



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**

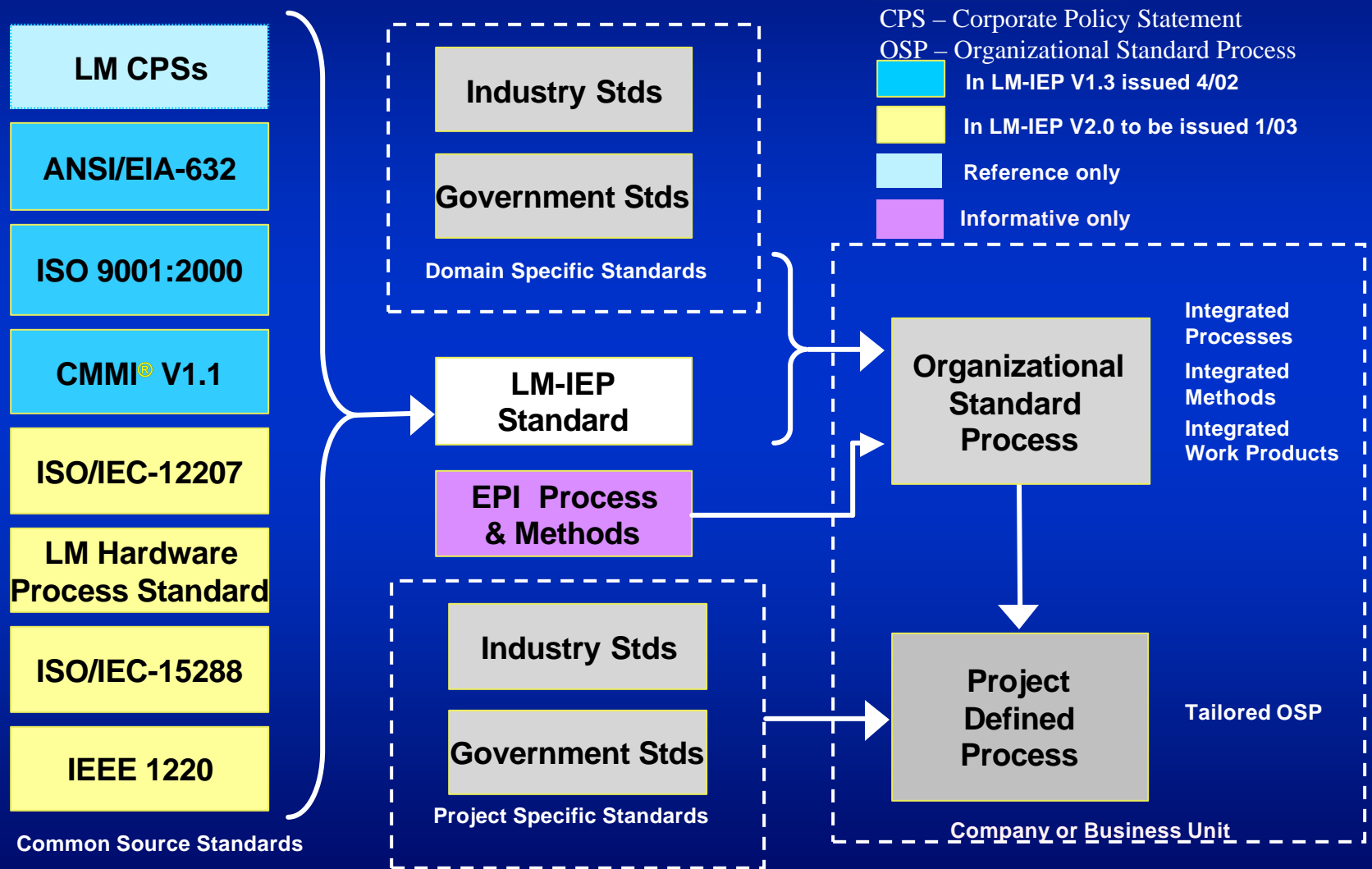
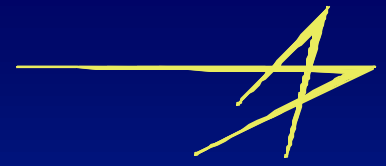


Context for CMMI[®] Deployment

- **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.

