

Architecture for Enterprise Process Improvement

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and User Group
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Integrated Systems & Global Solutions**



Agenda

- **Context : Problem to be Solved**
- **Software Architecture Applicability to Process Improvement Architecture**
- **Project Phases**
- **Lockheed Martin Operating Excellence**
- **Summary**

Context : Problem Definition

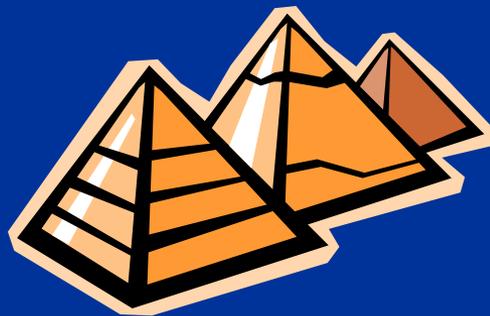
- A process-rich culture bred many process improvement “entities” over a decade+
 - Some vintage from legacy organizations
 - Some spawned to respond to multiple models/standards in an integrated way
 - All great mechanisms – but stovepiped!





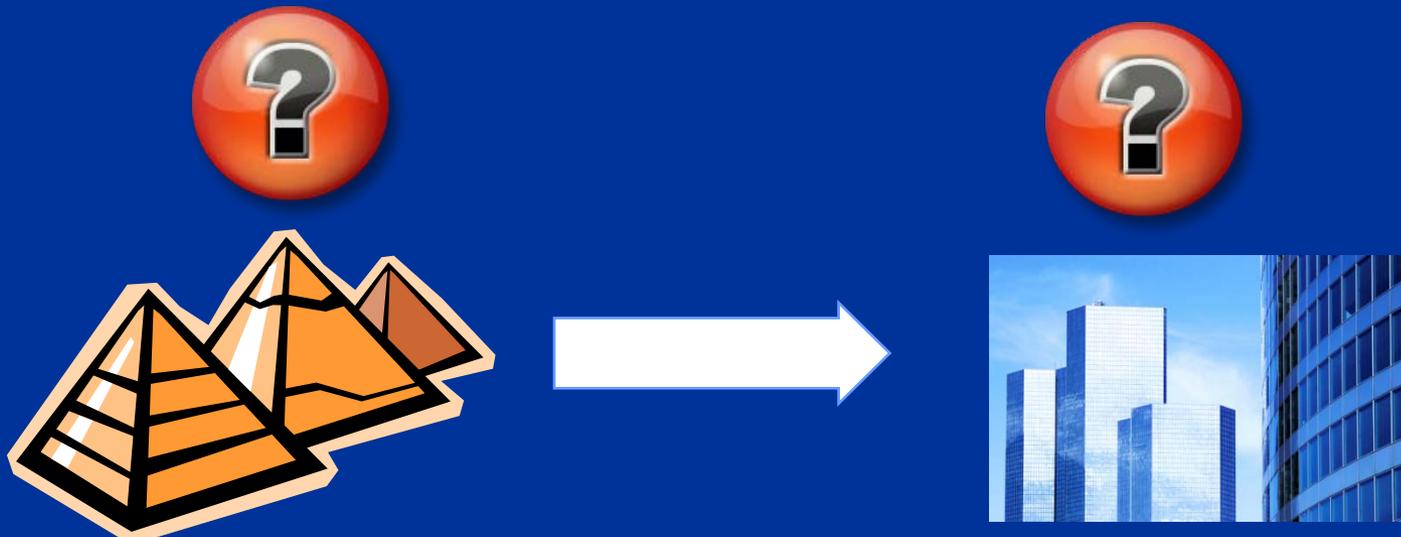
Project Sponsored

- Sponsorship and initiation of a process improvement project:
 - Objective: Improve the Enterprise Process Improvement (PI) Architecture



Defining an Enterprise PI Architecture

- **What comprises an enterprise process improvement architecture?**
 - **Approach taken: leverage concepts from software architecture**



Software Architecture Definition*

- The structure or structures of the system, which comprise the software elements,
- The externally visible properties of those elements and
- The relationships among them*



