The Acquirer's Role In Process Improvement

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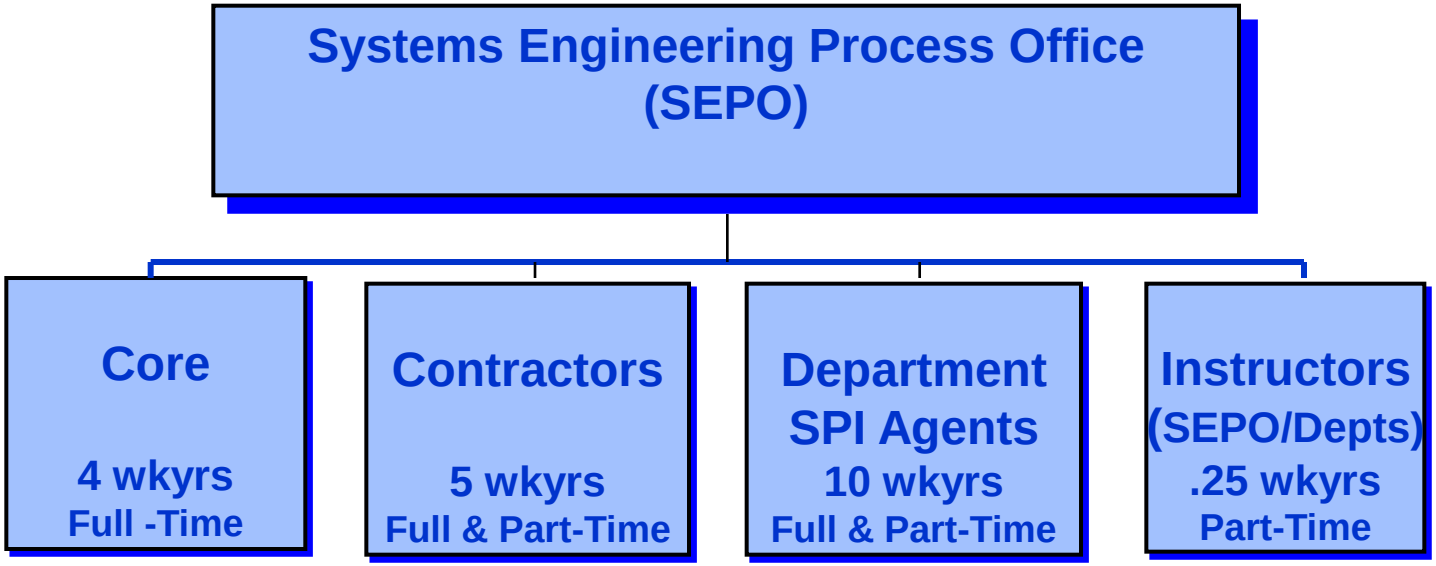
Objectives of the Briefing

- Overview of SSC San Diego and SEPO
- Discuss how Acquirers contribute to the failure of a project and the developer's process improvement efforts
- Describe what the Acquirer can do to ensure the success of a project and the developer's process improvement efforts

Space and Naval Warfare Systems Center San Diego (SSC San Diego)

- **Mission: to be the Navy's RDT&E, engineering and fleet support center for command and control, communications, ocean surveillance, and the integration of those systems which overarch multi-platforms**
- **Vision: to be the nation's pre-eminent provider of integrated C4ISR solutions for warrior information dominance**
- **~3,500 civilians, 70 military, and several thousand contractors**
- **Actual funding for FY 03 was ~$1.3 billion**
- **Attained SW-CMM Level 3 in Oct 2000; Reassessed at Level 3 in Aug 2003**

SSC San Diego Process Improvement Organization



-Funded by overhead

SEPO Products and Services

- **Maintains SSC San Diego's Process Asset Library (PAL): Comprehensive web page of software engineering material: at http://sepo.spawar.navy.mil/**
- **Facilitates systems process improvement across all SSC San Diego Departments**
- **Conducts training courses**
- **Assists with both internal and external appraisals on organizations and projects to determine best practices and areas for improvement**
- **Maintains Software Community Alias: Email alias with over 800 members for announcements, requests for assistance**
- **Facilitates Systems Process Improvement Working Group (SPIWG): periodic meetings, seminars, lectures, debates, demos about systems engineering and process improvement issues**
- **Maintains SEPO Library: Software-engineering related books, guidelines, standards, products, processes, publications, proceedings, articles, videos**
- **Performs Community Liaison: Interface with the software community outside of SSC San Diego, both government and commercial**

