

**Lean
Aerospace
Initiative**



***Growing the
Lean Community***
An LAI Plenary Conference

**LESAT
Lean Enterprise
Self-Assessment Tool**

April 11, 2001

Presented By:
Deborah Nightingale
LAI

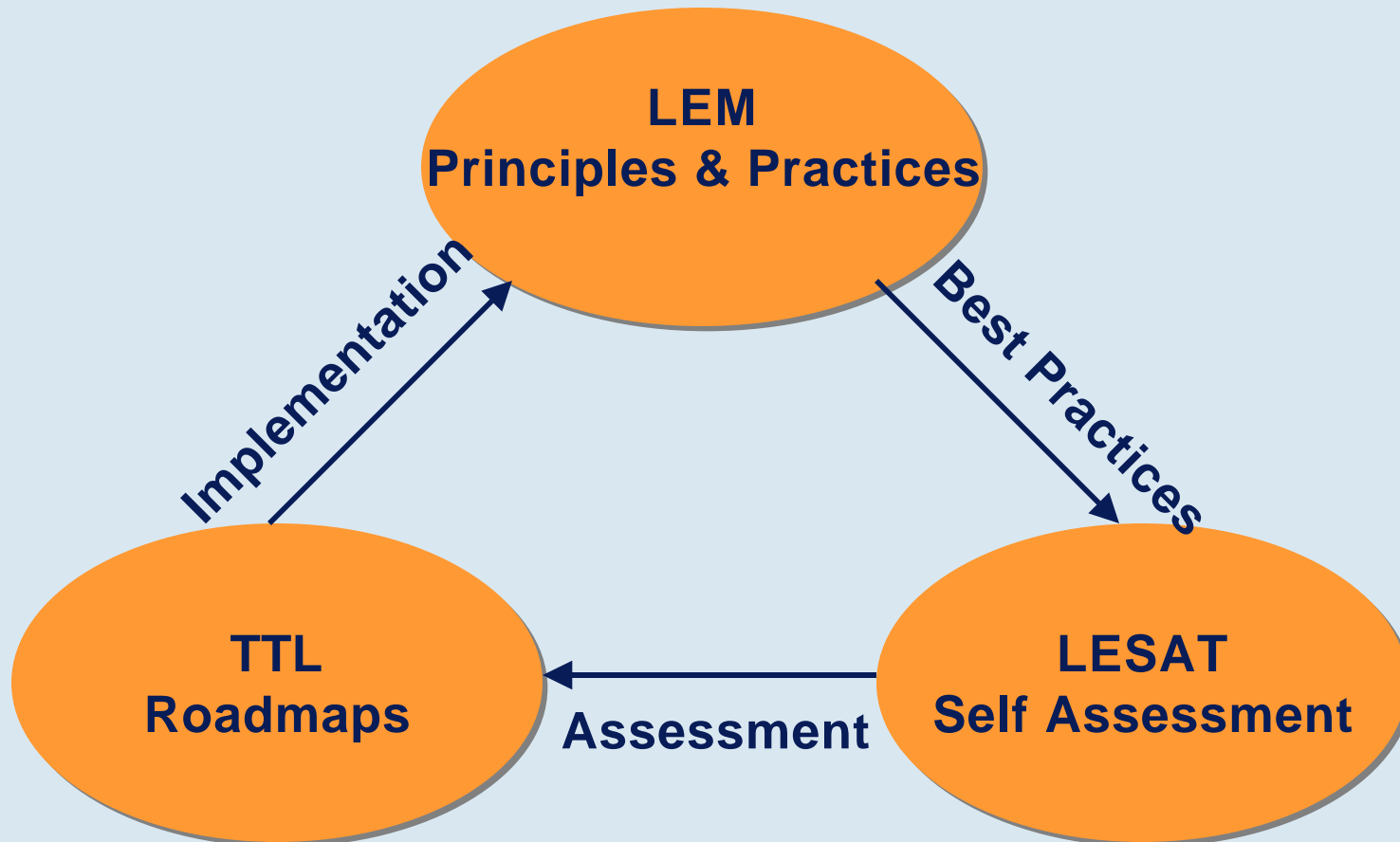
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- **Background**
- **LESAT Development Process**
- **LESAT Architecture and Practices**
- **Assessment Process**
- **Next Steps / Schedule**



LAI Enterprise Tool Triad





What Is LESAT?



- A tool for self-assessing the present state of “leanness” of an enterprise and its readiness to change
- Comprised of:
 - Capability maturity model for enterprise leadership, life cycle and enabling processes
 - Supporting materials: (instructions manual, scoring guide, etc.)



Approach: Evaluation of Existing Assessment Tools

- **Conducted analysis of existing tools vs. requirements**
- **Types of assessment tools**
 - **Maturity matrices (Boeing, SEI, SAE J4000)**
 - **Quality of document processes (Baldrige, Shingo Prize)**
 - **Outcome based, measured change in performance (Evidence of Lean, Financial Scorecard)**
- **None of the existing tools met key requirements**
 - **Did not address entire enterprise (most focused on factory floor) nor integration aspects**
 - **Did not provide a gap analysis**
 - **Did not identify “next steps” to take**



LESAT Tool Requirements (Survey of LAI Stakeholders)

- **Simple, easy to use and minimal time to create**
 - Instructions and mechanism for use
 - Standard and clear definitions
- **Focus on lean attributes**
- **Alignment with business performance planning (goals and results)**
- **Provides guidance for “next steps”**
 - Gap analysis capability
- **Ability to accommodate both single and aligned organizations (teaming, partnerships, suppliers) within an enterprise**



Enterprise Level Module Alpha Testing Feedback

**5 Companies (9 sites)
7 Government (2 SPOs, 5 DCM sites),
2 Lean Aerospace Initiatives (LAI, UK LAI)**

- **High enthusiasm for executive-level tool**
- **Strong support for linkages to enterprise transition to lean roadmap**
- **Suggested simplification and strong integrative focus for practices**
- **Strategic and enterprise-level issues given high priority**



