Lessons Learned from Use of the Continuous Appraisal Method (CAM) for Transition to CMMI®

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Agenda

- Context for Lockheed Martin CMMI® deployment
- Key Findings from CMMI® transition
- Overview of the Continuous Appraisal Method (CAM)
- Use of CAM for CMMI® transition
- Feedback on CAM usage
- Summary
Context for CMMI® Deployment

- Many Lockheed Martin (LM) companies have institutionalized best-of-breed integrated processes
  - Integrated Product and Process Development (IPPD)
  - Integrated Systems Development (ISD)

- Multiple process models and standards are in use across the corporation

- LM identified industry and internal best practices as sources for corporate-wide process requirements

- The LM Integrated Engineering Process (LM-IEP) standard synthesizes these requirements

Lockheed Martin’s Integrated Engineering Process Standard (LM-IEP) is being deployed under corporate policy.
**LM-IEP and CMMI® Relationship**

- CMMI® provides a set of integrated process and appraisal method requirements to appraise process capability and maturity

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*C From the Appraisal Requirements for CMMI® (ARC)

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**LM-IEP Benefits**

- Provides a corporate-wide standard engineering process standard that addresses the full product life cycle
- Leverages and facilitates reuse of mature process assets across the corporation
- Reduces inefficiencies across functions
- Eliminates redundant tracking and mapping to evolving process standards
- Leads to greater tool commonality and capital expenditure reductions
- Prepares operating units for appraisal using CMMI®
- Reduces overhead expense for appraisals
Key findings from CMMI® Transition

- Address CMMI® in the context of your organization’s business requirements
  - The LM-IEP standard includes CMMI®, in addition to other standards and requirements driven by business needs

- Adopt an incremental appraisal approach
  - The Lockheed Martin Continuous Appraisal Method (CAM) has been successfully deployed with CMMI®
Continuous Appraisal Method (CAM) Goals

- Make ARC Class A appraisals less expensive
- Make appraisals less invasive to the organization and projects
- Focus organizations on Continuous Process Improvement as opposed to a special event “test”
- Improve processes as a direct result of the appraisal
- Promote institutionalization
- Eliminate rework caused by rollout of organizational processes with weaknesses

*ARC = Assessment Requirements for CMMI®
Incremental Appraisal Using CAM

Appraise Organizational Processes → Fix Weaknesses → Re-appraise

Appraise PA 1 → Fix Weaknesses → Re-appraise

Appraise PA 2 → Fix Weaknesses → Re-appraise

Appraise PA 3 → Fix Weaknesses → Re-appraise

... → Maintenance Review

OSP = Organizational Standard Process
PA = Process Area

Institutionalization focus with minimal project disruption
Key Features of CAM

- **Minimal appraisal preparation**
  - No appraisal-specific objective evidence library
  - No practice interviews

- Opportunity to correct weaknesses by conducting the appraisal over **multiple-site visits**

- Weaknesses and process improvements are documented as **Process Corrective Actions (PCAs)**

- Verification of process fidelity by the **Maintenance Review** held after all PCAs are closed

- **Institutionalization** of the organization’s standard process by appraising other projects
CAM’s Minimal Appraisal Preparation

Start with value-add activities

- Appraise Organizational Processes
- Appraise Projects’ Processes
- Conduct Maintenance Review
- Appraise Additional Projects

Start with value-add activities

- Incrementally Appraise Organizational Processes
- Incrementally Appraise 3-4 Projects
- Maintenance Review
- Incrementally Appraise Additional Projects (Optional)

Multiple Visits
CAM’s Multiple Site Visits

- Provide flexibility in scheduling project assessments
- Provide time for organization/projects to correct weaknesses
- Allow reporting of interim status
  - To show positive results early
  - To track progress
**CAM’s Process Corrective Action (PCA)**

- **Assessment Team**
  - Documents the weakness or process improvement opportunity using the PCA form
  - Obtains consensus on the PCA wording with interviewees
  - Reviews the PCA with interviewees to determine if the weakness or process improvement opportunity is valid

- **Organization/Project**
  - Addresses identified weakness or improvement opportunity

- **Appraisal Team**
  - Appraises resolution of weakness or process improvement
**CAM’s Focus on Institutionalization**

- Appraise other projects after the initial Maintenance Review

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- **Project A**
- **Project B**
- **Project C**
- **Project D**
- **Project E**

Note: Typically 3 Programs at any given time.

**Legend**
- PCA-R = Process Corrective Action Review
- MR = Maintenance Review

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Decision on When to Apply CAM

Integrated Process In Place?

No

Develop Integrated OSP

Yes

Apply CAM

OSP = Organizational Standard Process
Feedback on CAM usage

- CAM is being deployed at 7 Lockheed Martin operating units
  - 9 prior CAMs have been completed

- Experience with CAM has been positive:
  - More focus on process improvement
  - Less invasive to programs
  - Less stressful to the organization
  - More value-add, in-depth findings
  - More cost effective
More focus on Process Improvement

- More active involvement by engineers and management
  - People volunteered to be a part of the activity, rather than trying to avoid participation

- Format invites participants to volunteer information and implement improvements
  - During interviews, people are more at ease and willing to share information
  - People bring up their own concerns and ideas, rather than forcing the interviewers to “dredge them up”
  - Weaknesses are addressed more enthusiastically because they were identified jointly
Less Invasive to Programs - 1

- Minimal non-value-add preparation (objective evidence collection, interviews)
  
  A CBA IPI or SCAMPI\textsuperscript{SM} typically involves
  - Many labor-months of activity just to identify, collect, catalog and index objective evidence
  - “Mock Interviews” conducted to acquaint interviewees with the appraisal process and model
  - Training classes on CMM\textsuperscript{®} and/or CMMI\textsuperscript{®} for all engineers
  - “Pre-reviews” to assess readiness

  \textit{CAM eliminates these activities}

CBA-IPI Objective Evidence Memorial Library:
- 62 2” binders for SW Level 4
- 99 2” binders for SW Level 5

\textsuperscript{SM} SCAMPI is a service mark of Carnegie Mellon University.
\textsuperscript{®} CMM is registered in the U.S. Patent and Trademark Office.
Less Invasive to Programs - 2

- Better able to accommodate and work around program schedules
  - Program schedules can change due to many factors (changing customer requirements, revised milestones, etc.)
  - SCAMPI<sup>SM</sup> assessment schedules must be planned well in advance, because of the logistics involved
  - Often, there is no simple resolution –
    - Proceeding with an assessment could cause major program impact
    - Re-scheduling the assessment is a major impact to the organization

*CAM is able to accommodate these changes more easily*
Summary

- CAM is being widely deployed across Lockheed Martin
- CAM has proven to be an efficient and effective appraisal method for CMMI® transition
- Government participation on Lockheed Martin CAMs has occurred and additional involvement is planned
- CAM is planned for use with LM-IEP requirements in 2003