Lean Aerospace Initiative

Executive Board Roundtable

Lean Enterprise Self-Assessment Tool ("LESAT")

December 14, 2000

Presented By:
Debbie Nightingale
MIT

Research Sponsored By LAI

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Briefing Purpose

- Status report on June Executive Board commitments
  - Enterprise-level LESAT Beta Version ✓
  - Detailed-level LESAT Development Plan ✓
- Industry and government participation and support requirements
- Resource Needs
- Executive Board decision on proposed next steps

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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.)

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Lean Enterprise Self Assessment Tool Architecture

Enterprise Level Module

Sub-enterprise Level Modules

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Consortium Involvement

Avionics/Missiles

Northrop Grumman ESSS Engineering & Manufacturing
Raytheon Systems and Electronics Sector
Rockwell Collins, Inc.
Textron Systems

Space

Boeing Space and Communications Group
GenCorp Aerojet
Lockheed Martin Space & Strategic Missiles

Airframe

Boeing Military Aircraft and Missile Systems Group
Boeing Phantom Works
Boeing Commercial Airplane Group
Lockheed Martin Aeronautical Systems Sector
Northrop Grumman ISS

Other Government

Defense Contracts Management Agency
OUSD(A&T)

MIT

- **Lead Researchers**
  Faculty and Staff

Propulsion

Rolls Royce Allison

US Air Force

Aeronautical Systems Center
Air Force Research Laboratory
(Materials and Manufacturing Directorate)
Space and Missile Center
SPOS: F-22, Training (JPATS)

Other Participants

IAM
DSMC
Arizona State University
Massachusetts Institute of Technology
International Collaborations:
UK LAI

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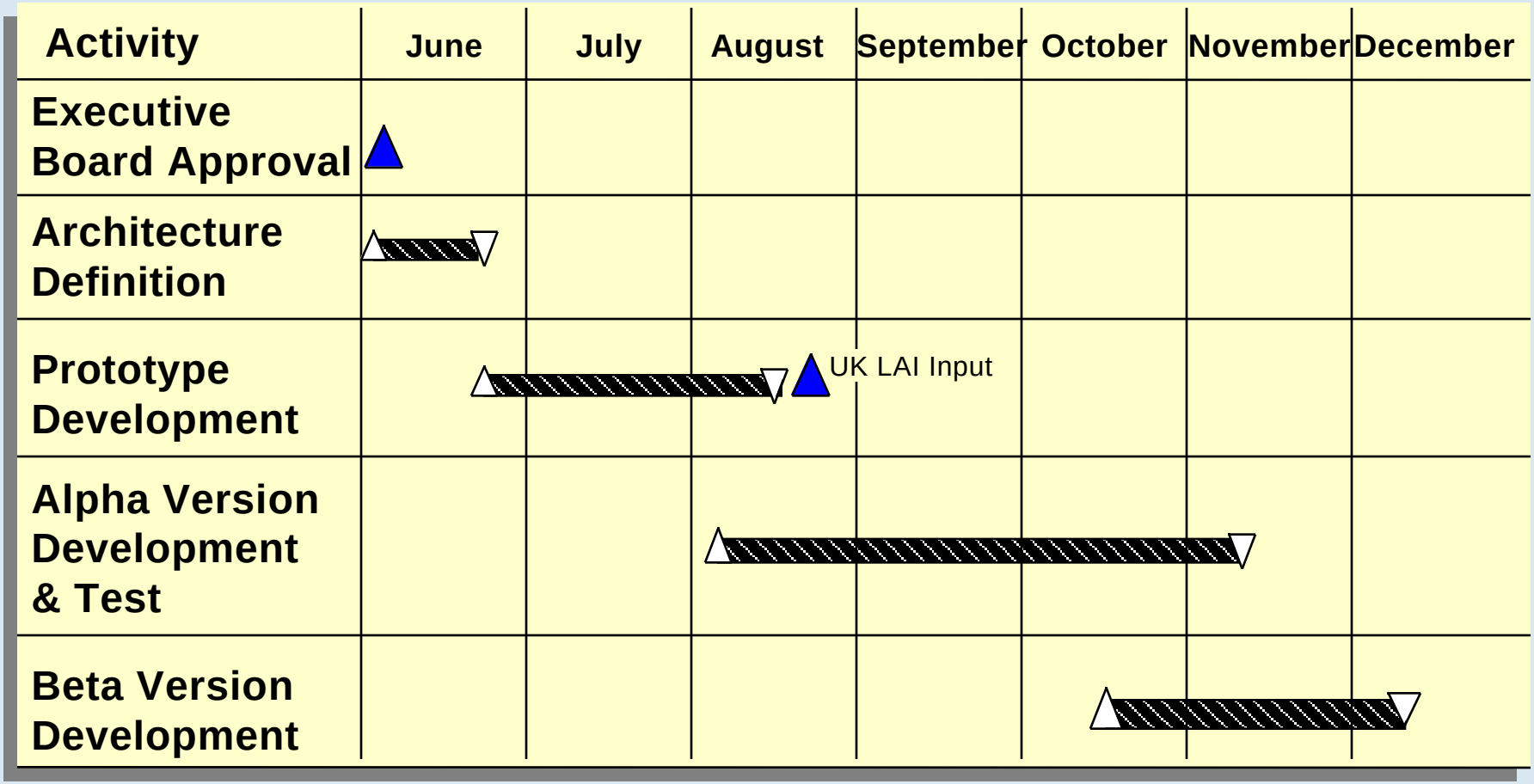
Enterprise Level Module Development Effort To Date



