



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

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# Agenda

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

# Context for CMMI<sup>®</sup> Deployment

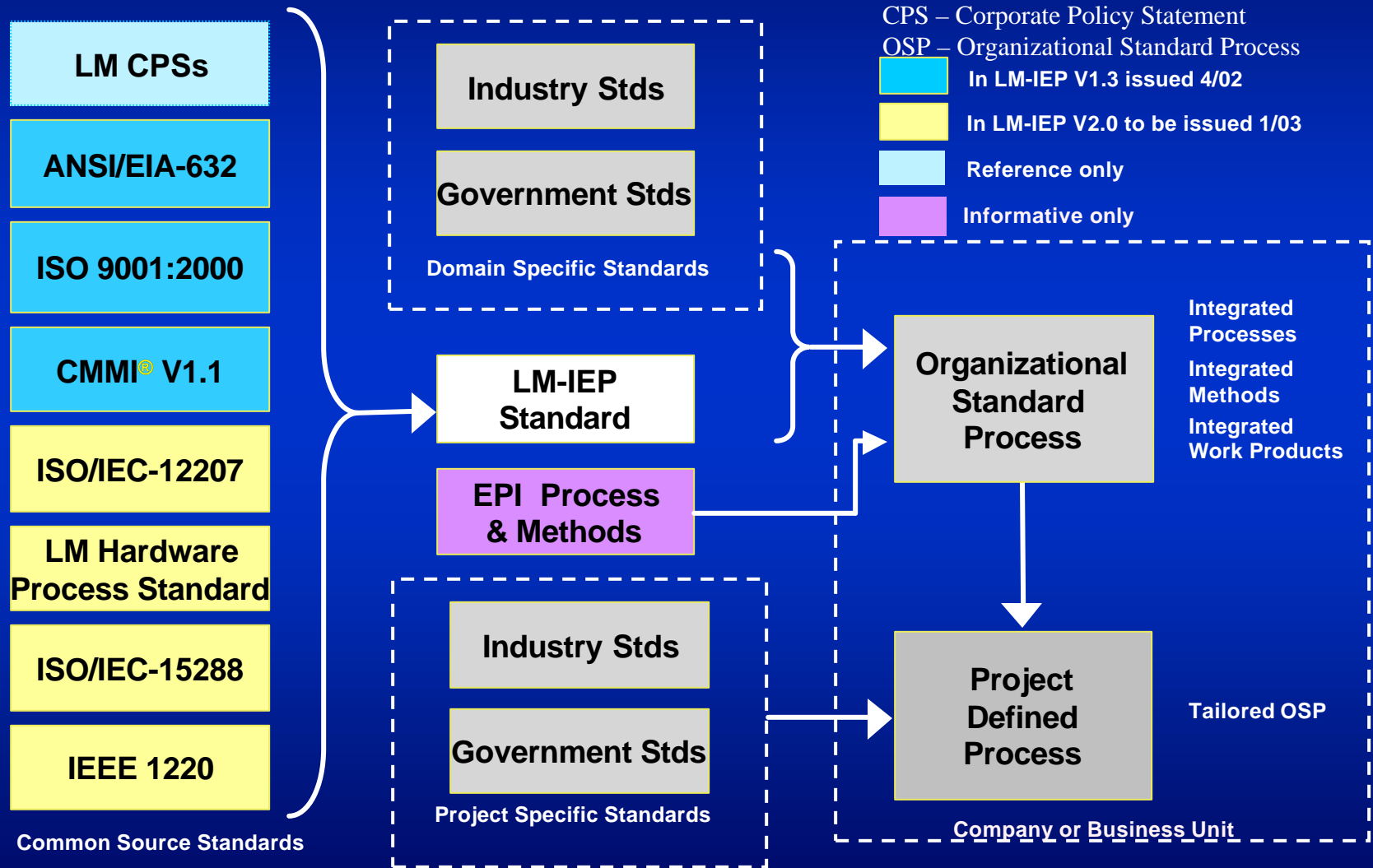
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- Many Lockheed Martin (LM) companies have institutionalized best-of-breed integrated processes
  - Integrated Product and Process Development (IPPD)
  - Integrated Systems Development (ISD)
- Multiple process models and standards are in use across 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.*

