GOVERNMENT LEAN ENTERPRISE
SELF-ASSESSMENT TOOL
(GOVERNMENT LESAT) 1.0

May 2005

Acknowledgements

This Lean Aerospace Initiative (LAI) product utilizes elements of the Enterprise Transition To Lean (TTL) Roadmap and the Lean Enterprise Self-Assessment Tool (LESAT Version 1.0) to provide a structure and implementation reference for the self-assessment process.

The Enterprise Transition-to-Lean Roadmap was developed at the Massachusetts Institute of Technology (MIT) under the auspices of the Lean Aerospace Initiative (LAI) but funded separately as part of the Advanced Manufacturing Technology Feasibility Demonstrations (AMTFD) Program, issued to MIT by the Anteon Corporation on behalf of the Manufacturing Technology Division (MANTECH) of the U.S. Air Force Research Laboratory (AFRL).

The Massachusetts Institute of Technology (MIT), under the auspices of the U.S. Lean Aerospace Initiatives, developed the current version 1.0 of the Government Lean Enterprise Self-Assessment Tool (Government LESAT).

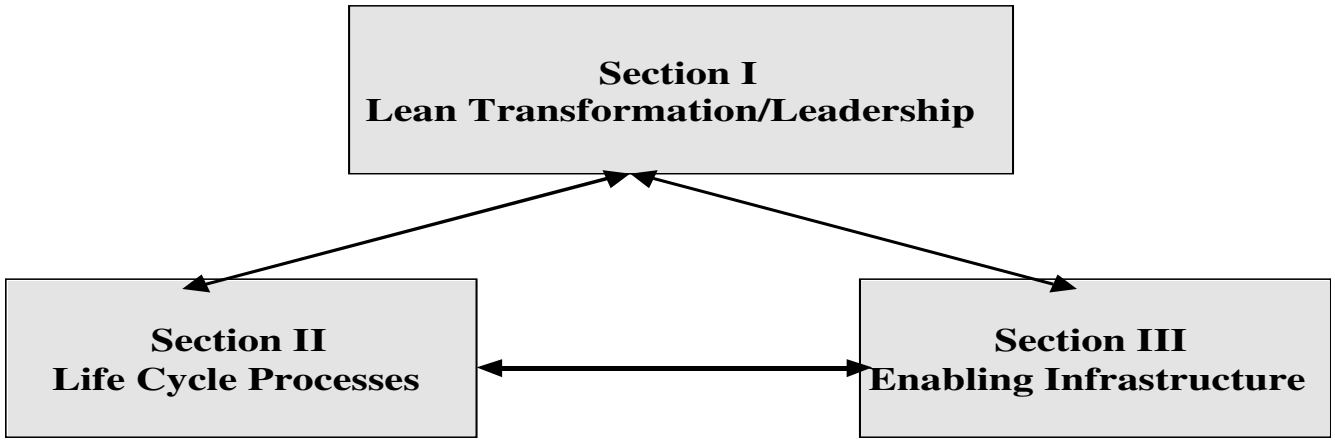
The U.S. Lean Aerospace Initiative is a consortium consisting of industry, government, and labor members joined with the Massachusetts Institute of Technology. The consortium is a cost share partnership with industry, MIT, and government. The Air Force Material Command with the Air Force Staff for Acquisition provides government leadership.

The core team consisting of Mr. Tom Shields and Major Ron Jobo developed the alpha version of the Government LESAT. All facts, statements, opinions, and conclusions expressed herein are solely those of the core team members in their capacity as principal co-authors of the tool.

Structure of Government LESAT Assessment Matrices

The Government LESAT Development Team developed its version as a modification to LESAT Version 1.0 to make the language more compatible with government organizations. The LESAT solicited input from a wide variety of LAI consortium members to determine the set of factors considered most important in transitioning to a lean enterprise. The Team determined an overarching organizing structure for the LESAT matrices consisting of three major sections (see Figure 1). This same organizing structure was used in the Government LESAT.

Figure 1. Government LESAT Architecture



The Enterprise Level Assessment Architecture is the basis for the Government LESAT. It provides the generic process definition found in the original LESAT and most aerospace enterprises. The Government LESAT is organized into these three assessment sections:

Lean Transformation/Leadership - the processes and leadership attributes nurturing the transformation to lean principles and practices
Life Cycle Processes - the processes responsible for the product from conception through post-delivery support
Enabling Infrastructure - the processes that provide and manage the resources enabling enterprise operations

Section I contains those lean practices pertinent to the lean transformation process, with emphasis on enterprise leadership and change management. Section II contains those lean practices pertinent to the "life cycle processes" of an enterprise, i.e., those processes involved in product realization. Section III contains those lean practices pertinent to the infrastructure support units. ***It is important to remember that all practices in these three sections are expressed at the enterprise level.***

Consequently, the lean maturity matrices for Government LESAT are organized as shown in Figure 2.

Figure 2. Organization of Government LESAT Maturity Matrices

Section I – Lean Transformation/Leadership

- I.A Enterprise Strategic Planning (3 lean practices)
- I.B Adopt Lean Paradigm (4 lean practices)
- I.C Focus on the Value Stream (4 lean practices)
- I.D Develop Lean Structure and Behavior (7 lean practices)
- I.E Create and Refine Transformation Plan (3 lean practices)
- I.F Implement Lean Initiatives (2 lean practices)
- I.G Focus on Continuous Improvement (5 lean practices)

Section II – Lifecycle Processes

- II.A Set-up the Enterprise (4 lean practices)
- II.B Build Relationships (3 lean practices)
- II.C Develop the Plan (5 lean practices)
- II.D Implement the Plan (4 lean practices)
- II.E Learn, Improve, and Sustain (2 lean practices)

Section III – Enabling Infrastructure

- III.A Lean Organizational Enablers (5 lean practices)
- III.B Lean Process Enablers (3 lean practices)

Government LESAT SUMMARY SHEETS

To facilitate the assessment effort, a set of Summary Sheets has been devised to record (1) the current capability level and (2) the desired capability level for each of the lean practices contained in the Government LESAT matrices. The gaps between the current and desired state provide a basis for determining modifications to the Enterprise Level Lean Transformation Plan, and for on-going continuous improvement initiatives.

Government LESAT Enterprise Self-Assessment Tool (Government LESAT) 1.0

SECTION I SUMMARY SHEET - LEAN TRANSFORMATION/LEADERSHIP

Process Definition: Develop and deploy lean implementation plans throughout the enterprise leading to (1) long-term sustainability, (2) acquiring competitive advantage, and (3) satisfaction of stakeholders.

TTL Link	Lean Practice	Lean Characteristic	Capability Level	
			Current	Desired
I.A. Enterprise Strategic Planning	I.A.1 - Integration of lean in strategic planning process	Lean impacts value delivery in terms of cycle time and capability		
	I.A.2 - Focus on customer value	Customers pull value from enterprise value stream		
	I.A.3 - Leveraging the extended enterprise	Value stream extends from customer through the enterprise to supporting organizations		
		Average		
I.B. Adopt Lean Paradigm	I.B.1 - Learning and education in lean for enterprise leaders	"Unlearning" the old, learning the new		
	I.B.2 - Senior management commitment	Senior management leading it personally		
	I.B.3 - Lean enterprise vision	New mental model of the enterprise		
	I.B.4 - A sense of urgency	The primary driving force for lean		
		Average		
I.C. Focus on Value Stream	I.C.1 - Understanding current value stream	How we now deliver value to customers		
	I.C.2 - Enterprise flow	"Single piece flow" of materials and information		
	I.C.3 - Designing future value stream	Value stream to meet the enterprise vision		
	I.C.4 - Performance measures	Performance measures drive enterprise behavior		
		Average		
I.D. Develop Lean Structure and Behavior	I.D.1 - Enterprise organizational orientation	Organize to support value delivery		
	I.D.2 - Relationships based on mutual trust	"Win-win" vs. "we-they"		
	I.D.3 - Open and timely communications	Information exchanged when required		
	I.D.4 - Employee empowerment	Decision-making at lowest possible level		
	I.D.5 - Incentive alignment	Reward the behavior you want		
	I.D.6 - Innovation encouragement	From risk aversion to risk rewarding		
	I.D.7 - Lean change agents	The inspiration and drivers of change		
		Average		

GOVERNMENT LESAT SECTION I SUMMARY SHEET - CONTINUED

Process Definition: Develop and deploy lean implementation plans throughout the enterprise leading to (1) long-term sustainability, (2) acquiring competitive advantage, and (3) satisfaction of stakeholders.

TTL Link	Lean Practice	Lean Characteristic	Capability Level	
			Current	Desired
I.E. Create/Refine Transformation Plan	I.E.1 - Enterprise-level lean transformation plan	Charting the course across the extended enterprise		
	I.E.2 - Commit resources for lean improvements	Resource provision for lean		
	I.E.3 - Provide education and training	Just-in-time learning		
		Average		
I.F. Implement Lean Initiatives	I.F.1 - Development of detailed plans based on enterprise plan	Coordinating lean improvements		
	I.F.2 - Tracking detailed implementation	Assessing actual outcomes against goals		
		Average		
I.G. Focus on Continuous Improvement	I.G.1 - Structured continuous improvement processes	Uniformity in how we get better		
	I.G.2 - Monitoring lean progress	Assessing progress toward achieving enterprise objectives		
	I.G.3 - Nurturing the process	Assure senior leader involvement		
	I.G.4 - Capturing lessons learned	Ensuring that successes lead to more successes		
	I.G.5 - Impacting enterprise strategic planning	Results lead to strategic opportunities		
		Average		

SECTION II SUMMARY SHEET – LIFE CYCLE PROCESSES

Process Definition: Implement lean practices across life cycle processes for defining customer requirements, designing products and processes, managing supply chains, producing the product, distributing product and services and providing post delivery support.

TTL Link	Lean Practice	Lean Characteristic	Capability Level	
			Current	Current
II.A. Set-up the Enterprise	II.A.1 - Leverage Lean capability for new opportunities	Exploiting new opportunities arising from lean enabled capabilities		
	II.A.2 - Optimize the capability and utilization of assets	Lean enables mission growth through the redeployment of assets		
	II.A.3 - Provide capability to manage risk, cost, schedule and performance	Success follows effective risk management		
	II.A.4 – Allocate resources for program/ project development efforts	Teaming for success		
		Average		
II.B. Build Relationships	II.B.1 - Define and develop relationships with stakeholders	Aligning stakeholder values through relationships that build credibility		
	II.B.2 - Optimize the relationship	Creating effective relationships to achieve customer value		
	II.B.3 - Foster innovation and knowledge-sharing	Incentivizing innovation through stakeholder involvement		
		Average		

SECTION II SUMMARY SHEET – LIFE CYCLE PROCESSES - CONTINUED

Process Definition: Implement lean practices across life cycle processes for defining customer requirements, designing products and processes, managing supply chains, producing the product, distributing product and services and providing post delivery support.

TTL Link	Lean Practice	Lean Characteristic	Capability Level	
			Current	Current
II.C. Develop the Plan	II.C.1 - Establish a requirement definition process to optimize life cycle value	Stakeholder pull *vs.* technology/product push		
	II.C.2 - Capture data from the extended enterprise to optimize future requirement definitions	Closed loop processes are in place to capture operational performance data		
	II.C.3 - Incorporate *stakeholder value* into design of products and processes	Understanding stakeholder value facilitates fewer development perturbations		
	II.C.4 - Incorporate downstream *stakeholder* values into products and processes	Understanding downstream stakeholders allows value to flow seamlessly		
	II.C.5 - Create a multidisciplinary approach	Breaking down of functional silos enables seamless communication and value flow		
		Average		

GOVERNMENT LESAT SECTION II SUMMARY SHEET - CONTINUED

Process Definition: Implement lean practices across life cycle processes for defining customer requirements, designing products and processes, managing supply chains, producing the product, distributing product and services and providing post delivery support.

TTL Link	Lean Practice	Lean Characteristic	Capability Level	
			Current	Current
II.D. Implement the Plan	II.D.1 - Utilize knowledge and capability in decision making	Strategic leveraging of stakeholder capability		
	II.D.2 - Foster lean behavior throughout the value stream	Promoting stakeholder innovation and flexibility		
	II.D.3 - Align customer requirements and expectations with the extended enterprise	Aligning customer and stakeholder expectations		
	II.D.4 - Transition product/service in a lean fashion	Right product for a ready customer		
		Average		
II.E. Learn, Improve, and Sustain	II.E.1 - Enhance value of delivered products and services to customers and the enterprise	Responding to the voice of the customer		
	II.E.2 - Provide post delivery service, support and sustainability	Providing customer solutions		
		Average		

SECTION II SUMMARY SHEET – ENABLING INFRASTRUCTURE

Process Definition: To achieve a successful lean transformation, the enterprise infrastructure must support the implementation of Lean principles, practices and behavior.

TTL Link	Lean Practice	Lean Characteristic	Capability Level Current	Capability Level Current
III.A. Lean Organizational Enablers	III.A.1 - Financial system supports lean transformation	Lean requires appropriate financial data		
	III.A.2 - Enterprise stakeholders pull required financial information	Data on demand		
	III.A.3 - Promulgate the learning organization	Learning organizations create a flexible workforce		
	III.A.4 - Enable the lean enterprise with information systems and tools	Facilitate the flow of information and knowledge		
	III.A.5 - Integration of environmental protection, health, and safety into the enterprise	"Cleaner, healthier, safer"		
		Average		
III.B. Lean Process Enablers	III.B.1 - Process standardization	Strive for consistency and re-use		
	III.B.2 - Common tools and systems	Assuring compatibility, reducing costs		
	III.B.3 - Variation reduction	Reduce uncertainty by reducing variation		
		Average		

GOVERNMENT LESAT SUMMARY SHEET			Lean Competence				
	Sub-Sections	Lean Practices	Level 1	Level 2	Level 3	Level 4	Level 5
(I)Lean Transformation / Leadership	I.A. Enterprise Strategic Planning	I.A.1. Integration of lean in strategic planning process					
		I.A.2. Focus on customer value					
		I.A.3. Leveraging the extended enterprise					
	I.B. Adopt Lean Paradigm	I.B.1. Learning and education in "lean" for enterprise leadership					
		I.B.2. Senior management commitment					
		I.B.3. Lean enterprise vision					
		I.B.4. A sense of urgency					
	I.C. Focus on Value Stream	I.C.1. Understanding the current value stream					
		I.C.2. Enterprise flow					
		I.C.3. Designing future value stream					
		I.C.4. Performance measures					
	I.D. Develop Lean Structure and Behavior	I.D.1. Enterprise organizational orientation					
		I.D.2. Relationships based on mutual trust					
		I.D.3. Open and timely communications					
		I.D.4. Employee empowerment					
		I.D.5. Incentive alignment					
		I.D.6. Innovation encouragement					
		I.D.7. Lean change agents					
	I.E. Create/Refine Transformation Plan	I.E.1. Enterprise-level lean transformation plan					
		I.E.2. Commit resources for lean improvements					
		I.E.3. Provide education and training					
	I.F. Implement Lean Initiatives	I.F.1. Development of detailed plans based on enterprise plan					
		I.F.2. Tracking detailed implementation					
	I.G. Focus on Continuous Improvement	I.G.1. Structured continuous improvement processes					
		I.G.2. Monitoring lean progress					
		I.G.3. Nurturing the process					
		I.G.4. Capturing lessons learned					
		I.G.5. Impacting enterprise strategic planning					

