

Tools and Resources to Enable Systems Engineering Improvement

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Head, Intelligence & Information Warfare Systems
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National Competency Lead for I/A 5.8

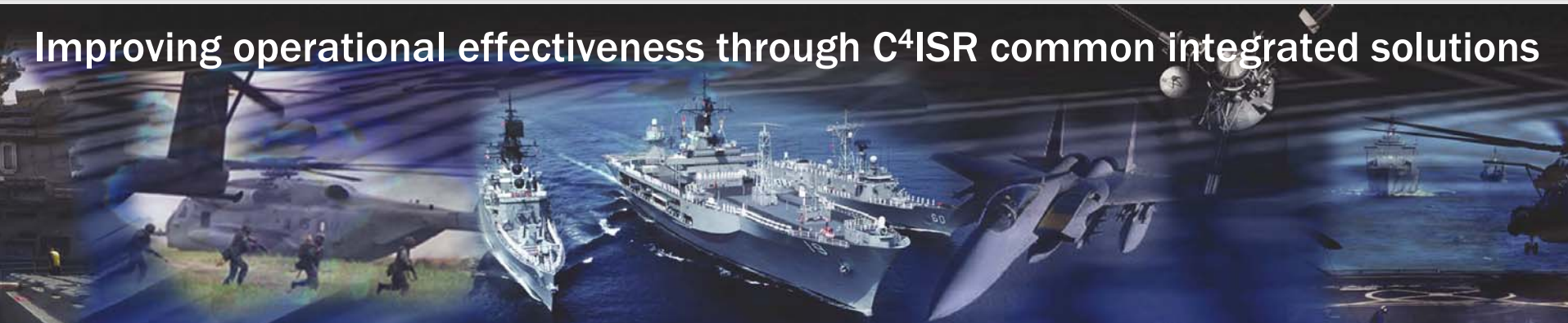
Deputy National Competency Lead for ISR/IO 5.6

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SEI Authorized Instructor

10th Annual Systems Engineering Conference
October 23, 2007

Improving operational effectiveness through C⁴ISR common integrated solutions



- **Vision and Strategy**
 - Elements of Implementation
- **Process Asset Library**
- **Tools**
 - ePlan Builder and eWBS
 - Organizational Measurement Repository
- **Training**
 - Training Architecture
 - Courses
- **Results**
- **Going Forward**

- **Vision**

- Develop and maintain a World Class Systems Engineering Organization

- **Approach**

- Achieve Command-wide operational consistency
- Based on ISO 15288 – systems engineering
- Based on ISO 12207 – software engineering
- Measure using best practices of CMMI®

- **Goals**

- CMMI Maturity Level 2 by April, 2005
- CMMI Maturity Level 3 by April, 2007



Both Goals attained on schedule

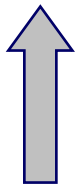
1st SPAWAR Systems Center to Achieve ML2 and ML3

New Goal: Maturity Level 4 by 2010

Which one is World Class?