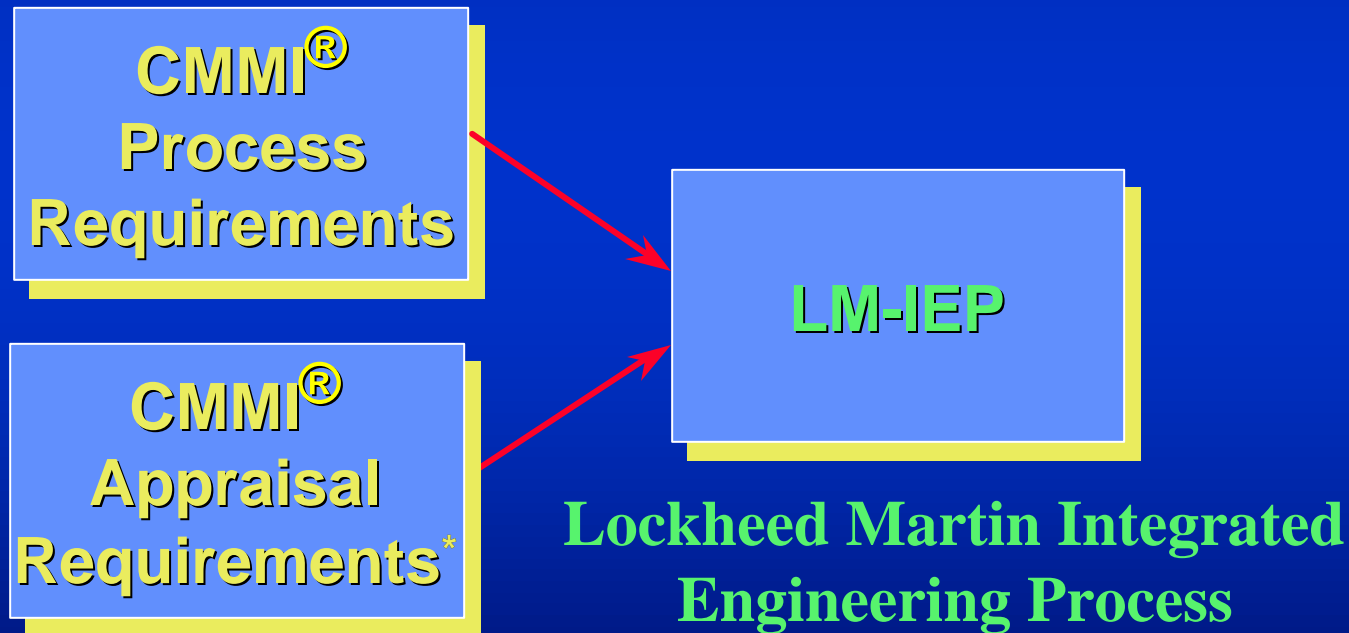
# LM-IEP Context Diagram



# LM-IEP and CMMI<sup>®</sup> Relationship



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



\* From the Appraisal Requirements for CMMI<sup>®</sup> (ARC)



# ***LM-IEP Benefits***

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- **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***

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- **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®

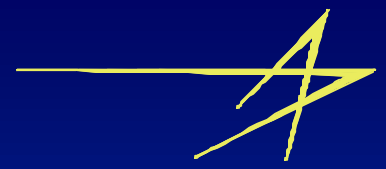
# **Continuous Appraisal Method (CAM) Goals**

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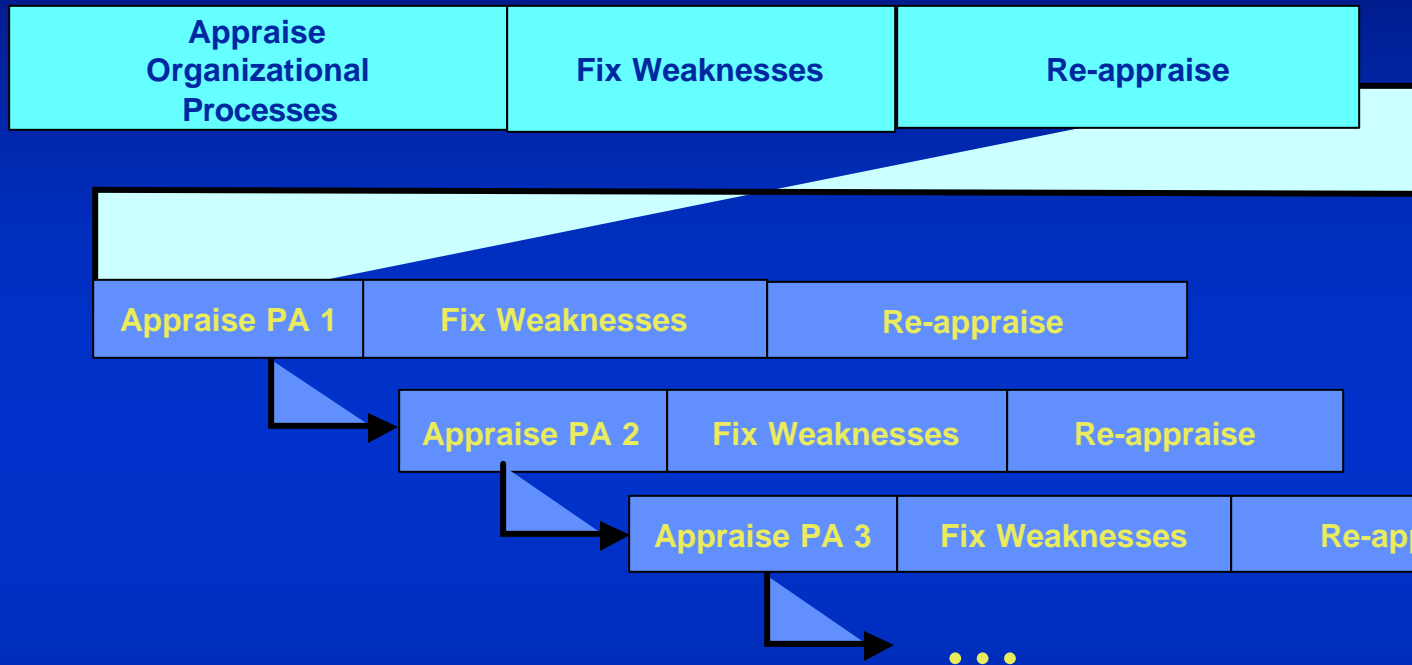
- **Make ARC\* Class A appraisals less expensive**
- **Make appraisals less invasive to the organization and projects**
- **Focus organizations on Continuous Process Improvement as opposed to a special event “test”**
- **Improve processes as a direct result of the appraisal**
- **Promote institutionalization**
- **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