GOVERNMENT LESAT SUMMARY SHEET			Lean Competence				
	Sub-Sections	Lean Practices	Level 1	Level 2	Level 3	Level 4	Level 5
(II) Life-cycle Processes	II.A. Set-up the Enterprise	II.A.1. Leverage lean capability for new opportunities					
		II.A.2. Optimize the capability and utilization of assets					
		II.A.3. Provide capability to manage risk, cost, schedule and performance					
		II.A.4. Allocate resources for program/project development efforts					
	II.B. Build Relationships	II.B.1. Define and develop relationships with stakeholders					
		II.B.2. Optimize the relationship					
		II.B.3. Foster innovation and knowledge-sharing					
	II.C. Develop the Plan	II.C.1. Establish a requirement definition process to optimize life cycle value					
		II.C.2. Capture data from extended enterprise to optimize future requirement definitions					
		II.C.3. Incorporate *stakeholder value* into design of products and processes					
		II.C.4. Incorporate downstream *stakeholder values* into products and processes					
		II.C.5. Create a multidisciplinary approach					
	II.D. Implement the Plan	II.D.1. Utilize knowledge and capability in decision making					
		II.D.2. Foster lean behavior throughout the value stream					
		II.D.3. Align customer requirements and expectations with the extended enterprise					
		II.D.4. Transition product/service in a lean fashion					
	II.E. Learn, Improve and Sustain	II.E.1. Enhance value of delivered products and services to customers and the enterprise					
		II.E.2. Provide post delivery service, support and sustainability					
(III) Enabling Infrastructure	III.A. Lean Organizational Enablers	III.A.1. Financial system supports lean transformation					
		III.A.2. Enterprise stakeholders pull required financial information					
		III.A.3. Promulgate the learning organization					
		III.A.4. Enable the lean enterprise with information systems and tools					
		III.A.5. Integration of environmental protection, heath and safety into the enterprise					
	III.B. Lean Process Enablers	III.B.1. Process standardization					
		III.B.2. Common tools and systems					
		III.B.3. Variation reduction					

Government LESAT Maturity Matrices

Section I: Lean Transformation/Leadership

I.A. Enterprise Strategic Planning

I. B. Adopt Lean Paradigm

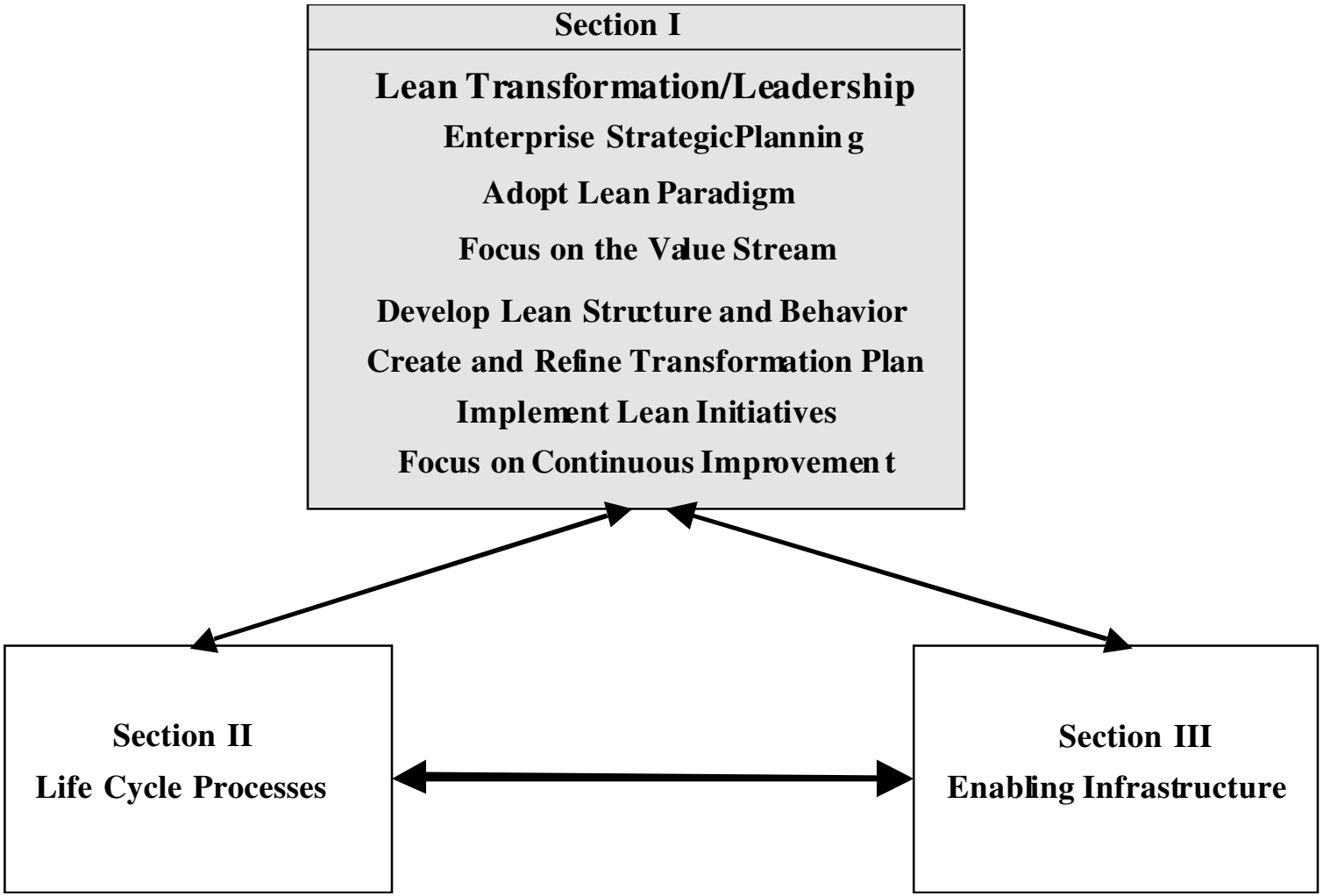
I. C. Focus on Value Stream

I. D. Develop Lean Structure and Behavior

I. E. Create and Refine Transformation Plan

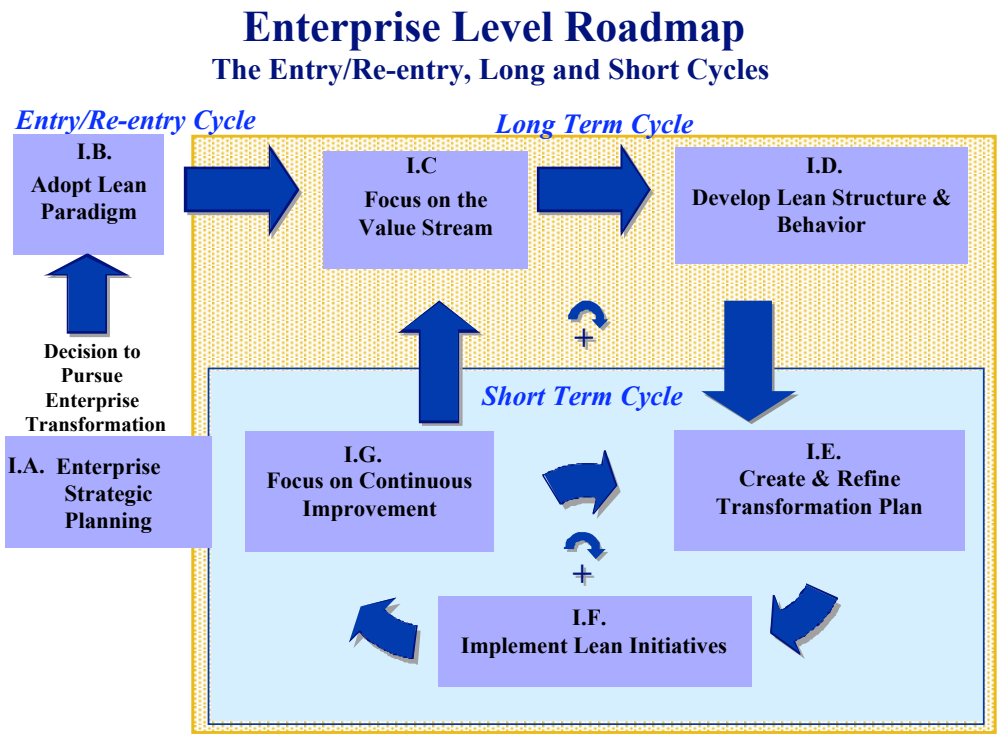
I. F. Implement Lean Initiatives

I. G. Focus on Continuous Improvement



Lean transformation/leadership consists of the major elements contained within the Transition to Lean (TTL) Roadmap. The TTL Roadmap describes a logical sequence of primary activities and major tasks required to complete each of these Primary Activities. The TTL Roadmap portrays the overall "flow" of action steps necessary to initiate, sustain, and continuously refine an enterprise transformation based on lean principles and practices.

Transition-To-Lean Roadmap: Enterprise Level



The Enterprise Level Transition-to-Lean Roadmap provides a general framework for assisting companies in their transition to lean. It portrays an overall "flow" of action steps that can initiate, sustain, and continuously refine the transformation of an enterprise based on lean principles and practices.

The Roadmap comprises three "cycles." First is the *Entry/Re-entry Cycle*, which specifies the actions associated with the decision to adopt the lean paradigm. This cycle is closely linked to the Enterprise Strategic Planning cycle. The second cycle is called the *Long Term Cycle*, in which the environment and conditions necessary for a successful lean transformation are created. The organization is then prepared for launching into detailed planning and implementation. The third cycle is the *Short Term Cycle*, in which detailed implementation is planned, executed, and monitored. This cycle has a fast clock speed, with ongoing action-monitoring-corrective action phases. The Long Term Cycle is re-entered periodically to capitalize on lessons learned during implementation and to accommodate changes occurring in the dynamic external environment.

Enterprise Strategic Planning

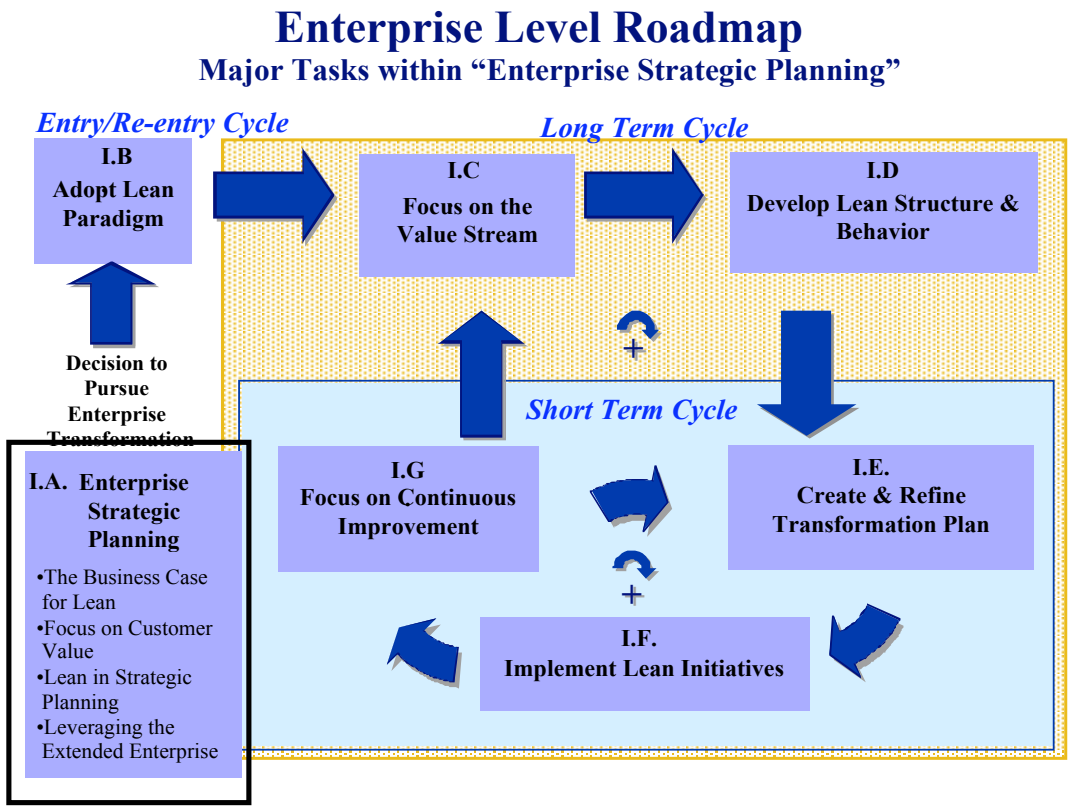
I.A. Enterprise Strategic Planning

The Business Case for Lean

Focus on Customer Value

Lean in Strategic Planning

Leveraging the Extended Enterprise



Significant, fundamental shifts in the competitive environment cause each affected enterprise to undertake a comprehensive review of its "collective mental model." This amounts to a thorough analysis and evaluation of its fundamental structure and its relationship with the external environment.

Many of the traditional assumptions underlying the enterprise's processes, practices, policies, and behavior will no longer be valid. A lean enterprise has a far different "look and feel"; indeed, it will "do business" (both internally and externally) in fundamentally new ways.

Lean implementation activities are enablers for achieving strategic objectives and as such must be an integral part of strategic and operational plans. Full benefits of lean implementation are achieved when they encompass the extended enterprise.

SECTION I: LEAN TRANSFORMATION/LEADERSHIP

Definition: Develop and deploy lean implementation plans throughout the enterprise leading to (1) long-term sustainability, (2) acquiring competitive advantage, and (3) satisfaction of stakeholders.

I.A. Enterprise Strategic Planning

The decision to pursue a lean transformation is strategic in nature. Its impact throughout the enterprise is profound and pervasive, affecting all business practices and processes. The lean enterprise will behave in a fundamentally new manner, significantly eliminating waste and enhancing relationships with all stakeholders.