**When you want it done right,
Who do you want working on it ?**



**Cutting corners,
undisciplined,
untrained**

**Rigorous processes,
Skilled resources**

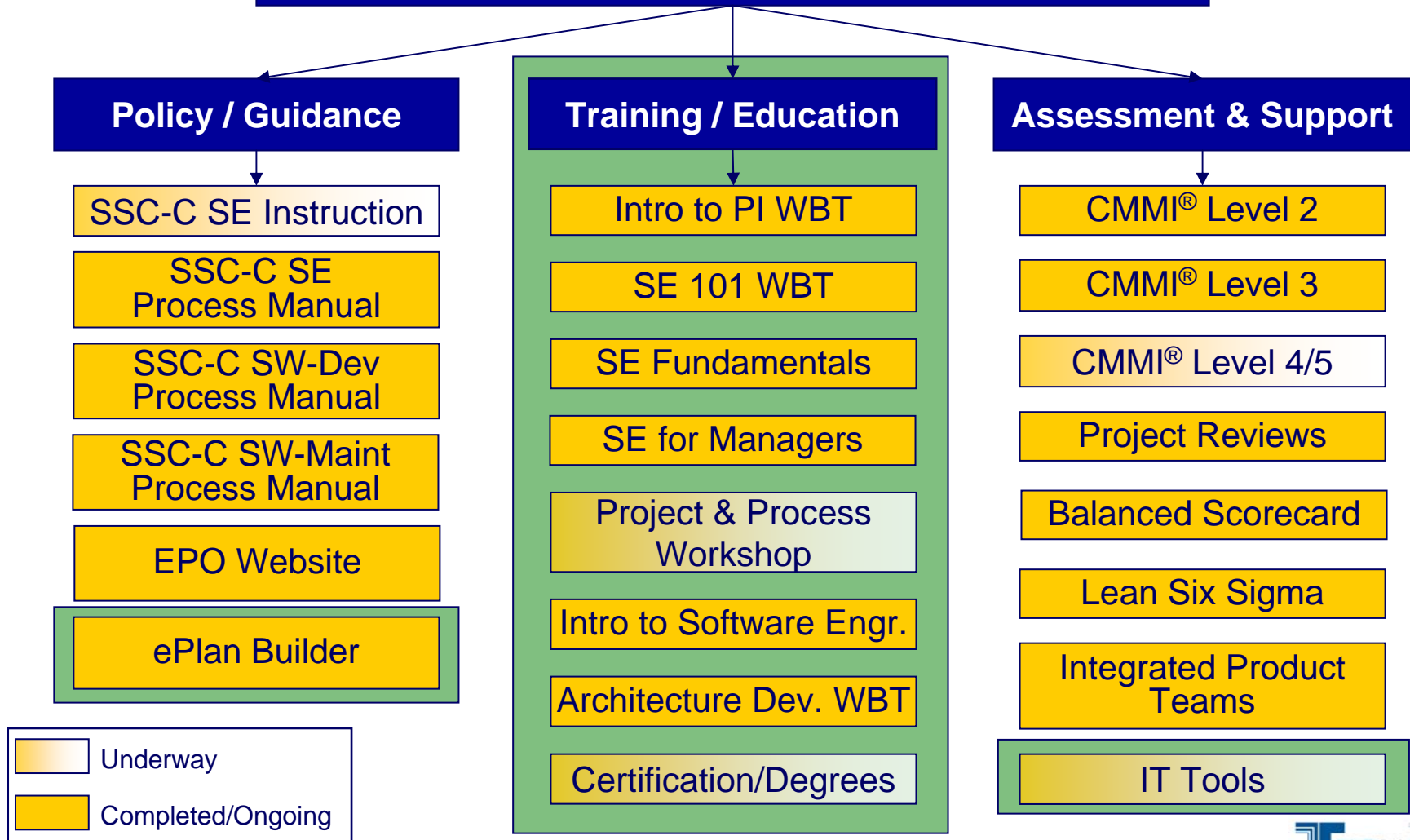


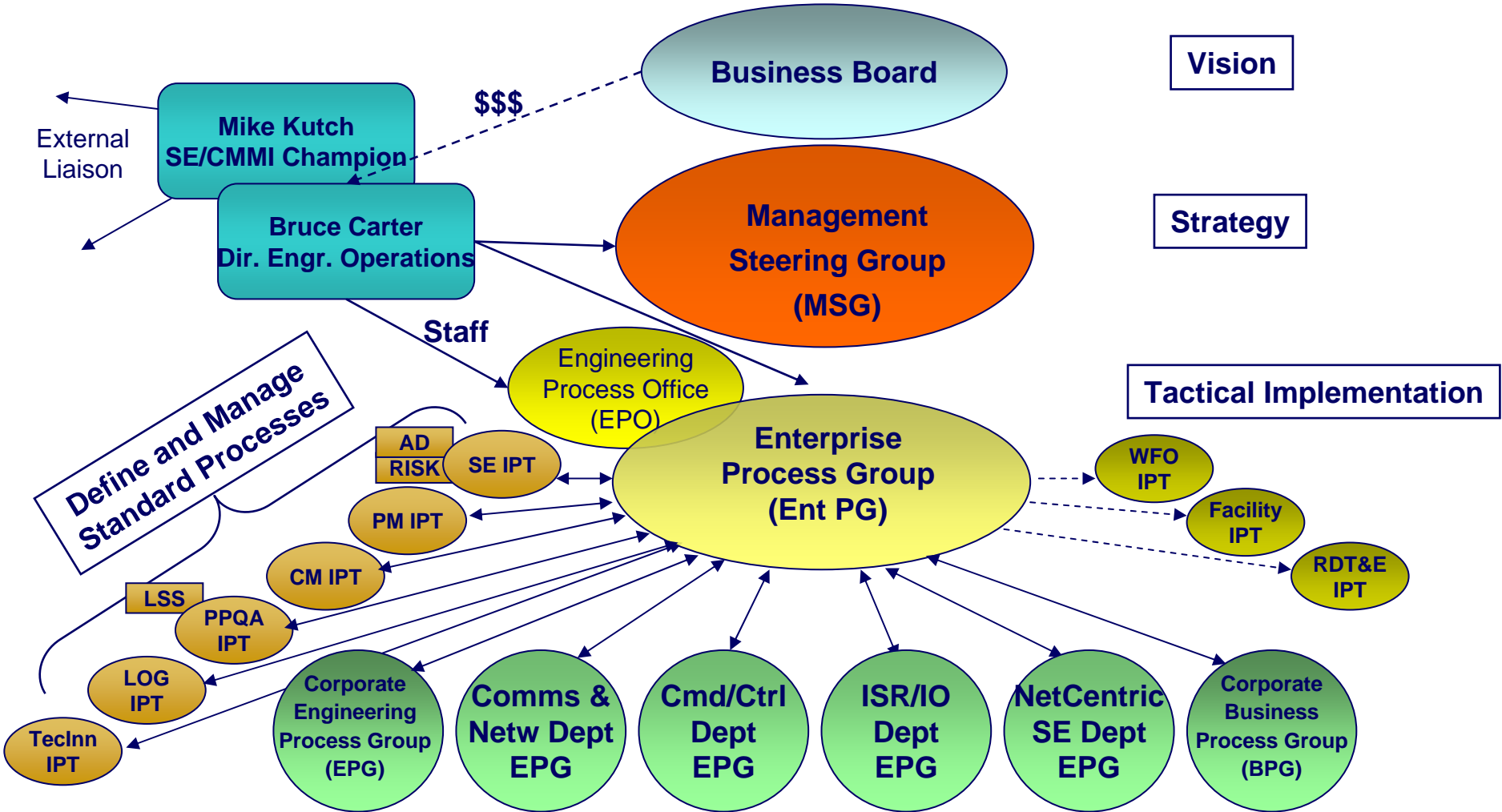
Permission to use Redneck Mechanic photo received from Dave Lilligren, 3/9/2007

