

WHEN VIRTUAL MANUFACTURING BECOMES REALITY



If you have any interest in the digitization and automation of manufacturing, you'll be interested in an interview with a Lockheed Martin executive that I came across recently in the Manufacturing Leadership Journal.

The executive is Dennis Little, VP of production at Lockheed Martin's Space Systems Division. Little is driving a project within the company called Digital Tapestry. It aims to combine the three key digital domains—virtual reality development environments, 3D printing, and digital processes—to, in the article's words, “radically streamline its entire approach to creating complex products” from end-to-end.

There are two things to note in that last statement. First, Lockheed Martin Space Systems knows something about complex products—they're in the business of producing missiles, orbital and exploration satellites, and manned space vehicles. Second, they really mean “end-to-end” digital operations.

The concept goes far beyond the typical digital development environments. What they're aiming for is nothing less than a fully digital product lifecycle. Here's how Little describes the project:

“The Digital Tapestry ties everything in our production operations together digitally, from concept to product realization. It's an end-to-end digital approach where everything is connected—from concept, design, simulation, manufacturing and assembly, to testing and getting the final product to the customer. Our goal is not to break a single thread in the digital process.”

One of their tools seems straight out of the Star Trek holodeck. Officially called the Collaborative Human Immersion Lab, but affectionately known as the Cave, it's a physical room with special projectors where engineers, suppliers, customers—anyone in the Digital Tapestry—can wear virtual reality goggles and gloves that enable them to see, touch, and manipulate anything from a product part to a satellite as if it's right there in front of them. (Note that Dassault Systèmes also has such a room, but ours is more for demonstrating the capabilities of our software.)

Lockheed Martin's Cave is tied to assembly and test operation bays, so it can link to manufacturing and vice versa. In other words, an actual working virtual room!

Clearly, Little is thinking big.

Most companies won't go that far, at least not yet. But most manufacturers could benefit from an end-to-end digital production system of some kind. Such a system enables individuals from different disciplines to communicate with everyone else throughout the product lifecycle—and that transforms product development from a linear process into a collaborative one. “A technician can help a design engineer design their product to improve produceability, manufacturability, and testability,” says Little. “It's also how we can reduce cost. We can hit the affordability piece head on by trying out new approaches.”

And of course, 3D printing can bring digitization to the actual production process. As Little says, “We can go from the simulation to producing a plastic part within hours, give it to the design engineer and the manufacturing engineer, get feedback, and plow that back upstream in the Digital Tapestry for the final manufacturing process.” Lockheed Martin already does more with 3D printing than just prototypes—they use it to create special tools and even some working aircraft parts.

Ultimately, Little believes the entire product lifecycle, from conception to retirement, will be digital and collaborative. There are hurdles to clear, however, before their fully digital process actually becomes reality. For example, there are significant investments to make in new technologies, and a new kind of skilled workforce will be needed. Still, Little believes the evolution to digital is inevitable.

Source: <http://www.aprison.com/blog/2014/08/when-virtual-manufacturing-becomes-reality/>