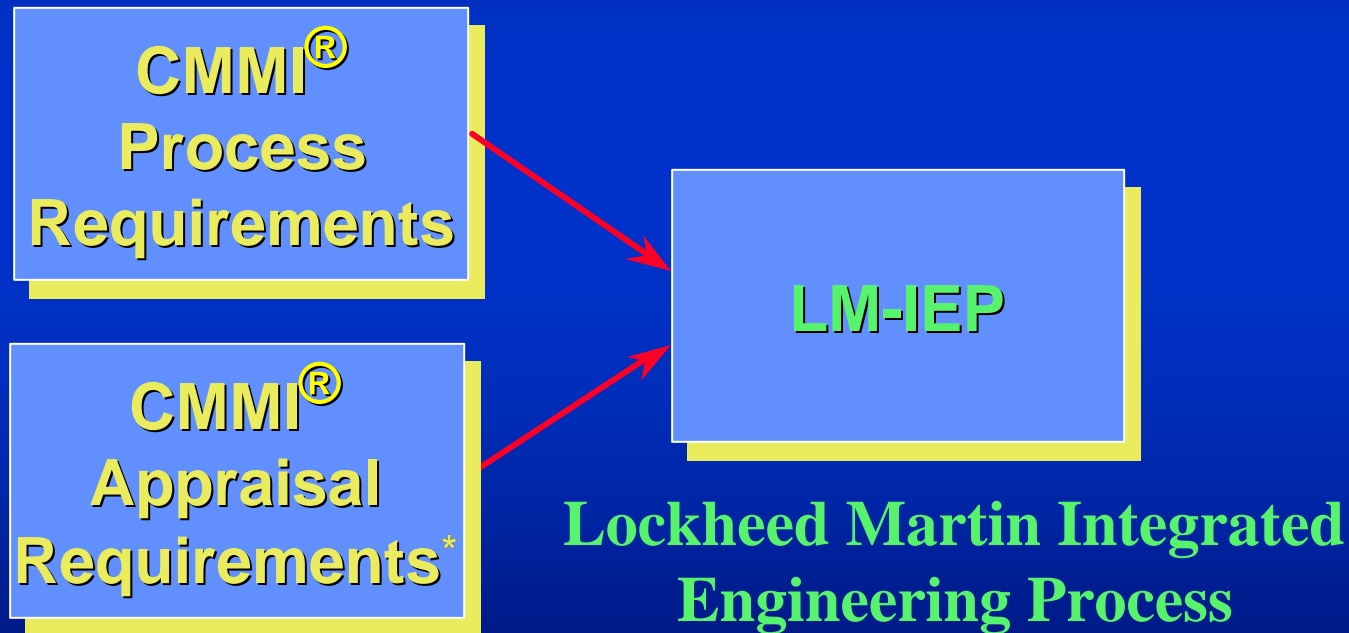
LM-IEP Context Diagram



LM-IEP and CMMI[®] Relationship



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



* From the Appraisal Requirements for CMMI[®] (ARC)