SSC San Diego Organizational PAL:http://sepo.spawar.navy.mil/

SSC San Diego PAL - Microsoft Internet Explorer provided by Navy Marine Corps Intranet

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SPAWAR Systems Center San Diego

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Space and Naval Warfare Systems Center San Diego

A CMM Level 3 Organization

Systems Engineering Process Office

SEPO

Process Asset Library

This is an official U.S. Navy web site.
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Please review the Privacy and Security Notice, External Links Notice, and Privacy Advisory.
For webmaster contact information click on *Contact Us*

The SEPO home page and Process Asset Library (PAL) is a sub-web of the Space and Naval Warfare Systems Center San Diego public Web site, which can be accessed by clicking the *HOME* link in the navigation pane to the left. To return here, click on *About SSC San Diego* and then click on *Software/System Engineering Process Office*.

Based on many lessons learned, it is our goal that the SSC San Diego software community, as well as our industry partners and other government associates, have the tools and techniques to raise our systems and software capability maturity in a concerted effort. In the spirit of improving the systems and software engineering competency of all players on the SSC San Diego team, we offer this home page. Also, in this spirit, we ask that any of you who have lessons learned in systems and software process improvement that could benefit the rest of the team, to please pass them along as a document or as a link and we will include them on this home page.

SSC San Diego Process Asset Library Local intranet

Start Inb... Micr... CM... SSC... SSC... Mee... Micr... SEP... Micr... Calc... Micr... 13:31

The Problem

- "The problem that I perceived – and it clearly exists today – is that a gross mismatch occurs when a DoD program office that can barely spell the word 'software' oversees a Level 3 or 4 contractor organization,"

"The government program manager has no appreciation for the tools, techniques and methods – and their cost – that are necessary to develop software on a predictable schedule at a predictable cost with predictable performance results," Lloyd Mosemann[1], former deputy assistant secretary of the Air Force

- Some Acquirers depend on the developer's maturity rating alone for project success
  - Maturity ratings alone do not guarantee project success
  - Let the buyer beware!
  - Remember, it's called the "Capability" Maturity Model, not the "Performance" Maturity Model

How Acquirers Contribute to the Failure of Development Projects and Process Improvement Efforts (1)

- Choosing developers based solely on their CMMI rating
  - Depending on ratings alone to ensure project success
- Not fully appreciating their own role in the developer's success
- Not managing the project in a "mature" fashion; driving the developer to level 1
  - Making requirements changes with the expectation that schedule and cost will not change
  - Setting unrealistic schedule deadlines
  - Not using quantitative measures to make programatic decisions
  - Not regularly reviewing progress and risks
  - Failing to provide resources for adequate documentation, configuration management or quality assurance

How Acquirers Contribute to the Failure of Development Projects and Process Improvement Efforts (2)

- Not understanding basic project management, systems engineering, and software engineering principles

- Blaming the CMMI for project failures
  - "I chose a Level 5 developer, and the project still failed. This CMMI stuff just doesn't work!"

What Acquirer's Can Do To Contribute To Project Success and the Developer's Process Improvement Efforts (1)

- Understand the CMMI and what process "capability" means
  - "Capability" means "having general efficiency and ability"[2]
  - CMMI Levels do not guarantee success; they are indicators of process maturity
  - CMMI Levels do not guarantee that the developer will use mature processes in the development of a project

- Develop mature processes with which to manage the developer
  - Use well-defined, repeatable processes
  - Implement CMMI-SE/SW/IPPD/SS

- Hold regular project reviews with the developer
  - Track progress using quantitative measures
  - Review risks
  - Tailor reviews to appropriate life cycle phase
  - Use standard format, checklists, entrance and exit criteria for reviews (e.g Software Management for Executives Guidebook and Appendix G of the SSC San Diego Software Measurement Plan Template; http://sepo.spawar.navy.mil)

Example Process Audit Checklist from SME Guidebook

PROJECT PLANNING, TRACKING AND OVERSIGHT PROCESS AUDIT

Project:

Date:

Prepared by:

Procedures:

Part 1. Getting Started

___ Review "Taking over an Existing Project" or "Beginning a New Project" in Appendix B of A Description of the SSC San Diego Software Process Assets.