Lean Enterprise Self Assessment Tool Architecture

Section I

Section II

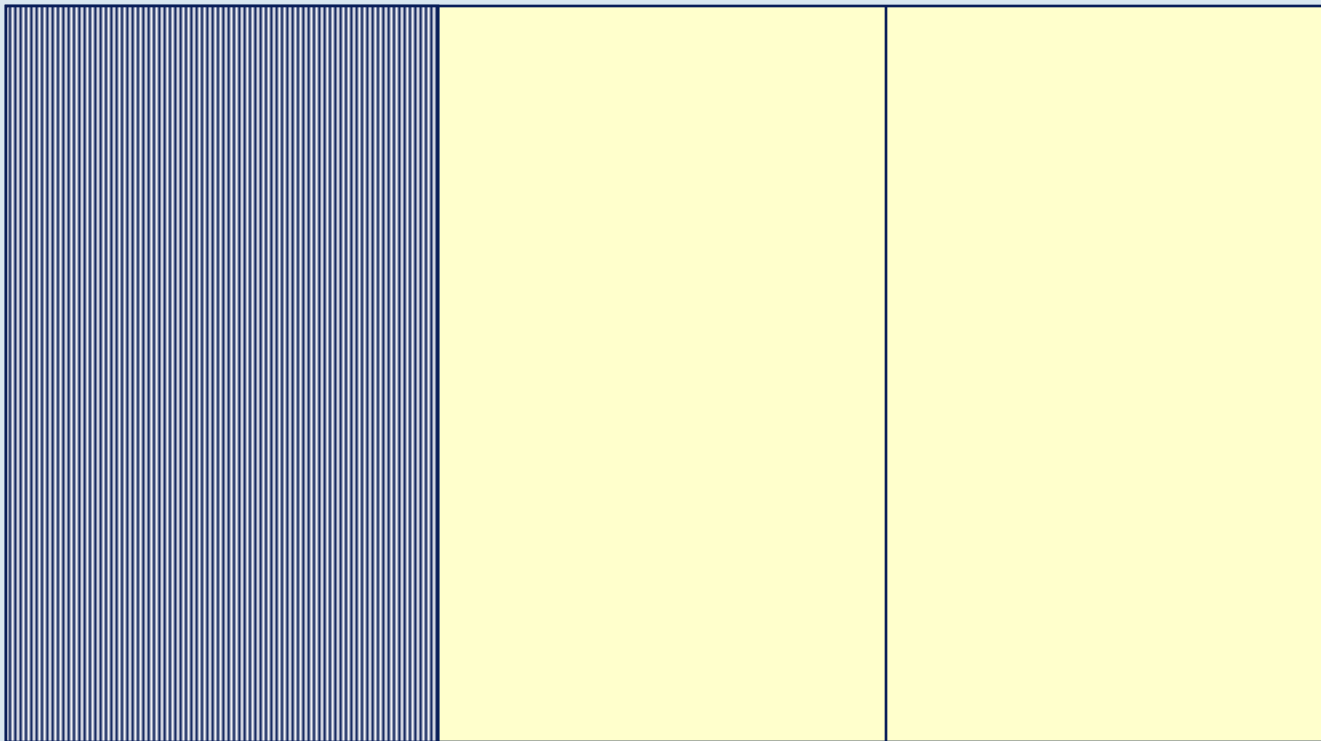
Section III

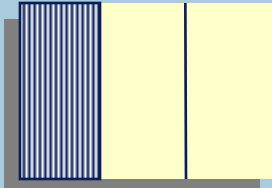
<p>Lean Transformation / Leadership</p>	<p>Life Cycle Processes</p>	<p>Enabling Infrastructure Processes</p>
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LESAT Architecture

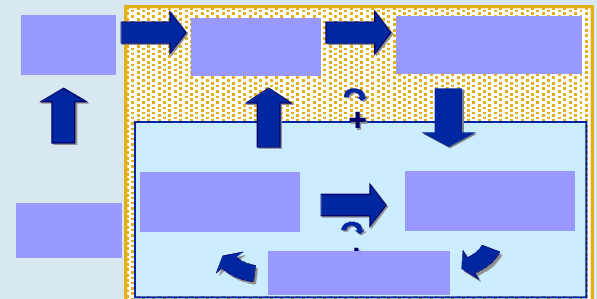
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Section I: Lean Transformation/Leadership

- Practices directly linked to enterprise Transition to Lean Model (TTL)
- Assesses the following elements:
 - Strategic integration
 - Leadership and commitment
 - Value stream analysis and balancing
 - Change management
 - Structure and systems
 - Lean transformation planning, execution and monitoring



