



# Leveraging Lean Six Sigma and CMMI<sup>®</sup> to Improve Program Performance

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# Purpose



- “ **Within Lockheed Martin, Lean Six Sigma and CMMI® approaches to continuous improvement are being integrated to address the goal of perfect program performance**
- “ **Identify where LM business units have used Lean Six Sigma and CMMI® in a complimentary manner to improve program and business performance**
- “ **Offer ideas how your business can integrate Lean Six Sigma and CMMI®**



# Defining the Terms

- “ **CMMI**<sup>®</sup> - Framework for managing processes and integrating activities across an organization
- “ **Lean** - Set of principles for efficient and effective processes, based on the Toyota Production System
- “ **LM21** - Lockheed Martin’s approach for combining Lean and Six Sigma: “Lean Processes Operating at Six Sigma Capability”
- “ **Six Sigma** - Problem-solving approach that addresses specific improvement needs through improvement projects and statistical methods

# Common Characteristics



- “ **Focus on eliminating defects and rework**
- “ **Reliance on measurement and statistical methods**
- “ **Emphasis on understanding and reducing variability**

# Differences Create Opportunities



<b><i>Lean Six Sigma</i></b>	<b><i>CMMI®</i></b>
" Assumes processes have been identified and defined	" Focus on defining management and technical processes early
" Doesn't distinguish organizational standard and project processes	" Organizational process definition used to capture best practices
" Emphasis on training to motivate and communicate skills	" Emphasis on infrastructure to ensure key processes addressed
" Reliance on statistical methods to manage performance	" Reliance on statistical methods to manage performance
" Focus on learning from internal experience and data	" Additional mechanisms leverage external technology
" Prioritization of efforts based on business payoff	" Link to strategic planning weak improved with V1.2
" Certification of individual practitioners	" Certification of assessors and organizations

Adapted from Card, *Integrating Lean, Six Sigma, and CMMI*

# Opportunities for Synergy



- “ **CMMI<sup>®</sup> provides a set of best practices for program management, systems and software engineering, and integrated product and process development**
- “ **CMMI<sup>®</sup> provides a measurement scale to benchmark organizations against each other**
- “ **CMMI<sup>®</sup> defines requirements for measurement and statistical analysis; Lean Six Sigma provides tools to implement**
- “ **Lean Six Sigma provides a process for performing process and product improvement activities**
- “ **Lean Six Sigma provides a strong mission/business orientation to process improvement**

# Lean Six Sigma Helps CMMI® Implementation



- “ **Provides a tactical engine for continuous improvement from problem definition through implementation of change**
- “ **Supports rational decision-making through credible measurement of benefit**
- “ **Helps solve specific problems and improve specific products or processes within the larger context of organizational process improvement**
- “ **Requires alignment with business drivers**
- “ **Garners effective sponsorship for change**

# Using LM21 and CMMI® Together

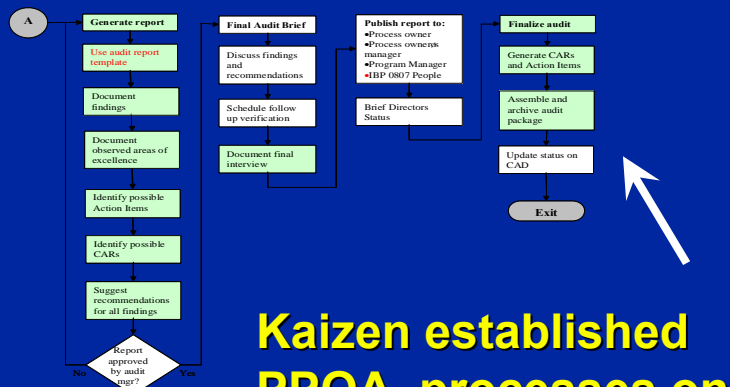
- “ **Within Lockheed Martin, LM21 is being used to support CMMI® based processes:**
  - **Implement CMMI® Processes**
  - **Improve CMMI® Processes**
  - **Achieve CMMI® High Maturity**
  - **Improve the Improvement Process**



