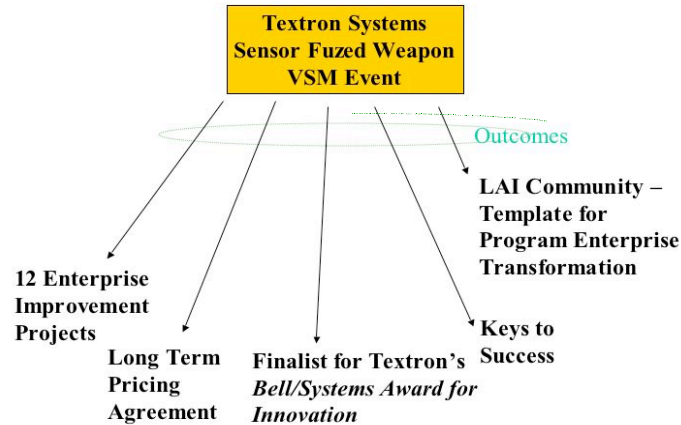


The Follow-Up: Added Value from Textron Systems SFW Value Stream Mapping Event

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Over a six-day period in the final quarter of 2004, members of the Lean Aerospace Initiative (LAI), Massachusetts Manufacturing Extension Partnership, Rockwell Collins, and Metis Design met with host company Textron Systems in a collaborative effort to map the enterprise value stream of Textron’s Sensor Fuzed Weapon (SFW) program. The workshop also included participation from the US Air Force (USAF), Alliant Techsystems, Cessna Aircraft, Herley Industries, and Pioneer Aerospace.

An earlier release (“*LAI’s Lean Enterprise Value Business Simulation Aids in Mapping Enterprise Value Stream of Textron’s Sensor Fuzed Weapons Program*”, available on the LAI Web site, <http://lean.mit.edu>) reported on the details and expectations of this workshop.

This commentary describes the results and follow-up in the six months since the workshop was held. Some of this information is contained also in a presentation of Geoff Bentley and Hugh McManus, entitled “*Textron Systems Sensor Fuzed Weapon VSM Event: Using LAI Tools to Transform a Program Enterprise*”, delivered at the LAI Plenary Conference on 23 March 2005 (also available at <http://lean.mit.edu>).

Workshop Objective and Improvement Projects

The objective of the workshop was to identify waste elimination opportunities at the enterprise level for purposes of closing on a Long Term Pricing Agreement (LTPA) between the USAF and Textron Systems. The LTPA would fund SFW production and delivery through the year 2012. The workshop involved 30 participants from multiple Textron disciplines, the US Air Force and SFW supply base.

In support of the workshop objective, 12 enterprise improvement projects were identified to close the gap between SFW’s current and future states. Each project was described and assigned process owners and team members to lead and conduct the efforts. In addition, each project was assigned a Black Belt or Green Belt from Textron’s Six Sigma program.

This was to ensure sustainment of the projects by lean practitioners from the umbrella Six Sigma program.

The 12 projects are:

- Certified Parts
- Design Change Strategy
- Inventory Accuracy
- Lean Thinking and Operations
- Low-Cost Robust Design
- Optimal Supply Base
- Paperless Processes and Systems
- Supplier Consigned Inventory
- Supplier Development
- Test and Inspect Strategy
- Visual Pull System with Suppliers
- Workforce Development

Post-Workshop Outcomes

Consummation of Long Term Pricing Agreement (LTPA) and Ongoing Projects

In December 2004, Textron Systems and the USAF agreed to fund SFW production and delivery through year 2012. While there were a number of factors that contributed to the parties reaching agreement in a timely fashion, clearly the use of a lean assessment tool gave Textron Systems a path to achieve much of the required cost savings, and at the same time gave the US Air Force confidence that Textron Systems was serious and innovative in its approach to waste reduction and value creation.

USAF Program Executive Office for Weapons and Air Armament Center Commander Maj. Gen. Robert W. Chedister noted: “Your company’s pursuit of Six Sigma improvements, both internally and throughout your supplier base, will save the taxpayer millions and gets more weapons to the warfighter faster.”

To date, six of the 12 workshop projects have been initiated, with an estimated aggregate (hard) cost savings in excess of \$7 million over the next 5 years. The LTPA reflects these savings as well as cost reductions from other initiatives.

Textron Bell/Systems Award Finalist

Every year Textron Corporate sponsors a rewards program to encourage innovation in product, technology or business practice. This year the SFW workshop was a finalist for the Bell/Systems award in the business practice category.

The supporting rationale is that the workshop represents a business practice innovation that allows for the identification and removal of waste for new and ongoing programs with multiple operations and stakeholders. This practice, using LAI tools and Air Force Lean Now facilitation techniques, integrates value stream mapping, business simulation, and lean thinking to achieve a systematic approach to evaluate lean progress at the enterprise level. Enterprise integration is achievable only if all stakeholders are involved in the analysis and acceleration of lean transformation. This practice combined application of new lean tools and simulation to a real program, and with *all* stakeholders – an advance on three fronts.

The key to this business practice innovation is the simulation, which focuses on the enterprise-level interfaces and their influences on generating non-value added activities. Early rounds of simulation demonstrated how “islands of success” could be achieved by local (functional) optimization. Later rounds carried these lessons forward to the enterprise level to achieve both performance beyond that possible with local improvements, and responsiveness to change. The final innovation is the way in which reality is brought into the game by relating the simulated enterprise value streams to SFW enterprise, such that groups and relationships, steady-state execution, and dynamic response to disruptions, can be mapped and evaluated. The identification of the 12 enterprise improvement projects was the direct outcome of applying the simulation lessons to SFW.