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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**

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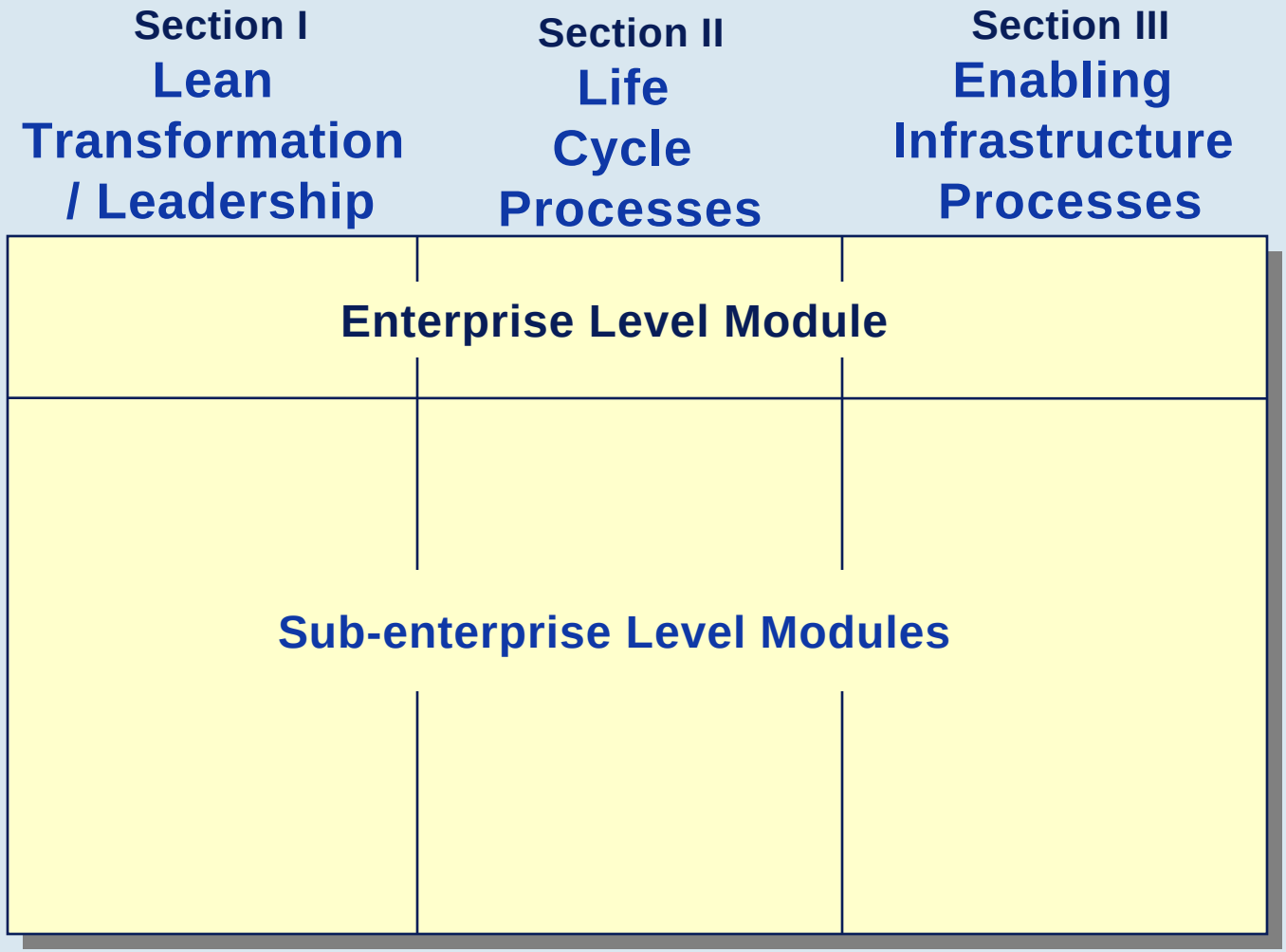
LESAT Architecture