Permission to use NASCAR Technical Institute photo received from Popular Mechanics, 3/16/2007

CRITICAL SUCCESS FACTORS FOR SE REVITALIZATION	
Command-wide Policy (Create vision that is urgent)	Assign Responsibilities (Strong Change Agents are essential)
Strategy and Plan (Include knowledge of why change is necessary and benefits)	Provide Training
Senior Management Support	Build Central Repository
Provide Resources and Funding (New Organizational Structure Usually Needed)	Measure and Communicate Progress

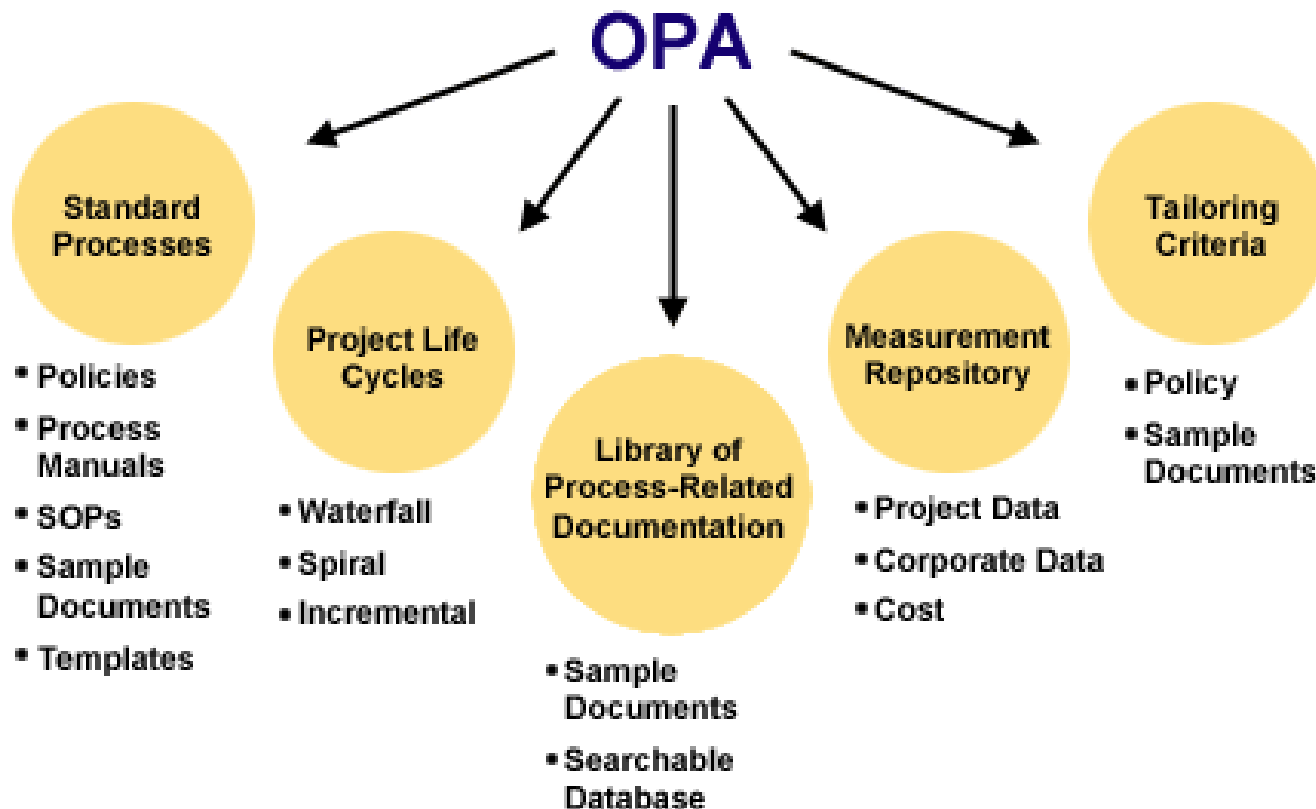
Elements of SSC-C SE Revitalization





- **Supports the Director of Engineering Operations**
- **Developed Policies**
 - Policy for each CMMI Level 2, 3, 4, & 5 Process Area
- **Developed Standard Process Manuals**
 - Top Level
 - Systems Engineering
 - Software Development
 - Software Maintenance
 - Supporting Processes
 - Process Manual for each CMMI Level 2, 3, 4, & 5 Process Areas
 - Additional process documentation as needed – Reviews, Tailoring, etc
- **Develop plan templates**
- **Coach and mentor selected projects**
- **Build tools**
- **Develop and deliver training**
- **Perform interim assessments**

Recognized early need for central repository for Organizational Process Assets



Approximately 100 pages of content; over 1000 documents available



The screenshot shows the SPAWAR SSC-Charleston Engineering Process Office (EPO) website. The header includes the SPAWAR logo and the text "SSC-Charleston Engineering Process Office". A search bar is located in the top right corner. Below the header is a navigation menu with links: "EPO Home", "ePlan Builder", "WBT Courses", "eWBS", "Contact EPO", and "CorpWeb".