LESAT Maturity Matrix Template

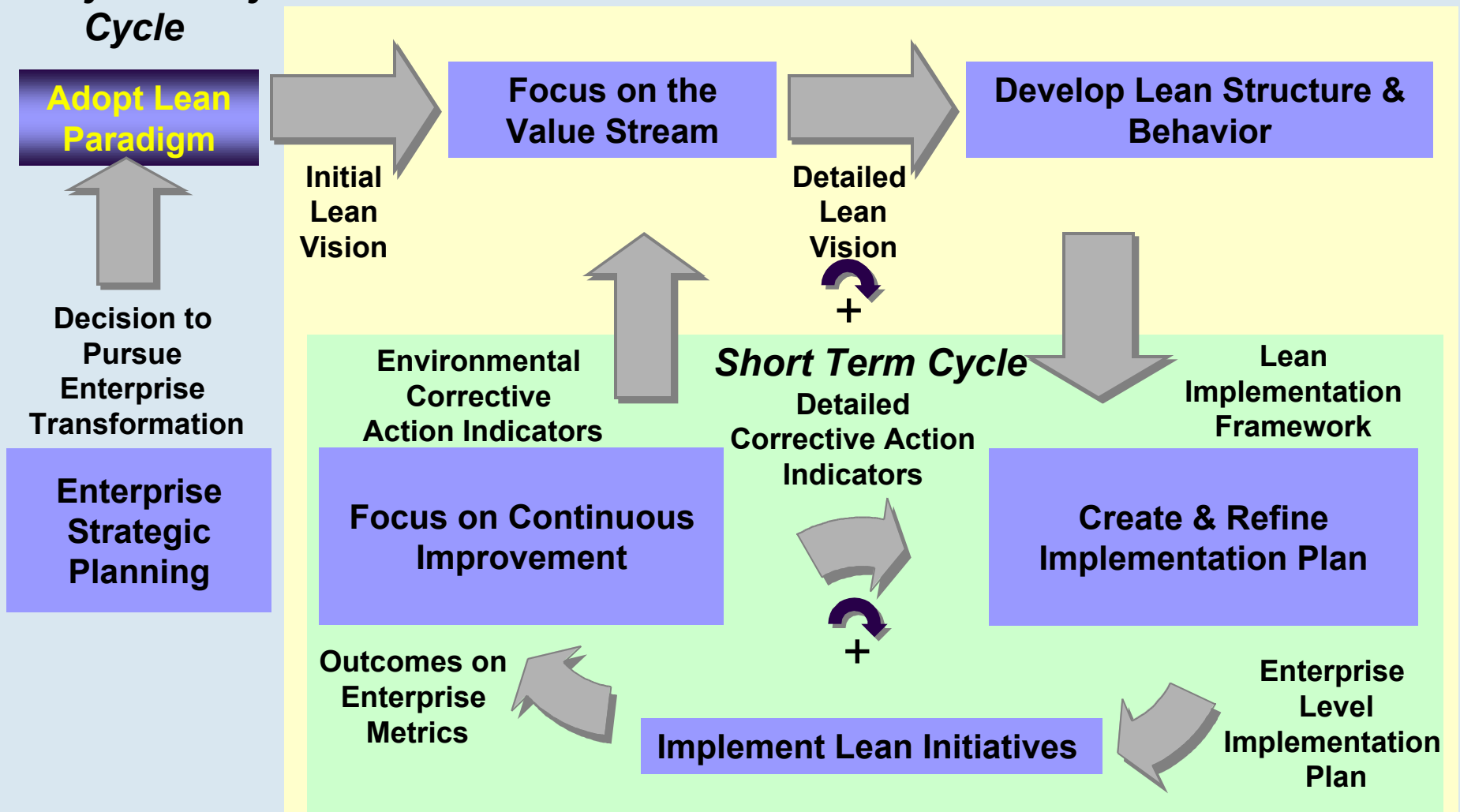
Name and brief description of one of the <u>Primary Activities</u> or Process Areas						
Diagnostic Questions		Generic questions regarding the performance of the enterprise relative to this <u>Primary Activity</u> on TTL Roadmap				
Lean Indicators		Lean behaviors that an enterprise will exhibit as it proceeds on its Lean transformation				
LP#	Lean Practices	Capability Levels				
		<u>Level 1</u>	<u>Level 2</u>	<u>Level 3</u>	<u>Level 4</u>	<u>Level 5</u>
	<i>A specific Lean practice associated with this <u>Primary Activity</u></i>	<i>Statement describing little awareness of this Lean practice</i>				<i>Statement describing world-class behavior for this Lean practice</i>



Enterprise Transition To Lean (TTL) Roadmap

Entry/Re-entry Cycle

Long Term Cycle



I.B. Adopt Lean Paradigm

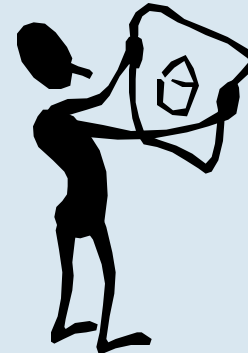
I.B Adopt Lean Paradigm- Transitioning to lean requires a significant modification to the business model of the enterprise. It is imperative that the enterprise leadership understands and buys into the lean paradigm since they will be responsible for creating a vision for doing business, behaving and seeing value in fundamentally different ways.

Diagnostic Questions		<ul style="list-style-type: none"> Do enterprise leader and senior managers understand the lean paradigm at the enterprise level? Have all senior managers made a commitment to enthusiastically support a lean transformation? 				
Lean Indicators		<ul style="list-style-type: none"> Lean transformation progress is integral to all senior leadership discussions and events Senior managers are championing the enterprise transformation. 				
LP#	Lean Practices	Capability Levels				
		Level 1	Level 2	Level 3	Level 4	Level 5
B.1	Education in 'Lean' for Enterprise Leaders <i>Learning the new, "unlearning" the old</i>	Little interest in learning lean principles is evident among enterprise leadership	Actively seeking opportunities to learn about lean; initial grasp of the extent of the paradigm shift for their company	Continuously applying and adopting lean learning	Actively sharing the organization's experiences in implementing lean; promoting lean learning within extended enterprise	Senior leaders contribute to & advance the development / refinement of the body of knowledge about lean
B.2	Senior Management Commitment <i>Senior management leading it personally</i>	Level of commitment among senior managers is variable – some endorse while others may actively resist	Senior managers buy into group commitment; senior managers who cannot or will not adapt are replaced	"Lean" is integral in all aspects of enterprise-wide meetings, senior staff meetings, etc.; senior managers personally and visibly lead lean transition	Senior managers are lean champions in transforming the enterprise	Senior managers mentor & foster lean champions internally & through the extended enterprise
B.3	Lean Enterprise Vision <i>New mental model of the enterprise</i>	Senior leaders have varying visions of lean, from none to well defined	Senior leaders adopt common vision of lean	Lean vision has been communicated and is understood by most employees	Common vision of lean shared by the extended enterprise	All stakeholders have internalized the lean vision and are an active part of achieving it
B.4	A Sense of Urgency <i>The primary driving force for lean</i>	Scan of environment identifies competitive threats & need for action	Enterprise senior leaders develop an urgent & compelling case for the lean transformation	Urgent & compelling case for lean transformation has been communicated & the organization rallies behind it	Urgent & compelling case for lean expanded to & accepted by key suppliers	Urgent & compelling case for lean expanded to & accepted throughout the extended enterprise



Diagnostic Questions

- **Do enterprise leader and senior managers understand the lean paradigm at the enterprise level?**
- **Have all senior managers made a commitment to enthusiastically support a lean transformation?**





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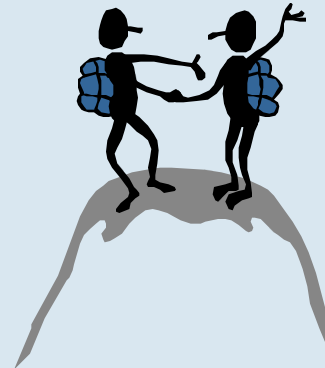
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- Do enterprise leader and senior managers understand the lean paradigm at the enterprise level?
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- Lean Indicators**
- Lean transformation progress is integral to all senior leadership discussions and events
 - Senior managers are championing the enterprise transformation.