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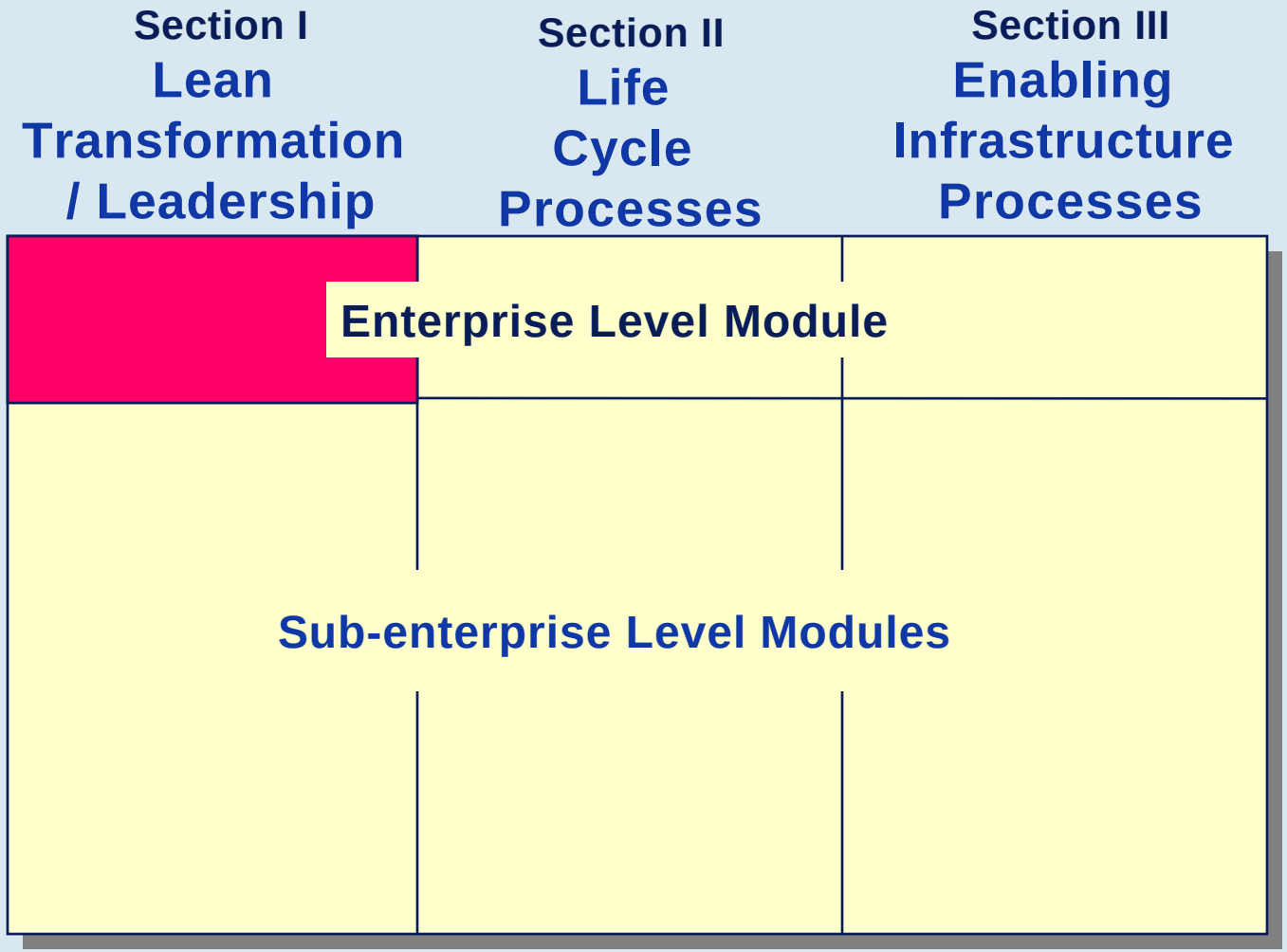
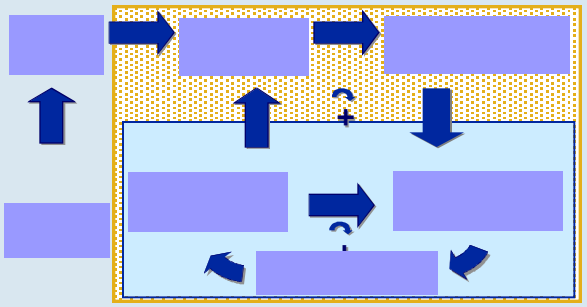
LESAT Architecture



Enterprise Level Section I

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



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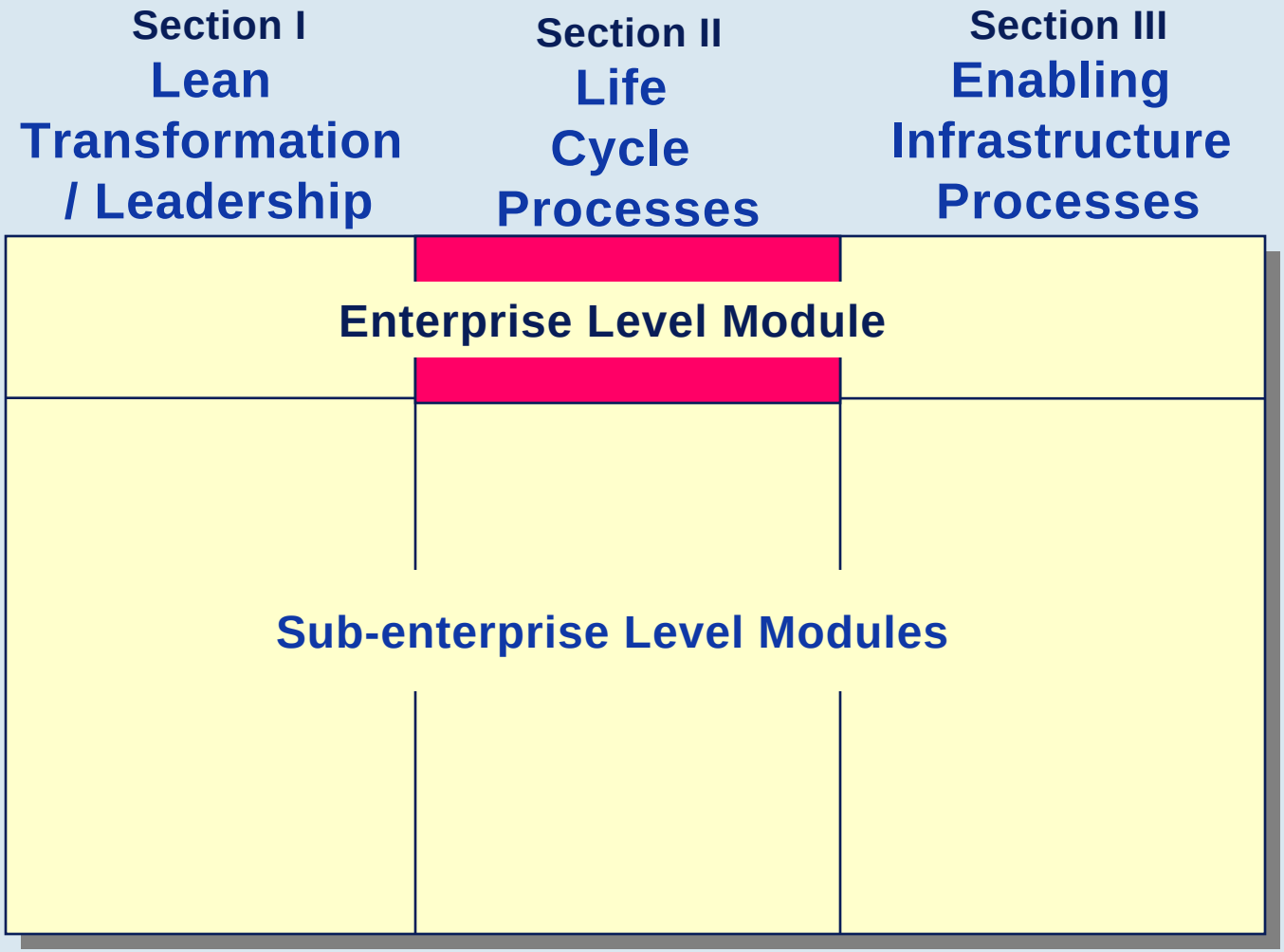
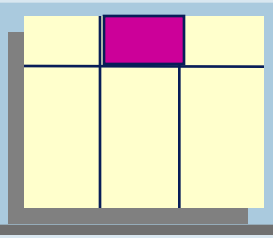
LESAT Architecture





