

LAI's Lean Enterprise Value Business Simulation Aids in Mapping Enterprise Value Stream of Textron's Sensor Fuzed Weapons Program

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From August 24 through September 10, members of the Lean Aerospace Initiative (LAI), the Massachusetts Manufacturing Extension Program (Mass MEP), Rockwell Collins and Metis Design met with host company Textron Systems in an historic collaborative effort to map the enterprise value stream of Textron's Sensor Fuzed Weapons (SFW) program. The workshop also included participation from the US Air Force, Alliant Techsystems, Cessna Aircraft, Herley Industries, and Pioneer Aerospace.

By utilizing LAI's Lean Enterprise Value (LEV) Business Simulation (aka "the Game"), the workshop convincingly showcased how a collaborative engagement can benefit all – not just some – of the stakeholders in an enterprise relationship. By adopting a group approach involving all stakeholders, customer, suppliers, and Textron alike, the program from the start was able to take advantage of synergies as well as leverage and combine resources to reduce the amount of time and effort involved in the mapping of the SFW program. This collaborative model is a hallmark and key benefit of membership within the LAI consortium.

A feature key to the success of this collaborative workshop was the use of LAI's newly released enterprise simulation tool, the LEV Simulation. In fact, Textron Systems is the first consortium member to make full use of the entire LEV Simulation in the context of a collaborative workshop involving all stakeholders for an entire program.

The LEV Simulation is a complete, flexible simulation of a complex enterprise, which allows interactive, hands-on lessons in lean improvement. In this case, it proved successful in establishing an enterprise framework applicable to Textron's SFW product line.

The speed with which the LEV Simulation was able to unite stakeholders in developing meaningful outcomes to aid the SFW program in different modes was a key benefit of the exercise. As one Air Force participant noted, "the inclusion of all elements of the enterprise game gave great perspective on the inter-relationships inherent in an organization, in both a steady state and disruptive mode".

Additionally, the LEV Simulation points to ways to eliminate waste across an entire enterprise, not merely in production. As one Textron supplier noted, a key advantage is the ability "to find waste in areas outside of production alone."

One of the most important attributes of the LEV Simulation is its ability to transcend operational units and instead embrace all groups that make up the enterprise. Textron Systems' Director of Business Development for Surveillance and Strike Weapons, Mark Rafferty, noted, "I'm surprised that as a business development guy I would benefit so much from the training, but I definitely did."

Dr. Hugh McManus of Metis Design, a co-designer of the LEV Simulation and facilitator for the workshop, underscored the crucial importance of the LEV Simulation to the

experience: “A special version of the LEV Simulation was created with strong parallels to the current state of the SFW program. This focused learning during the simulation, so that the experience gained in understanding and improving the simulated enterprise could be applied directly to the SFW program. Most significantly, the current and future value stream maps of the simulation had strong parallels with the SFW’s VSMs, allowing the experience of mapping out the simple, simulated world to be directly applied to the real world exercise that followed.”

This was a pioneering effort in shared responsibilities among all stakeholders, and equally an opportunity for all groups to communicate on equal footing within the context of potentially adding value to the customer across the entire enterprise, while also maintaining a “win win” situation for its customers and suppliers. One attendee from Pioneer Aerospace, a prime supplier to Textron, added: “I plan to use these tools both to improve efficiencies with Textron and within our own organization.”

LAI consortium member Rockwell Collins played a key role in the workshop by acting as facilitators of the LEV Simulation. As co-facilitator Tom Bednar noted, “The true power of the simulation lies in its integration. It demonstrates how efficiencies in one functional area do not necessarily translate to improvements to the enterprise. The need for a ‘big picture’ view and coordination among all stakeholders within the enterprise is demonstrated very well during the simulation.”

The overall objectives of the workshop were threefold: to identify opportunities to accelerate implementation of lean principles and practices at the SFW program enterprise level; to elevate enterprise value stream thinking among participants; and to deliver more SFW systems or equivalent resource capabilities to the user at a given program budget level.

The three-week workshop began with a tutorial on lean principles and a simulation of lean manufacturing from Mass MEP. Textron Systems President Richard Millman provided a video introduction and set the workshop’s expectations. The following week the group reconvened to develop the Enterprise Value Stream Maps (EVSMs) in earnest. Key to this exercise was the participants’ involvement in LAI’s LEVSG, which enabled them to develop true enterprise thinking and value stream mapping skills, from which they then created preliminary value stream maps.

Facilitators from LAI/MIT, Metis Design and Rockwell Collins supported the LEVSG and EVSM activities. The participants identified process steps in the preliminary SFW maps for additional focus and finished with assignments to collect more detailed information to refine the EVSMs.

The group met again the following week to complete these EVSMs as well as identify lean improvement actions to close the gap between the current and future states of the SFW program. A consolidated SFW current state map was created, and an “ideal [future] state” envisioned. This ideal state was then modified to reflect what could be done within a one- to two-year timeframe, resulting in a realistic, if aggressive, future state map for SFW. In fact, this synthesis of current and future state mapping is one of the workshop’s most significant achievements.

There are several others, of course, many of which are improvement projects that help close the gap between the SFW program's current and future states. In particular, twelve specific improvement projects were identified and selected. These were prioritized using group assessments of the impact of implementation vis-à-vis an anticipated project's difficulty or cost of investment. These projects, each with its own process owner and team members, are as follows:

- 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

Textron System's Vice President, Air Launched Weapons Tom Harrington summed up the importance of the workshop nicely, remarking that "The workshop provided a unique business partnering opportunity in which the US Air Force, Textron Systems, and Textron's SFW supplier base joined to collectively drive the future affordability of this combat proven weapon through a cutting-edge LAI simulation of lean applied at the enterprise level of this active U.S. Air Force production program."

Jeff Picard, Textron System's vice president for Lean Acceleration, added, "Many organizations recognize the importance of becoming lean. However, many organizations are doing lean without necessarily becoming lean. These Value Stream workshops provide the foundation for formulation of a lean implementation strategy that is based on data, and linked to customers' needs and expectations. I like to think of this process as providing us fact-based insight so that we are 'lean with a purpose'."

For further information on the workshop, please contact Geoff Bentley at Textron (gbentley@systems.textron.com). For further information on LAI and its enterprise value simulation tool, the Lean Enterprise Value Simulation Game, please contact Dr. Eric Rebentisch at LAI/MIT (erebenti@mit.edu) or Dr. Hugh McManus at Metis Design (hmcmanus@alum.mit.edu).



Collaborative enterprise planning at work



LEV Business Simulation in action



LEV Business Simulation explained