The main content area is titled "EPO Home" and contains the following text:

Welcome to the SPAWAR System Center - Charleston's Engineering Process Office (EPO) Homepage. This site is the repository for a wealth of systems engineering, software engineering, and process improvement information to aid our vision in becoming a world-class systems engineering organization.

The site contains the SSC-Charleston Organizational Process Assets, including the organization's set of standard engineering processes and procedures, tools, sample documents, templates, and project guidelines. The measurement repository of project and process measures is also accessible.

The site also contains information about the Capability Maturity Model for Integration (CMMI®) and SSC-Charleston's commitment to process improvement. The CMMI® is used to benchmark and measure our process improvement progress against industry best practices.

Background

SSC-C is committed to process improvement and has been actively pursuing process improvement since 1998. SSC-C is implementing the Capability Maturity Model for Integration (CMMI®). The IDEAL® model is being used to implement process improvement.

- SSC-C's commitment to process improvement and policy regarding it were re-affirmed in a SSC-C command-wide Process Improvement Policy dated 11 December 2003.
- Navy Endorses CMMI as the Standard Process Improvement Model
- ASN RDA Software Process Improvement Initiative

The information below describes what will be found under each major section of the site.

Navigation

- Getting Started
- Calendar
- SSC-C Standard Processes
- Process Areas
- Projects
- Process Improvement Teams
- Organizational Measurement Repository
- Training
- Innovation Program
- References

Comments

Please direct comments about or problems with this site to the [EPO Webmaster](#).


Upcoming Events

- 10/15/2007 [Architecting with DODAF](#)
- 10/22/2007 [10th Annual Systems Engineering Conference](#)
- 11/12/2007 [7th Annual CMMI Technology Conference and User Group](#)

[more »](#)

Latest Additions

- [2008 Innovation Program Application & Guidelines](#) **NEW**
- [CMMI® Maturity Level 4 Training Brief](#)
- [March 2007 S²e](#)



SSC-Charleston Engineering Process Office

[EPO Home](#) | [ePlan Builder](#) | [WBT Courses](#) | [eWBS](#) | [Contact EPO](#) | [CorpWeb](#)

Navigation

[Getting Started](#)

[Calendar](#)

[SSC-C Standard Processes](#)

Process Areas

- [Project Planning \(PP\)](#)
- [Project Monitoring & Control \(PMC\)](#)
- [Configuration Management \(CM\)](#)
- [Process and Product Quality Assurance \(PPQA\)](#)
- [Requirements Management \(REQM\)](#)
- [Measurement & Analysis \(MA\)](#)
- [Supplier Agreement Management \(SAM\)](#)
- [Requirements Development \(RD\)](#)
- [Technical Solution \(TS\)](#)

Project Monitoring & Control (PMC)

Project Monitoring and Control (PMC) is a Level 2 (Managed) Process Area. The purpose of PMC is to provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan.

Policy Document

- SSC-C Project Monitoring and Control Policy

Process Manual

- SSC-C Project Monitoring and Control Process Manual

SOPs

- In Process Review SOP
- Project Management Review SOP
- Meeting SOP

Sample Documents

- IBFTC PMC Plan
- CICS Project Management Plan (PMP)
- Towed Array Earned Value Plan

Templates


- PMP Plan

Related Process Areas

[Project Planning \(PP\)](#)

[Measurement & Analysis \(MA\)](#)

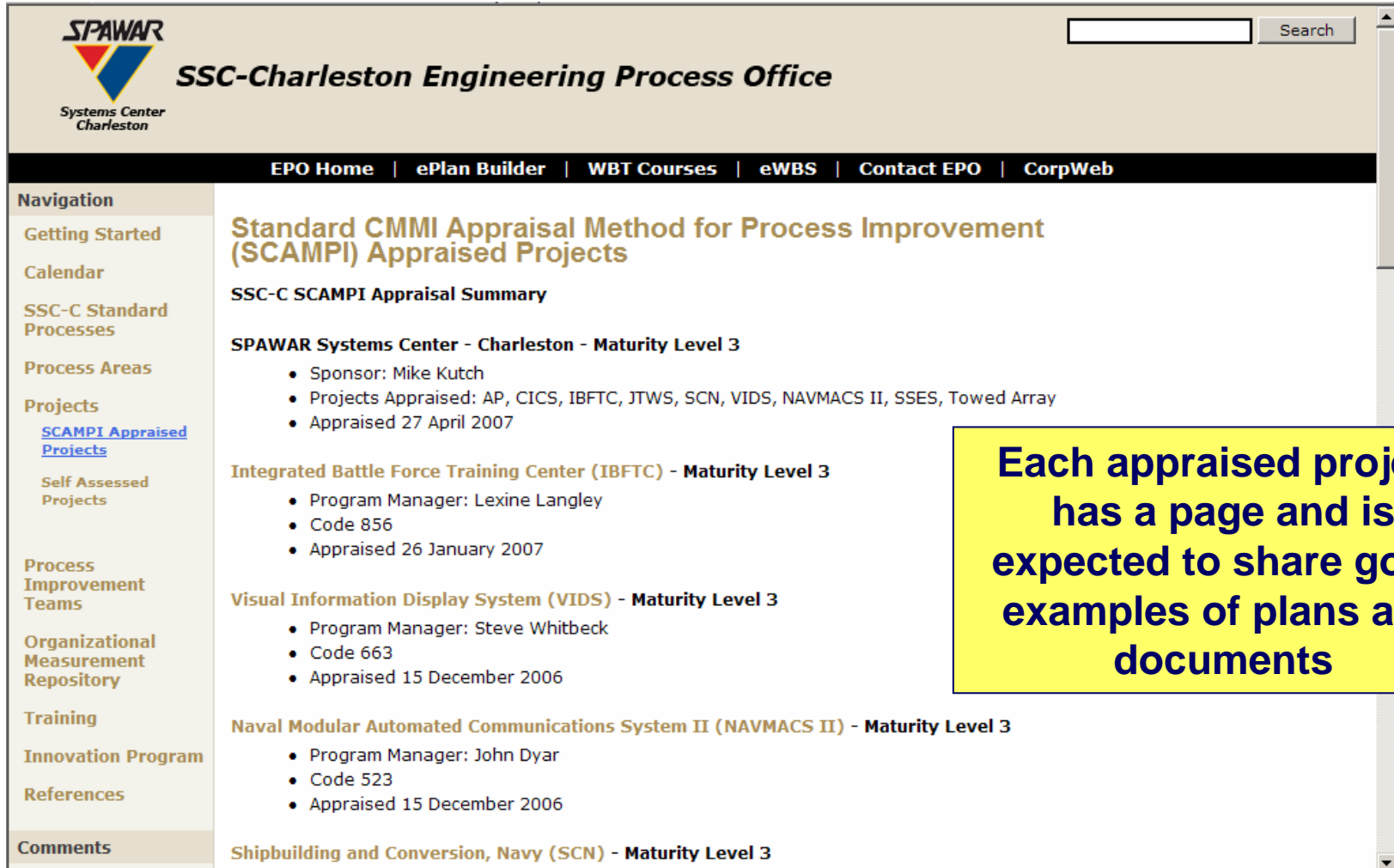
Each CMMI process area has a standard page with links to policy, process manual, SOPs, Sample/Project documents, and other resources