This definition can be applied to an Enterprise Process Improvement Architecture

* Software Engineering Institute Webinar “Software Architecture Fundamentals: Technical, Business, and Social Influences” by Rob Wojcik, July 8, 2010

Enterprise Process Improvement Architecture Definition



- **The structure or structures of the enterprise, which comprise the process improvement entities*,**
- **The externally visible properties of those entities and**
- **The relationships among them**



*** Includes people, processes, policies and tools**

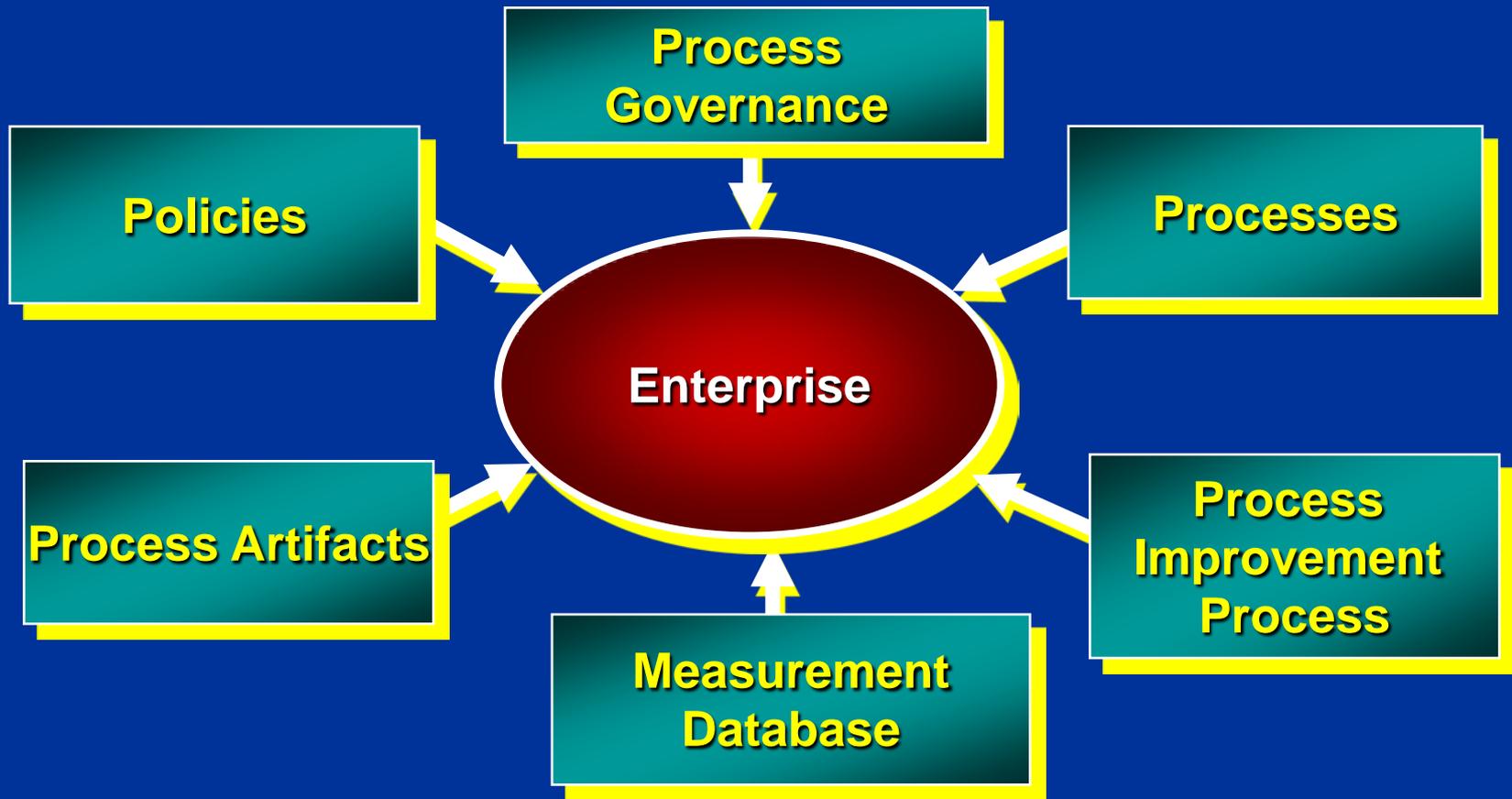