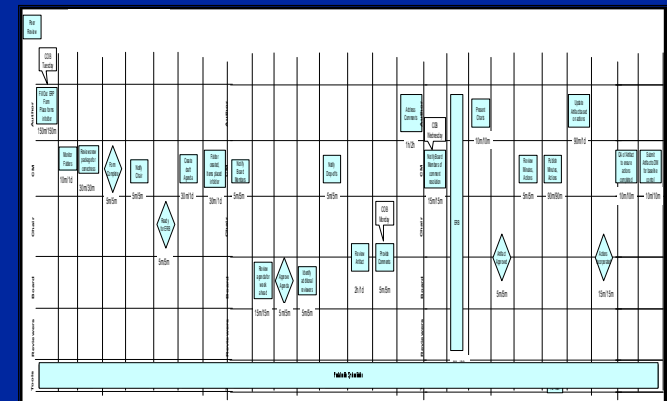
# Use LM21 to Implement CMMI® Processes



- “ By implementing a CMMI® process area or a group of process areas using LM21, the goal is a process that serves the mission *and* meets model requirements
- “Map the model to the process, not the process to the model”



**Kaizen established PPQA processes on Program**



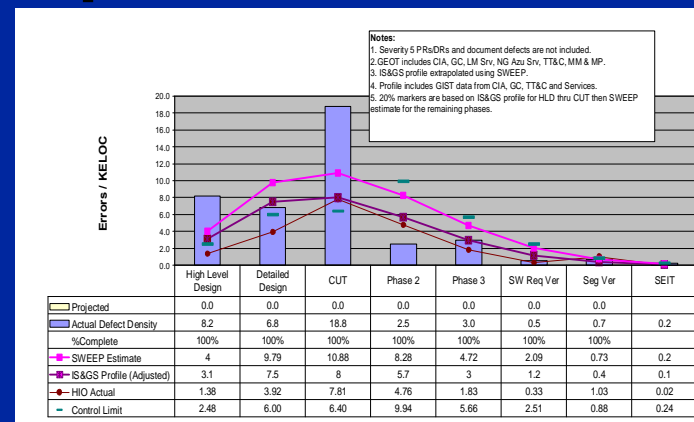
**Kaizen established Program ERB process**

# Use LM21 to Improve CMMI<sup>®</sup> Processes



- “ Use Lean principles to improve processes to improve processes and six sigma to measure results
- “ Drive process improvements where quantitative measures show actions are needed
- “ When LM21 is used with CMMI<sup>®</sup>, programs see meaningful, measurable performance improvements

“ 24% improvement in deflection detection  
 “ 45% reduction in cost to fix defects