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- 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**

Incrementally Appraise Organizational Processes

Multiple Visits

**Appraise Projects' Processes**

Incrementally Appraise 3-4 Projects

**Conduct Maintenance Review**

Maintenance Review

**Appraise Additional Projects**

Incrementally Appraise Additional Projects (Optional)

# ***CAM's Multiple Site Visits***

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- **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)***

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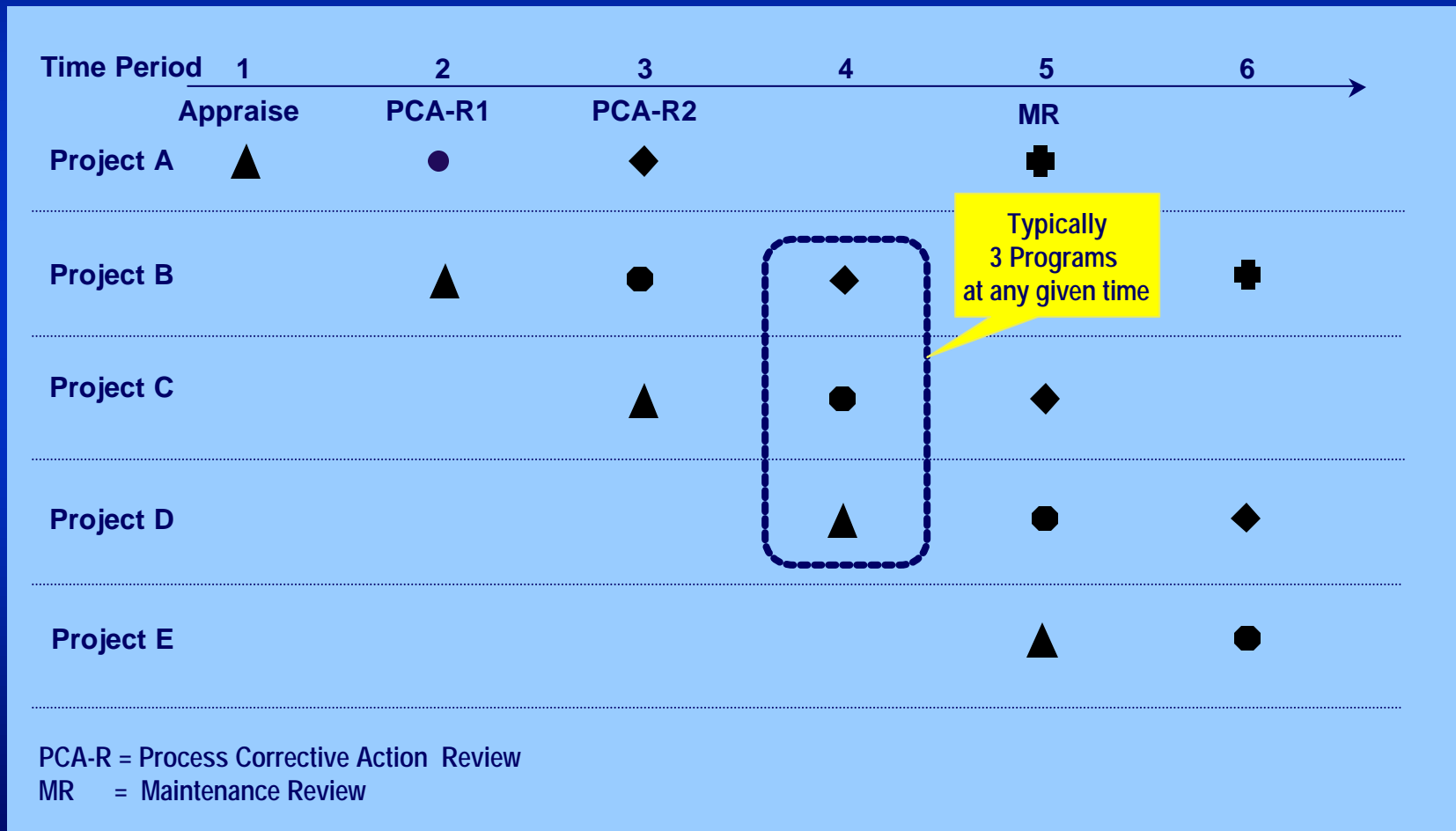