Software Architecture Principles*



- **Architecture abstraction includes all of the “elements”**
- **Roles, responsibilities, behaviors and properties of the elements are described**
- **Relationships depicted include those**
 - **Among elements**
 - **Between elements and other enterprise activities**
- **Artifacts provided to and required from elements**
- **Different views and perspectives available**

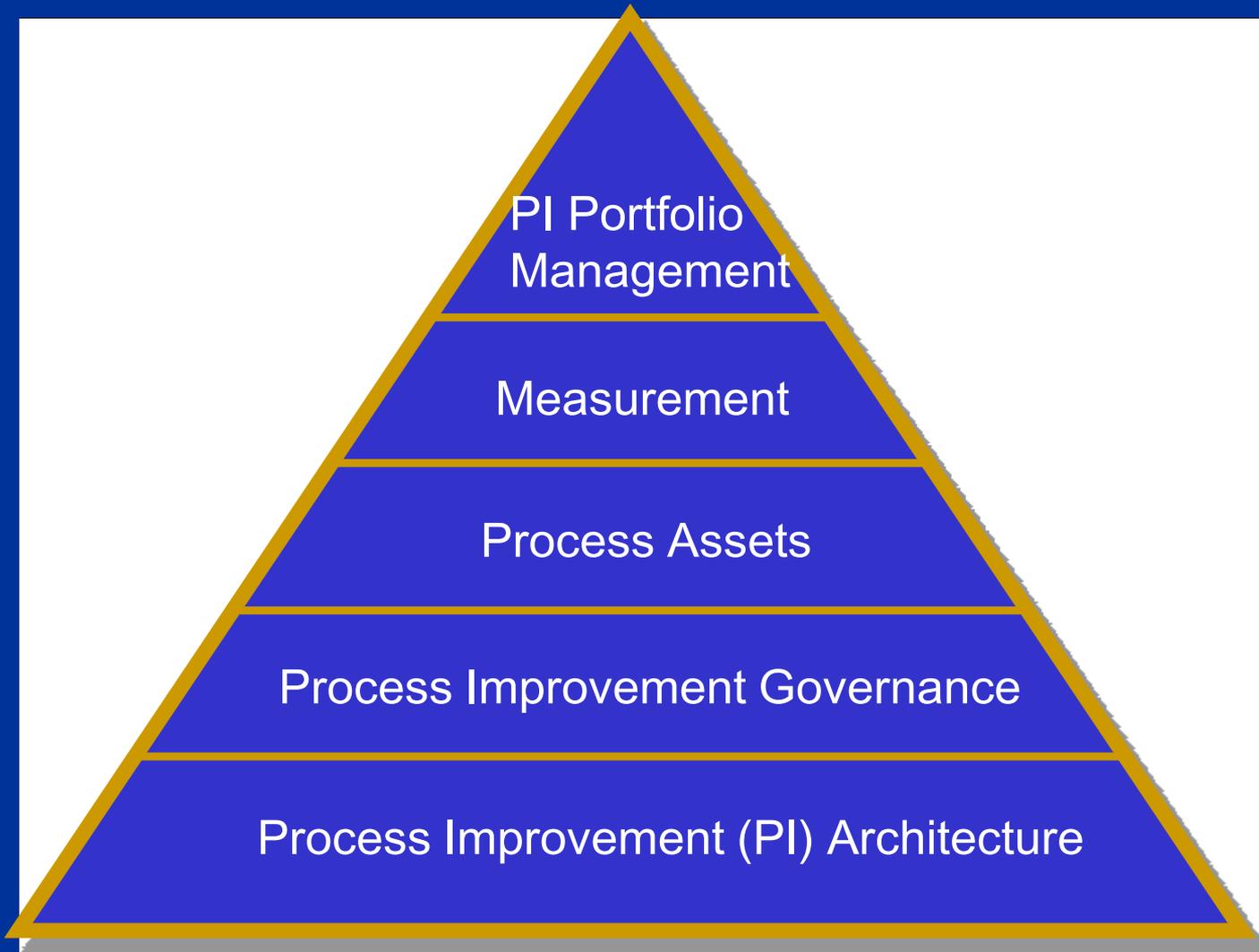
*** Also apply to an Enterprise Process Improvement Architecture**