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®

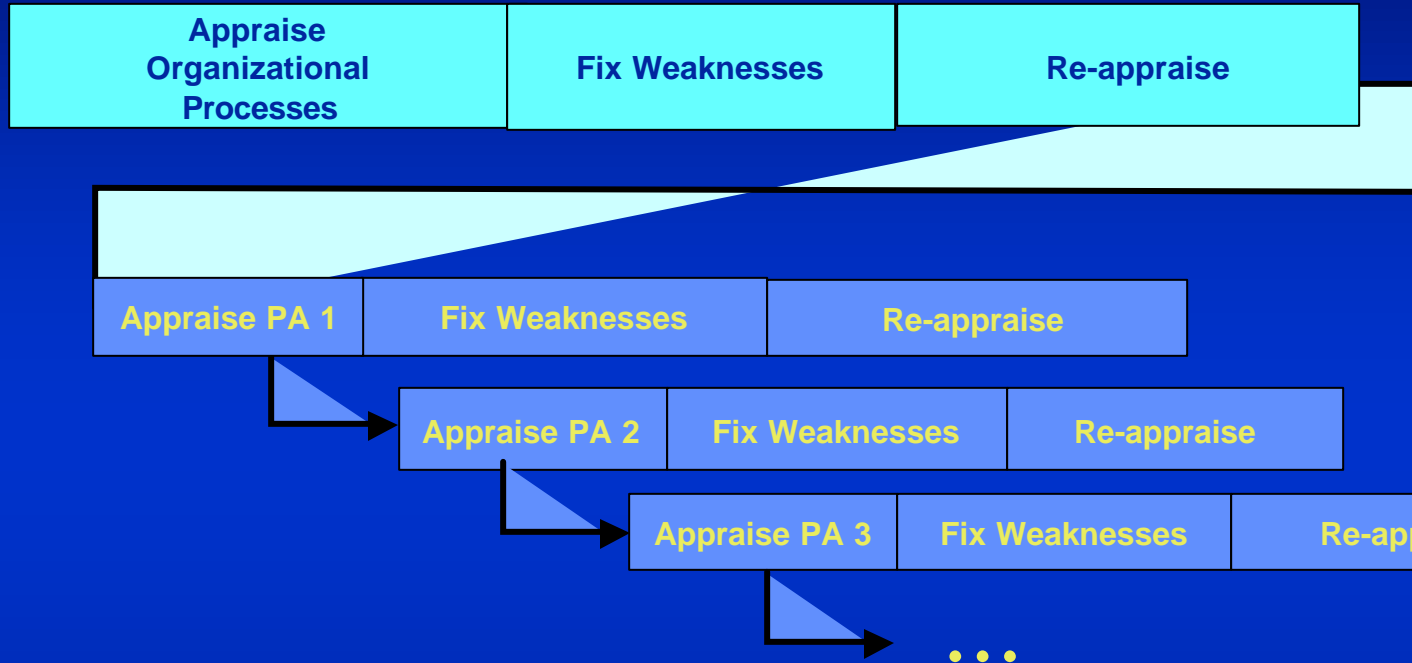
Continuous Appraisal Method (CAM) Goals

- **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



*OSP
Appraisal*

*Project
Appraisal*

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

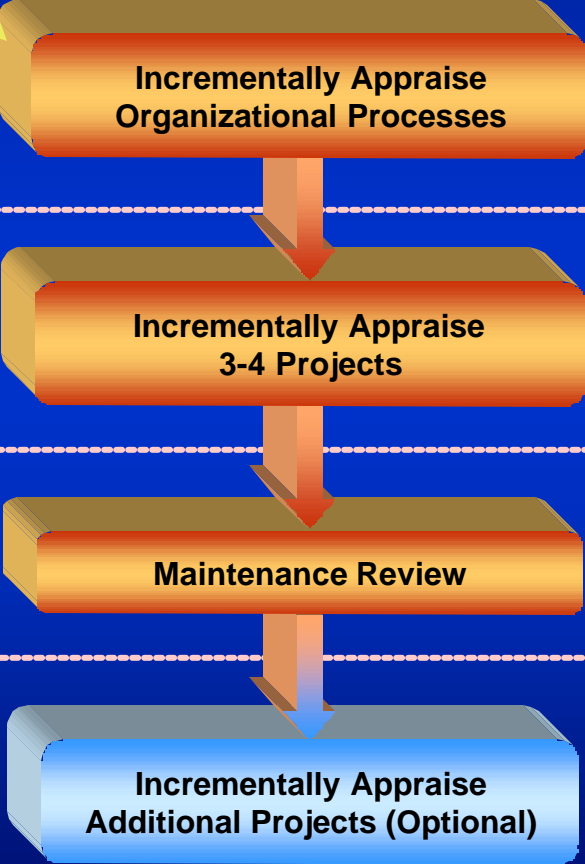
Appraise Organizational Processes

Multiple
Visits

Appraise Projects' Processes

Conduct Maintenance Review

Appraise Additional Projects



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)