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- **Senior managers are championing the enterprise transformation**



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I.B.3 Lean Enterprise Vision - new mental model of the enterprise

Level 1

Senior leaders have varying visions of lean, from none to well defined

Level 2

Senior leaders adopt common vision of lean

Level 3

Lean vision has been communicated and is understood by most employees

Level 4

Common vision of lean shared by the extended enterprise

Level 5

All stakeholders have internalized the lean vision & are an active part of achieving it

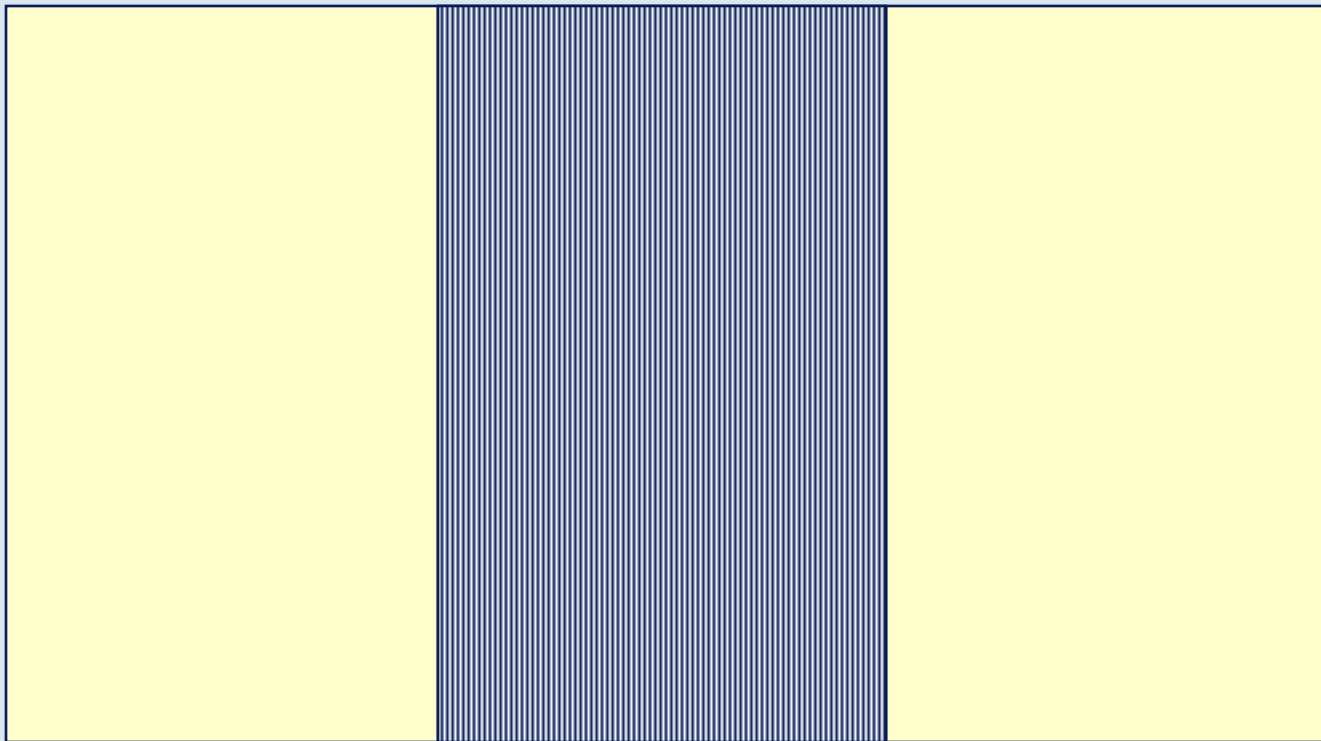


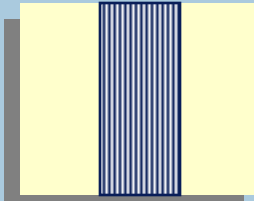
LESAT Architecture

**Section I
Lean
Transformation
/ Leadership**

**Section II
Life
Cycle
Processes**

**Section III
Enabling
Infrastructure
Processes**





Section II: Life Cycle Processes

Assess:

- **Enterprise level core processes**
 - **Acquisition**
 - **Program Management**
 - **Requirements Definition**
 - **Product/Process Development**
 - **Supply Chain Management**
 - **Production**
 - **Distribution and Support**
- **Key integrative practices**



II.C. Develop Product and Process

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Diagnostic Questions

- Are life-cycle stakeholders involved in product development?
- Are products and processes being developed concurrently?

Lean Indicators

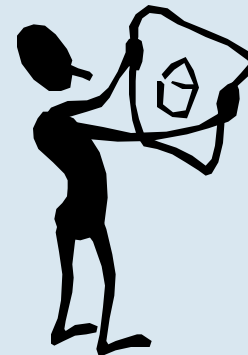
- Design cycle is shorter.
- Downstream design considerations considered at beginning.
- Significant reduction in design changes.