Enterprise Level Section II

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

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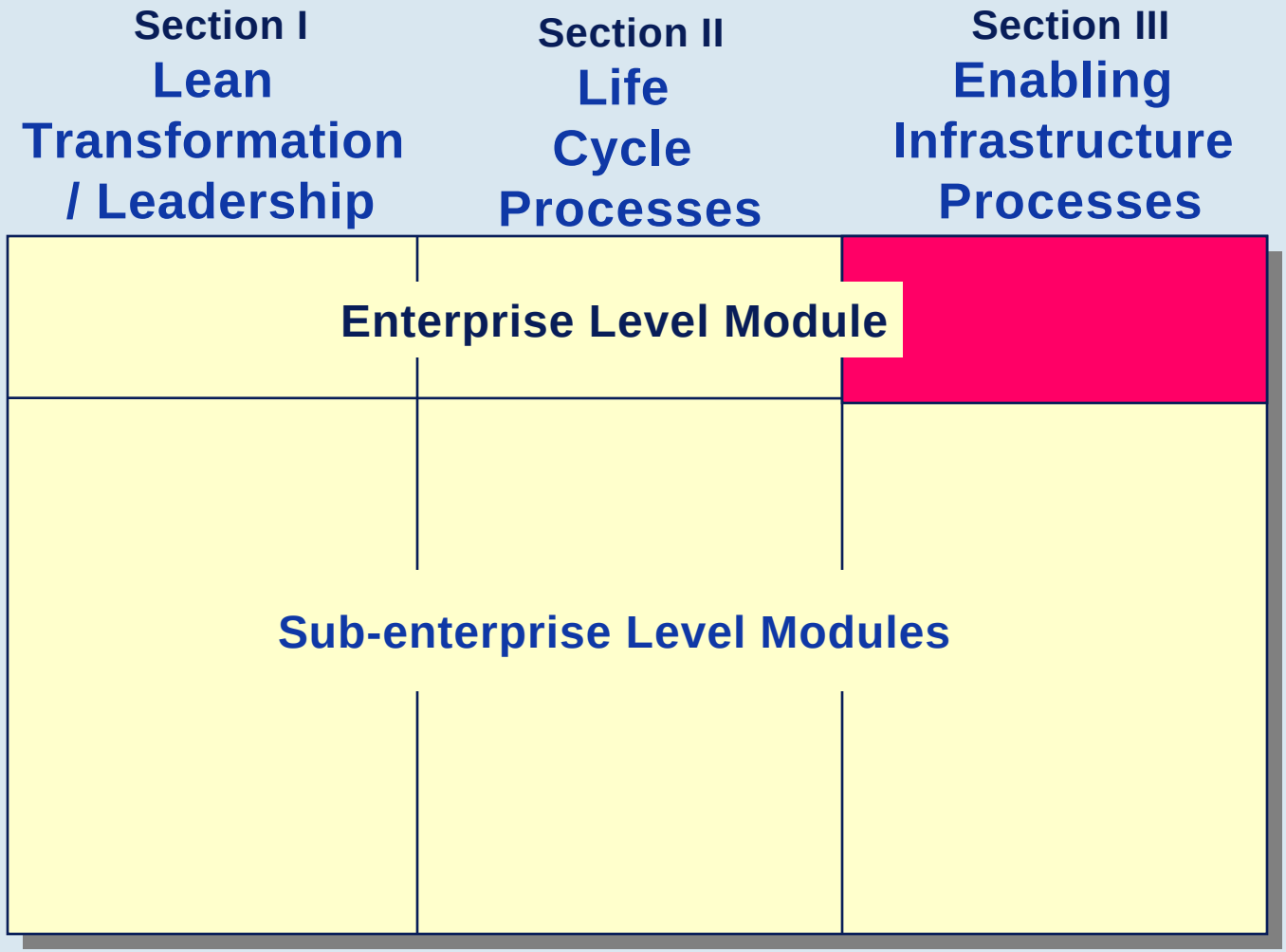

