that we can analyze," DeHart said.

A mathematical approach to prioritizing production could also stop the politics on the shop floor, when different product lines vie for the same workstations. But doing so would require transparency for users into how those decisions are made, Olsen cautioned.

Early discussions with prospective customers in the aerospace and defense industry led the company to develop an on-premise installation model for the software, with a focus on cybersecurity. A cloud-based version of the product is in the works, Davis said.

Future iterations could also address similar tangled workflows in the film or loan processing industries, she said.

"They have the same competitive pressures to reduce their costs and increase production," she said.