LP #	Lean Practices	Capability Levels				
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C.1.	<p>Incorporate customer value into design of products and processes</p> <p><i>Understanding customer value allows continuous improvement of product and process</i></p>	Customer inputs captured only at the beginning of the development	Customer inputs considered qualitatively through top-level liaison and occasional reviews.	The customer is formally represented on Integrated Product Teams (IPT) and feedback mechanisms exist to facilitate timely design iterations	Customer is actively involved with the IPT at multiple levels to jointly improve the effectiveness and quality of the product and process design	Customer is routinely involved with IPT via effective, continuous communication. Sharing of benefits is well established; Value quantification and tradeoffs are a continuous and automatic part of the process.
C.2.	<p>Incorporate downstream stakeholder values (manufacturing, support, etc.) into products & processes</p> <p><i>Understanding downstream stakeholders allows value to flow seamlessly to customer</i></p>	Manufacturing issues are considered late in design	Manufacturing & assembly issues are considered earlier in projects, but in an ad hoc manner. Supplier & cost considerations are limited	Multi-functional teams include some downstream disciplines and key suppliers	Priorities of downstream stakeholders quantified as early as possible in design, and used for process evaluation and improvement	Downstream stakeholders' values in the extended enterprise are quantified, and balanced via tradeoffs, as a continuous part of the process



Diagnostic Questions

- **Are life cycle stakeholders involved in product development?**
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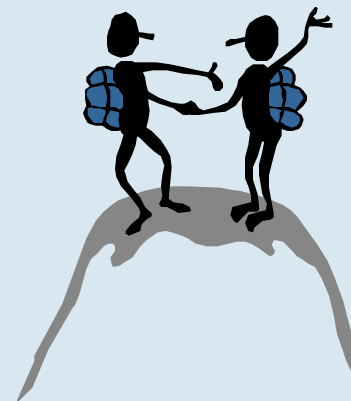
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- **Design cycle is shorter**
- **Downstream design considerations considered at beginning**
- **Significant reductions in design changes**





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II.C.2 Incorporate *downstream stakeholder values* (manufacturing, support, etc.) into products & processes - *Understanding downstream stakeholders allows value to flow seamlessly to customer*

Level 1

Manufacturing issues are considered late in design

Level 2

Manufacturing & assembly issues are considered earlier in projects, but in an ad hoc manner. Supplier & cost considerations are limited

Level 3

Multi-functional teams include some downstream disciplines and key suppliers

Level 4

Priorities of downstream stakeholders quantified as early as possible in design, and used for process evaluation and improvement

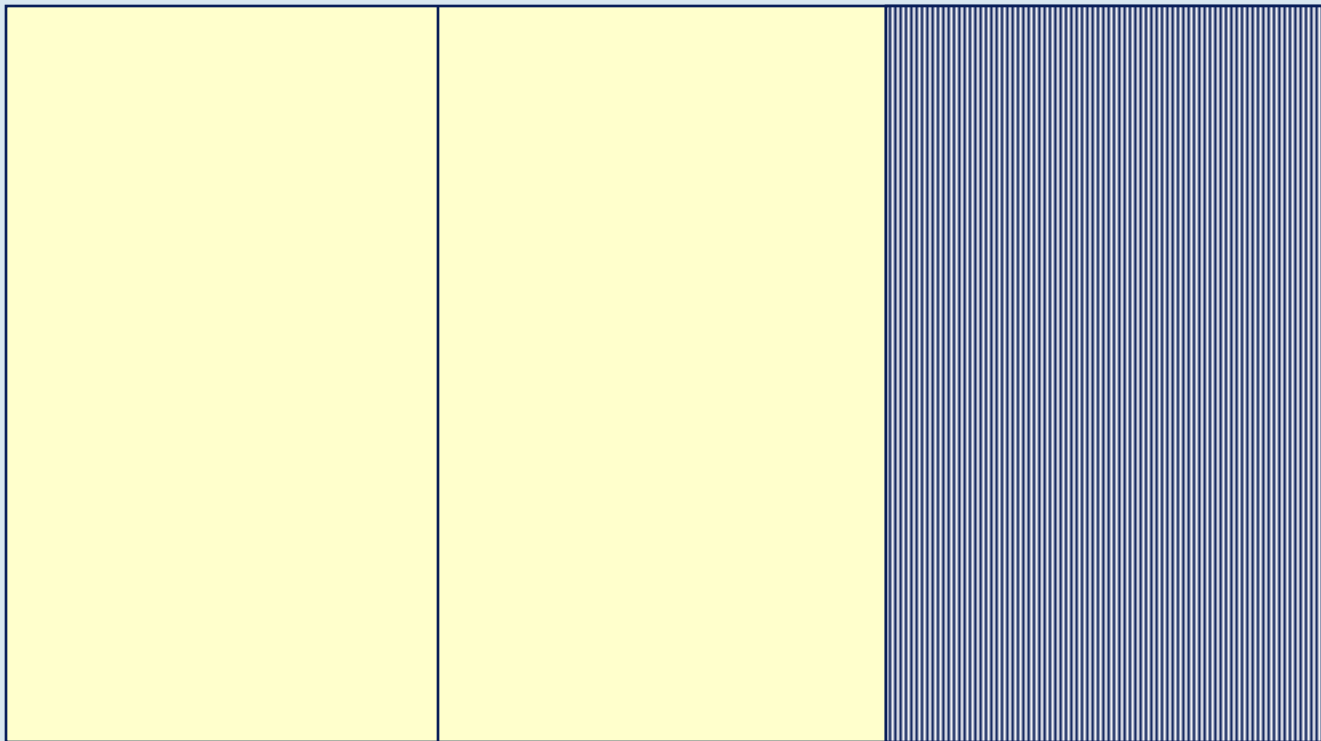
Level 5

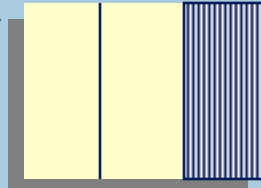
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LESAT Architecture

Section I Lean Transformation / Leadership	Section II Life Cycle Processes	Section III Enabling Infrastructure Processes
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Section III: Enabling Infrastructure

Assess critical supporting processes

- **Finance**
- **Information Technology**
- **Human Resources**
- **Environmental Health & Safety**



Section III - Enabling Infrastructure

Section III - ENABLING INFRASTRUCTURE

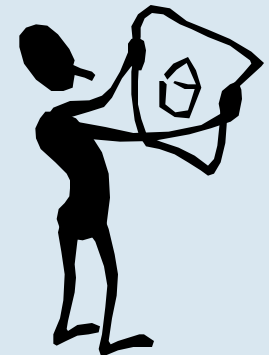
Definition: To achieve a successful lean transformation, the enterprise infrastructure must support the implementation of lean principles, practices & behavior.