Diagnostic Questions

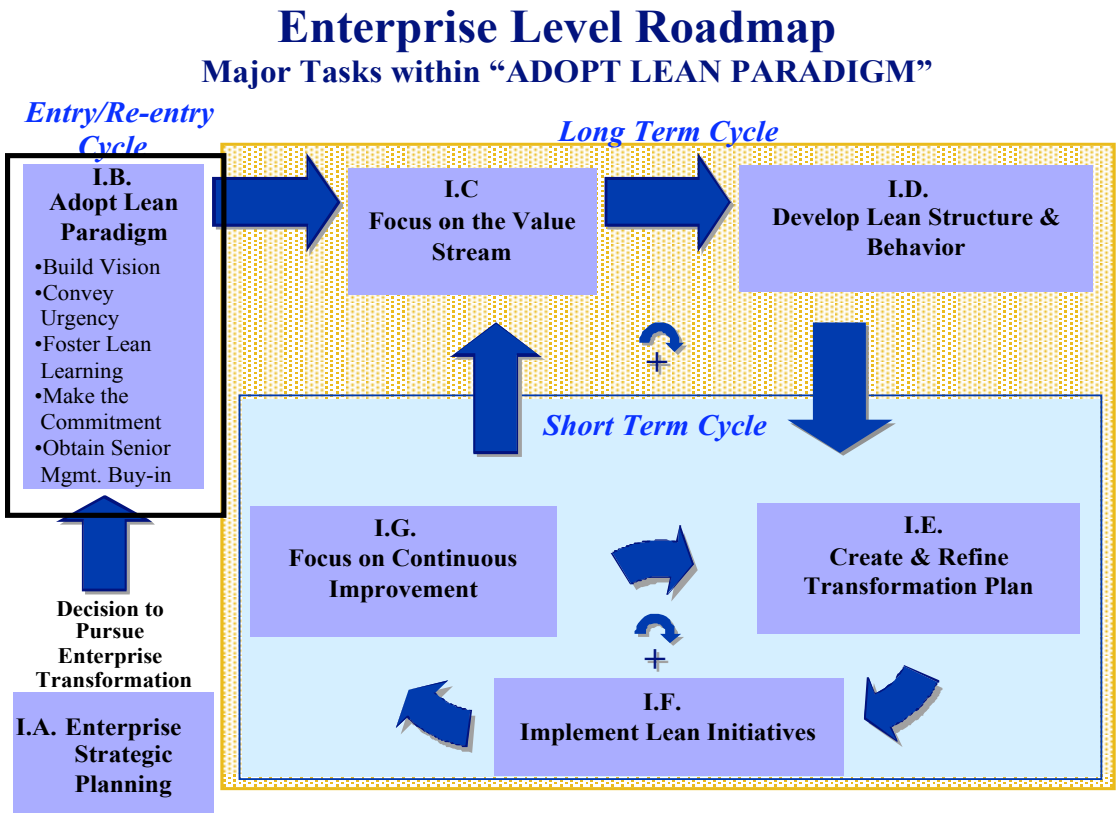
- Are enterprise leaders familiar with the dramatic increases in responsiveness as a result of transitioning to lean?
- Are enterprise leaders fully aware of the potential opportunities (i.e., shorter cycle times, needed capabilities at an affordable price) that can be realized within their own organization as a result of transitioning to lean?
- Has a suitable strategy for value delivery been identified to utilize resources freed up by improvements?
- Does "customer value" strongly influence the strategic direction?
- Has full leverage of the extended enterprise stakeholders been incorporated into the strategic plan?

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.A.1.	**Integration of Lean in Strategic Planning Process** *Lean impacts value delivery in terms of cycle time and capability*	Concepts and benefits of lean principles and practices are not evident in culture or strategic plans. **C** **D**	Lean is recognized, but relegated to lower levels of the enterprise and application is fragmented. **C** **D**	The value implications of lean are understood and lean implementation plans are formulated, but not integrated into the strategic plan. **C** **D**	Transitioning to lean is adopted as a key enterprise strategy and included in the strategic plan. **C** **D**	Strategic plans leverage the results of lean implementation to achieve shorter cycle times and affordable capability. **C** **D**
	Lean Indicators (Examples)	• Lean implementation is included explicitly in the enterprise strategic plan. • Strategic planning makes allowance for anticipated gains from lean improvements.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.A.2.	**Focus on Customer Value** *Customers pull value from enterprise value stream*	Means of defining value to customer(s) is informal and unstructured. C D	Structured process for defining value is applied to selected customers. C D	How the enterprise can best contribute to customer's success is well defined and incorporated into most projects/programs. C D	Customer definition of value strongly influences the strategic direction. C D	Enterprise processes are enhanced, as customer value becomes the predominant driving force throughout the extended enterprise. C D
	Lean Indicators (Examples)	• Enterprise employs a formal process for determining customer value. • The enterprise understands what constitutes success for its customers. • A formal process exists to measure and assess customer satisfaction. • Customer value strongly influences policies, practices, and behavior.				
	Evidence					
	Opportunities					
LP #	**Lean Practices**	**Capability Levels**				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.A.3.	**Leveraging the Extended Enterprise** *Value stream extends from customer through the enterprise to supporting organizations*	Relations between organizations reflect a "we-they" mentality. C D	Initial opportunities identified for establishing extended enterprise linkages. C D	Strategic planning process explicitly includes consideration of key stakeholders in value streams. C D	Integration and balancing of stakeholder values are achieved via collaborations between supporting organizations and strategic partnering. C D	Integration of the extended enterprise contributes to innovation, value delivery, responsiveness and affordable capability. C D
	Lean Indicators (Examples)	• Strategic planning is strongly influenced by stakeholder and customer value. • Strategic planning encompasses the total enterprise, including customer, alliances/partners, employees, and supporting organizations. • Risk and responsibilities are apportioned when leveraging the extended enterprise partners.				
	Evidence					
	Opportunities					

Adopt Lean Paradigm

I.B. Adopt Lean Paradigm
Build Vision
Convey Urgency
Foster Lean Learning
Make the Commitment
Obtain Senior Management Buy-in



The lean paradigm consists of many concepts, principles, and practices that are counter-intuitive and diametrically opposed to those of mass production. Most of today's business leaders climbed the ladder of success while following the same mass-production practices they are now being asked to abandon.

Lean requires a deep understanding of the fundamental aspects of an enterprise and a vision for its interactions with the rest of the world. This segment of the Roadmap provides a framework for acquiring an in-depth understanding of lean and for obtaining full commitment from senior managers to launch a lean transformation.

I.B. Adopt Lean Paradigm

Transitioning to lean requires a significant modification to the strategic plan of the enterprise. It is imperative that the enterprise leadership understands and buys into the lean paradigm as they will be required to create a vision for doing business, behaving, and seeing value in fundamentally different ways.

Diagnostic Questions

- **Do enterprise leaders and senior managers understand the lean paradigm at the enterprise level?**
- **Do all senior leaders and management enthusiastically support a transformation to lean?**
- **Has a common vision of lean been communicated throughout the enterprise and within the extended enterprise?**
- **Has a compelling case been developed for the lean transformation?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.B.1.	**Learning and Education in "Lean" for Enterprise Leadership** *"Unlearning" the old, learning the new*	Little interest in learning lean principles is evident among enterprise leadership. **C** **D**	Leaders are actively seeking opportunities to learn about lean. There is an initial grasp of the extent of the paradigm shift for the enterprise. **C** **D**	The leaders are adopting lean learning and continuously applying lean principles across the enterprise. **C** **D**	Leaders contribute to the development or refinement of the body of knowledge about lean. **C** **D**	Lessons learned in implementing lean are actively shared across the organization and within the extended enterprise. **C** **D**
	Lean Indicators (Examples)	• A formal lean education process for senior leaders has been established. • Majority of enterprise leaders have received significant exposure and education in lean principles, practices and behavior. • Leaders regularly apply and use lessons learned in lean.				
	Evidence					
	Opportunities					

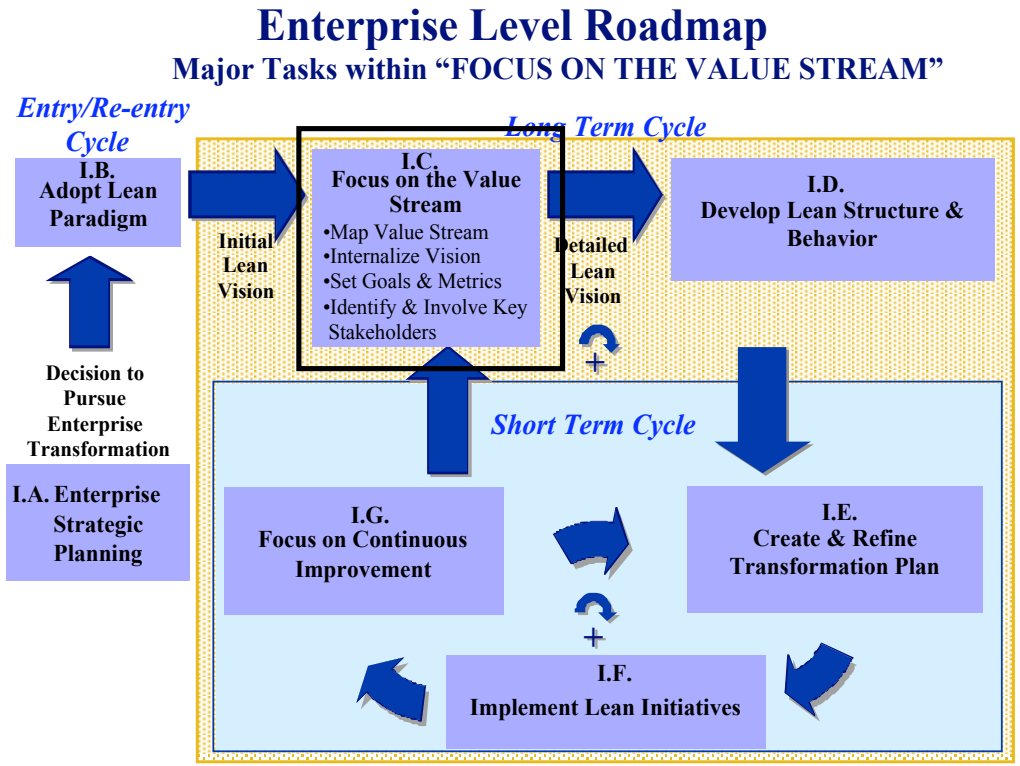
LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.B.2.	**Senior Management Commitment** *Senior management leading it personally*	Level of commitment among senior leaders and management is variable – some endorse while others may actively resist. C D	Senior management buys into group commitment; senior leaders / managers who cannot or will not adapt are replaced. C D	Lean is integral to enterprise-wide meetings, senior staff meetings, etc.; senior managers personally and visibly lead lean transition. C D	Senior leaders are championing the transformation to lean within the enterprise. C D	Senior leaders and management mentor and foster lean champions internally and throughout the extended enterprise. C D
	Lean Indicators (Examples)	• There is a consensus commitment supporting a transformation to lean. • Management provides support and recognition for positive actions • Senior management are champions in transforming the enterprise.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.B.3.	**Lean Enterprise Vision** *New mental model of the enterprise*	Senior leaders have varying visions of lean, from none to well-defined. C D	Senior leaders adopt common vision of lean. C D	Lean vision has been communicated and is understood by most employees. C D	Common vision of lean is shared by the extended enterprise. C D	Stakeholders have internalized the lean vision and are an active part of achieving it. C D
	Lean Indicators (Examples)	• The role that lean plays in achieving the vision is clearly defined. • The vision has been communicated to all levels and has extensive buy-in by most employees. • The vision incorporates a new mental model of how the organization would act and behave according to lean principles and practices.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.B.4.	**A Sense of Urgency** *The primary driving force for lean*	Scan of environment identifies competitive threats to responsiveness and need for action. C D	Enterprise senior leaders develop an urgent and compelling case for the lean transformation. C D	Urgent and compelling case for lean transformation has been communicated and the organization rallies behind it. C D	Urgent and compelling case for lean is expanded to and accepted by key supporting organizations. C D	Urgent and compelling case for lean is expanded to and accepted throughout the extended enterprise. C D
	Lean Indicators (Examples)	• A compelling case for lean has been developed and communicated. • The implications and time scales of the vision have been translated for each area of the enterprise. • Lean transformation progress is integral to leadership discussions and events.				
	Evidence					
	Opportunities					

Focus on the Value Stream

I.C. Focus on the Value Stream
Map Value Stream
Internalize Vision
Set Goals and Metrics
Identify and Involve Key Stakeholders



A primary concept of lean thinking is that all actions and resources of a firm should be focused on *creating value for its customers*. Any action or resource expenditure that cannot be associated with this goal is regarded as *waste* and should be eliminated.

It is helpful to visualize customers "pulling" value from the organization, resulting in cascaded pulling actions back upstream across all enterprise functions. The pulling action extends beyond the enterprise to supporting organizations and other external agencies.

Enterprise goals and metrics should also be expressed in terms of value-added, thereby better defining for the enterprise how to capture the customer's perception of value.

In a complex enterprise, it is useful to visualize and consider the balance of the primary value streams that flow to all of the primary stakeholders. It is important to optimize across these value streams by taking a global systems view.

I.C. Focus on the Value Stream

Value creation with minimal waste becomes the primary driving force of the enterprise. The current means of delivering customer value are documented, followed by improving the value stream by minimizing waste. Lean metrics are specified and stakeholder involvement clarified.

Diagnostic Questions

- **Is a formal process utilized to explicitly determine "value to the customer"?**
- **Have the value streams of all stakeholders been mapped, integrated and balanced?**
- **Does the enterprise understand how material and information flow throughout the various elements of the enterprise?**
- **Are enabling infrastructure processes being aligned to value stream flow?**
- **Does the enterprise understand clearly how it currently delivers value to customers?**
- **Has a system of balanced performance measures been established that reflect progress towards strategic enterprise objectives?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.C.1.	**Understanding the Current Value Stream** *How we now deliver value to customers*	The documented process flow differs from the actual flow. There is an initial understanding of the need for formal mapping and analysis. **C** **D**	Key stakeholders and what they value are identified. Present processes are mapped and initial analysis is underway. **C** **D**	Principal current value stream(s) are defined, allowing the identification of critical interactions. Significant opportunities for eliminating waste and creating value are identified and aligned with the strategic objectives. **C** **D**	Depth and breadth of knowledge of value stream elements and supporting processes exposes inter-dependencies across the enterprise. **C** **D**	Updated value streams and their independencies are evaluated across the extended enterprise. **C** **D**
	Lean Indicators (Examples)	• A formal process has been established for identifying customer and stakeholder value. • The practice and language of value stream mapping is recognized as an important part of an iterative improvement process. • Current value streams of major customers/product lines have been mapped, and hand off points and interfaces clearly defined.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.C.2.	**Enterprise Flow** *"Single piece flow" of materials and information*	Material and information flows are disjointed and optimized process by process. "Push" mentality prevails. C D	Some primary flow paths have been overhauled to overcome significant barriers to flow. C D	Primary flow paths are simplified and aligned to the value stream(s), which allows information and material to flow as required. C D	Material and information flow seamlessly throughout the enterprise. C D	Material and information flow seamlessly and responsively throughout the extended enterprise. C D
	Lean Indicators (Examples)	• Information flows have been rationalized to assure interoperability among enterprise elements. • Material flow paths have been simplified and shortened to enhance flow. • Information and material flows are responsive to stakeholder needs.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.C.3.	**Designing the Future Value Stream** *Value stream to meet the enterprise vision*	Management understands that the present processes do not meet the future lean enterprise objectives. C D	A concept for future value stream(s) design has been created based on balanced stakeholder requirements. C D	Future value stream(s) are developed, which encompass future enterprise goals and satisfy stakeholder requirements. C D	Future value stream(s) are refined to accommodate a changing environment. C D	Future value stream(s) are refined to dynamically accommodate a changing environment across the extended enterprise. C D
	Lean Indicators (Examples)	• A formal process has been established to identify how the enterprise can best deliver value to customers and stakeholders. • The future value stream(s) reflects new and improved ways to realize value and minimize non-value adding activities. • Future value stream(s) designs have been generated for the primary value stream(s) and their supporting processes.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.C.4.	**Performance Measures** *Performance measures drive enterprise behavior*	Performance measures are ad hoc, inconsistent and focused on functional areas rather than value streams. C D	Baseline performance measures are established to stimulate progress towards the lean future state and are visible throughout the enterprise. C D	Performance measurement system uses a minimal and balanced set of measures based on strategic objectives and aligning local with enterprise metrics. C D	Measurement systems and target-setting pulls performance improvement throughout the enterprise. C D	A common target-setting and measurement process pulls performance improvement across the extended enterprise. C D
	Lean Indicators (Examples)	• A balanced and minimal set of performance measures are used to track lean implementation progress towards the strategic direction. • Performance measures used assure that local and enterprise measures are aligned.				
	Evidence					
	Opportunities					