Process Improvement Architecture Elements



**The Process Improvement Architecture includes everything needed to
“operate” process improvement!**

Process Improvement Architecture Provides the Foundation



Project Phases



INVENTORY IMPROVEMENT ACTIVITIES



INVESTIGATE WHAT OTHERS ARE DOING



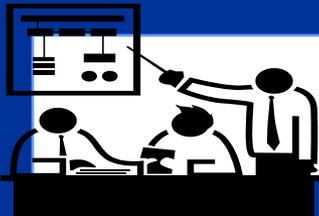
CREATE FLOWS OF STATUS QUO



RELATE TO OPERATING EXCELLENCE

**LEAN &
SIX SIGMA**

ENGAGE ENTERPRISE STAKEHOLDERS



**COMPILE FINDINGS &
RECOMMENDATIONS**



IMPLEMENT RECOMMENDATIONS

Results of Process Improvement Inventory



- **Stovepiped activities**
- **Unintegrated**
- **Not all are institutionalized**
- **Nevertheless . . .**
 - **Significant process improvement underway!**



An Enterprise Process Improvement Architecture has no

STOVEPIPES



So there is considerable work to be done!

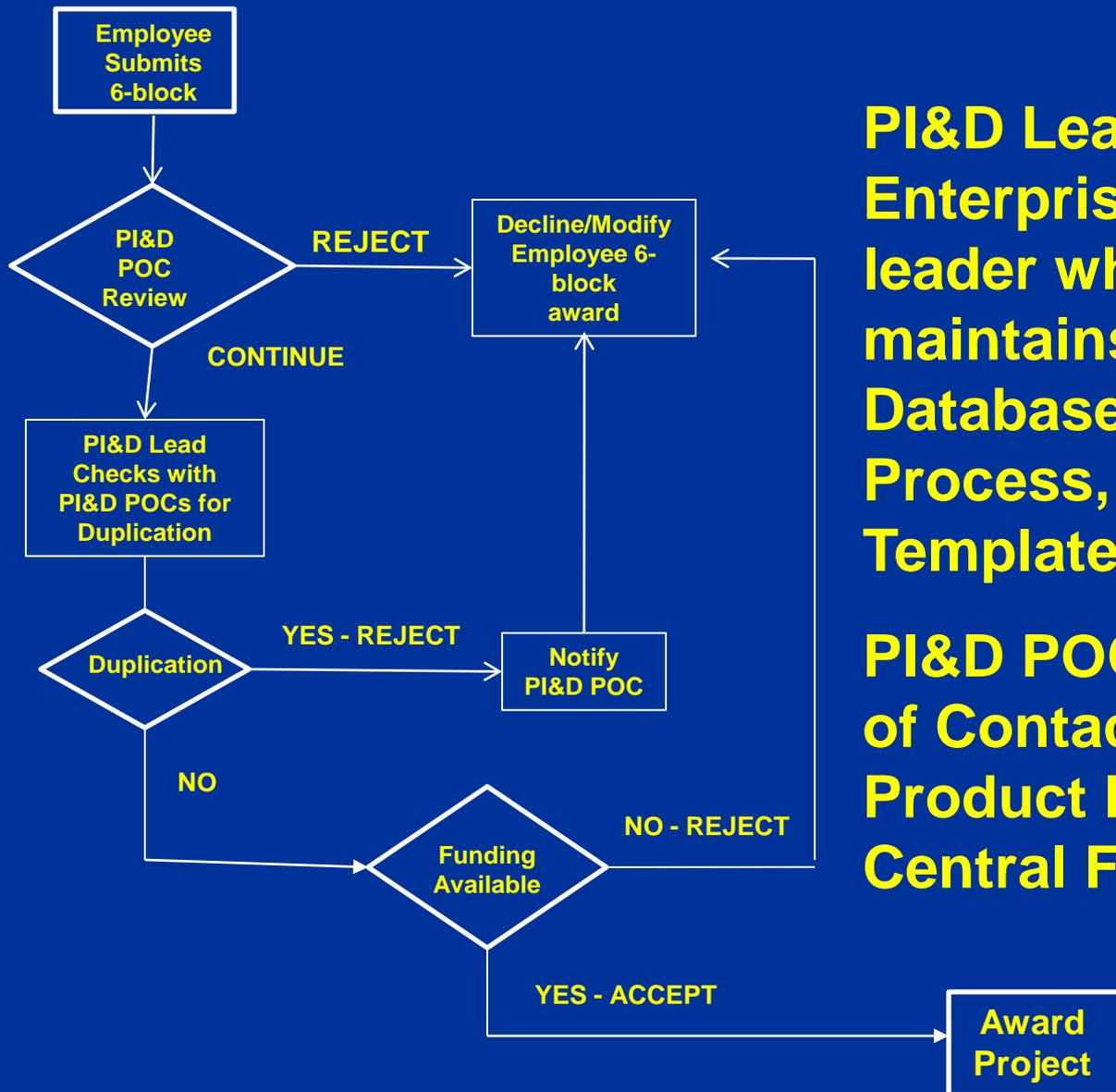
Tenets from Other Enterprise Process Improvement Activities