Diagnostic Questions		<ul style="list-style-type: none"> • Are common tools and systems being used across the enterprise? • How well has the financial and accounting systems been integrated with non-traditional measures of value creation? • How well can stakeholders retrieve financial information as required? • Are human resource practices reviewed to assure intellectual capital matches process needs? • Are enabling infrastructure processes being aligned to value stream flow? • Do processes create the least amount of environmental hazards practical? • Is the information technology system compatible with stakeholder communication and analysis needs? 				
Lean Indicators		<ul style="list-style-type: none"> • Workforce skills have improved to support lean implementation. • Financial and other performance measures are balanced. • Compatible information systems exist across the extended enterprise. 				
LP	<u>Lean</u>	Capability Levels				
#	Practices	Level 1	Level 2	Level 3	Level 4	Level 5
A.	Common Tools and Systems <i>Assuring compatibility, reducing costs</i>	Tools and systems vary by program or work center	Have identified high leverage opportunities for common tools and systems; initial deployment in a few areas	Plans are in place for achieving common tools and systems and have been implemented to varying degrees across most areas	Common tools and systems have been implemented across the enterprise	Compatibility of tools and systems with those of enterprise partners in the extended enterprise
B.	Financial system supports lean transformation <i>Lean requires accurate assessment of value stream activities</i>	Finance system provides basic balance sheet & cost accounting data; there is little awareness and exploration of broader support roles for finance.	Analytical tools are provided by the financial systems to assist users in planning and programming activities (e.g., cash flow, returns, NPV, etc.)	Initiatives are under way to apply new and systematic approaches to the use of financial data across the enterprise (e.g., activity-based costing, lifecycle cost accounting, total cost accounting, etc.)	Set of financial measures integrates with non-traditional measures of value creation (e.g., intellectual capital, balanced scorecard, etc.)	Seamless integration across the extended enterprise with emphasis on measurement of value creation for all stakeholders



Diagnostic Questions

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- **How well can stakeholders retrieve financial information as required?**
- **Are human resource practices reviewed to assure intellectual capital matches process needs?**
- **Are enabling infrastructure processes being aligned to value stream flow?**
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- **Is the information technology system compatible with stakeholder communication and analysis needs?**



Section III - Enabling Infrastructure

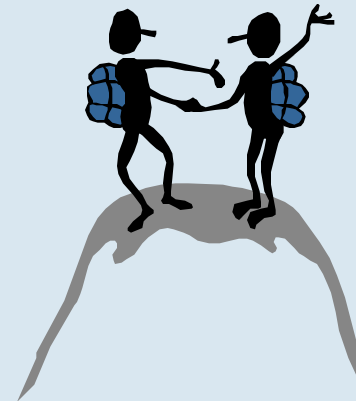
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- **Workforce skills have improved to support lean implementation.**
- **Financial and other performance measures are balanced.**
- **Compatible information systems exist across the extended enterprise.**





Section III - Enabling Infrastructure

Section III - ENABLING INFRASTRUCTURE

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Financial system supports lean transformation - *Lean requires accurate assessment of value stream activities*

Level 1

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Level 2

Analytical tools are provided by the financial systems to assist users in planning & programming activities (e.g., cash flow, returns, NPV, etc.)

Level 3

Initiatives are under way to apply new & systematic approaches to the use of financial data across the enterprise (e.g., activity-based costing, lifecycle cost accounting, total cost accounting, etc.)

Level 4

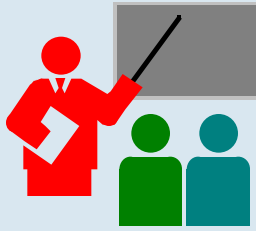
Set of financial measures integrates with non-traditional measures of value creation (e.g., intellectual capital, balanced scorecard, etc.)

Level 5

Seamless integration across the extended enterprise with emphasis on measurement of value creation for all stakeholders

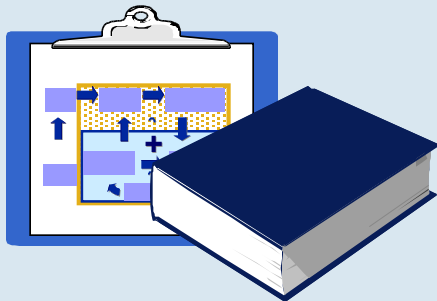
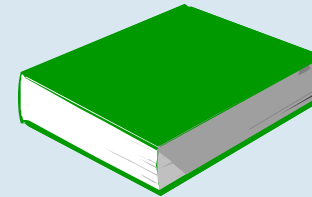


Enterprise Level Module Supporting Materials



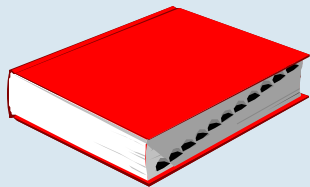
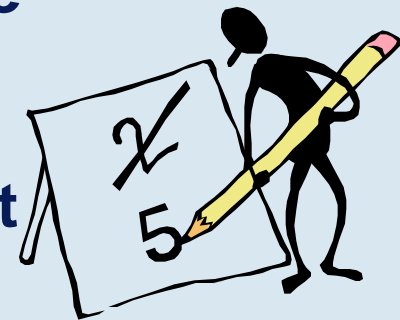
➤ **Introductory Presentation**

➤ **Assessor's Guide**



➤ **TTL Roadmap & Guide**

➤ **Summary Score Sheet**



➤ **Glossary of Terms**



Suggested Methodology for Employing LESAT



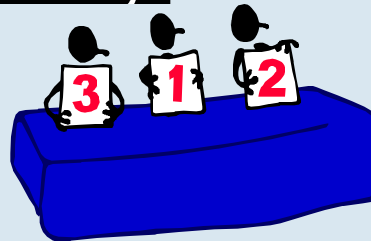
**Step 1: Facilitated meeting to introduce tool.
Enterprise leader champions**