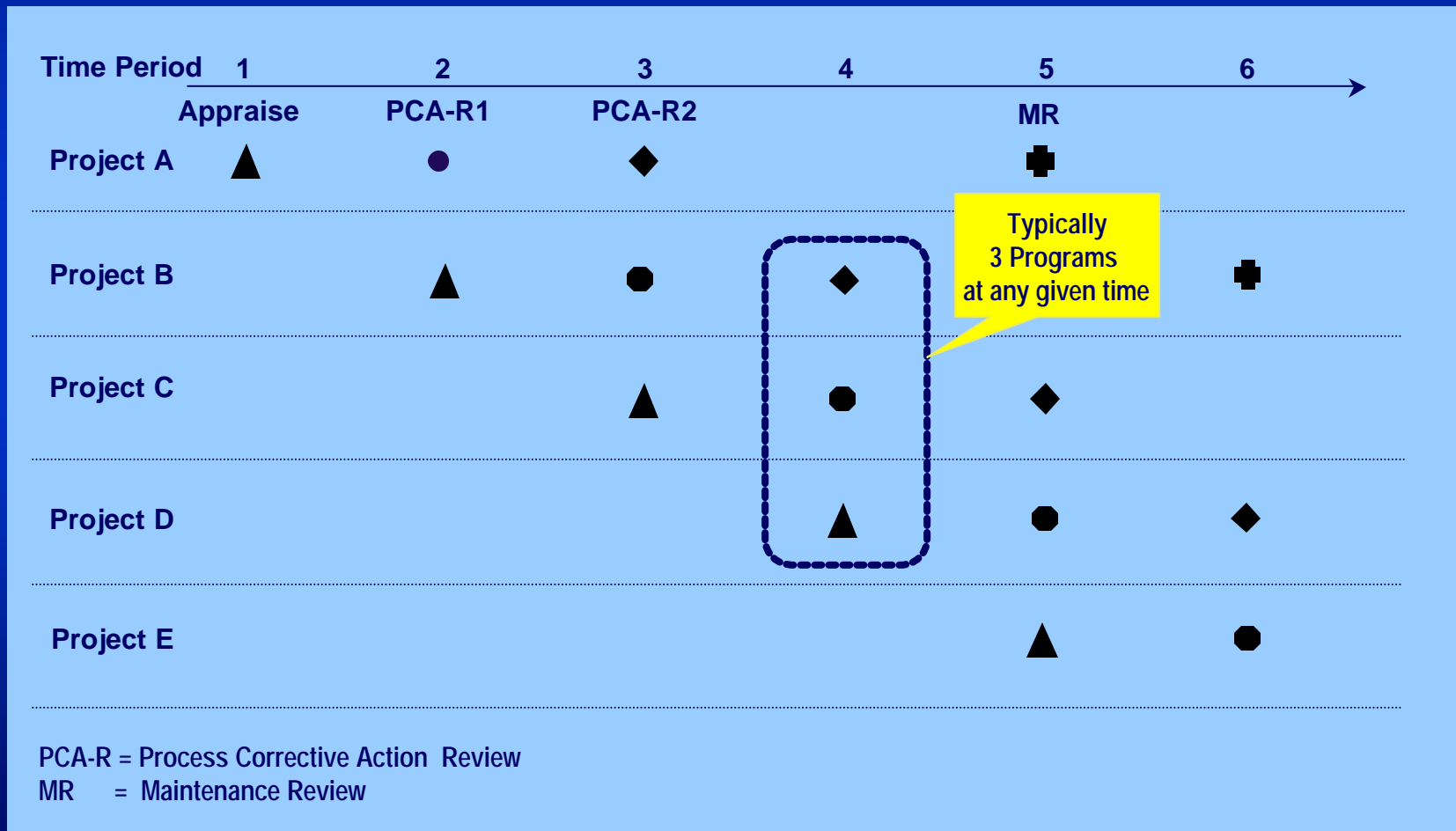


- **Assessment Team**
 - Documents the weakness or process improvement opportunity using the PCA form
 - Obtains consensus on the PCA wording with interviewees
 - Reviews the PCA with interviewees to determine if the weakness or process improvement opportunity is valid
- **Organization/Project**
 - Addresses identified weakness or improvement opportunity
- **Appraisal Team**
 - Appraises resolution of weakness or process improvement

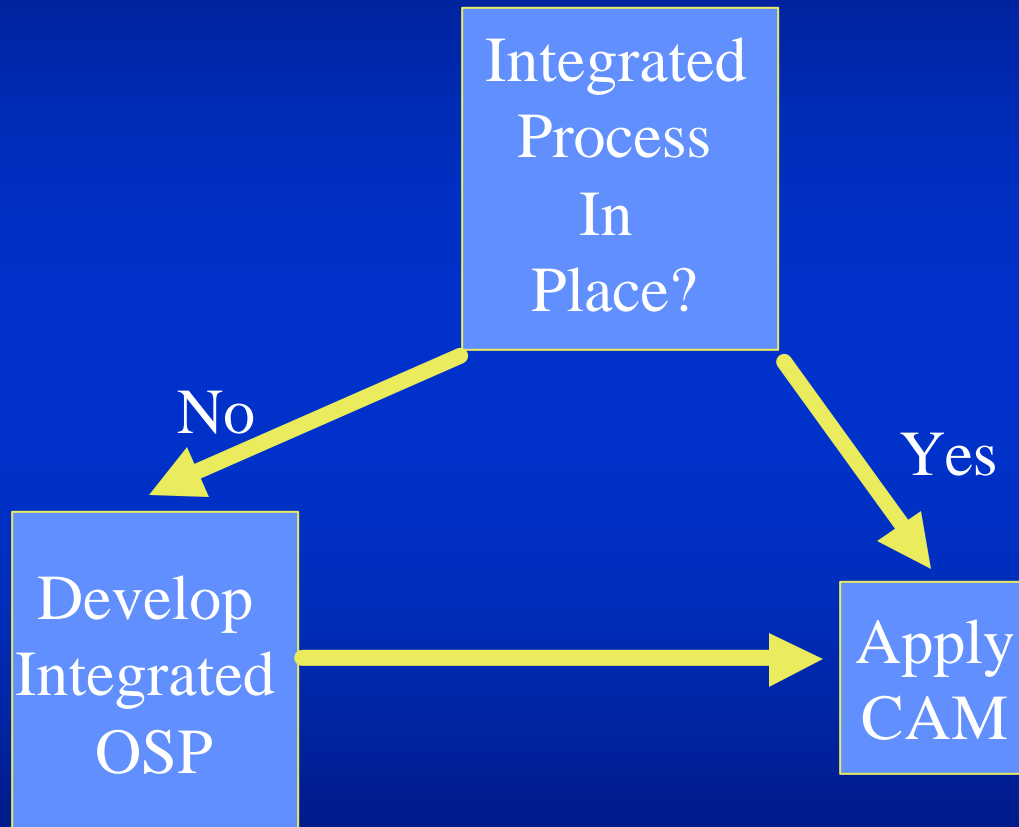
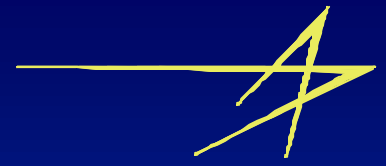


CAM's Focus on Institutionalization

- Appraise other projects after the initial Maintenance Review



Decision on When to 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 SCAMPISM 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[®] and/or CMMI[®] for all engineers
- “Pre-reviews” to assess readiness

CAM eliminates these activities

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



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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.)
 - SCAMPISM 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**