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Technical Software Services, Inc.

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SPAWAR
Systems Center
Charleston

SSC-Charleston Engineering Process Office

EPO Home | ePlan Builder | WBT Courses | eWBS | Contact EPO | CorpWeb

Navigation

- Getting Started
- Calendar
- SSC-C Standard Processes
- Process Areas
- Projects
 - [SCAMPI Appraised Projects](#)
 - Self Assessed Projects
- Process Improvement Teams
- Organizational Measurement Repository
- Training
- Innovation Program
- References
- Comments

Standard CMMI Appraisal Method for Process Improvement (SCAMPI) Appraised Projects

SSC-C SCAMPI Appraisal Summary

SPAWAR Systems Center - Charleston - Maturity Level 3

- Sponsor: Mike Kutch
- Projects Appraised: AP, CICS, IBFTC, JTWS, SCN, VIDS, NAVMACS II, SSES, Towed Array
- Appraised 27 April 2007

Integrated Battle Force Training Center (IBFTC) - Maturity Level 3

- Program Manager: Lexine Langley
- Code 856
- Appraised 26 January 2007

Visual Information Display System (VIDS) - Maturity Level 3

- Program Manager: Steve Whitbeck
- Code 663
- Appraised 15 December 2006

Naval Modular Automated Communications System II (NAVMACS II) - Maturity Level 3

- Program Manager: John Dyar
- Code 523
- Appraised 15 December 2006

Shipbuilding and Conversion, Navy (SCN) - Maturity Level 3

Each appraised project has a page and is expected to share good examples of plans and documents

Tools

- ePlan Builder
- Organizational Measurement Repository
- Appraisal Wizard





ePlan Builder

Electronic CMMI[®] Compliant Documentation Application

Save Quit Help

Sponsored by the Director of Engineering Operations (O9K) - Michael Kutch

ePlan Builder tool

- An interactive, web-based application that leads the user through a structured interview process (like TurboTax[®]) to generate a CMMI[®]-compliant plan
- Includes standard, consistent text
- Generates an initial project-specific document
 - Project Management Plan (with Work Breakdown Structure)
 - Configuration Management Plan
 - Process and Product Quality Assurance Plan
 - Requirements Management Plan
 - Measurement and Analysis Plan
 - Supplier Agreement Management Plan (by end of 2007)
 - Systems Engineering Plan (DoD SEP Format)

Tailor each role from pre-defined list of tasks and/or add custom tasks

- ORGANIZATION
 - Organization
 - Organization Chart
 - Program Manager Tasks
 - Project Leader Tasks
 - Systems Engineering Tasks
 - Security Engineering Tasks
 - Software Engineering Tasks
 - Test Engineering Tasks
 - Configuration Manager Tasks
 - Quality

Project Leader Tasks

The Project Leader is responsible for establishing and maintaining the project plan.

Please identify the specific responsibilities of the Project Leader.

- Coordinates all activities of the prime contractor and subcontractors
- Assigns specific responsibilities to subcontractors [PP GP 2.4]
- Discusses technical issues from the Government with subcontractors
- Discusses technical issues from the subcontractors with the Government
- Manages the project cost and schedule [PMC 1.1]
- Resolves any inconsistencies in the requirements [PMC 2.2]
- Mitigates project risks [PMC 1.3]
- Manage and resolve corrective actions [PMC 2.2] [PMC 2.3]
- Provides prime contractor and subcontractor work products and deliverables to the Government

Note mapping to CMMI® generic and specific practices

Please enter any additional specific responsibilities of the Project Leader.