Keys to Success and Added Benefit

With a six-month perspective since the workshop’s conclusion, it is apparent that several attributes were key to its success. These were the “five keys to success”.

1. *Real problem* – Participants are not doing just a learning exercise but are contributing to advancement of issues relating to a real program.
2. *Good lean tools, excellent facilitators* – LAI’s innovative and timely toolset, combined with hands-on, informed facilitation, are essential to success.
3. *Top-down management support* – Direct involvement by President Richard Millman and senior vice presidents sets an important standard of support for all participants.
4. *Multiple stakeholders* – Involvement of all program players and interested parties is essential for understanding the problem and implementing workshop outcomes.
5. *In-house lean experts for sustainment* – Essential for carrying forward for the post-workshop implementation phase.

An added benefit is the recognition by state and local officials of the training and employment aspects of the workshop. The Commonwealth of Massachusetts, Division of Employment and Training, has reimbursed Textron Systems the direct cost of conducting the workshop. Other LAI consortium members also should recognize the employment and training advantages associated with this type of collaborative business practice effort.

The C-130 and the Lean Enterprise Value Simulation: A Template for Program Enterprise Transformation

Along a similar theme, a highly successful series of events were completed on the C-130 Compass Call Program at the L-3 Communications Integrated Systems (L-3 Com)/Air Force Detachment 4 Facility in Waco, TX. An engagement strategy was formulated to capitalize on more than two years of experience gained from Lean Now Wave 1 and 2 experiences. The Lean Now Workshop was conducted on 15 February, with participation at the L-3 Com vice president level to the core value stream mapping (VSM) team. A total of 34 participants attended the workshop, with excellent engagement by all. The second block of events, conducted 23-25 February, consisted of the MIT-developed Lean Enterprise Value (LEV) Simulation and the generation of the beginning of the enterprise Compass Call VSM. The LEV Simulation was tailored specifically for this event to replicate a depot repair/modification process and was the first time it was used in this form.

The conduct of the LEV Simulation was very significant to the event and followed in the footsteps of the recent similar and successful Textron Systems SFW VSM engagement. By using the LEV Simulation as a precursor to the actual Compass Call VSM, the team experienced an enterprise simulation that demonstrated the pitfalls of a silo enterprise versus a lean integrated enterprise.

As part of this simulation, the team developed a value stream map of the simulation, which provided valuable knowledge and experience for the VSM work that followed. Following the simulation, a top-level "as is" VSM was initiated, to provide an introduction to the data collection that followed. Data collection was conducted with outstanding results. By the time the LAI team returned on 7 March to begin the week-long VSM event, the Compass Call teams had completed a series of seven outstanding, detailed lower-level VSMs. These encompassed all major value streams within the Compass Call program and provided excellent data with which to develop the Compass Call Enterprise "as is" and "future" value stream maps. By 11 March, the teams had identified gaps between the current and future states and constructed a prioritized project list to begin the Compass Call lean journey.

Participants agreed that this was an outstanding engagement, with a high degree of engagement of all team members. Congratulations to L-3 Com, Air Force Detachment 4, the Compass Call SPO, and other government members for an outstanding event as they begin their lean journey. As with the SFW workshop event, this was a collaborative effort through and through. LAI/MIT and LAI consortium members Boeing, Raytheon, and Rockwell Collins provided project coordination and facilitation.

Rockwell Collins and the Lean Enterprise Simulation

Rockwell Collins, a participant in both workshops, was an early adopter of the LEV Simulation. For the company's use, the initial version of the material was altered to include a Service and Support element, which when joined with the Design and Development, Manufacturing and Supply Chain segments, closely matched Rockwell Collins' Core Processes.

Internally, Rockwell Collins is using the LEV Simulation in support of the implementation of the Life Cycle Value Stream Management (LCVSM) concept across the company. LCVSM is a business model utilizing customer-focused value streams with clear accountability throughout the entire life cycle to maximize customer and shareowner value. This way of operating is supported by a complementary set of support structures consistent with life cycle focus and, through an integrated set of core processes, is meant to minimize hand-offs. As such, the LEV Simulation truly simulates the way that Rockwell Collins operates.

With its message of "the power of integration" as a theme, the LEV Simulation is used by Rockwell Collins to demonstrate the "coming together" of a business. It shows how efficiencies in one functional area (core process) do not necessarily translate to improvements to the enterprise. A "big picture" view and coordination among all stakeholders within the enterprise is needed. During the LEV Simulation, an LCVSM leader is assigned to coordinate the collaboration of all the functional groups to create a smooth running enterprise. Those who have participated in the LEV Simulation have

provided extremely positive reviews for the material and for the lessons learned as a result of the experience.

The initial LEV Simulation session was conducted at Rockwell Collins in March, 2004. Since that time significant investment in time and resources has been made to train internal facilitators so that skilled resources are available to conduct the LEV Simulation when needed. Members of this facilitation team have gained experience facilitating several sessions of the LEV Simulation both internally at Rockwell Collins and in support of selected LAI projects, such as the Textron SFW VSM Event and the C-130 Compass Call Program.

To promote the LEV Simulation, Rockwell Collins developed a seven-minute video, with footage of a LEV Simulation being conducted, as well as testimonials from several participants about what they learned and the value of the experience. The video has provided value in showing potential attendees a visual portrayal of the experience, as well as the positive commentary provided by many of their peers.