Develop Lean Structure and Behavior

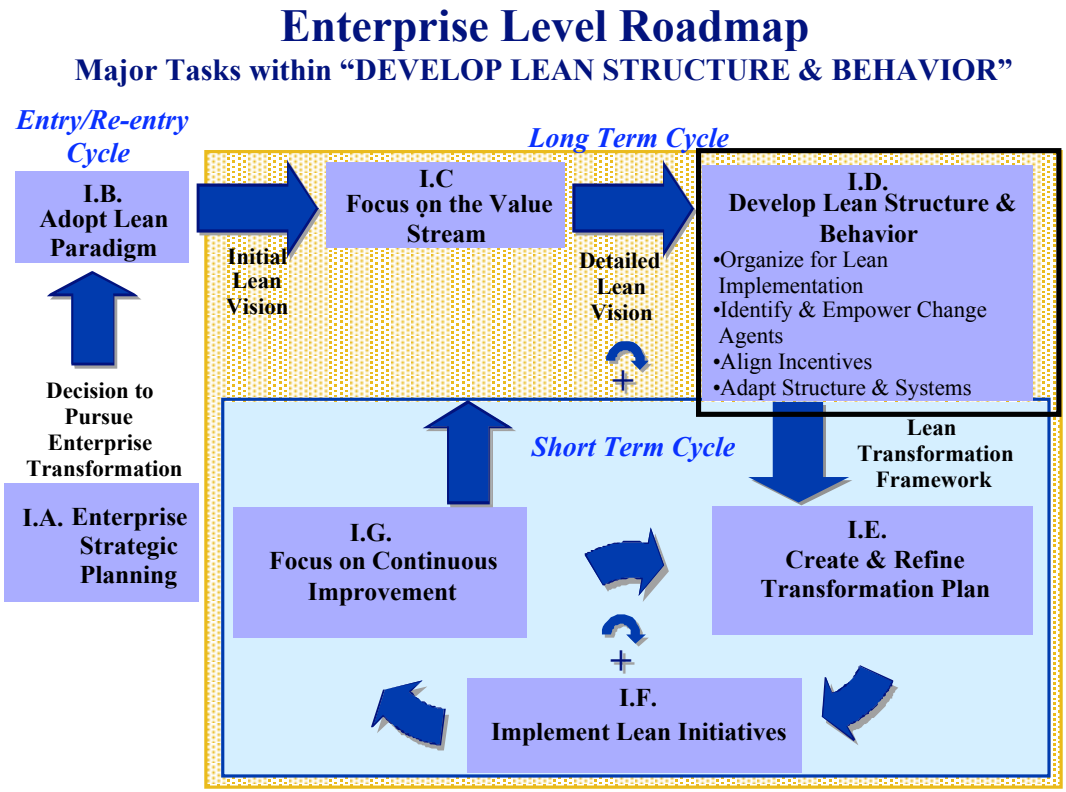
I.D. Develop Lean Structure and Behavior

Organize for Lean Implementation

Identify and Empower Change Agents

Align Incentives

Adapt Structure and Systems



This section of the Roadmap deals with creating the mental model and conditions within the enterprise that will enhance the successful implementation of lean principles and practices.

Both the *structure* and the *behavior* of lean organizations are significantly different from those of rule based/functional organizations. The rule based/functional mentality, so firmly embedded in the organization's collective mindset, must be relentlessly rooted out and banished. Lean principles and practices must be learned, practiced, and perfected through continuous improvement efforts, facilitated by change agents.

Lean may have an impact on organizational structure as well. Incentives must be rationalized with the new behavior desired. Consequently, there will be an impact on most business systems, processes, and policies.

I.D. Develop Lean Structure and Behavior

Organization infrastructure must be assessed and modified prior to launching a lean initiative as well as throughout the transformation itself. Organizational structure, incentives, policies, business systems and processes must be aligned and coordinated to elicit the behavior required for successful implementation of lean principles and practices.

Diagnostic Questions

- **Has an organizational structure been implemented that focuses on core processes along the customer value stream?**
- **Is organizational structure designed for flexibility and responsiveness to changes in the external environment?**
- **Are relationships with stakeholders based on mutual respect and trust?**
- **Have policies and procedures been revised to promote and encourage lean behavior?**
- **Have incentives been developed which are consistent with the behavior desired?**
- **Has decision-making been delegated to the lowest practical level?**
- **Is prudent risk-taking encouraged?**
- **Are lean change agents positioned and empowered to provide guidance and leadership for the lean transformation?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.1.	**Enterprise Organizational Orientation** *Organize to support value delivery*	The enterprise operates as functional or team silos. **C D**	Initial efforts are underway to identify functional or team barriers and understand their full implications. **C D**	Partially deployed cross-functional/cross-team processes are aligned with enterprise value stream(s). **C D**	Extensive cross-functional/cross-team processes are implemented across the enterprise. Functional units now serve as knowledge centers for skill retention. **C D**	Cross-functional/cross-team, process-based orientation is aligned across the extended enterprise. **C D**
	Lean Indicators (Examples)	• Functional/team barriers have been minimized. • There is extensive use of cross-functional/cross-team processes across the enterprise. • Career progression potential exists across both processes and functions.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.2.	**Relationships Based on Mutual Trust** *"Win-win" vs. "we-they"*	Relationships tend to be determined by organizational role, resulting in a "we-they" perspective. C D	Selective application of enterprise perspective results in breaking down of organizational barriers and developing mutual trust. C D	Stable and cooperative relationships exist across the enterprise; cooperative relations are established with some enterprise partners. C D	Mutual respect and trust exists across the extended enterprise with equitable sharing of benefits from continuous improvement initiatives. C D	Stakeholders modify behavior so as to enhance extended enterprise performance (win-win). C D
	Lean Indicators (Examples)	• Communication barriers based upon organizational position have been significantly reduced. • Stable and cooperative relationships exist among most enterprise stakeholders.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.3.	**Open and Timely Communications** *Information exchanged when required*	Communication is largely top-down, limited and lagging. C D	Basic communication mechanisms are employed but are not uniform; communication strategy is under development. C D	Enterprise leaders are accessible and visible, developing two-way communications in open, concise and timely form. C D	Communication processes are undergoing continuous refinement and information is exchanged or can be pulled as required. C D	Comprehensive system of two-way communication is employed throughout the extended enterprise. C D
	Lean Indicators (Examples)	• Open and timely communications exist among stakeholders (i.e., regular meetings with employees, newsletters, etc.) • Technology has been leveraged to speed communications flow and accessibility, while filtering unnecessary communications. • Employee input is valued and plays a key part in decision-making.				
	Evidence					
	Opportunities					

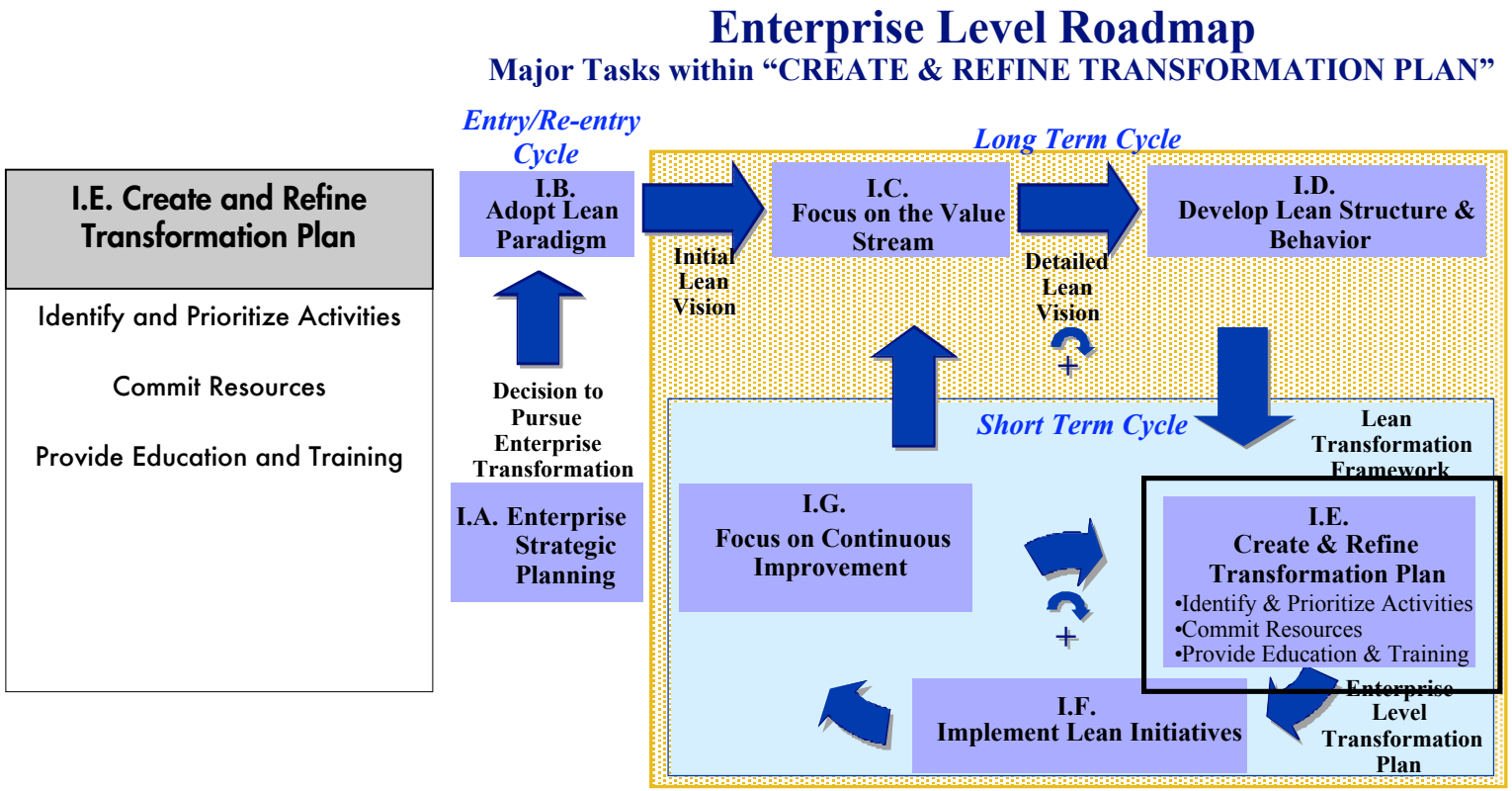
LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.4.	**Employee Empowerment** *Decision-making at lowest possible level*	Centralized decision-making occurs in a hierarchical structure with limited delegation of authority. C D	Appropriate structure and training is being put in place to enable empowerment. C D	Organizational environment and management system supports limited decision-making at point of application and need. C D	Decision processes are continually refined to promote increased accountability and ownership at point of use. C D	Decision-making across the extended enterprise is delegated to the point of application. C D
	Lean Indicators (Examples)	• Managers and supervisors serve as mentors and educators, promoting lower level decision-making. • The extent and types of empowerment are tailored to match the environment and people empowered. • Empowerment enables swift and effective decision-making closest to the point of use.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.5.	**Incentive Alignment** *Reward the behavior you want*	There is sporadic use of incentives and an awareness that some incentives discourage lean behavior. C D	Incentives that reward and encourage lean behavior are deployed in some areas. C D	Organizational leader performance reviews and employee incentives are linked directly to attainment of lean objectives. C D	Incentive systems successfully contribute to achievement and sustainability of lean objectives. C D	Lean incentives are deployed, with measurable success across the extended enterprise. C D
	Lean Indicators (Examples)	• Incentives include a balance of money and non-monetary rewards / recognition to encourage lean activity. • Incentives are based on performance measures that encourage lean activity. • Incentives encourage local improvements that will benefit multiple processes or value steam performance.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.6.	**Innovation Encouragement** *From risk aversion to risk rewarding*	Innovation initiatives are sporadic and ad hoc; security, stability and risk aversion drive most decision-making. C D	Initial efforts are underway to develop systems, processes and procedures for fostering innovations. C D	Innovation initiatives are underway in selected areas; measures for assessing impact are in use. C D	Innovation initiatives are flourishing across the enterprise; prudent risk taking is encouraged and rewarded. C D	Comprehensive innovation program is implemented and positive results recognized across the extended enterprise. C D
	Lean Indicators (Examples)	• The review process for suggestions has been streamlined and gives clear visibility of the progress of each suggestion. • Suggestion programs have been properly incentivized to give recognition to originators of innovative ideas.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.7.	**Lean Change Agents** *The inspiration and drivers of change*	Change agents are sporadically distributed, but without change authority. C D	There is formal identification of change agents, along with role definition, authority delegation and program of education and training for change agents. C D	Appropriately skilled change agents are assigned to key areas with the authority to effect changes. C D	Change becomes self-generating, initiated by employees as well as change agents. C D	Change agents are providing a critical resource of lean knowledge, skill and experience in transforming the extended enterprise. C D
	Lean Indicators (Examples)	• Lean change agents have been designated and empowered. • Lean change agents operate throughout all areas and cross-transfer lean implementation experience. • Process for developing "lean masters" and other change agents has been established.				
	Evidence					
	Opportunities					

Create and Refine Transformation Plan



Having prepared the organization for implementing the lean paradigm, we are now in a position to develop, implement, and monitor a comprehensive *Enterprise-Level Plan* to achieve the desired transformation.

The Enterprise-Level Plan must be designed to address the explicit need previously established, thereby aligning the strategic and lean visions. It also will draw heavily from the enterprise-level value-stream mapping performed in the "Focus on Value Stream" block.

Key enterprise transformation activities must be identified and prioritized. Critical resources (including education and training) must be assured.

I.E. Create and Refine Transformation Plan

Identify, prioritize, and sequence a comprehensive set of lean initiatives that collectively constitute the plan for achieving the desired transformation.

