How the CMMI Maturity Level 2 Practices Benefit the 367 TRSS

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STSC
Intro to the Software Technology Support Center (STSC)

- Chartered in 1987 by the USAF to improve development/sustainment of systems and software engineering
- Customers include: Army, Navy, Marine Corps, Air Force and other Executive Branch units
- The STSC draws on an organic cadre certified in:
  - Capability Maturity Model Integration® (CMMI®)
  - Scaled Agile Framework (SAFe®)
  - Personal Software Process® / Team Software Process® (PSP®/TSP®)
  - Air Force Systems Engineering Assessment Model (AFSEAM)
- The STSC contracts for unique expertise (e.g., Subject Matter Experts (SMEs) in Microsoft Team Foundation Server) and to supplement organics
The 367 TRSS develops a vast array of operational training products for the Air Force’s maintenance enterprise.
The Problems

The 367 TRSS was operating in a perpetual state of crisis

- Ability to establish solid customer requirements was lacking
  - 95%+ of projects required rework
  - Fewer than 5% of projects delivered on-time (e.g., 1 yr. simulator build turned into a 4 yr. build)
- Creation of solid work processes had not occurred leaving work ad hoc and unrepeateable
  - Development team failed to identify 1500 defects (one project)
  - Project Managers often over-committed to customers
- Establishment of employee core knowledge had not occurred
  - A majority of military personnel rotate out every 4 years
  - 90% of workforce has no prior experience in software/educational development

Our Organizational Maturity was non-existent!
Root Cause Analysis

- Identified the need for
  - Process development
  - External mentoring and assessment
  - Set of standards and best practices
- Several project management frameworks were evaluated
  - Agile Development Methods
  - Project Management Body of Knowledge
  - Capability Maturity Model Integration (CMMI)
- CMMI for Development
  - Framework of best practices, not requirements
  - Incremental improvement – matures with the organization
  - Continuous Improvement – data driven
CMMI Maturity Level 2 Best Practices

Requirements Establishment was lacking

- CMMI Requirements Management best practices suggest we:
  - Understand requirements
  - Obtain commitment to requirements
  - Manage requirements changes
  - Maintain bi-directional traceability of requirements
  - Ensure alignment between project work and requirements
Project Processes were ad hoc and unrepeatable

- CMMI Project Planning and Process & Product Quality Assurance best practices suggest we:
  - Define standard work and project lifecycle phases
  - Objectively evaluate processes
  - Objectively evaluate work products
  - Communicate and resolve gaps

The Problems Solved by CMMI Maturity Level 2 Best Practices

- Product Defects
- Process Audits

Observations:
- 70 Peer
- 8 Internal QA
- 2 External

Process Audits:
- 17
- 6 Minors
- 2 Majors
Corporate knowledge was shallow

- CMMI Project Planning best practices suggest we:
  - Plan needed knowledge and skills
First Attempt – Lessons Learned
  – Commitment to change was lacking
  – Failed to commit resources – organization only assigned 1 individual
  – Set unrealistic goals – certification in 2 years
  – Technological solutions were not considered – paper-based

Second Attempt – Success
  – Commitment to change was established
  – Committed resources – 7-person team
  – Set realistic goals - stopped chasing certification
  – Technology solutions were integrated

STSC taught SMEs Intro to CMMI V1.3
STSC performed a Gap Analysis and started mentoring
Process Development

- Software leveraged
  - Integration of MS Team Foundation Server, MS Project, and MS Excel reporting

STSC shared lessons learned from other customers
CMMI best practices are the main framework but has with infusions from Art of the Possible, agile methods, and other project management models
Process Development

Each project is planned using the 500+ standardized tasks

- Reduces guess work
- Makes abnormalities more visible
- Enables Continuous Process Improvement

Standard Work Packages

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STSC conducted a SCAMPI B appraisal and continued mentoring
**Result of this Initiative**

- Only 5% projects require rework (was 95+%).
- Over 75% of projects delivered on time (was below 5%).
- 367 TRSS Process SMEs have evolved into mentors:
  - Medical Training Organizations
  - Educational and Training Development Organizations
  - Aircraft Maintenance Group
- Achieved CMMI V1.3 Maturity Level 2 with strong inroads into ML3.
- 367 TRSS continuing to improve and mature using best practices of CMMI ML3.
Conclusion

• An organization needs to document their own standard work with adjustments based on best practices of the CMMI

• An organizational culture change requires more time than anticipated

• Continuous engagement by mentors was a major factor towards success
  – Roadmaps for improvement
  – Gap Analyses / Assessments
  – Increased confidence and provided direction

• The integration of an organization’s task flow with technology ensures consistency, employee efficiency, and transparency

• CMMI Maturity Level 2 best practices apply to virtually any organization/development model:
  – Configuration Management
  – Measurement and Analysis
  – Process and Product Quality Assurance
  – Project Monitoring and Control
  – Project Planning
  – Requirements Management
Questions?