- **Assessment Team**
  - Documents the weakness or process improvement opportunity using the PCA form
  - Obtains consensus on the PCA wording with interviewees
  - Reviews the PCA with interviewees to determine if the weakness or process improvement opportunity is valid
  
- **Organization/Project**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

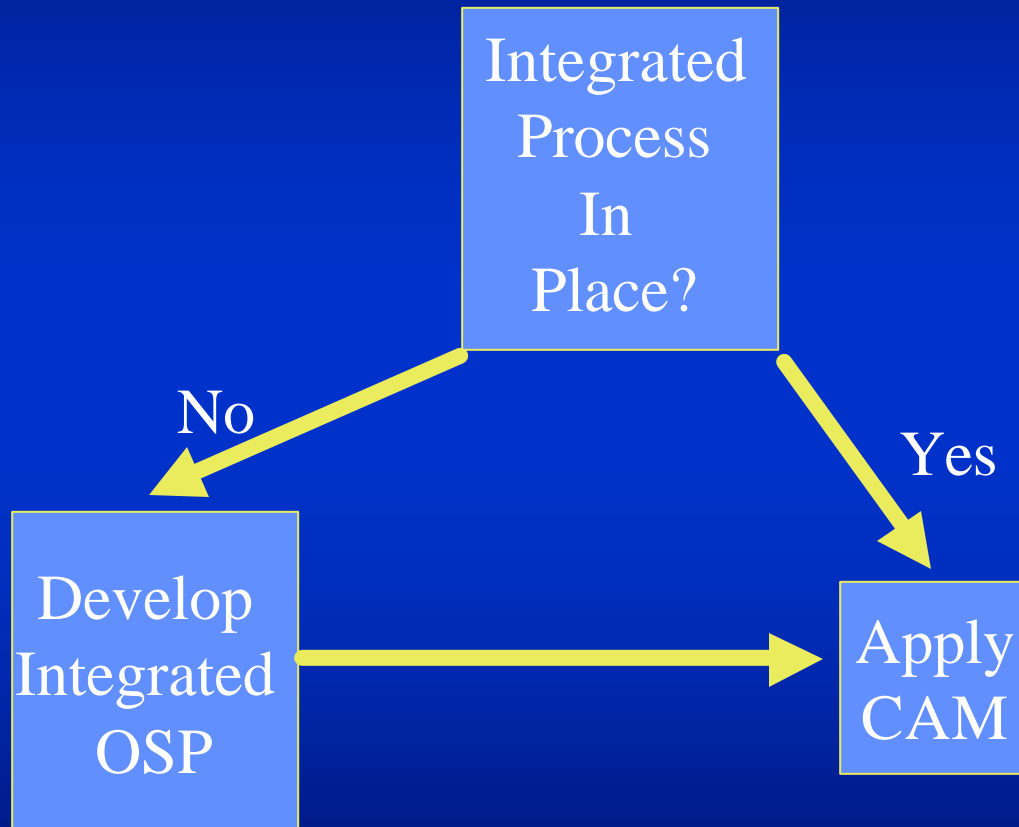
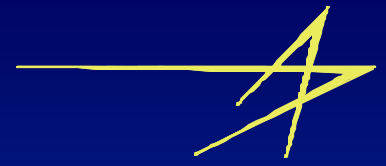
# CAM's Focus on Institutionalization



- Appraise other projects after the initial Maintenance Review



# Decision on When to Apply CAM



OSP = Organizational Standard Process

# **Feedback on CAM usage**

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- **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

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- **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<sup>SM</sup> 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<sup>®</sup> and/or CMMI<sup>®</sup> 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

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- **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

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- **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**