Diagnostic Questions

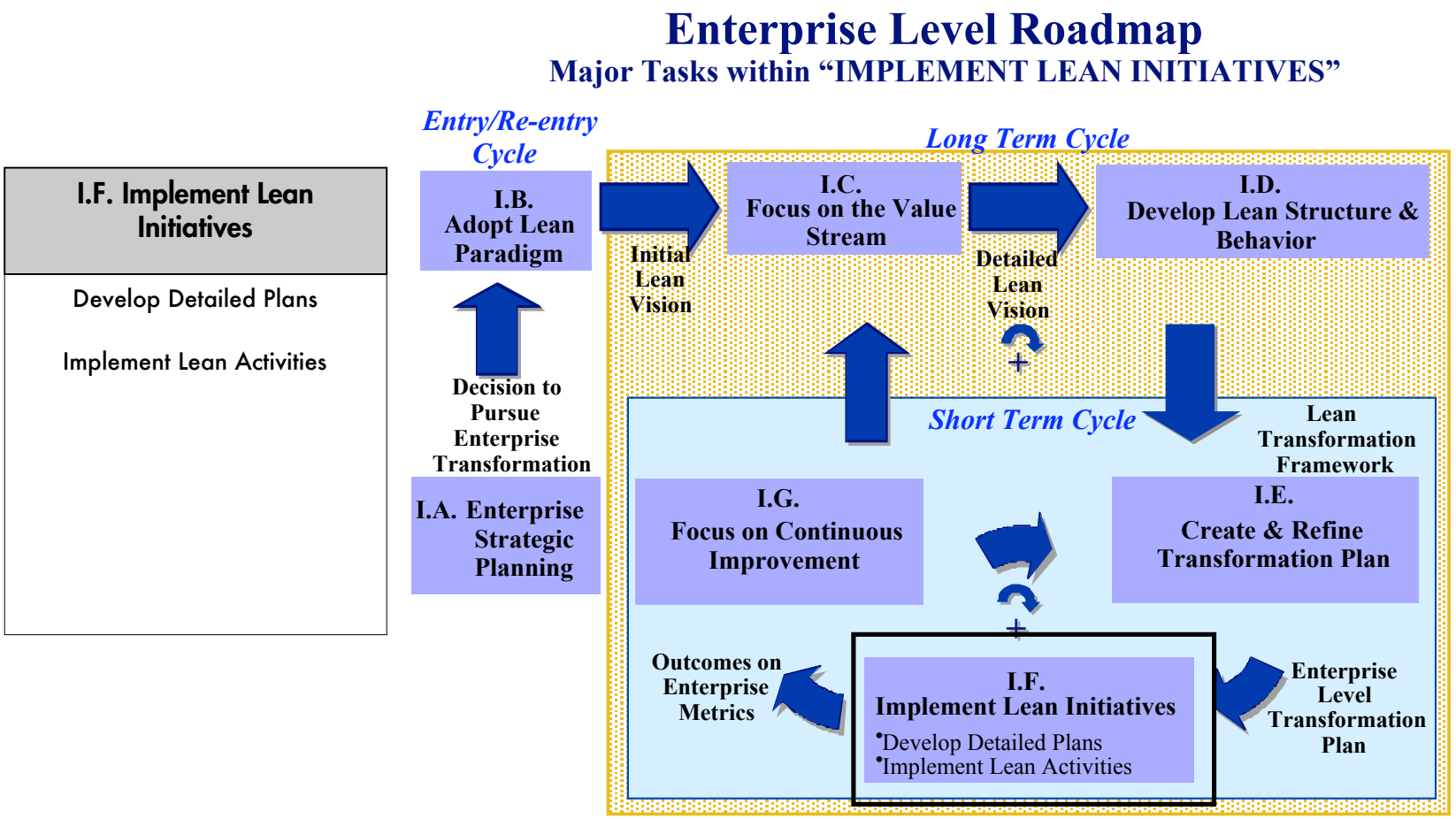
- **Is the enterprise level lean transformation plan prioritized and aligned with strategic enterprise objectives?**
- **Have adequate resources been provided to facilitate lean transformation?**
- **Does the current education and training program adequately support the strategic direction(s) and lean transformation?**
- **Have lessons learned and best practice been effectively incorporated within lean transformation planning?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.E.1.	**Enterprise-Level Lean Transformation Plan** *Charting the course across the extended enterprise*	Individual planning efforts are mostly bottom up initiatives with little priority or coordination established at enterprise level. **C D**	Enterprise-level view identifies lean implementation projects, which are prioritized to meet long and short-term strategic objectives. **C D**	Enterprise improvement plans are coordinated and prioritized across enterprise value stream(s), with a timeline for expected measurable results. **C D**	Lean transformation plan is continuously refined through learning from implementation results and changing strategic requirements. **C D**	Lean transformation plan balances mutual benefits of stakeholders across the extended enterprise. **C D**
	Lean Indicators (Examples)	• A process is in place to incorporate lessons learned into the enterprise-level lean transformation plan. • The milestone targets of the lean transformation plan are broken-down by section and deployed across the enterprise. • Plans balance long-term and short-term stakeholder objectives for the best overall solution.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.E.2.	**Commit Resources for Lean Improvements** *Resource provision for lean*	Little or no resources are provided for process improvement or waste elimination. C D	Limited enterprise-level resources are committed and often applied to the symptom rather than the root cause. C D	Resources are allocated as required for execution of the lean transformation plan and prioritized across the value stream. C D	A pool of earmarked resources is provided for lean initiatives with minimal justification required. C D	A pool of earmarked resources is provided for lean initiatives across the extended enterprise. C D
	Lean Indicators (Examples)	• Resources are committed to support the level and speed of lean transformation required. • Time to build on improvements by personal contribution is given at all levels. • The procedure to apply for improvement resources has been simplified, and gives priority to improvements that benefit multiple areas.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.E.3.	**Provide Education and Training** *Just-in-time learning*	There is little coordination of education and training programs to facilitate change. C D	Education and training covers a set of skills required to support the lean transformation projects. C D	Education and training program is comprised of a balanced and sequenced set of elements to support the coordinated transformation plan. C D	Education and training at all levels is periodically reviewed to check alignment and suitability to the lean transformation plan. C D	Education and training program supports the upcoming needs of the extended enterprise transformation plan. C D
	Lean Indicators (Examples)	• Education and training programs, including refreshers, are provided on a just-in-time basis. • Education and training has a balanced and sequenced set of elements to support the lean transformation plan. • The application of lean principles learned in training and education is formally appraised.				
	Evidence					
	Opportunities					

Implement Lean Initiatives



The *Enterprise-Level Transformation Plan* created in the previous segment provides the broad parameters and directions for achieving the changes required to respond to the identified critical needs. Within these parameters and overall schedule, specific short-term action plans and programs are now developed. Detailed plans at the enterprise level are linked to lower-level plans. The lower-level plans are prioritized and time-phased resources are provided within the framework of a comprehensive schedule. These plans are executed and monitored. Short-term corrective action is determined and incorporated as necessary.

I.F. Implement Lean Initiatives

Flow down the enterprise-level plan into specific actions, programs, and projects that are executed within each process organizational area and determine how they are integrated at the enterprise level.

Diagnostic Questions

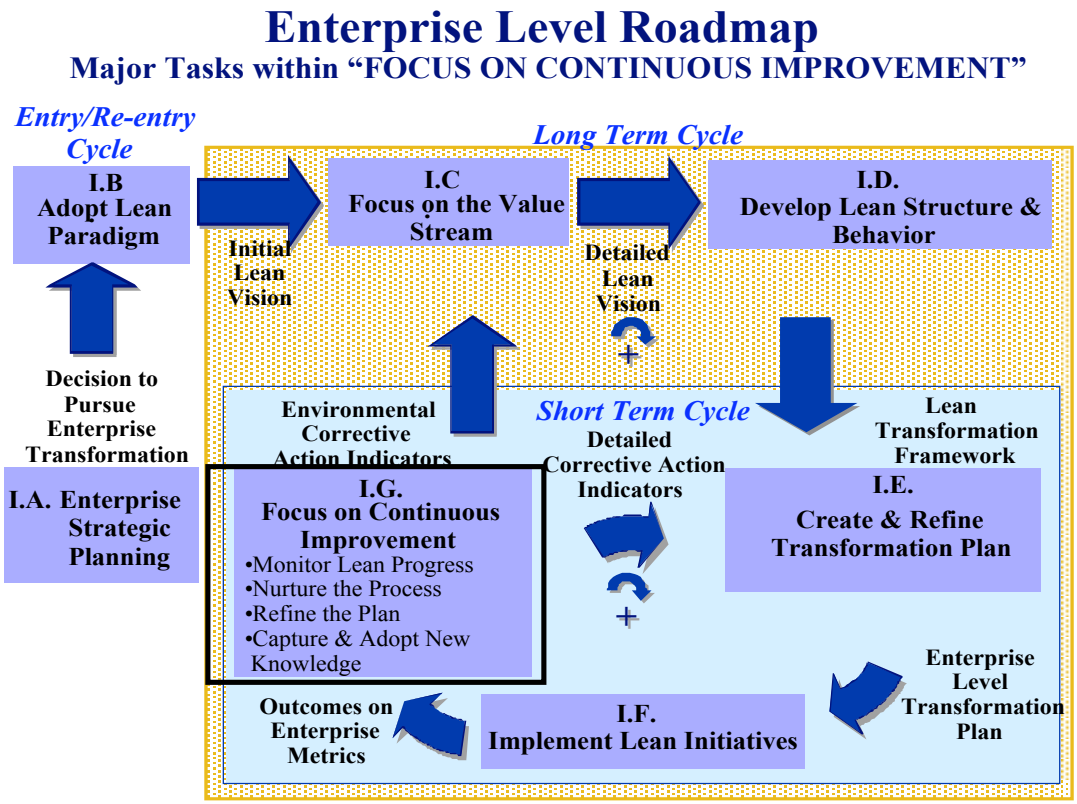
- **Has the enterprise level lean transformation plan been translated into detailed execution projects?**
- **Has a uniform system been established to track the progress of lean initiatives with respect to the overall plan?**
- **Do lean initiative plans contain a feedback mechanism for revision and to share lessons learned?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.F.1.	**Development of Detailed Plans Based on Enterprise Plan** *Coordinating lean improvements*	Improvements are generally optimized for individual areas and employees cannot clearly see the links between localized and enterprise goals. **C D**	Key goals of the enterprise lean transformation plan are understood by most employees. Process owners are involved in developing detailed plans linked to the goals/strategic objectives of the enterprise plan. **C D**	Detailed lean implementation plans supporting the enterprise level plan are developed and coordinated across processes. **C D**	Detailed lean implementation plans accounting for any interdependencies are refined and integrated across the enterprise. Best practices are shared. **C D**	Implementation plans from extended enterprise are coordinated with and support the lean transformation plan. **C D**
	Lean Indicators (Examples)	• Detailed implementation plans are aligned to milestone targets of the enterprise-level plan. • A process is in place to incorporate lessons learned in detailed implementation plans. • Detailed improvement plans are coordinated throughout the enterprise where shared implications exist.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.F.2.	**Tracking Detailed Implementation** *Assessing actual outcomes against goals*	Results of process improvement initiatives are observed but not quantified. C D	Process is under development to permit tracking and quantification of progress of the detailed lean implementation. Data from some projects is being reviewed. C D	There is a project management process implemented to track progress of detailed lean projects against milestones, with feedback provided to enterprise level. Appropriate corrective action is initiated within individual projects. C D	The project management process can readily assess detailed plans and can accommodate revisions mandated by changes to the enterprise level lean transformation plan. C D	The project management process is deployed across the extended enterprise to enable real-time tracking. C D
	Lean Indicators (Examples)	• Lean initiatives are coordinated and tracked, with the individual results "rolled up" and assessed against enterprise-level milestones and targets. • Responsibility and accountability for improvement success is assigned locally to enable fast corrective action on deviations from the plan. • Changes to processes/value stream map(s) are documented and updated regularly.				
	Evidence					
	Opportunities					

Focus on Continuous Improvement

I.G. Focus on Continuous Improvement
Monitor Lean Progress
Nurture the Process
Refine the Plan
Capture and Adopt New Knowledge



This "oversight" segment is critically important for long-term effectiveness and continuity. Only when the activities in this segment become a natural part of the enterprise's culture can the organization achieve a significant state of being lean. The organization will learn from various implementation initiatives. Modifications will be required and fed back through the "Create and Refine Transformation Plan" segment.

On those occasions when significant structural modifications seem to be called for, the flow will proceed along a second path, to the segment "Focus on the Value Stream", taking us back to the *Long Term Cycle*.

When the lean transformation process becomes recognized as a keystone within the enterprise's strategic plan, a third flow path may occur through the segment "Enterprise Strategic Planning" in the *Entry/Re-entry Cycle*. This occurs when the results of lean implementation directly impact the strategic planning process.

I.G. Focus on Continuous Improvement

Successful execution of lean implementation plan forms the basis for further improvement. The improvement process is monitored and nurtured, lessons learned are captured, and improved performance becomes a strong driving force for future strategic planning by enterprise leaders.

Diagnostic Questions

- **Are guidelines for continuous improvement sufficiently developed for effective facilitation of enterprise-wide transformation plans?**
- **Are enterprise participants being challenged to build-on and sustain existing improvements?**
- **Are senior managers actively involved in monitoring progress of lean implementation at all levels?**
- **Is appropriate support and encouragement being provided to all participants in lean implementation?**
- **Are lessons learned being captured in a consistent, systematic manner?**
- **Are lean implementation results impacting strategic planning?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.G.1.	**Structured Continuous Improvement Processes** *Uniformity in how we get better*	Improvement initiatives are ad hoc and not data driven. **C** **D**	An improvement process for the enterprise is broadly defined and being selectively applied. **C** **D**	Systematic, structured methodology for continuous improvement and value creation is developed and deployed across many areas. **C** **D**	Structured continuous improvement process is deployed at all levels across the enterprise, using value analysis to target improvements. **C** **D**	Structured continuous improvement process is fully ingrained throughout the extended enterprise. **C** **D**
	Lean Indicators (Examples)	• A consistent improvement/transformation approach is implemented, sustaining improvements gained. • The continuous improvement process challenges people to tackle the root cause, rather than the symptom. • Lean principles are being applied to most enterprise systems and processes, utilizing lessons learned.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.G.2.	**Monitoring Lean Progress** *Assessing progress toward achieving enterprise objectives*	Enterprise leaders are not actively involved in the review of overall lean implementation plan progress. C D	Implementation plan progress is reviewed against enterprise level milestones and success criteria, for some projects. C D	A formal methodology is used by enterprise leaders to analyze the overall progress across all lean implementation projects. Current plans are adjusted based on learning from lean implementations. C D	Results of implementation projects are aggregated to permit reallocation of resources and to ensure on-going alignment with strategic objectives. C D	Senior managers monitor lean progress throughout the extended enterprise. Results are impacting future enterprise strategic planning. C D
	Lean Indicators (Examples)	• Lean transformation progress is judged by the aggregate benefits, not individual or localized improvements. • Leaders actively participate in monitoring implementation progress and addressing deficiencies within the transformation plan. • Lean progress reviews are documented in a common format and disseminated.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.G.3.	**Nurturing the Process** *Assure senior leaders' involvement*	There is growing awareness that successful lean implementation is highly dependent upon senior management support and encouragement. C D	Some senior managers are providing encouragement, support and recognition, which is not consistent across the enterprise. C D	Managers seek to identify and remove barriers to lean implementation. Teams and individuals who successfully implement lean practices are recognized and rewarded. C D	Senior managers across the entire enterprise are highly visible in their involvement, support and encouragement of the lean initiative. An enthusiastic atmosphere is evident. C D	Senior leaders and managers champion and nurture a culture of continuous improvement in the extended enterprise. C D
	Lean Indicators (Examples)	• Management actively supports and is involved in ensuring the success of improvements. • Positive actions and the effort taken are recognized and rewarded, even if improvements are not fully successful.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.G.4.	**Capturing Lessons Learned** *Ensuring that successes lead to more successes*	Lessons learned from improvement activities are not documented, residing only in the memories of participants. C D	Lessons learned in some areas are documented and maintained in paper files, design rulebooks, etc. C D	A formal process for readily capturing and communicating lessons learned is being applied. Employee contributions are actively sought. C D	Lessons learned are consistently captured, communicated and regularly used in a structured manner. An enterprise knowledge base is created. C D	A formal knowledge management process is adopted. Lessons learned are routinely and explicitly incorporated into the formulation of new lean initiatives. C D
	Lean Indicators (Examples)	• "Best" practice, suggestions and lessons learned are maintained in a concise and clear standard format. • A formal process has been established throughout the enterprise for capturing and reusing lessons learned. • Lessons learned are periodically reviewed to maintain relevance of information kept.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.G.5.	**Impacting Enterprise Strategic Planning** *Results lead to strategic opportunities*	Results of lean implementation are not fed back to strategic planning process. C D	Benefits of lean implementation are beginning to influence the strategic planning process. C D	Senior management considers potential impact of performance improvement initiatives in its assessment of new organizational or program opportunities. C D	Forecasted improvements from lean implementation are incorporated into enterprise planning and budgeting decisions. C D	Senior management integrates forecasted future results of lean implementation in its assessment of new opportunities and future organizational needs. C D
	Lean Indicators (Examples)	• Business results reflect improvements resulting from lean implementation. • Strategic planning makes allowance for anticipated gains from lean improvements. • Gains realized from lean implementation are leveraged to achieve growth, profitability, market position and employment stability.				
	Evidence					
	Opportunities					

