



Appraisal using the Federal Aviation Administration's Integrated Capability Maturity Model (FAA-iCMM)

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Abstract

The Federal Aviation Administration (FAA) has been improving its processes for several years. As part of this process improvement effort, they recently completed an appraisal of eleven programs representing the full systems engineering and acquisition lifecycle, against the FAA's Integrated Capability Maturity Model (FAA-iCMM). This presentation describes the method used and identifies lessons learned.



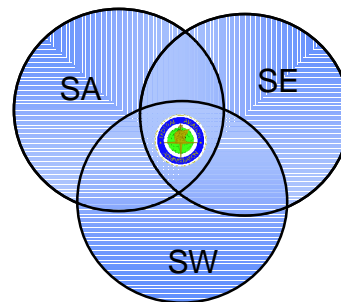
Topics

- FAA-iCMM
- FAA-iCMM Appraisal Method (FAM)
- Full Internal FAMs Conducted at FAA
- FAM 2000 [scope, schedule, team, statistics, results]
- Lessons Learned
- Summary of FAA Process Improvement



FAA-iCMM

- Published November 1997
- Integrates three CMMs the FAA had been using separately:
 - SW-CMM documented in (Paulk et al. 1993)
 - SE-CMM documented in (Bate et al. 1995)
 - SA-CMM documented in (Ferguson et al. 1996)





FAA-iCMM Appraisal Method (FAM)

- Published April 1999
- Based upon several existing appraisal methods currently used against the various CMMs:
 - CBA-IPI documented in (Dunaway et al. 1996)
 - SCE documented in (Byrnes et al. 1996)
 - IP documented in (Whitney et al. 1994)
 - SAM documented in (Kuhn et al. 1996)



FAM Variations

- **Full internal appraisal [FI]** (formal, robust, method - ratings)
- **Full external appraisal [FE]** (for external evaluation of FAA processes - ratings)
- **Facilitated discussion [FD]** (derives description of a compliant, improved process and an implementation plan)
- **Document-intensive appraisal [DI]** (examines process documents and work products)
- **Questionnaire-based appraisal [QBA]** (based on managers' and practitioners' perceptions)
- **Interview-based appraisal [IB]** (uncovers major issues)

The FAA has performed at least one of each of the appraisal variations with the exception of the Full external evaluation.



Full Internal FAMs Conducted at FAA

- September 1998 / 12 acquisition programs / 3 Process Areas (PA)
Capability Level 2 (CL2)
- April 1999 / Requirements Organization / 2 PAs (CL2)
- May 1999 / Maintenance Program / Maturity Level 2 (ML2)
- October 1999 / Test Organization / 4 PAs (CL2)
- **January - March 2000 / 11 programs / ML2 + Oct Re-Do**
- September 2000 / IOT&E Organization / ML2
- September 2000 / Maintenance Program / ML2
- October 2000 / Maintenance Program / ML2
- November 2000 / Maintenance Program / ML2
- November 2000 / Technical Support Organization / 2 PAs (CL2)



Maturity Level 2 PAs

Needs
Requirements
Outsourcing
System Test and Evaluation
Transition
Project Management
Contract Management
Quality Assurance and Management
Configuration Management



FAA 2000 FAM

- Started 24 January 2000; final briefing was 15 March 2000
- Sponsors of the appraisal were:
 - Steve Zaidman (Associate Administrator for Research and Acquisitions - ARA)
 - Ray Long (Director Airway Facilities Operational Support - AOS)
 - James H. Washington (Director of Air Traffic System Requirements - ARS)



Scope of FAM

Organizational	11 programs with program specific results
Model	Maturity level 2 (capability level 2 in the nine PAs).
Acquisition Management System (AMS) Life Cycle documented in (FAA, 1997) WEB: http://fast.faa.gov/	Investment Analysis (pre-project) - two programs, Solution Implementation – seven programs, and In-service Management (operational support) - one program with one in transition from Solution Implementation to In-service Management.