Task

Choose the WBS Source

Add Previous Fiscal Year

000 Leadership/Management		2007	2007
001 Leading		\$500 K	1900 K
002 Management		\$900 K	
003 Personnel Management Activities		\$500 K	
004 Communications			
100 Project Management		2007	2007
110 Management Documentation		2007	2490 K
111 Programming & Budgeting	2007	\$500 K	
112 Program Planning Documents	2007	\$200 K	
113 Acquisition Documents	2007	\$100 K	

Cost estimates entered using the SPAWAR global WBS or the SSC-C Activity Based Costing WBS

ePB accommodates multi-year projects

Can drill down three levels deep in WBS structure. Costs sum up to higher level.

Risks

This page allows you to enter a list of known or expected risks. The severity of the risks and the mitigation approach for each should be identified. Please use the table below to identify the major risks associated with the project.

 [Click for more information about risks](#)

Risk Category

Schedule

Impact/Concern

Products are required by the customer by 10/1/06

Level

High

Mitigation Approach

Be prepared to provide draft materials if development of

Risk Category

Quality

Impact/Concern

Will products be ready for 10/15/06 in a condition

Level

Medium

Mitigation Approach

Provide technical data to contractor in accordance with schedule with

Risk Category

Technical

Impact/Concern


Ability to get teh technical ata from the

Level

High

Mitigation Approach

Interact directly with the satellite manufacturer to obtain the technical

Add More Items 

PMP may also reference a more comprehensive Risk Management Plan

Cost, Schedule, and Process Performance are standard categories of measures

Collection, Storage, and Analysis is defined for each Project measure

Cost is a measure within the Financial Performance category that measures the cost for activities, events, and products. The measure provides an easy-to-understand view of the budget. Comparison of planned and actual cost data provides insight into significant and repetitive cost changes at the activity level.

While more detailed cost information provides more insight into the project's total cost, until the project personnel have achieved a certain level of proficiency in estimating costs, it is recommended that the cost data should be captured at a level commensurate with this level of experience.

Collection and Storage

Identify the level of detail for capturing cost data

Project Level

Please select how the Project Leader will report contract costs from the list below. If the Project Leader is not responsible for managing contracts, select "Project".

Project

Identify who will provide the actual cost data:

Project Leader

Identify the tool to be used to collect cost data:

BSA and PMACS

Identify how often the actual cost data will be collected:

Monthly

Analysis Procedures

Identify how often the cost data will be analyzed:

Monthly

Identify the cost alert threshold:

95%

SEP format follows the DoD SEP Preparation Guide

SEP

**NAS Pensacola
OSP Survey**

- PROJECT SETUP
- DOCUMENT SETUP
- PROGRAM
- INTRODUCTION
- ACQUISITION HISTORY
 - Previous Life-Cycle Phases
 - Next Life-Cycle Phase
- SYSTEM CAPABILITIES
- SE ORGANIZATIONAL INTEGRATION
- SYSTEM ENGINEERING PROCESS
- INTEGRATION
- INTEGRATED MASTER PLAN

0
50
100

Next Life-Cycle Phase

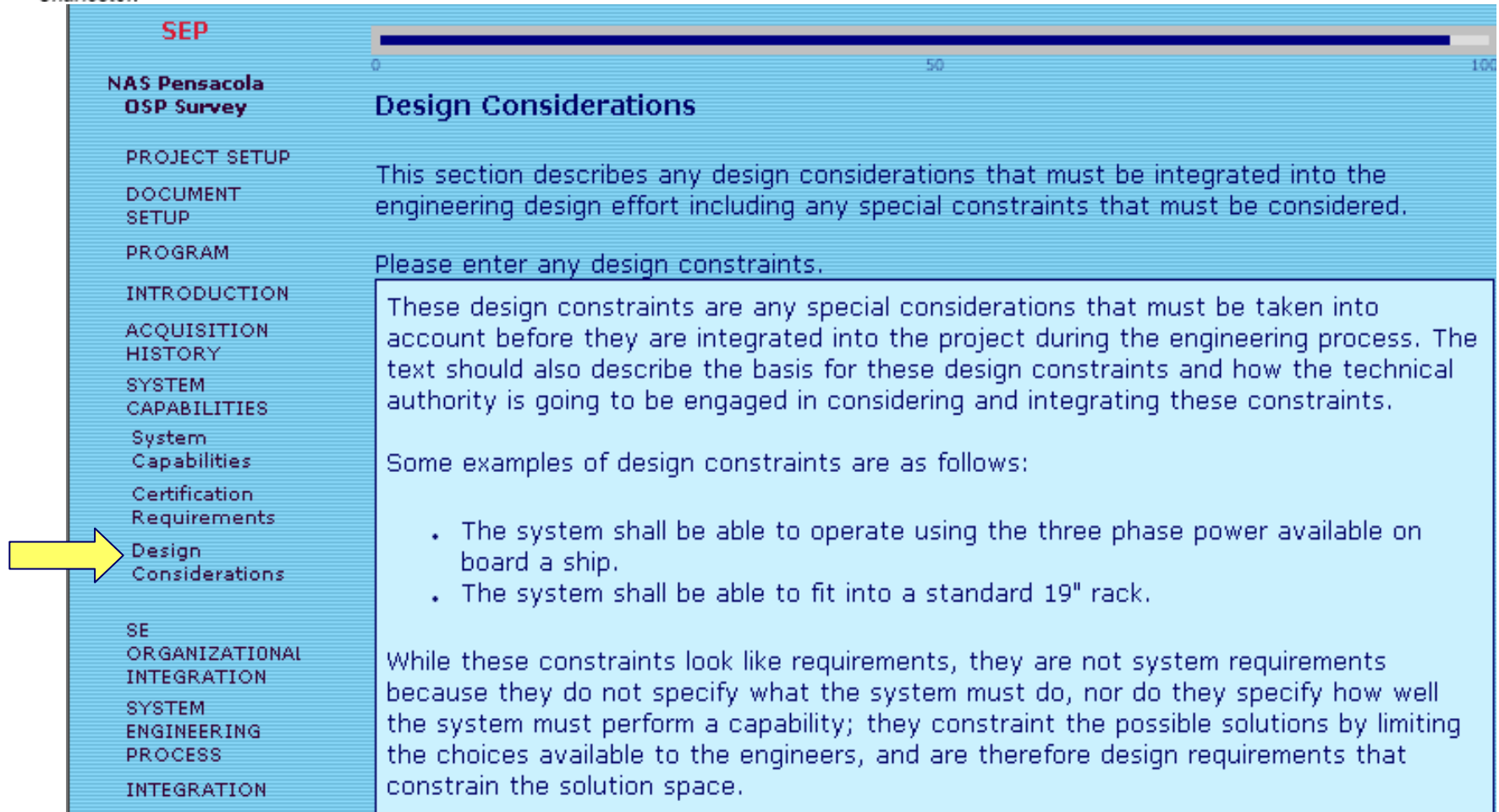
The SEP requires that the program's acquisition history and life-cycle phase ? be discussed, describing the top-level, technical process used in each life-cycle phase. This Next Life-Cycle Phase section should give an overview of the next planned life-cycle phase as well as summarize the process activities that are expected to be finished during the next life-cycle phase.