Government LESAT Maturity Matrices

Section II: Life Cycle Processes

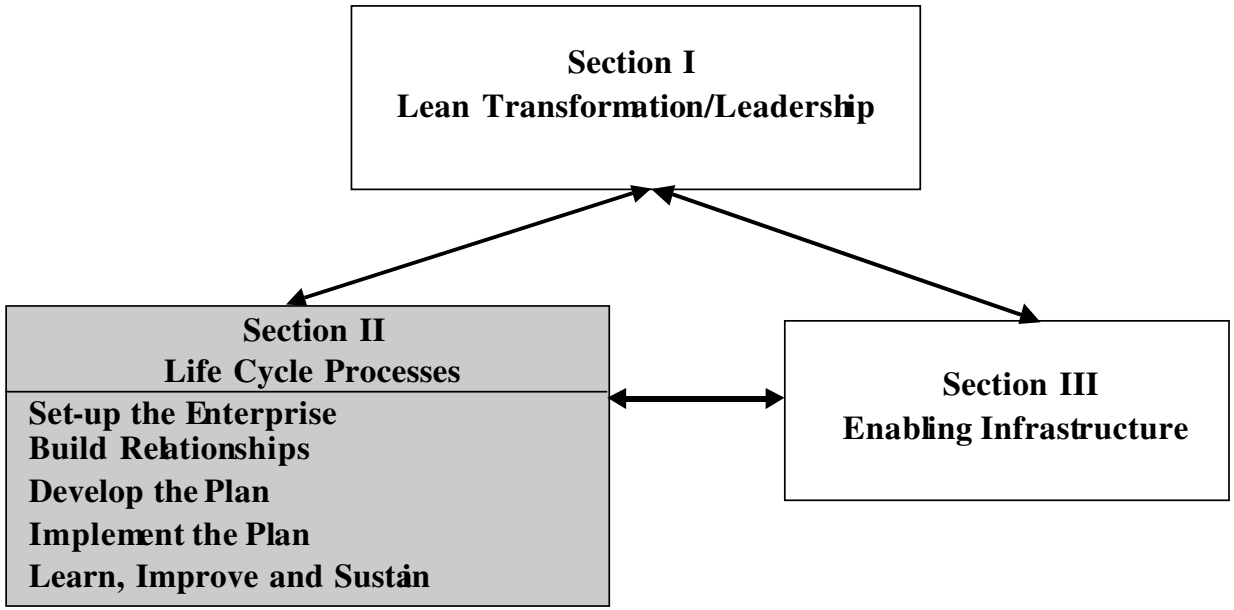
II.A. Set-up the Enterprise

II.B. Build Relationships

II.C. Develop the Plan

II.D. Implement the Plan

II.E. Learn, Improve, and Sustain



Life cycle processes are defined by the product life cycle, from initial conception through operational support and ultimate disposal. As shown above, these processes directly determine the value provided to customers and stakeholders alike. The degree to which an enterprise is successful in making these processes lean is a measure of its effectiveness and efficiency. Enterprise leadership provides the direction and resources to break down the barriers among and within life cycle processes that result in wasted resources and reduced value to customers and stakeholders. This section of the Government LESAT addresses the level of lean implementation applicable to these life cycle processes.

SECTION II – LIFE-CYCLE PROCESSES

Definition: Implement lean practices across life-cycle processes for defining customer requirements, designing products and processes, managing supply chains, producing the product, distributing product and services, and providing post delivery support.

II.A. Set-up the Enterprise

Enterprises must develop and manage partnerships with their stakeholders and be able to dynamically re-configure and align core competencies among the enterprise and its partners to deliver best life cycle value to customers in an ever-changing environment.

Diagnostic Questions

- **Are new opportunities arising from lean enabled capabilities being fully exploited?**
- **Does customer feedback and usage data drive organizational processes?**
- **Are assets allocated across the value stream in a consistent and balanced manner?**
- **Are program risks and resource requirements balanced to assure optimal flow throughout the product life cycle?**
- **Are skills and resources drawn from across the extended enterprise to enhance program/project development efforts?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.A.1	**Leverage Lean Capability for New Opportunities** *Exploiting new opportunities arising from lean enabled capabilities*	Improvement initiatives are ad hoc and are focused on operational efficiency. **C** **D**	Improvement gains provide resources to facilitate future improvements. Potential opportunities from applying lean thinking across core competences are recognized and plans have been developed. **C** **D**	Benefits sustained from applying lean thinking within the enterprise are used to retain current capabilities and/or develop new opportunities. **C** **D**	There is full use of the enhanced capabilities and customer knowledge throughout the enterprise to leverage opportunities for providing greater value to customers. **C** **D**	The strategic plan dynamically incorporates extended enterprise capabilities and stakeholder interests to identify and leverage opportunities. **C** **D**
	Lean Indicators (Examples)	• Reduced cost, increased quality and faster response times from waste eliminated are used to maintain or develop new opportunities. • The ability to improve and refine processes quickly is used extensively to respond to changing customer requirements. • A process is used to scan the environment to exploit opportunities arising from the enhanced capabilities of the lean enterprise.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.A.2.	**Optimize the Capability and Utilization of Assets (people, equipment, facilities, etc.)** *Lean enables mission growth through the redeployment of assets*	Utilization of people and material assets is optimized within functional/team units. C D	There is evidence of ad hoc cooperation between functional/team units to eliminate waste and share resources. C D	An enterprise approach provides consistent and balanced asset allocation across the value stream. C D	As a result of the application of lean concepts and techniques, assets are freed up to be applied across the enterprise to support current or growth activities. C D	The ability exists to easily and quickly shift or divest resources to new opportunities. C D
	Lean Indicators (Examples)	• Assets freed up from lean implementation are readily redeployed. • Workforce and its knowledge is nurtured, reallocated and maintained where possible. • Available assets and resources are coordinated throughout the enterprise to leverage resources to the maximum.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.A.3.	**Provide Capability to Manage Risk, Cost, Schedule and Performance** *Success follows effective risk management*	Programs/projects are managed and staffed as independent entities. C D	There is a management system to monitor and control program/project performance and staffing. Regular reviews focus on cost, schedule and performance of individual programs/projects. C D	Reviews assess risk within individual programs/projects and staffing is adjusted as necessary to mitigate risk. C D	The programs/projects are reviewed assessing the risk across the portfolio of programs/projects with appropriate reallocation of resources. C D	Risk abatement processes are used to optimize performance of the portfolio of programs/projects. C D
	Lean Indicators (Examples)	• Program/project and process reviews have a portfolio approach to achieve enterprise balance. • A risk management process is fully integrated across the enterprise.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.A.4	**Allocate Resources for Program/Project Development Efforts** *Teaming for success*	Program/project development efforts rely on functional units for allocation of the required skills. C D	Some but not all skills / resources necessary are dedicated and assigned to program development. Skilled resources are narrowly guarded within programs/projects. C D	Some of the skilled resources are routinely shared across programs/projects. Formal methods are being developed for determining team makeup and assignment of necessary skills. C D	Resources and skills are routinely balanced and shared across the portfolio of programs/projects. C D	"Virtual organizations" are created as needed from the extended enterprise and provided with the skills and resources necessary to execute the development effort(s). C D
	Lean Indicators (Examples)	• A process is defined and used to ensure that cross-disciplinary skills are represented on teams. • Resources and skills are easily and quickly shifted or divested to balance requirements across all program/project development efforts.				
	Evidence					
	Opportunities					

II.B. Build Relationships

Internal responsibilities are aligned with the core competencies of the extended enterprise such that the product/service value chain is optimized throughout the extended enterprise.

Diagnostic Questions

- **Is there an enterprise wide understanding of all stakeholder values?**
- **Do contractual arrangements enable supplier flexibility and adaptation to both expected and unexpected changes?**
- **Are in-house capabilities balanced with the collective capabilities of the extended enterprise to optimize the product/service value chain?**
- **Are constraints and bottlenecks throughout the extended enterprise identified and rapidly resolved to ensure continuous flow?**
- **Are relationships established to strengthen the ability to deliver best life cycle value to all stakeholders?**
- **Are relationships flexible and dynamic to meet changing life cycle and stakeholder needs?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.B.1	**Define and Develop Relationships with Stakeholders** *Aligning stakeholder values through relationships that build credibility*	Some stakeholders have been identified and relationships are based on situational necessity. C D	Temporary relationships are established with major stakeholders to support upcoming events. C D	Relationships are developed and maintained with key stakeholders throughout the life cycle. There is a plan or process to engage other stakeholders in the product/service value chain. C D	Relationship building is a key program/project strategy. Stakeholder relationships are nurtured over time and foster high enterprise credibility. C D	Relationships have been established across the extended enterprise, are self-sustaining, and result in widespread stakeholder trust. C D
	Lean Indicators (Examples)	• Relationships are defined and developed in line with the enterprise strategic plan to ensure efficient creation of value for the extended enterprise. • Stakeholders in the extended enterprise value the relationships established. • Robust relationships provide stakeholders the ability to adapt to changing requirements and unanticipated disruptions.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.B.2.	**Optimize the Relationship** *Creating effective relationships to achieve customer value*	Relationships are at arm's length and adversarial. Relationships are defined only by contract language or formal agreements. C D	Beside the formal relationship agreements, objectives, roles and responsibilities are communicated informally between stakeholders. C D	Shared values are established and communicated in key stakeholder relationships, who are involved early in the design/development of relationship processes and program/project plans. C D	A seamless relationship is established between stakeholders that is dynamic to changes and provides insight into values of others, such that organizational boundaries become blurred. C D	Stakeholders in the extended enterprise balance competencies in their relationships for best program / service value. C D
	Lean Indicators (Examples)	• Relationships focus on program/service life cycle value rather than organizational objectives. • Interactions between stakeholders are effortless. • Stakeholders balance capabilities for best value to the program/service.				
	Evidence					
	Opportunities					
LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.B.3.	**Foster Innovation and Knowledge-Sharing** *Incentivizing innovation through stakeholder involvement*	Primary focus on internal expertise, with little cognizance of tacit (experience-based) or explicit (formal) knowledge of other stakeholders. C D	Internal organizational structures and processes are established to leverage stakeholder knowledge and innovation. C D	Strategic planning includes stakeholders in pursuance of a common strategic vision. Shared metrics for continuous improvement are utilized. C D	Knowledge transfer mechanism is created for open and rapid access by all stakeholders. C D	Mutually beneficial arrangements to foster innovation between stakeholders. Process for communication of needed changes in vision, strategy, metrics, and implementation. C D
	Lean Indicators (Examples)	• Long-term collaborative relationships are established and maintained where possible. • Processes to facilitate sharing and transfer of innovation, knowledge and technology are deployed. • A mutually beneficial continuous improvement process is established between stakeholders over the product/service life cycle.				
	Evidence					
	Opportunities					

II.C. Develop the Plan

Stakeholder needs and values must be assessed continuously and translated into requirement statements that form the basis for the program/project plan.

