

Bottom-line Results From the Lean Initiative

Lean initiatives in the aerospace and defense sector are leading to shorter production time and decreased costs.

by thomas r. cutler

ACCORDING TO BRAD CAMPLING, program development manager for aerospace and defense for TechSolve, Inc., a lean optimization consulting firm headquartered in Cincinnati, OH, there has been a trend over past several years for original equipment manufacturers in aerospace and defense to work lean, using only what they need to consume and nothing more.

For example, OEMs are creating supplier partnerships and networks implementing lean manufacturing techniques, from value stream mapping to e-kanban. The lean initiatives being practiced in the aerospace and defense manufacturing sector translate to a gamut of issues in any sector, from shorter production time, delivery to market, and eliminating waste.

Continued Process Improvement

For example, Campling notes that TechSolve was contracted by the United States Air Force to work with a manufacturer of mission-critical munitions hardware. The supplier was having production problems and had failed first article acceptance testing (FAAT) due to workmanship defects. The instructions the assembly technicians were using were engineering documents that contained limited black and white sketches of the assemblies. Without specific visual instructions, the

manufacturer could not follow directions and there was no repeatable quality.

TechSolve worked closely with the manufacturer's engineers and assembly technicians in a detailed lean two-month evaluation to establish and document the best practices, creating visual work instructions that included photographs and captions of each step in the assembly process. The immediate improvement in quality helped lead to a successful FAAT.

Continued process improvement is a key component of any lean manufacturing process. Critical aspects of observation, documentation, and quantification should not be dismissed or diminished.

Value Stream Mapping

Improved on-time delivery is another key lean manufacturing consideration. Value stream mapping (VSM), also known as an end-to-end system map, is a tool to provide a detailed overview of a process's capabilities and shortcomings. During the future state development stage, defining where you want to go, a Takt Time is established. Takt Time is the target production rate that must be achieved in order to satisfy customer demand. Once the Takt Time is established, all processes in the value stream must be balanced to meet it. If processes are operating with a cycle time greater than the Takt Time, the operations must be broken apart or duplicate capacity should be added. However, before capacity is added, efforts must be made to eliminate waste that could be adding to the cycle time but provides no value to the process.

Aerospace and defense firms often subcontract the actual manufacture of their designs to others. Design meetings are held between the aerospace and defense design teams, the suppliers, and the production manufacturers in a critical VSM process to determine how to cut costs of producing a part or optimize production time via design alterations. Campling recalls how one munitions company benefited from a VSM design meeting, "The simple design changes

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Lean Transformation: Transferring the Company Vision from Management to Employees

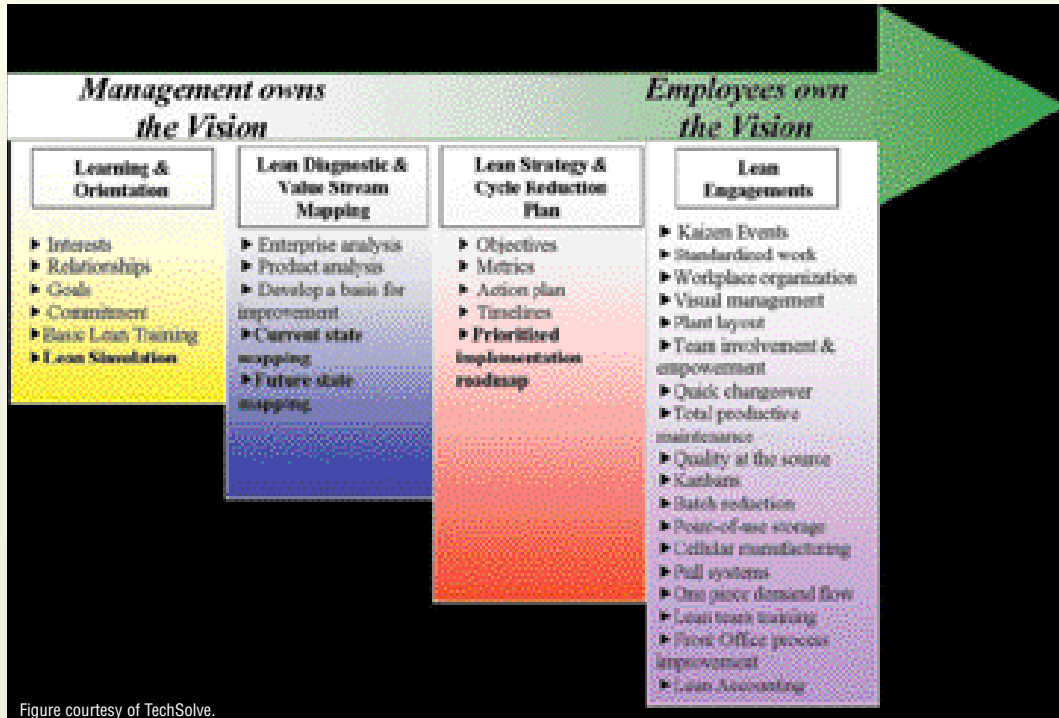


Figure courtesy of TechSolve.

A lean initiative involves of transformation in the way in which an organization operates and views itself. It is not merely a quick glance and how waste might eliminated from various activities and processes. There are four key steps to a lean transformation: learning and orientation lean diagnostic and value stream mapping; lean strategy and cycle reduction plan; and lean engagements. These steps allow the company vision to transfer from a management owned vision to an employee owned vision.