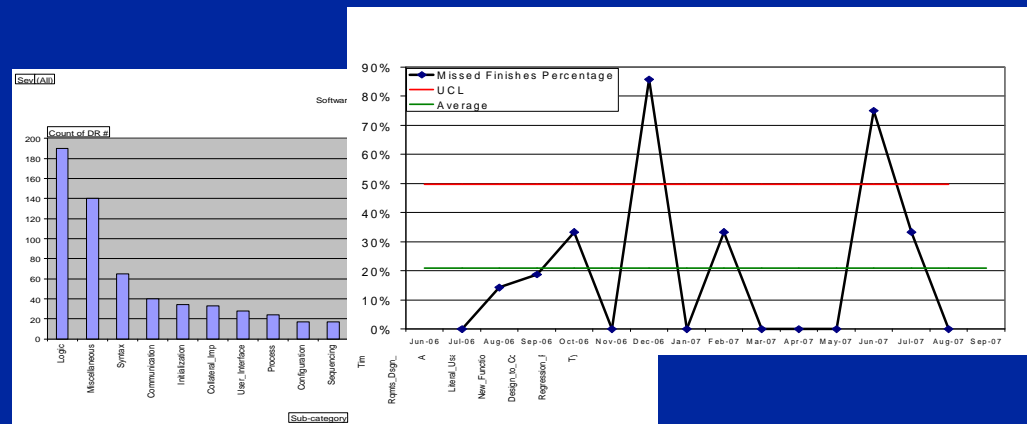


# Use LM21 Critical Skills to Achieve CMMI® High Maturity



- “ CMMI® High Maturity is about applying appropriate statistical and other quantitative methods to understand and predict process performance
- “ LM21 provides the statistical analysis tools to implement
  - *Not limited to use in high maturity organizations*

LM21 Critical Thinking  
used to understand  
process performance and  
reduce variation

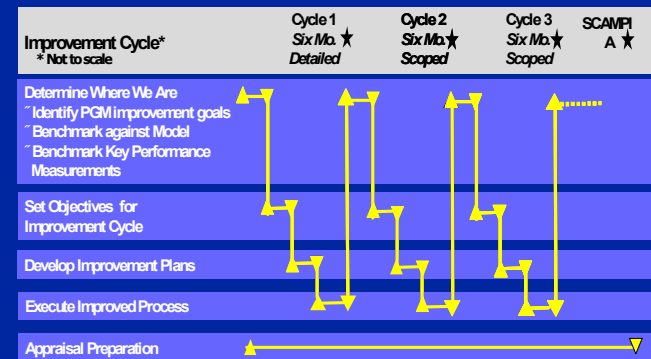


# Use LM21 to Improve the Improvement Process



- “ LM21 can be used to identify the highest priority problems to support improvement project selection and portfolio management
  - Program Excellence Plans (PEPs) link strategic and tactical goals with process improvement initiatives
- “ Optimize improvement program execution
- “ Common repository provides a record of the results of all improvement activities

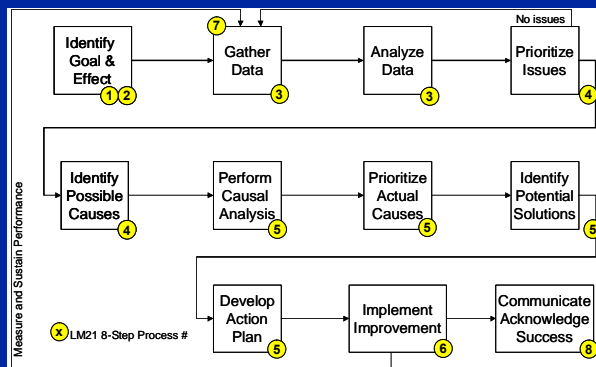
Project to lean improvement process



# Integrate Improvement Initiatives

- “ **LM21 and CMMI® integrated into an organization-wide governance model that provides a standard for program execution**
- “ **Establish a set of standard processes that incorporates all the features of the initiatives of choice**

Process flow for using LM21 for causal analysis





# Conclusions

- “ **Within Lockheed Martin, Lean Six Sigma and CMMI® have demonstrated their value in the pursuit of perfect program performance**
- “ **Lean Six Sigma brings focus on business needs and measurable improvement to CMMI® based improvement**
- “ **For those responsible for rolling out process improvement efforts - design your implementation so Lean Six Sigma and CMMI® interoperate**



# References

**Card, David N., “*Integrating Lean, Six Sigma, and CMMI.*” <http://vc.ieee.org.ar/2005-Card-Integrating-Lean.pdf>**

**Siviy, Jeannine, Penn, M. Lynn, Harper, Erin.  
“Relationships Between CMMI and Six Sigma.”  
CMU/SEI-2005-TN-005, December 2005.  
[http://www.sei.cmu.edu/publications/documents/  
05.reports/05tn005/05tn005.html](http://www.sei.cmu.edu/publications/documents/05.reports/05tn005/05tn005.html)**