- **Focus on practices resulting in measurable business improvements**
- **Establish a process improvement framework**
 - **GRIP (Growth, Reputation, Innovation, People)**
 - **Protect/Transition/Grow**
- **Engage Subject Matter Experts from each business unit**
- **Follow a business rhythm to establish initiatives and track progress**
- **Encourage, but don't edict, best practice adoption**

Key Practice: Use a feedback loop to guide actions and calibrate whether practices are working

Process Innovation & Deployment (PI&D) Process Flow - Example



PI&D Lead:
Enterprise level leader who maintains the PI&D Database, PI&D Process, and PI&D Templates

PI&D POC: One Point of Contact from each Product Line and Central Function

Project Phases



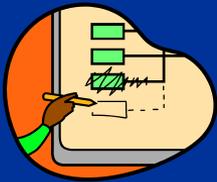
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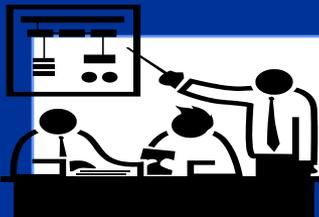
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COMPILE FINDINGS & RECOMMENDATIONS



IMPLEMENT RECOMMENDATIONS



The Path to Excellence Uses...

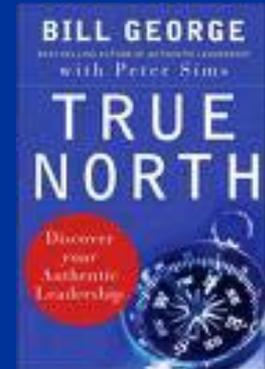
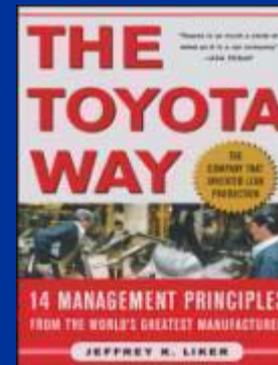
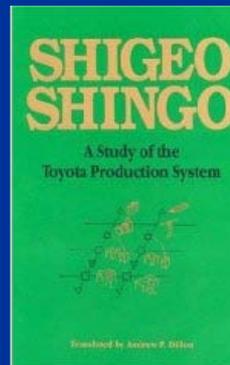
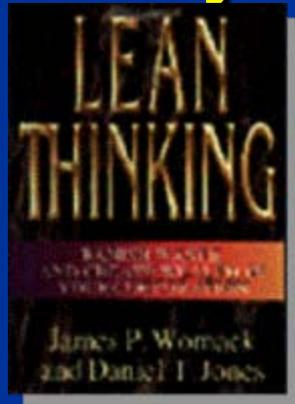
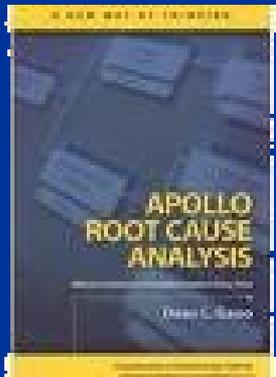
LEAN & SIX SIGMA