**Step 2: Enterprise leaders and staff conduct
LESAT assessment**



**Step 3: Leadership reconvenes to jointly
determine present maturity level**



**Step 4: Leadership determines
desired level and measures
gap**



**Step 5: Develop
action plan and
prioritize resources**



Summary Form Example

LESAT Enterprise Self-Assessment Tool (LESAT) Beta Version

Section I		Lean Transformation/Leadership		
Process Description		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	
			Desired	Present
I.A Enterprise strategic planning	Integration of Lean in Strategic Planning Process	Lean impacts growth, profitability and market penetration		
	Focus on Customer Value	Customers pull value from enterprise value stream		
	Leveraging the Extended Enterprise	Value stream extends from customer through the enterprise to suppliers		
I.B Adopt Lean Paradigm	Education in "Lean" for Enterprise Leaders	Learning the new, "unlearning" the old		
	Senior Management Commitment	Senior management leading it personally		
	Lean Enterprise Vision	New mental model of the enterprise		
	A Sense of Urgency	The primary driving force for Lean		
I.C Focus on the Value Stream	Current Value Stream	How we now deliver value to customer		
	Future Value Stream	Delivering value with minimal waste		
	Performance Measures	performance measures drive enterprise behavior		
I.D Develop lean Structure and Behavior	Enterprise Organizational Structure	Organize to support value delivery		
	Relationships Based on Mutual Trust	"Win-win" vs. "we-they"		
	Open and Timely Communications	Facilitates a learning environment		
	Employee Empowerment	Decision making at lowest possible level		
	Incentive Alignment	Reward the behavior you want		
	Innovation Encouragement	From risk aversion to risk rewarding		
	Lean Change Agents	The inspirational leaders and drivers of lean change		
Process Standardization	Strive for consistency and re-use			

LESAT Assessment Scoring Form

Section I Lean Transformation/Leadership

I.B Adopt Lean Paradigm

**Desired
Level**

**Present
Level**

I.B.1 Education in Lean for Enterprise Leaders
Evidence

I.B.2 Senior Management Commitment
Evidence

I.B.3 Lean Enterprise Vision
Evidence

I.B.4 A Sense of Urgency
Evidence

Average Level

Gap

Suggested Actions

**LESAT Assessment Scoring Form
(Sample)**

Section I Lean Transformation/Leadership

I.B Adopt Lean Paradigm

I.B.1 Education in Lean for Enterprise Leaders

Evidence 8 of 9 Leaders have attended 30 hours of executive seminars in Lean principles. 6 have visited other Lean firms. All are engaged in Kaizen events.

**Desired
Level**

**Present
Level**

 5

 3

I.B.2 Senior Management Commitment

Evidence 26 of 30 Sen. Mgrs. have demonstrated commitment. 2 have been re-assigned. 2 are attempting to understand.

 4

 2

I.B.3 Lean Enterprise Vision

Evidence A common vision of Lean has been agreed upon and an extensive communication plan is being prepared.

 4

 2

I.B.4 A Sense of Urgency

Evidence The urgency has been articulated in terms of direct competitive threat. It is understood that the company's survival is threatened.