Diagnostic Questions

- **Are the customer's needs continually evaluated in determining product and process requirements?**
- **Is a data collection and customer feedback process defined and deployed?**
- **Is product life cycle data used in determining requirements and subsequent specifications?**
- **Are product and process capability matched to product or service criteria?**
- **Is the product development process formalized and understood?**
- **Are customers and other life cycle stakeholders regularly involved in product and process development?**
- **Are downstream stakeholder issues in design and development considered and incorporated as early as possible in the process?**
- **Has the development cycle been simplified and aligned to the critical path?**
- **Are products and processes being developed concurrently?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.C.1.	**Establish a Requirement Definition Process to Optimize Life Cycle Value** *Stakeholder pull vs. technology/product push*	Requirements are defined internally based on past experience, rather than on a formal requirements definition process. **C** **D**	Requirements definition process, which balances cost, schedule and performance, is partially developed, deployed and documented. **C** **D**	Requirements definition process leverages value chain capabilities and focuses on overall life cycle implications. **C** **D**	An iterative requirements definition process spans the value chain resulting in a minimal set of requirements that balances cost and performance. **C** **D**	The requirements process is a strategic advantage for the extended enterprise contributing to increased responsiveness and new capabilities. **C** **D**
	Lean Indicators (Examples)	• There is a process in place to determine clear and concise product and life cycle requirements, with acceptable ranges. • The process ensures a balanced representation from all stakeholders across the value chain. • Structured methods are used to elicit and gather needs from the different stakeholders/customers.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.C.2.	**Capture Data from Extended Enterprise to Optimize Future Requirement Definitions** *Closed loop processes are in place to capture operational performance data*	Ad hoc communication processes represent the primary source of data that is collected and analyzed for impacts to present requirements. C D	A proactive process is being developed to collect product/service usage data as the basis for future requirements. C D	Data are collected across the present value chain and used to feed future design solutions and requirement definitions. C D	Process allows real-time access, collection and dissemination of data from across the extended enterprise for analysis by stakeholders for future use. C D	The process is established across the extended enterprise to actively seek data on needs, usage and process capability to populate a data repository that can be mined for future requirements. C D
	Lean Indicators (Examples)	• Customer feedback is actively sought and provided as input to the requirements definition process. • A product/service database is maintained and extensively used to establish future requirements definitions. • Enhanced knowledge of customer and stakeholder requirements and desires is used to leverage future requirements.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.C.3.	**Incorporate *Stakeholder Value* into Design of Products and Processes** *Understanding stakeholder value facilitates fewer development perturbations*	Stakeholder inputs are captured only at the beginning of the development. C D	Stakeholder inputs are considered qualitatively through top-level liaison and occasional reviews. C D	Stakeholder values are represented on Integrated Product Teams (IPT) and feedback mechanisms exist to facilitate timely design iterations. C D	Stakeholders are actively involved with IPT at multiple levels to jointly improve the effectiveness and quality of the product and process design. C D	Stakeholders involved with IPT in continuous communication. Sharing of benefits well established; value quantification and tradeoffs continuous, automatic part of process. C D
	Lean Indicators (Examples)	• Stakeholders participate throughout the development process. • Designs satisfy stakeholder value requirements, without unnecessary functionality.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.C.4	**Incorporate Downstream *Stakeholder Values* into Products and Processes** *Understanding downstream stakeholders allows value to flow seamlessly*	Downstream activities are considered late in process. C D	Downstream activities are considered earlier in projects, but in an ad hoc manner. Cost considerations are limited. C D	Multi-functional teams include some downstream disciplines and key downstream stakeholders. C D	Priorities of downstream stakeholders are quantified as early as possible, and used for process evaluation and improvement. C D	Downstream stakeholders' values in the extended enterprise are quantified, and balanced via tradeoffs, as a continuous part of the process. C D
	Lean Indicators (Examples)	• There is early consideration and incorporation of downstream stakeholders issues throughout product and process development. • The scope of considerations integrated into product and process development has been extended to include downstream activities and cost implications. • Processes flow with reduced cycle time and integrate upstream and downstream stakeholder values.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.C.5.	**Create a Multidisciplinary Approach** *Breaking down of functional silos enables seamless communication and value flow*	Development is performed in functional organizations. C D	Multidisciplinary development is used to a limited extent. C D	Multidisciplinary development is used extensively; metrics are established for process evaluation. C D	Multidisciplinary techniques are deployed for most programs/product development efforts; metrics are used for process evaluation and improvement. C D	Product and process definition is seamlessly integrated both internally and with the upstream and downstream stakeholders. C D
	Lean Indicators (Examples)	• Resources and skills are balanced across projects and programs, to aid maximum re-use and sharing of knowledge. • Suitability and timing of information released, is matched to the requirements of subsequent processes.				
	Evidence					
	Opportunities					

II.D. Implement the Plan

The plan must be designed and managed to eliminate waste and produce value to all stakeholders.

Diagnostic Questions

- **Is lean knowledge and capability regarded as a strategic capability?**
- **Has enterprise strategy been aligned to capitalize on lean capability?**
- **Are products pulled in accordance with customer demand in real-time?**
- **Are production schedules and capacity considered prior to making a contract commitment?**
- **Have the enterprise processes been ordered and adapted for flow?**
- **Is the customer ready to effectively use and deploy the product/service when it is received?**
- **Is there a process to identify and eliminate bottlenecks in the work flow?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.D.1	**Utilize Knowledge and Capability in Decision Making** *Strategic leveraging of stakeholder capability*	Decision processes employ knowledge available at the time to address the current crisis or issue.	An informal decision process is in place that is used in some areas or under some conditions which draws knowledge from a broad set of experts to apply to the decision process.	Decision processes have been established which gather knowledge from many stakeholders to be used in a majority of decisions. It is not adverse to ask for help.	Decision processes are integrated with organizational strategic objectives and applied to a broad set of decisions.	Decision processes leverage the knowledge and capabilities of the extended enterprise and take into account the enterprise goals and objectives.
		C **D**	**C** **D**	**C** **D**	**C** **D**	**C** **D**
	Lean Indicators (Examples)	• Decision making capability constitutes a major consideration in enterprise level long-range, strategic planning. • Knowledge is maintained and shared throughout the extended enterprise.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.D.2.	**Foster Lean Behavior Throughout the Value Stream** *Promoting stakeholder innovation and flexibility*	Processes and relationships are established based on past/historical norms. C D	There are pockets within the value stream where the objectives of the task, program, or mission influence creation of new processes to maximize value. C D	All members of the value stream have established processes that foster open sharing of information with "no spin" assessments C D	Senior leadership involvement allows stakeholders to develop innovative approaches that are flexible to changing conditions. C D	Stakeholders along the value stream are empowered to develop flexible and innovative processes based on value delivered to the extended enterprise. C D
	Lean Indicators (Examples)	• Conversion to lean has freed up resources for re-deployment. • Bottleneck have been identified and eliminated to allow processes to flow seamlessly. • Work is performed only when "pulled" from subsequent "customers" in the value chain.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.D.3	**Align Customer Requirements and Expectations with the Extended Enterprise Capabilities** *Aligning customer and stakeholder expectations*	New projects are started by aligning customer requirements with internal enterprise capabilities. Other stakeholders are not consulted or involved in this process. C D	An external stimulus drives the need to align key stakeholder capabilities with customer requirements. C D	Customers and key stakeholders work collaboratively to align capabilities and requirements on key project/process milestones. C D	Stakeholders actively engage with customers to align customer requirements and enterprise capabilities as a normal way of doing business. C D	Customers' actual and future requirements align in real-time with the extended enterprise's capabilities. C D
	Lean Indicators (Examples)	• Stakeholder capabilities are aligned with current and future customer requirements. • Stakeholders and customers are engaged as indicated by constant communication to align capabilities with customer requirements. • Products/services are delivered as expected, on-time and without unplanned Herculean efforts or rework on the part of some stakeholders.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.D.4	**Transition Product/Service to the Customer** *Right product for a ready customer that meets all stakeholder requirements*	Primary focus is program/service completion, with insufficient emphasis on customer transition activities. **C** **D**	There is an internal activity considering the customer transition. Activities are limited to rehashing existing plans. **C** **D**	Customers and key stakeholders are active as contributors and reviewers of internally developed transition plans. **C** **D**	Customers and key stakeholders actively collaborate to develop and execute transition activities. **C** **D**	There is a seamless transition of product/service to customer with all stakeholders aligned to support the customer. **C** **D**
	Lean Indicators (Examples)	• The customers collaborate early in product/service development and are supported after the delivery of the product/service. • Support such as training, facilities, special equipment and other resources are in place in time for product/service delivery. • The transition to new product/service happens seamlessly without major perturbations.				
	Evidence					
	Opportunities					

II.E. Learn, Improve and Sustain

On-time deliveries of defect free products are complemented by superior post delivery service, support and sustainability. Continuous feedback from customers and other stakeholders is used to improve enterprise processes and products/services.

Diagnostic Questions

- **Are product delivery data flowed throughout the value chain?**
- **Does the organization satisfy customer sustainment requirements effectively?**
- **Are in-service usage data deployed to appropriate personnel in the extended enterprise?**
- **Are customer products/services deficiencies treated as opportunities?**
- **Is learning shared across the enterprise, customers and other stakeholders?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.E.1	**Enhance Value of Delivered Products and Services to Customers and the Enterprise** *Responding to the voice of the customer*	Product/service support system reacts to customer needs, usually on-time and from inventory or internal resources. **C** **D**	Support system delivers products / services on time, but with disruptions to production flow and associated resources. **C** **D**	Support system flow paths are identified and are beginning to be integrated with lean product development and production flows. **C** **D**	Standardized customer and product support processes provide responsive information and product flow fully integrated with development and production flows. **C** **D**	Customer needs for post-delivery products / services are anticipated in enterprise plans and fulfilled by adaptation and extension of capabilities already provided. **C** **D**
	Lean Indicators (Examples)	• Solutions to product / service issues are coordinated throughout the extended enterprise to find fast, cost effective solutions. • Customer and product support processes have been standardized and are regularly reviewed against customer feedback. • Disruptions to design and production flow from support services has been minimized.				
	Evidence					
	Opportunities					

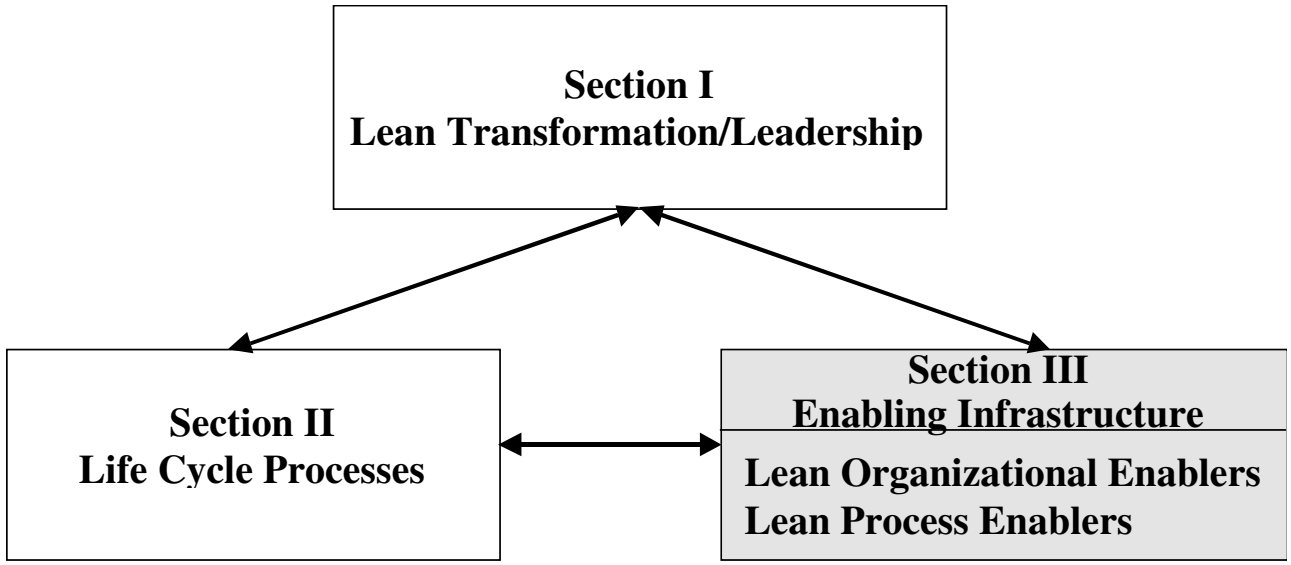
LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.E.2.	**Provide Post Delivery Service, Support and Sustainability** *Providing customer solutions*	High level of spares or support necessary because of unknown failure rates, long lead times for spare replenishment or service incompatible with customer expectations. C D	Collection of deficiency data permits both determination of service and support levels for preventative activities and a reduction of spare part levels. C D	The enterprise is increasingly involved in addressing customer service/support solutions. Commonality is used to reduce spare part and support levels; root cause analyses are fed back into product design. C D	The enterprise is part of the customer's service/support solution by ensuring availability through replacement of critical components or support needs before failure or loss of capability. C D	The enterprise has become the customer's total system capability solution. Support and sustainment issues are addressed before they impact customer total system capability. C D
	Lean Indicators (Examples)	• Customer feedback is proactively maintained and used to predict any emerging service issues and enhance future designs. • There is a close relationship between the enterprise and the customer organization. • The enterprise has internalized the customers total system capability needs and collaborates with the customers to ensure long term capability solutions. • Spares levels are reduced in line with short predicable lead times for replacement spares.				
	Evidence					
	Opportunities					
II.E.3.	**Maintain Challenge of Existing Processes** *Ensure a culture of continuous improvement*	Ad hoc feedback in progress with variable formats. Primary focus is on program or service delivery. C D	Lessons learned have been periodically gathered from key stakeholders. Even though lessons learned are collected in the enterprise known issues are experienced again. C D	Feedback is gathered at major milestones from the customer and key stakeholders. Lessons learned are effectively used to a varying degree across the enterprise. C D	Leaning is shared across the enterprise, among customers and between stakeholders. Within the enterprise learning takes place between projects throughout their life cycles. C D	Seamless integration of learning, robust to change that provides total system solutions across the life cycle for all stakeholders. C D
	Lean Indicators (Examples)	• Lessons learned are shared across projects or over life cycle periods. • There is low problem or issue repetitions in the enterprise. • There is a central repository of lessons learned with robust user interfaces.				
	Evidence					
	Opportunities					

Government LESAT Maturity Matrices

Section III: Enabling Infrastructure

III.A. Lean Organizational Enablers

III.B. Lean Process Enablers



Enabling infrastructure supports the execution of enterprise leadership and life cycle processes. These enabling processes provide the means for managing the resources to the organizations they serve as internal customers. Since they enable rather than directly result in enterprise success, they can be easily overlooked as a source of waste. However, waste that is inherent in these processes can negatively impact the enterprise as a whole in a manner hidden from view. This section of the Government LESAT addresses the level of lean implementation applicable to the enabling infrastructure.

SECTION III - ENABLING INFRASTRUCTURE

Definition: To achieve a successful lean transformation, the enterprise infrastructure must support the implementation of lean principles, practices and behavior.

III.A. Lean Organizational Enablers

The support units of an enterprise must themselves become lean in executing their assigned function, but they must also redefine what they do such that they support lean implementation within the life cycle processes and the lean transformation/leadership processes.