Part 2. Project Planning

___Determine Project Vision, Mission, Objectives, Goals

___Get operational requirement from sponsor

___Get task statement from sponsor

___Determine Acquisition strategy

___Determine Software Development Methodology

___Develop prototype

___Perform Risk Management

___Determine Independent Verification and Validation (IV&V) needs on the project

___Review software engineering processes that will be used during project

___Review and tailor standards/guidelines that will be used during project

____ IEEE/EIA 12207

___Develop Statement of Work

___Prepare Request for Proposal (RFP)

___Initiate training program

Example SRR Check List from SME Guidebook

5.3.1 System Requirements Review (SRR) Checklist

Purpose: The objective is to ascertain the adequacy of the efforts in defining system requirements.

To assess the risks associated with plans and requirements.

To obtain initial agreement between the user/customer and the system developer that the preliminary requirements specified for the system are complete, accurate, and the requirements represent the initial commitment for the system.

To review and approve preliminary System/Segment Specification (SS).

SRR Entrance Criteria:

1) Peer Review (Formal Inspection) has been done on these documents (note: see Formal Inspection Process document, Appendix C, for checklist):

_____ Preliminary System/Segment Specification (SS), p. C-8

2) Following analysis performed:

_____ feasibility

_____ reliability (hardware and software)

_____ maintainability

_____ survivability

_____ logistics support

_____ system/cost-effectiveness

_____ system safety

_____ human factors

3) __ Risk management program (identification, avoidance, impact, contingency, and reduction) is defined

4) Review team has been assembled and they have committed to attend

_____ Developer:
- project manager, system manager, system engineer, software development manager, hardware development manager, testing manager, software quality assurance

_____ Government:
- sponsor (program manager), program manager, software project manager, software personnel, hardware personnel, IV&V, users, life cycle support activity, testing activity

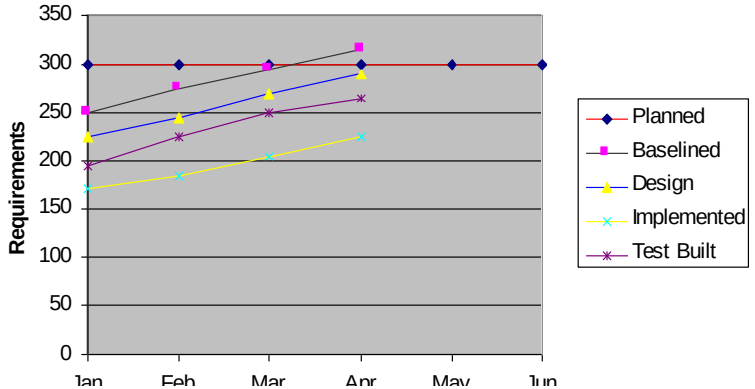
5) Metrics collected and analyzed: (see SSC San Diego Project Tracking and Control Process)

Example Project Metrics To Be Reviewed

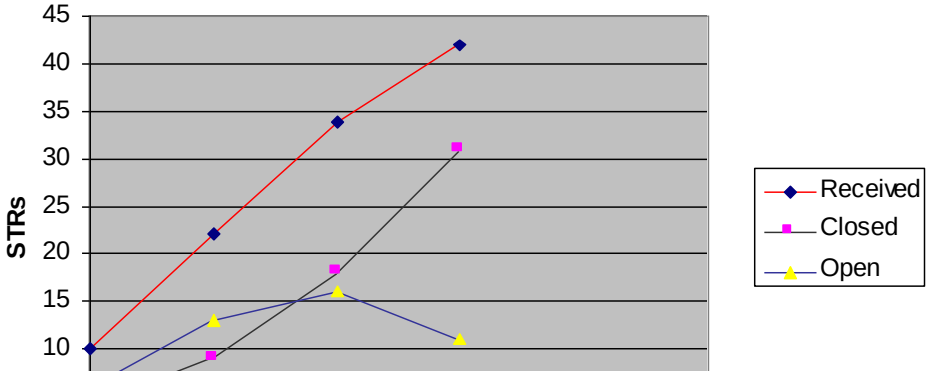
(From Appendix G of SSC SD Software Measurement Plan Template)