Please enter text discussing the Next Life-Cycle Phase of the program.

This description should give an overview of the planned SE process and should have more detail than the historical life-cycle processes completed. It should include how the technical process will be integrated into the life-cycle model and summarize the process activities that are expected to be finished during the next life-cycle phase.

Life-Cycle Phases (in hierarchical order):

1. Concept Refinement
2. Technology Development
3. System Development and Demonstration
4. Production and Deployment
5. Operations and Support



SEP

0 50 100

**NAS Pensacola
OSP Survey**

PROJECT SETUP

DOCUMENT
SETUP

PROGRAM

INTRODUCTION

ACQUISITION
HISTORY

SYSTEM
CAPABILITIES

System
Capabilities

Certification
Requirements

**Design
Considerations**

SE
ORGANIZATIONAL
INTEGRATION

SYSTEM
ENGINEERING
PROCESS

INTEGRATION

Design Considerations

This section describes any design considerations that must be integrated into the engineering design effort including any special constraints that must be considered.

Please enter any design constraints.

These design constraints are any special considerations that must be taken into account before they are integrated into the project during the engineering process. The text should also describe the basis for these design constraints and how the technical authority is going to be engaged in considering and integrating these constraints.

Some examples of design constraints are as follows:

- The system shall be able to operate using the three phase power available on board a ship.
- The system shall be able to fit into a standard 19" rack.

While these constraints look like requirements, they are not system requirements because they do not specify what the system must do, nor do they specify how well the system must perform a capability; they constraint the possible solutions by limiting the choices available to the engineers, and are therefore design requirements that constrain the solution space.

The nature of the SEP requires more open input text fields, but EPB helps by providing elaborations and examples for the user

SEP

NAS Pensacola OSP Survey

- PROJECT SETUP
- DOCUMENT SETUP
- PROGRAM
- INTRODUCTION
- ACQUISITION HISTORY
- SYSTEM CAPABILITIES
- SE ORGANIZATIONAL INTEGRATION
- SYSTEM ENGINEERING PROCESS
 - Planning
 - Process Improvement
 - Modeling and Simulation
 - Resources
 - Trade Studies
- INTEGRATION
- INTEGRATED

0 50 100

Trade Studies

This section should include a brief description of the process used to determine trade-offs between various attributes of the program (e.g., between requirements and design). Information about how trade studies are addressed within the organization will be automatically embedded into the document. To view the embedded information about how trade studies will be addressed, click the "Click to view the embedded trade studies text" link below.

 [Click to view the embedded trade studies text.](#)

Trade studies will be addressed in accordance with the *SSC-C Technical Solutions Process Manual* and *SSC-C Decision Analysis and Resolution Process Manual* where the development of alternate solutions, selection criteria and trade processes are discussed.

The actual trade studies to be performed on the program will be captured and listed in the control below.

Please enter the trade studies that will be conducted on this program.