Diagnostic Questions

- **Do the finance and accounting measures support the implementation of lean?**
- **How well have the financial and accounting systems been integrated with non-financial measures of value creation?**
- **Can stakeholders retrieve financial information as required?**
- **Are human resource practices reviewed to assure that intellectual capital matches process needs?**
- **Are the information technology systems compatible with stakeholder communications and analysis needs?**
- **Do processes create the least amount of environmental hazards practical?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.A.1.	**Financial System Supports Lean Transformation** *Lean requires appropriate financial data*	Finance system provides basic budget and cost accounting data; there is little awareness and exploration of broader support roles for finance. **C** **D**	Initial efforts are underway to adapt or modify systems to compensate for the inadequacies of the formal financial system. **C** **D**	Finance system is overhauled to provide data and financial information to support and enable a lean transformation at any level. **C** **D**	Financial system scope is expanded to integrate with non-traditional measures of value creation (e.g., intellectual capital, balanced scorecard). **C** **D**	Financial systems provide seamless information exchange across the extended enterprise, with emphasis on value creation for all stakeholders. **C** **D**
	Lean Indicators (Examples)	• Financial measures that conflict with lean activity are no longer used to measure progress and performance. • The financial system handles a balanced set of financial and non-financial measures to assist decision-making. • The financial system has been overhauled to ensure fast and efficient processing of information as required.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.A.2.	**Enterprise Stakeholders Pull Required Financial Information** *Data on demand*	Lagging financial information is reported through regularly scheduled standardized reports. Specific requests for measures require extraordinary effort. C D	Finance actively provides traditional financial information to assist users in planning and programming activities. C D	Users are able to directly access and use financial information to make trade-off decisions. C D	Users are able to pull financial and other value creation information to support decision analysis in the format desired. C D	Users across the extended enterprise generate and share timely financial and performance data. Data reflects extended enterprise results. C D
	Lean Indicators (Examples)	• Financial and performance measurement data can be accessed as needed in user-defined format. • Financial information can be extrapolated to forecast outcomes. • System provides up to date information on request and rationalizes information no longer used.				
	Evidence					
	Opportunities					
III.A.3.	**Promulgate the Learning Organization** *Learning Organizations create a flexible workforce*	The human resources processes concentrate on recruiting, placement and benefits. Personnel training is ad hoc and not aligned to organizational needs. C D	A well-defined personnel development process, aligned with organizational needs, is applied for selected employees. C D	Personnel development process is extended to all employees and incorporates the anticipated future needs of the enterprise. Resources and facilities are dedicated for learning. C D	A learning climate is promoted within the enterprise through ready access to information and input to strategy/ policy making. Opportunities for extending learning experiences are provided. C D	A learning climate is promoted throughout the extended enterprise by the sharing of capabilities, knowledge, skills and best practice. C D
	Lean Indicators (Examples)	• Intellectual capital is regarded as an asset. • Employees have individual training plans, which are aligned to the current and projected skill base requirements. • Employees actively capture and incorporate lessons learned into future training and practices.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.A.4.	**Enable the Lean Enterprise with Information Systems and Tools** *Facilitate the flow of information and knowledge*	The information infrastructure consists mainly of stand-alone systems. The need for systems integration is recognized but no improvement plan exists. C D	Elements of a common information infrastructure have been determined, and an implementation plan is under development. Maintenance of legacy systems consume most IT resources. C D	The information infrastructure has been formalized and is in use in selected locations. Legacy systems are rationalized and aligned across the value stream. C D	An information infrastructure is deployed that supports seamless information exchange across the enterprise. C D	Information systems are fully interoperable and the pertinent information is easily accessible and usable across the extended enterprise. C D
	Lean Indicators (Examples)	• Compatible information systems and tools exist across the extended enterprise. • Information systems facilitate fast and effective transfer and retrieval of information required. • Information systems and tools complement lean processes and practices and are easily adapted to accommodate change.				
	Evidence					
	Opportunities					
III.A.5.	**Integration of Environmental Protection, Health and Safety into the Enterprise** *"Cleaner, healthier, safer"*	The enterprise complies with all known legal and regulatory requirements and reacts if issues are identified. C D	Consideration is given to means of mitigating conditions that cause environmental, health and safety issues. C D	A process is in place to proactively identify Environmental protection, Health and Safety (EHS) risks and manage them appropriately, with a preference for source prevention. C D	Forward thinking solutions to potential life cycle EHS risks are implemented early in product (service) design and throughout the value stream. C D	EHS risk prevention and mitigation is part of the natural way business is conducted across the extended enterprise, creating a sustainable environment and creating a capability advantage. C D
	Lean Indicators (Examples)	• Health and safety issues are routinely addressed in employee driven improvement activities. • Processes and designs are proactively adapted to minimize environmental, health and safety issues at source. • Designs meet current environmental regulations and are capable of easy adaptation to meet projected changes over the life cycle of the product.				
	Evidence					
	Opportunities					

III.B. Lean Process Enablers

A number of enablers can facilitate lean implementation via consistent application throughout the enterprise.

Diagnostic Questions

- **Have the full benefits from process standardization been realized across the enterprise?**
- **Has process standardization and reuse been imbedded in enterprise policies and procedures?**
- **Are common tools and systems used throughout the enterprise?**
- **Is process variation continually reviewed and reduced in all processes throughout the enterprise?**

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.B.1.	**Process Standardization** *Strive for consistency and re-use*	Processes vary by program or product line. C D	Key processes in the organization have been identified that could benefit from standardization, with initial efforts underway. C D	Selected processes are standardized across the enterprise. C D	Process standardization and reuse is consistently employed across the enterprise. C D	Extended enterprise interface processes have been standardized. C D
	Lean Indicators (Examples)	• The workforce plays a significant role in devising standard processes and practices, which are adhered to and periodically updated. • Process improvements are documented in a concise and easy to use standard format and transferred. • Processes are standardized where applicable throughout the extended enterprise.				
	Evidence					
	Opportunities					
III.B.2.	**Common Tools and Systems** *Assuring compatibility, reducing costs*	Tools and systems vary by program or work center. C D	Have identified high leverage opportunities for common tools and systems; initial deployment in a few areas. C D	Plans are in place for achieving common tools and systems and have been implemented to varying degrees across the enterprise. C D	Common tools and systems have been implemented throughout the enterprise. C D	Compatibility of tools and systems with those of enterprise partners in the extended enterprise. C D
	Lean Indicators (Examples)	• Policies have been established and deployed that require the use of common tools and systems throughout the enterprise. • Common tools and systems provide easy access and reuse of knowledge across the product life cycle. • Enterprise-wide use of common tools and systems provides enhanced compatibility between processes and aids employee transfer.				
	Evidence					
	Opportunities					

LP #	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.B.3.	**Variation Reduction** *Reduce uncertainty by reducing variation*	There is limited use of variation reduction tools and methods. There is some evidence of variation understanding in parts of the organization. **C** **D**	There is evidence that sources of variation are being identified and analyzed. Initial efforts are underway to reduce variability. **C** **D**	A formal approach that balances customer value and variation reduction is implemented in many parts of the enterprise. **C** **D**	Considerable benefits are realized from reduced variation in processes and practices across the enterprise. **C** **D**	Benefits of reduced variation are realized across the extended enterprise. **C** **D**
	Lean Indicators (Examples)	• Process ownership and visual displays of process variation enable quick and easy identification of adverse trends. • High levels of process stability are maintained by utilizing mistake proofing and root cause identification techniques to the fullest. • Variation reductions achieved enable short predicable lead times for information and material flow.				
	Evidence					
	Opportunities					

Government LESAT Glossary

Activity - A unit of work that has a beginning and an end, occurs over a period of time, and consumes input(s) and produces output(s). (Ref. 2)

Backflow - a condition in which a part/product being processed is returned to a previous stage due to a defective condition, a missing operation, or other anomalous situation.

Balanced Scorecard - An analysis technique and management instrument that translates an enterprise's mission and strategy into a comprehensive set of performance measures to provide a framework for strategic action. The scorecard may gauge organizational performance across several perspectives such as: financial, customers, internal business processes, and learning and growth. (Ref. 2)

Baseline - A standard for comparison used as a reference for measuring progress. Often used as representation of the current state to be used to assess performance against benchmarks and/or to assess future states. (Ref. 2)

Batch-and-queue - The mass-production practice of making large lots of a part and sending the batch to wait in the queue before the next operation in the production process. Contrast with single-piece flow. (Ref. 1)

Best Practice – A method of accomplishing a business function or process that is considered superior to other known methods. (Ref. 2)

Business Case - Justification for an improvement. Serves as a decision package for enterprise executives. Typically includes such information as an analysis of current problems or future needs, a proposed solution, assumptions and constraints, alternative solutions, life-cycle investment costs, quantified benefits, an analysis of costs versus benefits, and an analysis of risks involved. Within Department of Defense (DoD), a business case for a business process improvement project is called a Functional Economic Analysis (FEA). (Ref. 2)

Cellular layouts – The layout of machines of different types performing different operations in a tight sequence, typically in a U-shape, to permit single-piece flow and flexible deployment of human effort by means of multi-machine working. (Ref. 1)

Change Agent – A person who leads a change project or enterprise-wide initiative by defining, researching, planning, building support and carefully selecting volunteers to be a part of a change team. The term is often associated with a certain zealousness for implementing changes in activities or processes.

Consensus - A state where group members support an action or decision, even if some do not fully agree with it. A consensus decision is made after aspects of an issue, both positive and negative, have been reviewed or discussed to the extent that everyone openly understands, supports, and participates in the decision. (Ref. 2)

Continuous Flow Production – Items are produced and moved from one processing step to the next one unit-at-a-time. Each process makes only the one piece that the next process needs, and the transfer batch size is one. Also called "single-piece flow" or "one-piece flow." Contrast with batch-and-queue. (Ref. 4)

Core Competency - The particular capabilities (knowledge, demonstrated proficiency and experience) of an enterprise that satisfy existing strategy and serves as the basis for growth or diversification into new lines of business. (Ref. 2)

Cross Functional Management – a process designed to encourage and support interdepartmental communication and cooperation throughout an enterprise, as opposed to command and control through narrow departments or divisions. The purpose is to achieve enterprise targets such as quality, cost, and delivery of products and services by optimizing the sharing of work. (Ref. 6)

Culture - Shared characteristics such as values, behaviors, and beliefs that distinguish the members of one group from those of another. Organizational culture includes the common set of beliefs, sentiments, priorities, attitudes, perceptions, operating principles, and accepted norms shared by individuals within an organization. **Cultural change** is a major shift in these organizational characteristics. (Ref. 2)

Customer - A stakeholder who is a recipient of a product or service produced by an enterprise. Customers may be internal or external to the organization. External customers, those in the marketplace, are the reason an enterprise exists. Internal customers are the reason a functional area or department exists – an interdependent department, or a downstream user in the value chain. When services rather than products are provided, customers are often called clients. (Ref. 2)

Cycle Time - The time required to complete one cycle of an operation. If cycle time for every operation in a complete process can be reduced to equal takt time, products can be made in single-piece flow. (Ref. 1)

Employees – All of the individuals employed by the organization including full time, part time, temporary and contract employees. (Ref. 5)

Enterprise - Any organization with a distinct mission, market segment, suite of products or services, customer base, profit/loss responsibility, and set of competitors. The purpose for the organization's existence is to perform its mission and achieve associated goals. (Ref. 2)

Extended Enterprise – All enterprises along the value stream that contributes to providing value to a customer. (Adapted from Ref. 1.)

Flow – The progressive achievement of tasks along a value stream so that a product proceeds from design to launch, order to delivery, and raw materials into the hands of the customer with no stoppages, scrap, or backflows. (Ref. 1)

Gap Analysis - The difference between a current state or position and a desired state or position. (Ref. 2)

Innovation – The practical transition of ideas into new products, services, processes, systems and social interactions. (Ref. 5)

Just-in-Time – Producing or conveying only the items that are needed by the next process when they are needed and in the quantity needed. (Ref. 4)

Lead-time – The total time a customer must wait to receive a product after placing an order. When a production system is running at or below capacity, lead-time and throughput time are the same. When demand exceeds the capacity of a system, there is additional waiting time before the start of production, lead-time exceeds throughput time. (Ref. 1)

Non-value Added - Any product, process, or service that does not add value to the ultimate customer. (It is important to note that non-value added is not the same as "not necessary", since some activities are required by law or are necessary for process control, such as inspection. These may not add value but are used to assess processes for control and improvement.) (Ref. 3)

Partnerships – A working relationship between two or more parties. Partners can include suppliers, distributors, joint ventures, and alliances. (Ref. 5)

Performance Measure - A dimension of an activity or process – quality, cost, cycle time, or other characteristic – that can be used to judge the effectiveness or efficiency of the process against a target or standard value. (Ref. 2)

Process – A sequence of activities that adds value by producing required outputs from a variety of inputs. (Ref. 5)

Productivity - An overall measure of the ability to produce a good or service. It is the actual output of production compared to the actual input of resources. Productivity is a relative measure across time or against common entities. In economics, the ratio of output in terms of dollars of sales to an input such as direct labor in terms of total wages. (Ref. 3)

Pull System - A planning system based on communication of actual real-time needs from downstream operations - ultimately final assembly or the equivalent - as opposed to a push system. (Ref. 3)

Push System - A planning system that schedules upstream operations according to theoretical downstream needs based on a plan, which may not be current – as opposed to a pull system. (Ref. 3)

Single-Piece Flow – A situation in which units proceed, one at a time, through operations in design, order-taking, production and assembly, without interruptions, backflows, or scrap. (Ref. 1)

Stakeholders – All those who have an interest in an organization, its activities and its achievements. These may include customers, partners, employees, shareholders, owners, government, and regulators. (Ref. 5)

Strategic Plan - A comprehensive statement of an organization's overall mission, objectives, and strategy. A detailed roadmap of the direction the organization intends to follow in conducting its activities. Provides direction, concentration of effort, consistency of purpose, and flexibility as a business moves to maintain and improve its competitive position. (Ref. 2)

Strategic Planning - The top-level management decision process that focuses on the overarching, long-range direction of the enterprise and establishes the means by which that direction is reached. Includes defining top-level and subordinate missions, goals, and supporting objectives, i.e., how the enterprise sees its purpose and where it wants to go. Provides the "big picture" along with a description of how goals and objectives are to be achieved and the indicators that will be used to measure performance and outcomes. (Ref. 2)

Takt Time - The available production time divided by the rate of customer demand. For example, if customers demand 240 widgets per day and the factory operates 480 minutes per day, takt time is two minutes; if customer wants two new products designed per month, takt time is two weeks. Takt time sets the pace of production to match the rate of customer demand and becomes the heartbeat of any lean system. (Ref. 1)

Value – A product or service's capability provided to a customer at the right time, at an appropriate price, as defined in each case by the customer. (Ref. 4)

Value-added Activity - Value-added is the difference between dollar sales and the cost of raw materials and purchased parts. Value-added activity is an activity or step in a process that adds value to an output product or service. Such an activity merits the cost of the resources it consumes in production. These are the activities that customers would view as important and necessary. A value-added activity contributes directly to the performance of a mission, and could not be eliminated without impairing the mission. (Ref. 2)

Value Added Time – Time for those work elements that transform product into value the customer is willing to pay for. (Ref. 4)

Value Stream - The specific activities required to design, order, and provide a specific product, from concept to launch, order to delivery, and raw materials into the hands of the customer. (Ref. 1)

Value Stream Mapping/Analysis - Involves defining a product families' / business processes' material and information flows from beginning to end utilizing a visual representation of every process. This facilitates understanding of current state and the development of the proposed future state. The difference between the two states becomes the basis for the Lean Transformation plan.

Virtual Organization - An assemblage of core competencies from (perhaps) previously unassociated participants; on a temporary basis for a defined purpose and for an indefinite period of time; has capability or other accomplishment responsibility; upon completion of the original purpose, the organization is dissolved.

Vision - A guiding theme that articulates the nature of the business and the enterprise's intent for its future. A description of what senior management wants to achieve. Usually refers to the medium to long term and is often expressed in terms of a series of objectives. (Ref. 2)

Waste - Any product, process, or service, which does not add value to the ultimate customer. Waste in business processes/production can be broken down into seven types; Waiting, Unnecessary Motion, Processing, Inventory, Moving Items, Making Too Much, Fixing Defects. (Ref. 3)

Government LESAT Glossary References

Ref. 1 *Lean Thinkin*g, James P. Womack and Daniel T. Jones, Simon & Schuster, 1996.

Ref. 2 *Techniques for Enterprise Managemen*t, Software Productivity Consortium, SPC-98016-MC, Feb. 1999.

Ref. 3 Internal Glossary of Rockwell Collins Corp., Lean Electronics Division.

Ref. 4 *Training to Se*e, Mike Rother and John Shook, The Lean Enterprise Institute, Feb. 2000.

Ref. 5 The EFQM Excellence Model Glossary of Terms.

Ref. 6 *The Lean Enterprise*, Dan Dimancescu, Peter Hines, and Nick Rich, American Management Association, 1997.