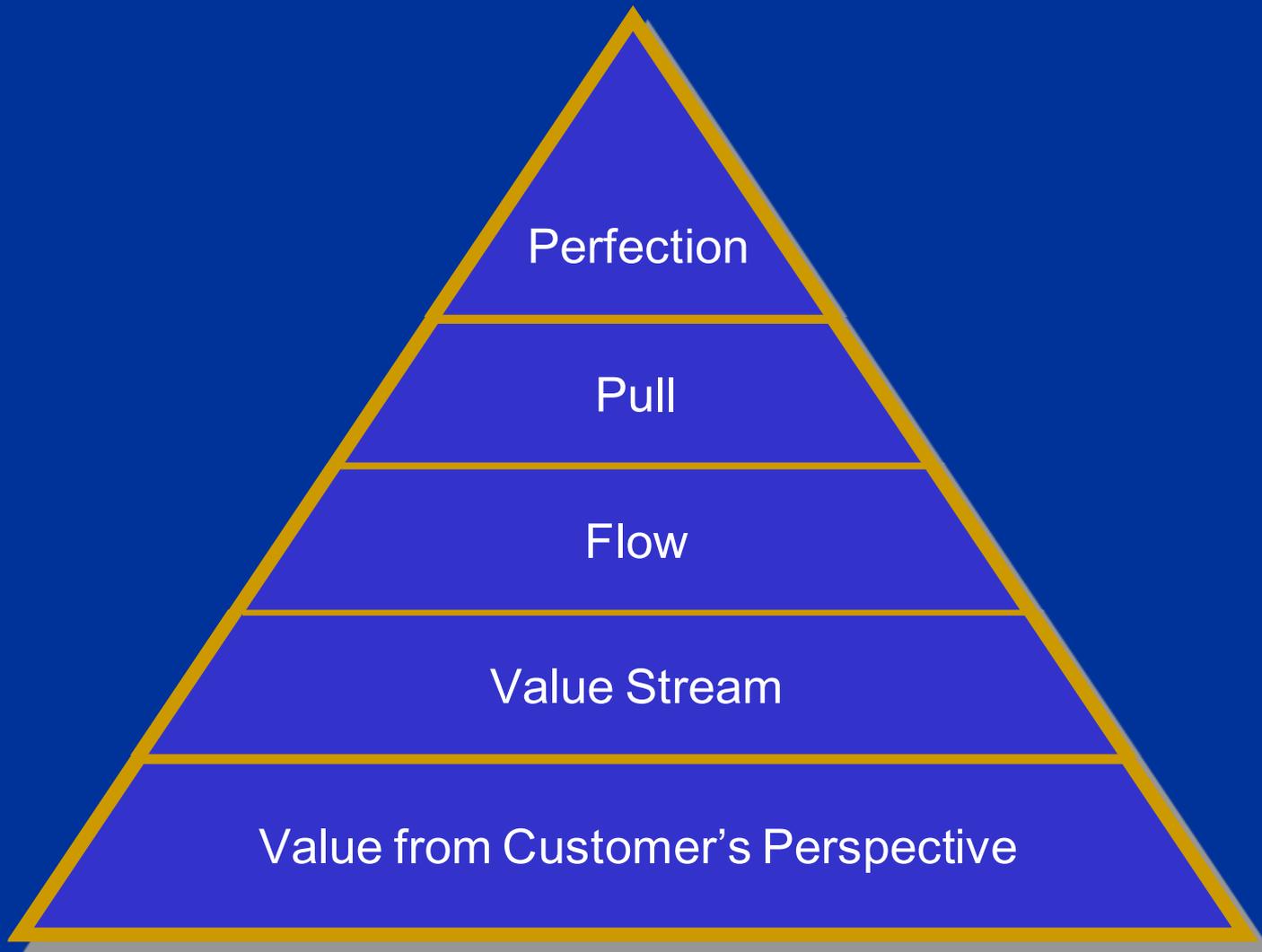


Five Principles of Operating Excellence

- Specify **Value** of the product from your Customer's perspective
- Identify the **Value Stream** for each product
- Enable product to **Flow** without interruptions
- Allow the customer to **Pull** value from the producer
- Continuously improve...pursue **Perfection**



Principle Based Approach



Eliminate Non Value Elements



- Reduce Waste
- Mistake Proofing
- Reduce Variation

OVERALL YIELD vs SIGMA (Distribution Shifted $\pm 1.5\sigma$)

# of Parts/Steps	$\pm 3\sigma$	$\pm 4\sigma$	$\pm 5\sigma$	$\pm 6\sigma$
1	93.32%	99.379%	99.9767%	99.99966%
7	61.63	95.733	99.839	99.9976
10	50.08	93.96	99.768	99.9966
20	25.08	88.29	99.536	99.9932
40	6.29	77.94	99.074	99.9864
60	1.58	68.81	98.70	99.9796
80	0.40	60.75	98.26	99.9728
100	0.10	52.70	97.70	99.966
150	---	46.61	96.61	99.949
200	---	40.55	95.45	99.932
300	---	34.50	93.26	99.898