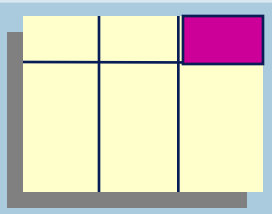

Enterprise Level Section III

Section III: Enabling Infrastructure

Assess critical supporting processes

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

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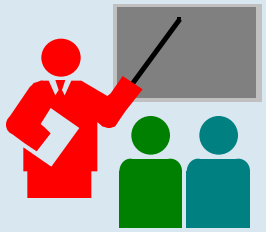
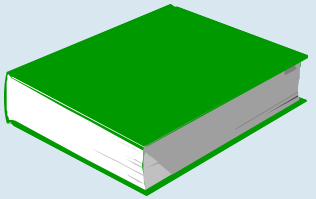
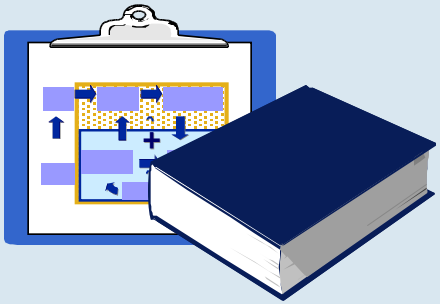
Enterprise Level Module Supporting Materials

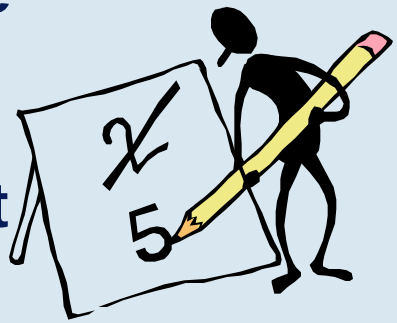


- Introductory Presentation
- Assessor's Guide

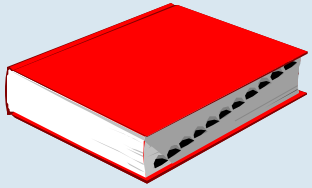




- TTL Roadmap & Guide



- Summary Score Sheet



- Glossary of Terms

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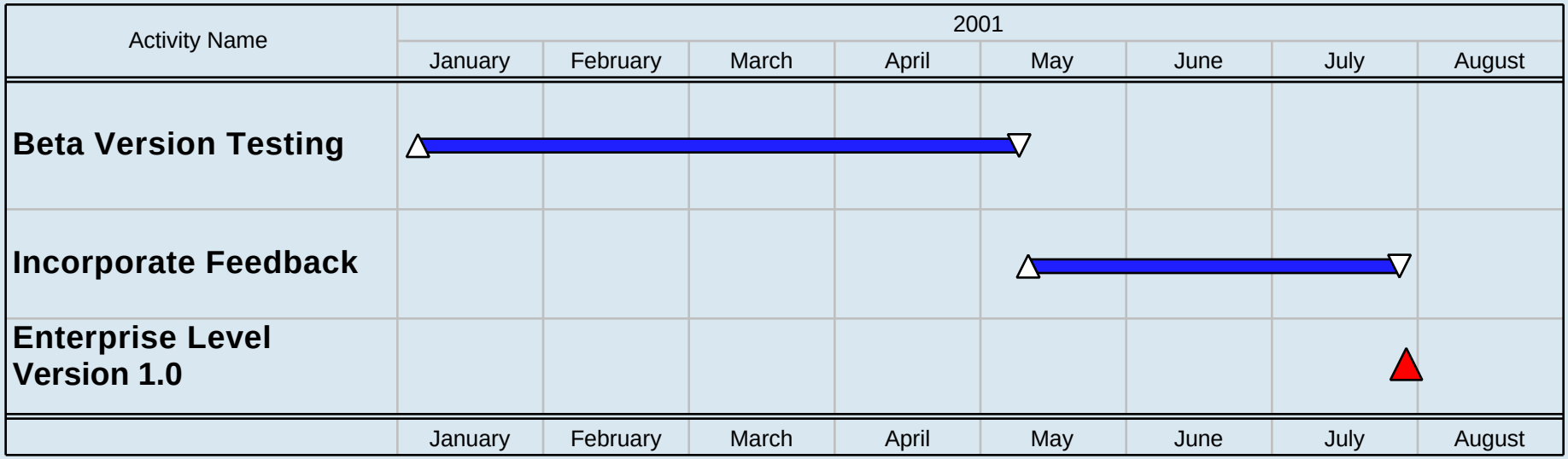
Enterprise Level Module Development Plan



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Sub-Enterprise Level Modules

Enterprise Level Module

Sub-enterprise Level Modules

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Sub-Enterprise Level Modules Development Plan

Section I Lean Transformation / Leadership	Section II Life Cycle Processes	Section III Enabling Infrastructure Processes
Change Mgmt.	Acquisition	Finance
	Program Mgmt.	
	Requirements Defn.	Information Tech.
	Product/Process Development	
		Human Resources
	Supply Chain Mgmt.	
		Quality
	Production	
		Environment Health & Safety
	Distrib. & Support	

