Lockheed Martin Aeronautics
Appraisal Project Management
Strategy

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Lockheed Martin Aeronautics Overview

29,000 employees across the company and around the world

Fort Worth, TX
14,529

Marietta, GA
6,864

Palmdale, CA
3,834

Johnstown, PA – 103
Clarksburg, WV - 78

Meridian, MS - 134

Pinellas Park, FL - 174

Greenville, SC - 3400

YF-22

F-117

U-2

F-16

F-35C

CTOL

F-35B

STOVL

X-35

CV

C-130J

F-22

C-5

29,000 employees across the company and around the world

International - 39
2010 SCAMPI\textsuperscript{SM} Project Team

- **Leadership**
  - Sponsor – LM Aero Executive Vice President, Operations
  - Champion – Director, Enterprise Process Improvement (EPI)
  - Implementation – Sr. Manager, EPI Enterprise Common

- **Process Management Organization**
  - SCAMPI\textsuperscript{SM} Project Manager
  - Appraisal Planning Coordinator
  - PIID Population Lead
  - Project Integrators

- **Project representatives**
  - Project POC’s
  - Subject Matter Experts

- **Functional SME’s**
  - Engineering
  - Quality
  - Program Management
  - Supply Chain Management
  - Organizational Training
  - Measurement and Analysis
  - Global Sustainment
What is a CMMI® appraisal like at Lockheed Martin Aeronautics?

SCAMPI<sup>SM</sup> Appraisal planning is problematic

- Our CMMI® projects can be HUGE – much larger than many organizations that are appraised
- Evidence collection requires coordinating activities with 200-300 people or more
- Projects are spread across large geographic regions
- Access to project artifacts is a challenging and complex task
  - Security/Classification issues
  - Proprietary information of national and international partners
  - Computer network access issues
2007 SCAMPI$^\text{SM}$ Was a Significant Effort

- **Document review**
  - Over 3900 items examined
  - Included classified data
  - Only 9 Information Needs
  - No major findings

- **Interviews**
  - Over 100 participants at 3 sites
  - Conducted 9 group interviews
  - Included major engineering disciplines
    - Hardware
    - Software
    - System

- **Appraisal Team**
  - Team consisted of 11 members
    - 5 internal, 6 external
    - 4 SCAMPI$^\text{SM}$ Lead Appraisers
  - Consistent mini-team assignments
Mission Accomplished!

Maturity Level 3
Appraisal Methodology
(through the eyes of Generic Goal 2)

Institutionalize a Managed Process

- GP 2.1 and 2.2 – Establish a Policy and Plan the Process
- GP 2.3 and 2.4 – Provide Resources and Assign Responsibility
- GP 2.5 – Train People
- GP 2.6 – Manage Configurations
- GP 2.7 – Identify and Involve Relevant Stakeholders
- GP 2.8 – Monitor and Control the Process
- GP 2.9 – Objectively Evaluate Adherence
- GP 2.10 – Review Status With Higher Level Management
GP 2.1 and 2.2

Establish a Policy and Plan the Process

- Policies are defined at corporate level and company level tell us to align our business objectives with our process improvement activities
  - CMMI® Maturity Level 3 allows us to bid on certain government contracts
  - Process institutionalization reduces our total cost of doing business
  - Standards compliance is required by our customer

- Our response to the policy was to create and execute a plan to achieve CMMI® Maturity Level 3

What if... we plan our SCAMPI™ like a program?
Planning the SCAMPI\textsuperscript{SM}

Key Elements

• Appraisal Team Selection

• Project Selection

• Assessment of Project Readiness

• Evidence Collection / PIID Population

• Evidence Verification and Validation

• Integrated Master Schedule
Appraisal Team Selection
Lead Appraiser

It is important to select the right lead appraiser for the organization!

- Must understand the product and the organization
- Must have an approach which melds with the organization
- Must have participation throughout entire process
- No rookies allowed!
Appraisal Team Selection

Appraisers

Lockheed requires every mini-team have a team member from outside of the company (can be from a sister company within the corporation)

Every mini-team has a member from within the company that has access to the artifacts

Every mini-team member has a member with substantial SCAMPI\textsuperscript{SM} appraisal experience

Providing artifact access to mini-team members can be problematic – plan ahead!
Project Selection

• Organizational strategy
  – Reflect anticipated business base
  – Include all major development sites
  – Touch full span of our products
    • From JSF, largest aircraft program in history
    • To smaller projects of 30-35 heads
  – Reflect range of program types
    • Major Aircraft development
    • Legacy Upgrade Projects
    • R&D projects
Assessment of Project Readiness

We conducted gap analysis events* early in the schedule with each program to determine:

– Compliance with organizational processes
– Identify gaps and prioritize corrective actions
– Develop plans to fix process problems

*Note – gap analysis events are not audits (although they can be closely related)!

