

**TECH NOW**

## Simulations identify cost-saving procedures before production

A product development team spends billions of dollars and many years researching and developing the company's next generation of products, so when it is time to transition the product to manufacturing, how does the team put in place a complex manufacturing process that works properly the first time while maximizing profits?



SIMULATION  
AND  
OPTIMIZATION

SCOTT DIXON  
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The answer is simulation and optimization, which allows an organization to build a computer generated visual of the most complex business process — whether manufacturing, logistics or data movement — then apply hypothetical scenarios so that company executives can easily and clearly see the results.

In essence, simulation is the act of modeling a process or series of processes that, upon running, demonstrates the “as is” state of an organization. Optimization is asking the “what-ifs” to get to the “to be” state of the organization.

Users can set up an infinite number of hypothetical scenarios, such as what happens if half the labor force turns up late for its shift, what happens if a crucial

machining tool breaks and what is the effect of having a spray paint procedure at the end as opposed to the middle of a manufacturing process.

A successfully executed simulation and optimization project generates information that enables intelligent decisions, promoting collaboration and buy-in from everyone involved on even the most complex project.

The process works like this: Icons that typically represent elements used within manufacturing, such as machines, labor, conveyor belts etc., are dragged onto the computer screen. Once the icons are in place, the elements are linked to define the process flow. When the routing has been established, as much detail as desired is added to make the process appear as lifelike as possible.

Simulation and optimization technology has been proven in both industry and government to help reduce the time, resources and ultimately, risk associated with systems and product development.

Because of the value simulation brings to large-scale projects, it is becoming the methodology of choice for many manufacturing projects in the U.S. Department of Defense, allowing complex variables and issues to be rapidly calculated before the actual physical part of the project begins, and enables monitoring and managing of these variables as the project unfolds.

For example, the U.S. Army began an ambitious 20-year project to update its Black Hawk Helicopters — two-thirds of which was built before 1988.

The Army found that through simulating the update process using technology, it could save significantly by upgrading its current fleet rather than building one from scratch.

Simulation and optimization helps ensure that all variables in a complex upgrade program are coordinated so that the cost of the overhaul project is kept to a minimum.

It also allows a program manager to see a visual representation of the whole overhaul process and where potential constraints and bottlenecks in the process lie.

The program manager can then choose the optimum conditions for the process before the first helicopter has even been brought into the workshop, and adjust workflow conditions based on up-to-date modeling and optimization information to ensure cost savings continue to be optimized through the life of the project.

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