Enterprise Level

Sub-enterprise Level Modules

Key

- **Research Teams**
- **Workshops**
- **Not addressed**

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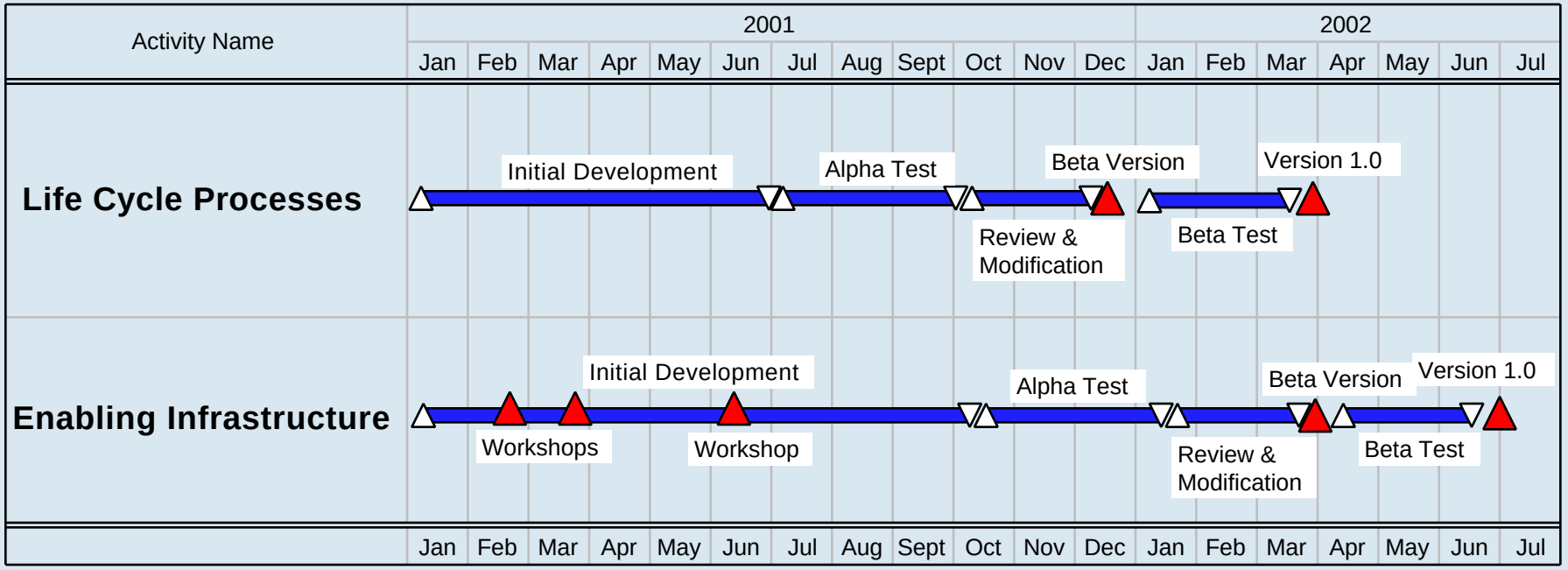
Sub-enterprise Level Modules Development Plan



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Executive Board Support Needed

- Enterprise level module Beta testing
  - Utilize LESAT in actual enterprise executive level assessments
  - Multiple industry and government sites (6-8)
  - Test site nominations by January 15, 2001
- Sub-enterprise level module
  - Provide subject matter experts for tool development
  - Support testing

RESOURCES

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LESAT Resource Requirements

(June1, '00 forecast with updates based on LESAT experience)

ITEM	RESPONSIBILITY	ESTIMATED RESOURCES	IMPACTS/COMMENTS
LESAT IPT	Help manage member inputs	Industry – 0.7MY/Year Gov't – 1.0MY/Year MIT- 0.25 MY/Year MIT – 0.5 MY/Year	Board commitment required for continued in-kind support No further efforts on LEM or enterprise tools
LAI RESEARCH TEAMS	Technical Support & Oversight Manage development of sub-enterprise modules	Reallocation of 10% to 15% of baseline support Reallocation of 35% to 40% of baseline support	Reduce/eliminate research & product support No other products from Product Dev, Supplier, Manf. Systems or Test & Space Ops teams except research underway
LESAT DIRECT STAFF	Product Documentation & Integration Mgmt of Workshops, testing and product publishing	2 FTE	Reallocation of LAI funds Reduce/eliminate baseline research & products Increase in allocation for support staff assistance
CONSORTIUM	Testing Participation of sub-enterprise module development teams and workshops	TBD	

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Expectations For Completing Phase III

- Develop LESAT
- Complete the LAI book
- Complete LAI research which is underway
- Executive Board meetings and roundtable
- Plenary conferences and a few workshops
- Plan for the post Phase III transition
  - Students
  - Staff
  - Tools
  - Knowledge

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Decisions Regarding LESAT

1. Do you want the Lean Enterprise Self-Assessment Tool?

which includes:

a. enterprise level self-assessment module

b. sub-enterprise level self-assessment modules

2. Should the LAI proceed forward with its development as planned?

Back up Slides

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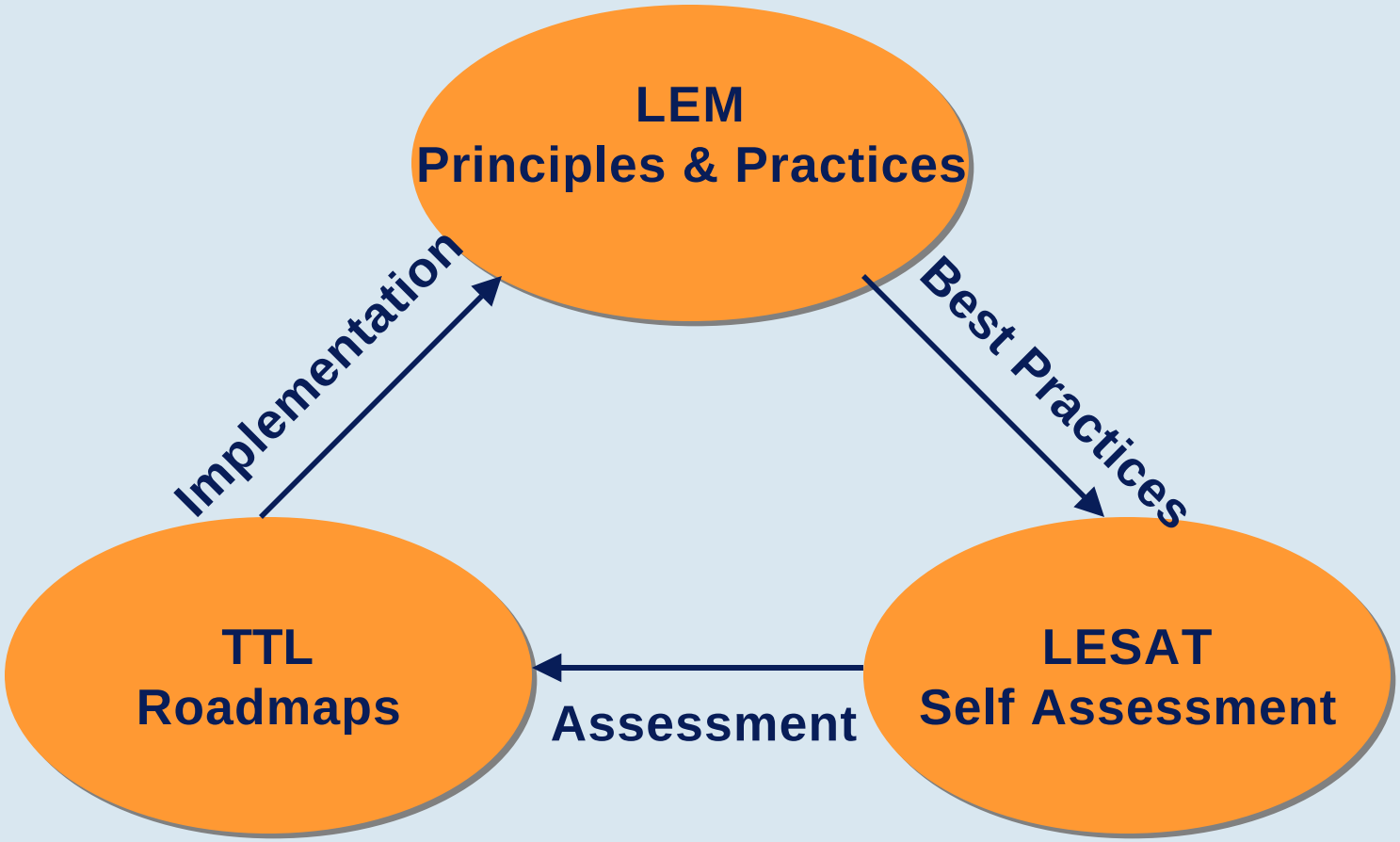
LAI Enterprise Tool Triad



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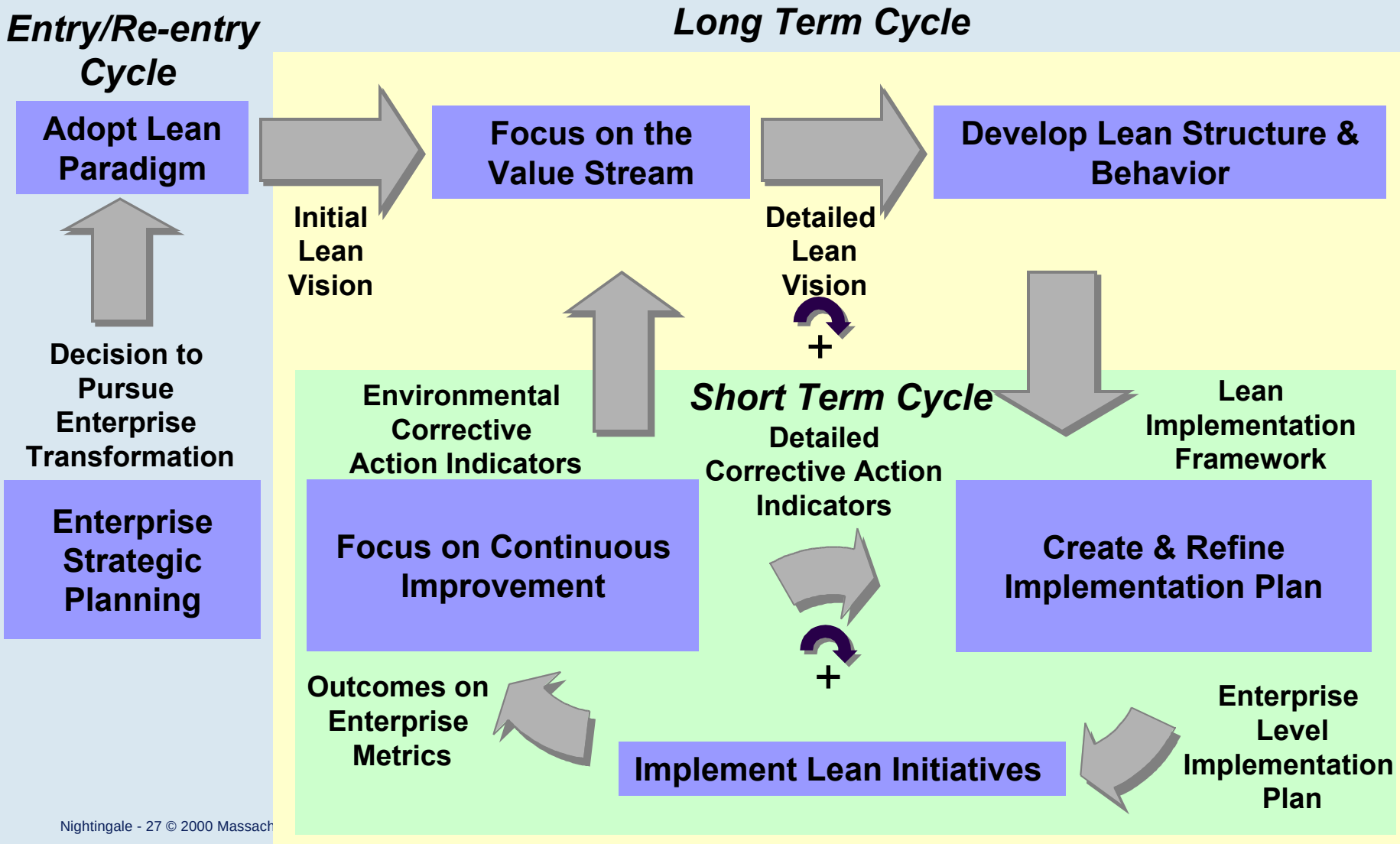
Enterprise Level Roadmap