 5

 3

Average Score

 4.5

 2.5

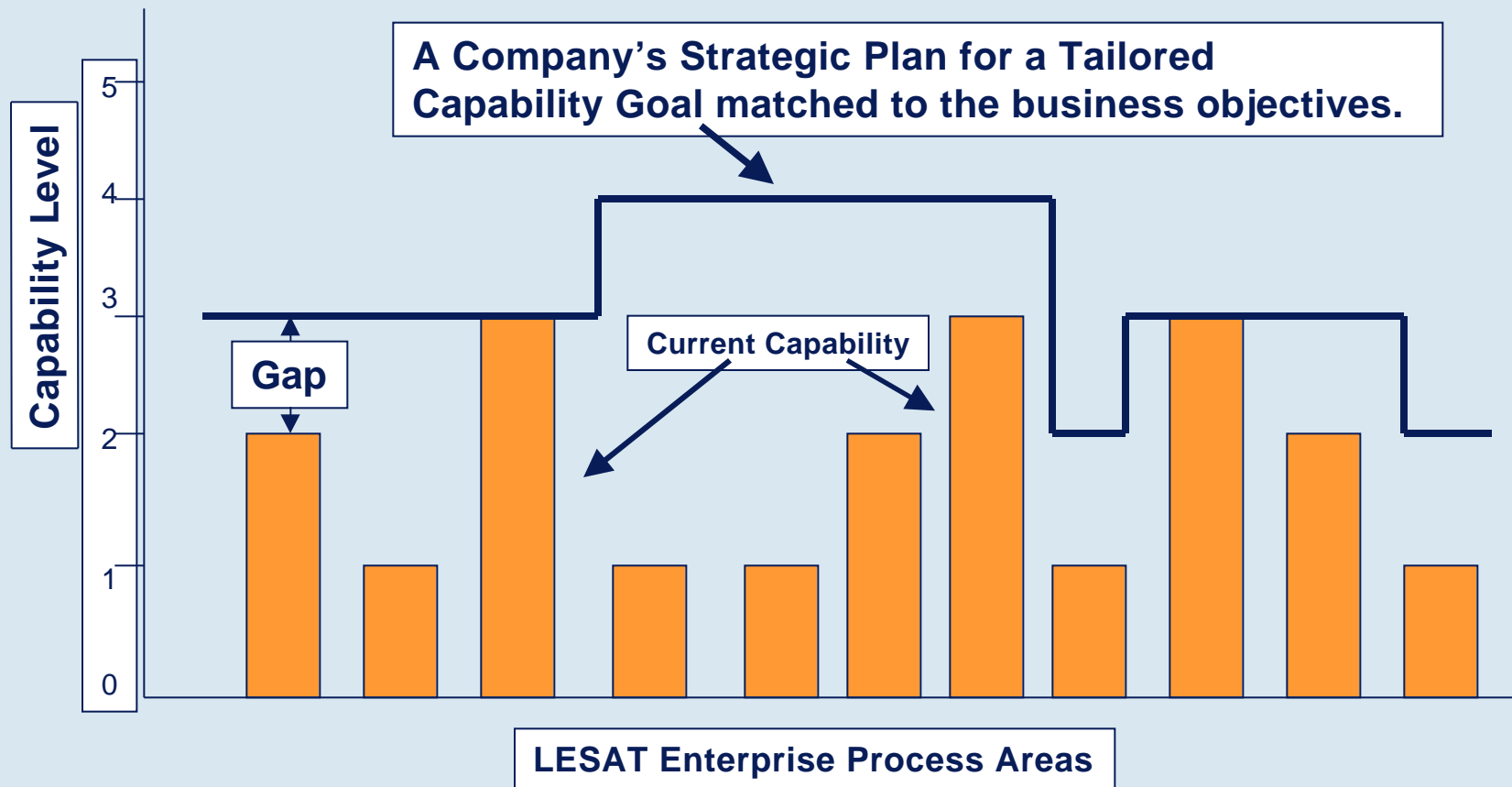
Gap

 2.0

Suggested Actions

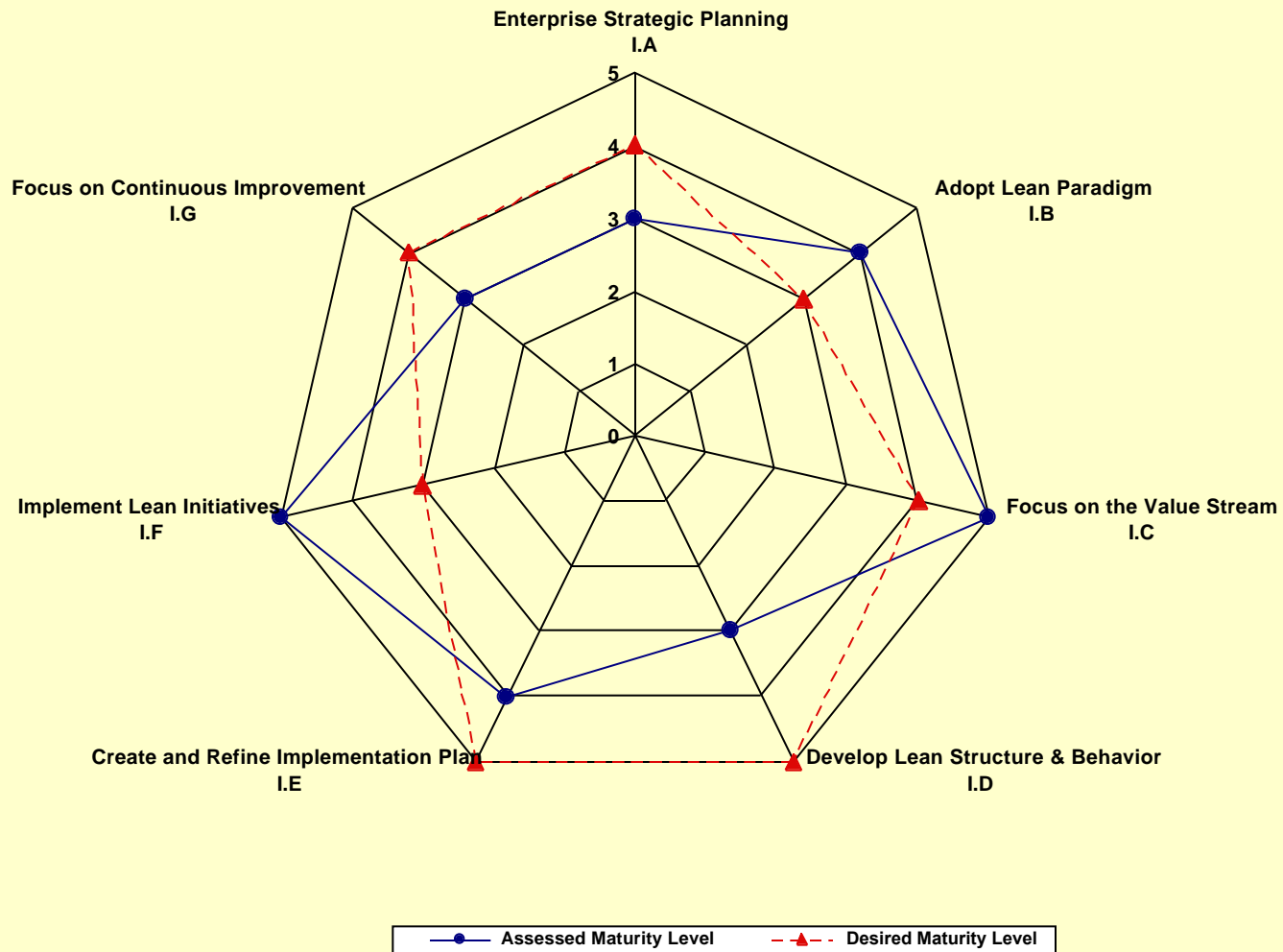
1. Initiate Lean Enterprise education for Senior Leaders of key suppliers and customers.
2. Increase budget for Education and Training of top management and staff.
3. Press for full commitment; replace any managers who cannot or will not commit.
4. Contract with top behavioral specialists for promulgating the Lean Enterprise Vision.

LESAT Desired Score Can be Tailored for Each Process Area







Sample
Section I Results Chart





Enterprise Level Module Development Plan

Activity Name	2001							
	January	February	March	April	May	June	July	August
Beta Version Testing	▲  ▼							
Incorporate Feedback					▲  ▼			
Enterprise Level Version 1.0							▲	
	January	February	March	April	May	June	July	August



Cross-Section of LAI Consortium is Participating in LESAT Beta Assessment

H	Boeing Helicopter
E	Textron Systems
E	Rockwell Collins (2 business units)
S	Lockheed Martin (Newtown)
A	Northrop Grumman (3 sites)
A	Lockheed Martin (Fort Worth)
N	Pratt & Whitney
H	Sikorsky Helicopter
E	Raytheon
S	Aerojet

H - Helicopter
A - Airframe
E - Electronics
N - Engine
S - Space