Goals

- Evaluate ARA Performance Goal 7 satisfaction (this first goal applied only to the eight ARA programs):
 - *Enabling Process Improvement using the FAA-iCMM: Institutionalize maturity life cycle processes that enable high quality solutions to Agency and user needs, predictable cost and schedule, and increasing productivity. To accomplish this:*
 - *75% of selected product teams will achieve FAA Integrated Capability Maturity Model (FAA-iCMM) maturity level 2 by December 1999.*



Goals (cont'd)

- Motivate and focus the process improvement effort.
- Promote buy-in, learning, participation, and involvement.
- Provide visibility into current status; track our improvement effort.
- Provide focused program feedback to support action planning and plan adjustment.



FAM Method (Pre-on Site Phase)



- **Plan and Prepare for the Appraisal**
 - Obtain Sponsor Commitment
 - Select Appraisal Scope
 - Select Appraisal Team
 - Plan Appraisal Details
 - Orient Participants (optional)
 - Train Team
 - Administer Questionnaire
 - Develop Exploratory Questions



FAM Method (on Site Phase)



- **Conduct Appraisal**
 - Conduct Opening Meeting
 - Interview Participants
 - Review Documentation
 - Consolidate Data
 - Develop Draft Findings
 - Present Draft Findings
 - Develop Ratings
 - Develop Final Briefing
 - Brief Sponsor
 - Present Final Briefing
 - Conduct Wrap-up



FAM Method (Post-on Site Phase)

- Report Results
 - Prepare and Deliver Appraisal Report (May be Final Brief)
 - Manage Records



FAM Location

- Two major locations
 - Washington DC
 - Atlantic City, NJ
- Appraisal divided into 3 phases
 - Four programs in Washington DC
 - One program in Atlantic City, NJ (plus people from other programs in NJ)
 - Six programs in Washington DC



FAM Schedule

Administer Questionnaire	Jan 4 - 19
Train Team	Jan 18 - 19
Phase 1 (in DC)	Jan 24 - Feb 3
Phase 2 (in Atlantic City)	Feb 14 - 18
Phase 3 (in DC)	Feb 25 - Mar 10
Draft Findings	Mar 13
Final Findings	Mar 15



FAM Appraisal Team

- Ten-person appraisal team [3 mini teams]
 - 5 FAA employees
 - 4 FAA support contractors
 - 1 external contractor - Software Productivity Consortium.
- Two-day FAM training class
 - FAA-iCMM training was a prerequisite
- Two day preparation time prior to phase 1 and 3
- Preparation time included:
 - 45-minute briefing from each product lead
 - Initial document review
 - Review of the questionnaire results