Step One: Learning and Orientation

This requires an honest examination of the interests, relationships, and goals of the organization. Often this initial step in a lean transformation helps to identify where some of the miscommunication and explains why waste occurs in the organization. Everyone has to get on the "same page" in the organizational objectives. Everyone must sign on to the commitment of being exception and efficient. Once accomplished, there are basic lean training components and a lean simulation that will help to advance the lean transformation.

Step Two: Lean Diagnostic and Value Stream Mapping

An organization cannot decide where to grow next in a lean transformation without clearly identifying where they are right now. Value stream mapping of the

current state of the organization gives way to the target future state mapping process. These mapping procedures are completed after a detailed enterprise and product analysis have been conducted. The lean diagnostic phase allows for the basis of improvement throughout the organization.

Step Three: Lean Strategy and Cycle Reduction Plan

The measurement component to lean transformation is critical. Written objectives, metrics, action plans, and timelines, all create a visual, quantifiable, and meaningful prioritize implementation roadmap. Throughout the organization the ability to see the transformation is obvious and gratifying.

Step Four: Lean Engagements

Events that actually eliminate waste are central to the implementation of a lean initiative. These activities from kaizen events to e-kanban implementations transform the methods by which employees and management view the organization. Lean engagement activities never stop. They are ongoing and fundamental to the concept of continued process improvement. Looking for better, more efficient and effective ways to run the company becomes the mission of all involved in the ownership of the company vision.

Kanban improves supplier lead times, while E-KANBAN ENFORCES THOSE LEAD TIMES AND DRASTICALLY IMPROVES CUSTOMER SATISFACTION.

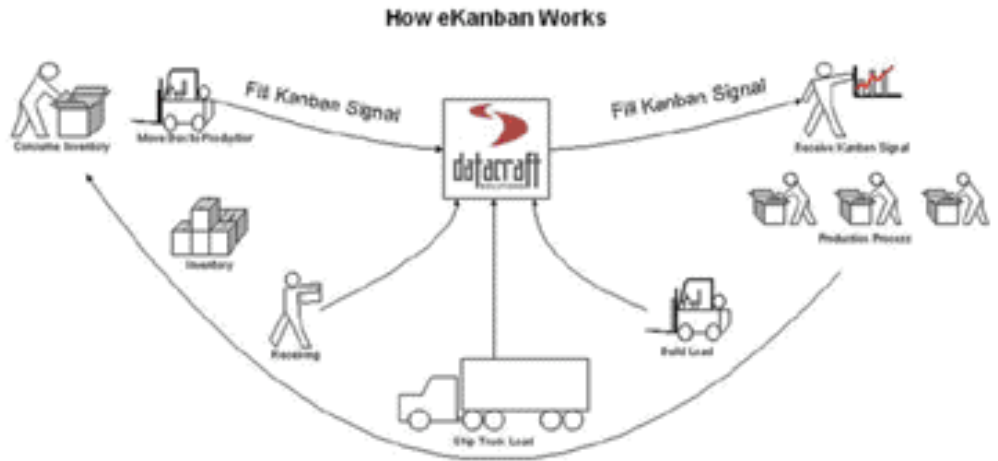


Figure 1
How e-kanban works.
Figure courtesy of Datacraft Solutions.

that came out of the VSM design meeting allowed leadtime to be reduced from 30 days to five days, producing a shorter production time and delivery to market, as well as cutting cost of parts in half due to simple design changes. Lean will look at the spaces between processes and break it down to shorten time...changing routings.”

Mark Adkins, president of Turnkey Marketing (Cleveland, OH) believes that VSM can lead to a speedier time to market. “We anticipate a 50 percent reduction in time to market by eliminating waste and performing more tasks in parallel.”

Where Kanban Timing Fits In

When processes are set to respond to customer demand rates, the visual signals that operate the kanban system will trigger production or product release with minimal in-process inventory. The closer any system is to operating in a single piece flow operation, the shorter the leadtime will be when customers, internal processes, and suppliers are all linked via kanban.

It is important not to confuse MRP (materials resource planning) with kanban. The scheduling component of MRP (and ERP, enterprise resource planning) is not the discipline of a triggering signal for suppliers, internal processes, and customers. Some suggest that physical (card) kanban is best for internal operations, and e-kanban is best with customers and suppliers (see **Figure 1**). This perspective is not widely held as most manufacturers are moving to 100 percent electronic kanban solutions.

Justin Diana, chief technology officer with Datacraft Solutions (Durham, NC) articulates the distinctions of e-kanban. “Once the visibility of a manual Kanban system is in place, e-kanban focuses

on knowledge and availability as critical factors in the equation. With a centralized e-kanban system, not only is information visible, but it’s visible to everyone in the supply chain, whenever they need it, in a format that’s consistent and reliable. When the players know what is needed, when it is needed, and the impact that it has if it’s not obtained, then responsiveness is improved. In short, kanban improves supplier lead times, while e-kanban enforces those lead-times and drastically improves customer satisfaction.” The goals and metrics of any organization, aerospace and defense, or otherwise, must first be clearly articulated so that when data are available to assess the efficacy of VSM or e-kanban, the question can be answered: Were the target metrics achieved? As the creator of PEER (Process Evaluation Executive Review), Mike Ligudzinski, president and CEO of PRONTO North America (Eden Prairie, MN) notes that holding “upfront cross-functional meetings captures the values of lean manufacturing throughout the enterprise. This functionality is accomplished using an innovative process modeling and automation toolset that helps manufacturers and distributors realize continuous process improvement and profitability.” **TCT**

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