SMP Template
Appendix G
TM-SPTO-03 v1.0
5/20/02

REQUIREMENTS STABILITY



PRODUCT QUALITY



SMP Template
Appendix G
TM-SPTO-03 v1.0
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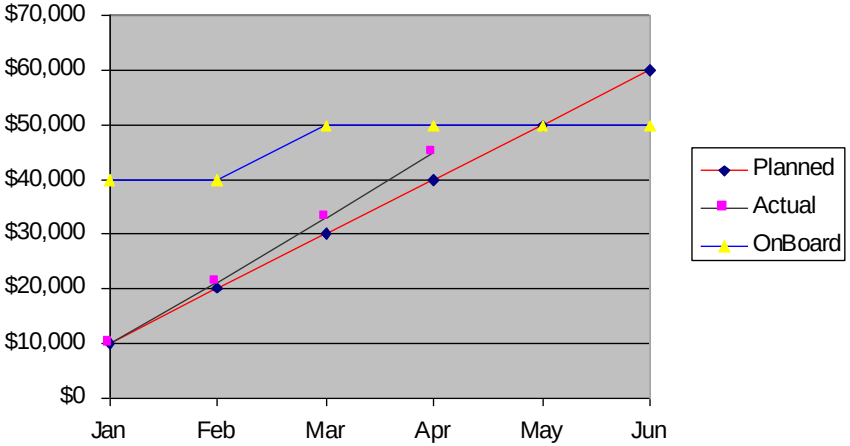
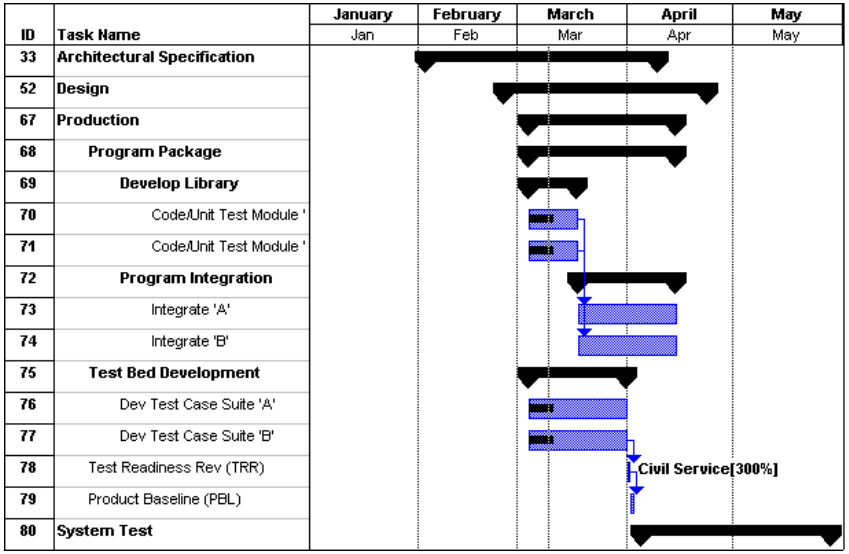
COSTS



SCHEDULE



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What Acquirer's Can Do To Contribute To Project Success and the Developer's Process Improvement Efforts (2)

- Become knowledgeable in project management, systems engineering, and software engineering principles
  - The Acquirer does not have to become an expert, but they do need sufficient knowledge in these areas to oversee a project
  - Do not "set it and forget it!"; get involved
- Ensure the developer is implementing their mature processes on the project
  - Audit QA and CM functions; review SQA reports
  - Review peer review logs; participate in peer reviews of project work products

What Acquirer's Can Do To Contribute To Project Success and the Developer's Process Improvement Efforts (3)

- Perform "mini-appraisal" (e.g. SCAMPI C) on the project to determine process maturity and identify strengths and weaknesses

- Have a "mini-appraisal" (e.g. SCAMPI C) performed on the themselves to determine process maturity and identify strengths and weaknesses
  - Ensure that Acquirer's process maturity matches or exceeds the Developer's process maturity

Summary

- The Acquirer plays an important role in the success of a project and the success of a developer's process improvement efforts
- Acquirers need to manage their efforts using mature processes
- Acquirers can support a developers process improvement efforts by becoming knowledgeable about the CMMI, project management, systems engineering, and software engineering principles
- CMMI levels do not guarantee project success

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Acronyms

- C4ISR: Command, Control, Communication, and Computers, Intelligence, Surveillance, and Reconnaissance
- CMMI: Capability Maturity Model Integrated
- QA: Quality Assurance
- RDT&E: Research, Development, Test, and Evaluation
- SCAMPI: Standard CMMI Appraisal Method for Process Improvement
- SEPO: Systems Engineering Process Office
- SME: Software Management for Executives
- SPI: Software Process Improvement
- SSC San Diego: Space and Naval Warfare Systems Center, San Diego

References

1. GCN Articles “CMM: part Art, part science” August 8, 2002
2. Webster’s 9th New College Dictionary, Merriam-Webster Inc., Springfield, Massachusetts 1984