400	---	28.44	91.11	99.864
500	---	22.38	89.02	99.830
600	---	16.32	86.97	99.796
700	---	10.26	84.97	99.762
800	---	4.20	83.02	99.729
1000	---	0.37	81.11	99.695
1500	---	0.20	79.24	99.661
2000	---	0.06	75.88	99.593
3000	---	---	50.15	98.985
5000	---	---	1.91	94.384
10000	---	---	---	87.880
38000	---	---	---	78.820
70000	---	---	---	60.000
150000	---	---	---	---

Lean

Head North East !

Six Sigma

LM21 Operating Excellence

Logic Map



Leadership

- Leader Engagement
- Customer Engagement



Strategic

- Knowledge
- Discipline
- Communication



Tactical

- Infrastructure
- Activity and Results

Train & Deploy Experts

Resources

Improvement Events
(PDKs, Kaizens, Projects JDIs)

Closed-Loop Continuous Improvement

Project Phases



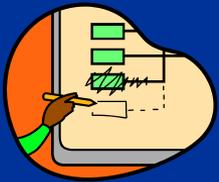
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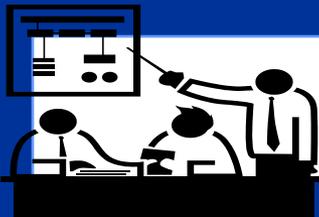
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Here we are!