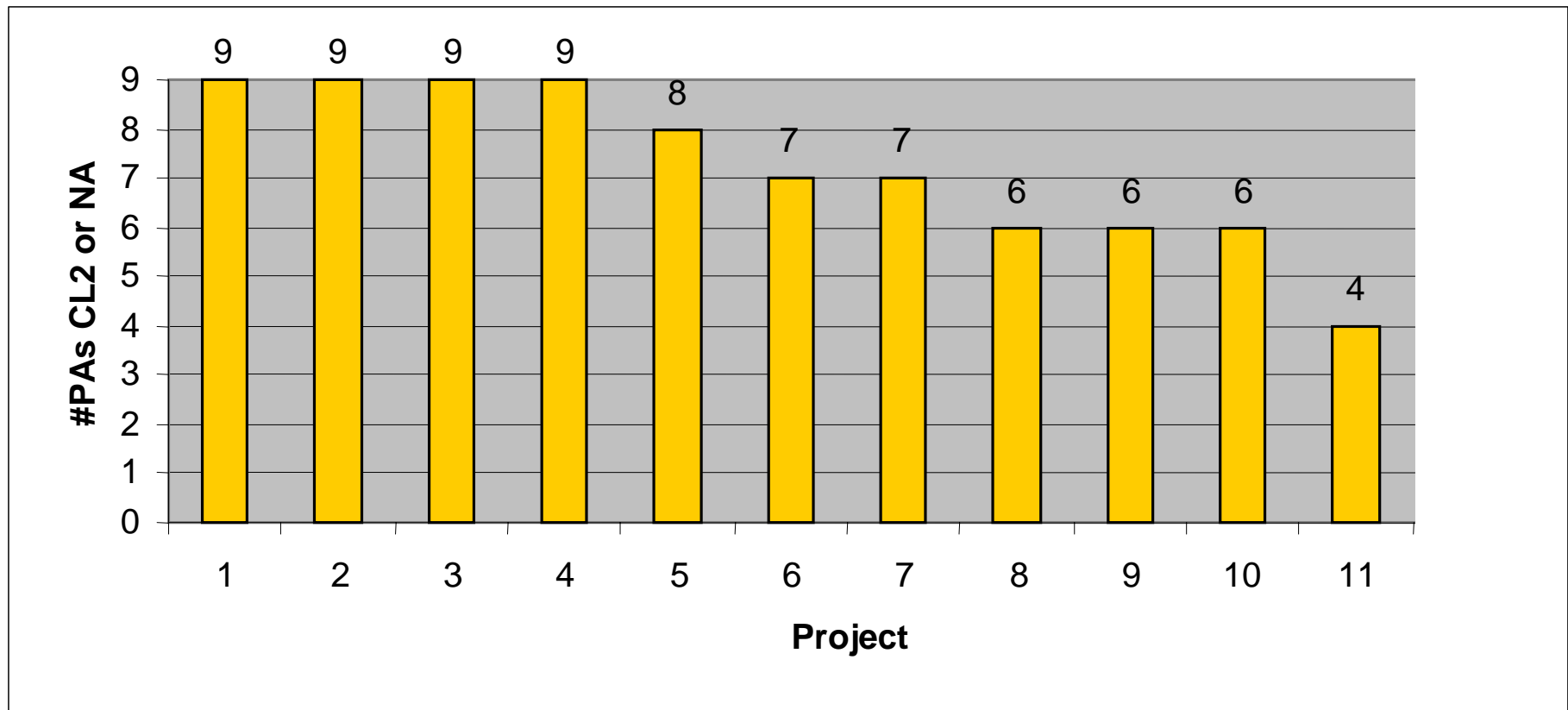


FAM Statistics

Participated in the discussions during the appraisal	160
• project leaders	16
• senior managers	13
• practitioners	131
Number of interview sessions	44 (1-1.5 hours each)
Number of documents or groups of artifacts reviewed	Over 500
Completed questionnaires	357



Results





Analysis of Results

- Two most deficient areas were:
 - Quality Assurance and Management
 - Although most had a documented way of performing Quality Assurance and Management, in many cases they had only performed the process once.
 - Project Management
 - Although most projects had a way of doing estimates, in many cases the process was not documented.



Lessons Learned

- Advantages of an integrated appraisal:
 - The CMMs have many commonalities
 - People being appraised do not separate the CMM disciplines in their own minds
 - Artificial barriers of separate domain appraisals are removed
 - Decreased the impact on the projects



Lessons Learned (Cont'd)

- Size of appraisal (number of projects and length of time) raised several issues:
 - Scheduled for the winter months [2 days lost]
 - Plan included free time for weather and fatigue issues
 - Only two 1.5 hour interviews per day
- Project-specific results
- Need to use FAM variations more [One “project” was only a functional team for a large project]
- Corrections to the FAA-iCMM identified



Summary of FAA Process Improvement

- FAA has made major progress in the past several years.
- Integrated model has helped focus people on a common goal.
- Senior management was committed from the beginning, but has had to learn their roles.
- Initial goals were set without fully understanding the process improvement culture within the FAA.
- As understanding of the culture has increased, management's ability to perform roles has matured.



Summary of FAA Process Improvement (Cont'd)

- Many areas within the FAA have not yet applied the process improvement approach, but it is expanding.
- New organizations are beginning to participate in process improvement activities.
- The number of FAA organizations that realize the importance of process improvement is growing rapidly.
- Four programs were re-appraised in October 2000
 - Team composed of 5 members from the original team
 - Only looked at PAs that were not CL2



FAA Documents

- Federal Aviation Administration (FAA), *Federal Aviation Administration Acquisition Management System*, June 1997.
- Ibrahim, Linda, et. al, *The Federal Aviation Administration Integrated Capability Maturity Model (FAA-iCMM)*, Version 1.0, November 1997.
- Ibrahim, Linda, et. al, *The Federal Aviation Administration Integrated Capability Maturity Model (FAA-iCMM) Appraisal Method (FAM)*, Version 1.0, April 1999.

WEB: <http://www.faa.gov/aio/>



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