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Collaboration With UK LAI

- In August, a UK LAI meeting discovered also developing enterprise-level assessment tool
- Researchers exchanged “alpha” models and found similar approach (e.g., both employed capability maturity models)
- Common architecture was defined and knowledge from both consortiums leveraged to develop LESAT Beta
- Multiple benefits from single model:
  - Many common US & UK suppliers
  - Potential single standard
  - Synergy of research knowledge for future detailed assessment modules development

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Information Exchange with CMMI

- Issue: Numerous industry and government assessment models
  - Baldrige, ISO, SEI/CMMI, SAE AS9100, etc.
- Sept. 7th meeting with CMMI Project Director to discuss content and format of LAI and CMMI tools
- Conclusion: Models are not duplicative
  - CMMI more focused in areas including software engineering, IPPD, and systems engineering
  - Project tool versus enterprise view - bottoms-up opposed to LAI top-down
- Future collaboration explored
- Ongoing communication via LAI inclusion as a CMMI stakeholder

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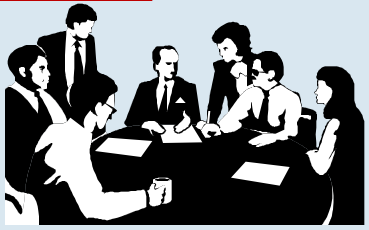
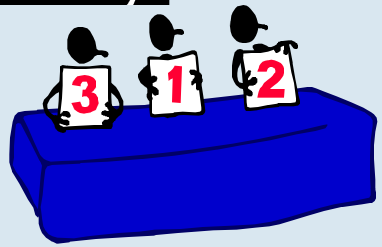
Proposed Methodology

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

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LESAT Beta Development

Actions taken to incorporate feedback into Beta Version:

- Simplified LESAT architecture and practices
- Rewrote and expanded leadership section
  - More explicit tie to enterprise TTL Roadmap
  - More comprehensive treatment of strategic issues
- Convened consortium team to rewrite process focused practices
  - Enterprise-level practices
  - Integration practices
- Enhanced supporting materials
  - Process description
  - Assessor guide
- Hired “editor” to assure consistency of content

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Enterprise Level Content

- **Business drivers and strategy (make buy, core competencies, responsiveness)**
- **Leadership**
- **Balancing the multiple stakeholder values**
- **Change management**
- **Lean transformation planning, execution and monitoring**
- **Integration (internal and external)**
- **Enterprise level process practices**

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Detailed Assessment Level Content

- Process analysis (benchmarking, value stream mapping, etc.)
- Process standardization, measurement and improvement
- Practices that deal with information, tools/ technology and people
- Horizontal handshaking across processes (integration) and vertical handshaking with the enterprise
- Capture and utilization of knowledge (lessons learned, reuse, best practices, tools, etc.)

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LESAT User Needs
(Survey of LAI Stakeholders)

- **Self assess the degree of becoming a lean enterprise**
- **Applicable to entire aerospace enterprise (government & industry)**
- **Not to be used for source selection or comparison of industry or government**
- **Must provide value to stakeholders**
- **Must address all elements and processes within an enterprise**
- **Provides guidance for an enterprise improvement plan**
- **Use available tools, processes and attributes**

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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**

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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)
  - Did not provide both a measure of lean and gap analysis
  - Did not identify "next steps" to take

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Maturity Model Approach Scores Highest

Needs / Requirements	Wt.	Candidate Tool Process: Maturity Matrix	Baldrige Type	Outcome Based
Assesses Degree of "Lean-ness" for an Enterprise and all its Core Processes	5	250	130	80
Provides Feedback for Improvement. Provides Guidance for "Next Steps"	5	240	150	120
Objective Evidence / Data Driven	3	108	63	132
Matches / Aligns with LEM Attributes	3	230	75	48
Leverages LAI / Industry Tools	3	114	78	36
Minimal Time / Effort to Create Tool	3	96	78	114
Scaleable / Flexible for Different Users	3	34	90	78
Simple - Easy to Use	3	102	90	54
Aligns with Business Planning Process / Goals and Results	1	32	30	30
Able to Accommodate Simple and Partnership Self-Assessments	1	36	32	26
		1218	816	718