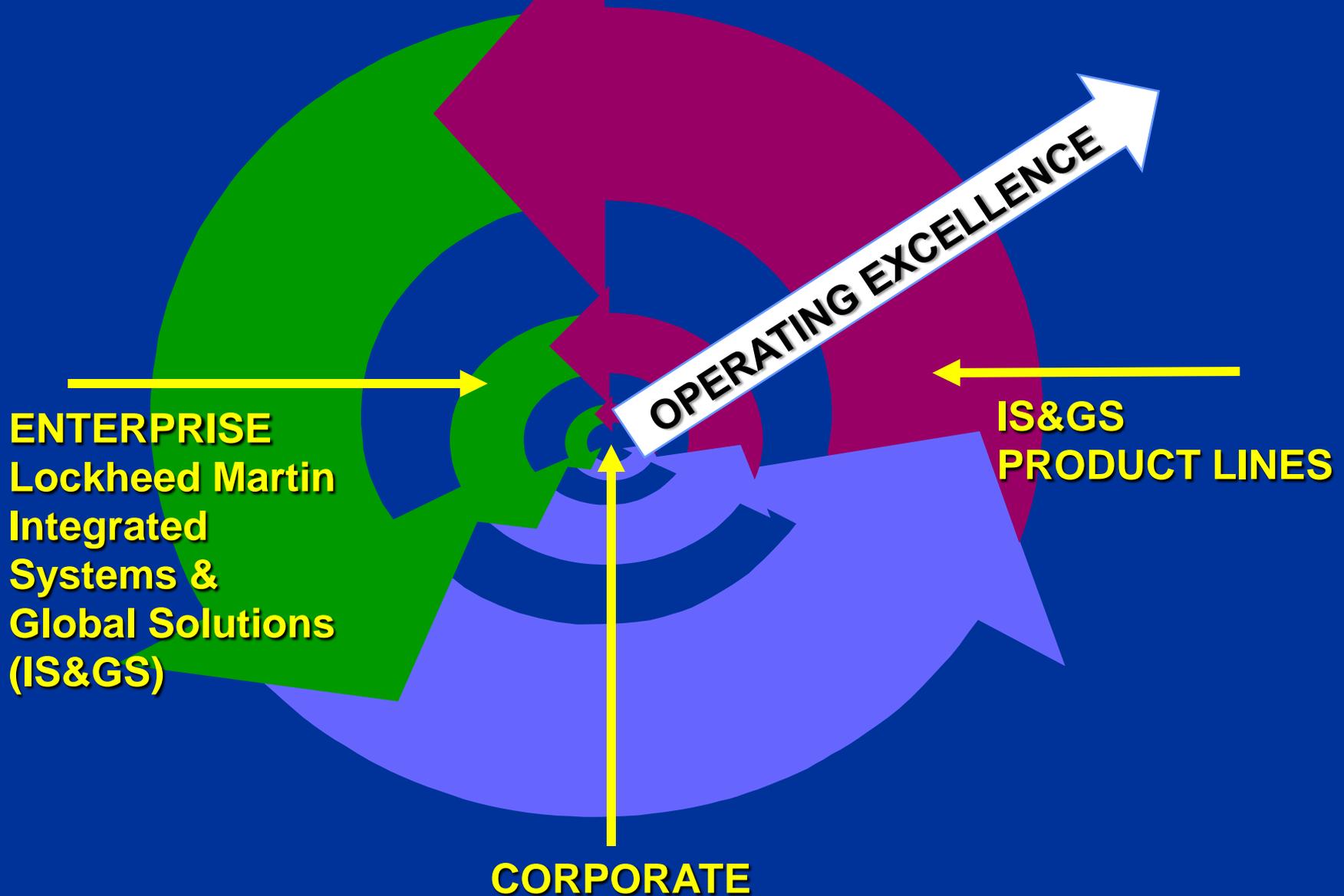
IMPLEMENT RECOMMENDATIONS

Significant Project Findings



- **Focusing on Operating Excellence at the enterprise level**
 - Ensures practices result in measurable business improvements
 - Provides a business rhythm to establish initiatives and track progress
 - Works by encouraging, not mandating, best practice adoption
- **Directives and procedures are useful to flesh out the Operating Excellence process (e.g., in Product Lines)**
 - Directives and procedures mapped to the corporate process and ensure integration and completeness
 - The same Operating Excellence process applies at every level of the corporation

Operating Excellence Deployment at Every Function and Organizational Level in the Corporation



Summary



- **Software architecture concepts apply to the Enterprise Process Improvement Architecture**
 - Provide discipline
 - Ensure completeness
- **Lockheed Martin's Operating Excellence is a fundamental cornerstone of our business model**
 - Applies to process improvement activities at every level
 - Provides a robust tool kit
 - Yields business results!





Contact Information

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