Audits are against the company processes
Gap analysis events are against the CMMI® model
Evidence Verification and Validation

• Class C Appraisal
  – Validated the organizational processes
  – Validated company standards for PIID artifacts

• PIID Reviews
  – Four distinct reviews using external reviewers
  – Validated proposed artifacts for objective evidence
  – Identified long-lead action items (OT, PPQA, GP 2.5, GP 2.9, …)
  – No interviews conducted

• Class B (SCAMPI$^\text{SM}$) Appraisal
  – Dry run for Class A appraisal, including interviews
  – Identify and close out all major and minor issues

• Class A (SCAMPI$^\text{SM}$) Appraisal
  – Everything is “perfect”
  – Coffee cups are distributed
Evidence Verification and Validation

• **PIID Record Life Cycle States**
  - **No Data** – A practice in scope of appraisal needs to be populated but has no PIID data
  - **In work** – The PIID record information associated with a piece of objective evidence is being populated
  - **Submitted** – The PIID record information is complete and submitted for quality check
  - **Audited** – The PIID record hyperlink works and information referenced within the record can be easily located
  - **Reviewed** – The PIID record has passed an internal review of the objective evidence it references
  - **Corrective Action** – The PIID record has failed an Audit or Internal Review
<table>
<thead>
<tr>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td>Select Appraisal Team</td>
<td>Collect Objective Evidence</td>
</tr>
<tr>
<td>Select Projects</td>
<td>Establish Project Stakeholder Network</td>
</tr>
<tr>
<td></td>
<td>Perform Gap Events</td>
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<tr>
<td></td>
<td>Perform PIIID External Reviews</td>
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**Planning the SCAMPI\(^{SM}\)**

**The Integrated Master Schedule**
GP 2.3 and 2.4
Provide Resources and Assign Responsibility

Budgeting
People
Tools
Facilities
Tools
PIID* Database

• Partitioning data by appraisal, schedule, project, PA, etc. is a very powerful and useful thing
  – Filtering data
  – Measuring data
  – Controlling Access
• Multi-user environment is critical
• Locks down data after submittal
• Tracks to closure corrective actions resulting from audits and reviews
• Enforces PIID life cycle

*PIID -> Process Implementation Indicator Description
LMASA – Lockheed Martin Aeronautics Standard Approach

• Defines the Lockheed Martin Aeronautics standards for SCAMPI\textsuperscript{SM} artifacts
• Accessible through PIID database tools
• Validated via Class C appraisal

CMMI\textsuperscript{®} Practice Info

Other contextual help

Standards for Direct and Indirect evidence

CMMI Practice Report for CM GP 2.4
Tools

• SharePoint Site
  – Primary means for project communication
  – Project files
  – Metrics and Measures
  – Archives

• Artifact repositories
  – Simple networked file shares
  – Each project controls its own
Assigning Responsibilities

**SCAMPI\textsuperscript{SM} Team**
- SCAMPI Project Lead
- PIID Population Lead
- Project Integrators
- Admin Support

**Project Teams**
- Point of Contact / Team Lead
- Subject Matter Experts
- Admin Support

**SCAMPI\textsuperscript{SM} Appraisal Team**
- Planning Coordinator
- Lead Appraiser
- Mini Team Members

**Functional Core Teams**
- Functional Representative
- PIID Population Coordinators for:
  - PPQA
  - SAM
  - OPD
  - OPF
  - OT
GP 2.5

Train People

• CMMI® Training Courses
  – SEI training
  – Management Overview
  – Introduction (1-day)
• PIID Tool Training Courses
  – Data entry role
  – Auditor and Reviewer roles
• Other Training
  – LMASA
  – Organizational Standard Processes
  – Role-based training From Functional Cores
GP 2.6

Manage Configurations

- Artifact Repositories
- File shares

- Archives from past appraisals
- Program archives
- CD's
- DVD's

- Tools
- SharePoint & File shares
  - PIID Database Software
  - PIID Documentation
  - LMASA

- Project files and documents
- SharePoint
  - Plans
  - Presentations
  - Status Reports
  - ...


Identify and Involve Relevant Stakeholders

Project Integrators meet regularly with their project POC’s to coordinate activities.

Coordination meetings with all project integrators and project points of contact occur weekly.

Coordination meetings with functional representatives occur every two weeks.

Accountability review meetings with higher level management occur monthly.
Monitor and Control the Process

- Tracking against the Integrated Master Schedule is a regular topic at our meetings

How are things going?
GP 2.8
Monitor and Control the Process

PIID Life Cycle Metrics Are Used to Monitor PIID Population Process Activity
Objectively Evaluate Adherence

We use SCAMPI\textsuperscript{SM} preparation and SCAMPI\textsuperscript{SM} appraisal results to identify adherence issues within the organization

- Project gap events
- PIID Corrective Actions
- Integration with organizational auditing functions through PPQA

Ensuring compliance with PIID standards is automatically built into the life cycle

- Auditing Standards
- LMASA Evidence Standards
- File Repository Standards
- Corrective Actions
GP 2.10
Review Status With Higher Level Management

Accountability Review Meetings (ARM) – everyone should have them!

Financial Status
Schedule Status
Process Decision Boards
Project Risks
Program Issues
Project Accomplishments
Conclusions

1. SCAMPI events at Lockheed Martin Aeronautics are uncommonly large efforts

2. Even if your effort is smaller, the underlying methodology can be similar

3. Run your SCAMPI preparation like a major project (using CMMI® GG 2 as a guide)
   • Establish a Policy and Plan the Process
   • Provide Resources and Assign Responsibility
   • Train People
   • Manage Configurations
   • Identify and Involve Relevant Stakeholders
   • Monitor and Control the Process
   • Objectively Evaluate Adherence
   • Review Status With Higher Level Management
Questions?