Trade Study

Research on OSP topologies


Trade Study

Research on different conduit installation



Table of Contents

1.	Introduction.....	.....
1.1	Program Description and Applicable Documents.....	.....
1.2	Technical Status as of the date of this SEP.....	.....
1.3	Approach of SEP Updates.....	.....
2.	System Engineering Application to Life-Cycle Phases.....	.....
2.1	Acquisition History.....	.....
2.1.1	Previous Life-Cycle Phases.....	.....
2.1.2	Next Life-Cycle Phase.....	.....
2.2	System Capabilities, Requirements and Design Considerations.....	.....
2.2.1	System Capabilities.....	.....
2.2.2	Certification Requirements.....	.....
2.2.3	Design Considerations.....	.....
2.3	SE Organizational Integration.....	.....
2.3.1	Organizational Roles.....	.....
2.3.2	Program Roles and Responsibilities.....	.....
2.4	Training.....	.....
2.5	System Engineering Process.....	.....
2.5.1	Planning.....	.....
2.5.2	Process Improvement.....	.....
2.5.3	Modeling and Simulation.....	.....
2.5.4	Resources.....	.....
2.5.5	Trade Studies.....	.....
2.6	Technical Management and Control.....	.....
2.6.1	Technical Baseline Management and Control (Strategy and Approach).....	.....
2.6.2	Technical Review Plan (Strategy and Approach).....	.....
2.7	Integration with Other Management Control Efforts.....	.....
2.7.1	Acquisition Strategy.....	.....
2.7.2	Risk Management.....	.....
2.7.3	Integrated Master Plan.....	.....
2.7.4	Earned Value Management.....	.....
2.7.5	Contract Management.....	.....



N6326-93-PMP-001v1
August 18, 2006

**Project Management Plan (PMP)
For
MARSOC West SCAMPI CER (593)**

August 18, 2006

Prepared by:
Space and Naval Warfare Systems Center, Charleston
(SSC-C)
(593)
P. O. Box 190022
North Charleston, SC 29419-5542

Approved by: Matt Renard (593) Date: August 23, 2006

1

Appendix – CMMI® Compliance Matrix

N65236-593-PMP-0001-v1

August 18, 2006

PROJECT PLANNING

CMMI®-SE/SW Goal/Practice Number	CMMI®-SE/SW Level 2 Process Area Project Planning (PP)	SSC-C PP Process Manual Paragraph	593 PMP Paragraph
1	Establish Estimates. Estimates of project planning parameters are established and maintained.	3.2	1.2.1
PP 1.1	Estimate the Scope of the Project. Establish and maintain a top-level work breakdown structure (WBS) to estimate the scope of the project.	3.2	1.2.1 3 Appendix A
PP 1.2	Establish Estimates of Project Attributes. Establish and document estimates of the attributes of the work products and tasks.	3.2	1.2.1 1.3
PP 1.3	Define Project Life Cycle. Define the project life cycle phases upon which to scope the planning effort.	3.2	1 1.2.1
PP 1.4	Determine estimates of Effort and Cost. Estimate the project effort and cost for the attributes of the work products and tasks based on estimation rationale.	3.2	1.3 1.2.1 Appendix A
PP 2	Develop a Project Plan. A project plan is established and maintained as the basis for managing the project.	3.3	1 1.2.1

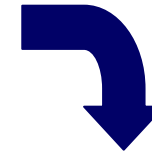
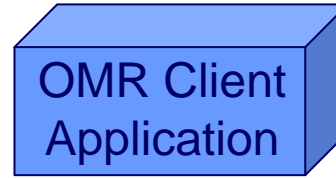
Compliance matrix cross references CMMI® practices with associated SSC-C Process Manual and Project-specific plan

(No matrix for SEP)

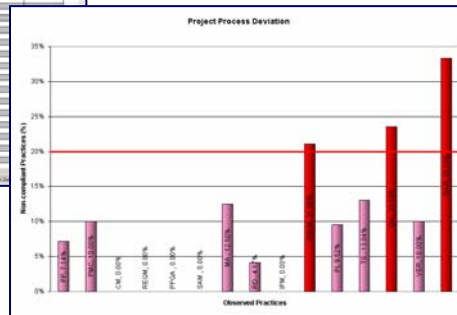
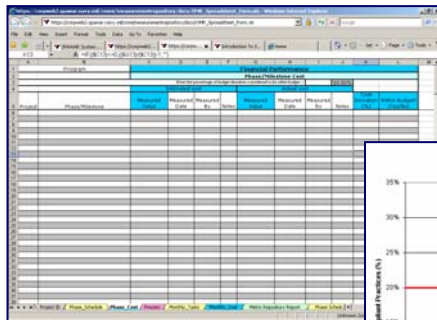
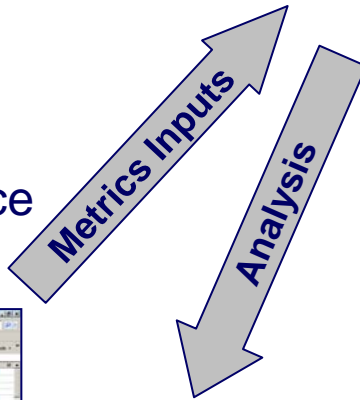
Organizational Measurement Repository (OMR)

- **Organizational database for collecting standard project measures and providing analysis**
- **Currently, the OMR accepts the following standard project measures**

Category	Core Measure
Schedule Performance	<ul style="list-style-type: none"> • Estimated vs. Actual Milestone dates • Estimated vs. Actual Monthly Task completions
Cost Performance	<ul style="list-style-type: none"> • Estimated vs. Actual Milestone costs • Estimated vs. Actual Monthly costs
Process Performance	<ul style="list-style-type: none"> • Total # of noncompliance issues

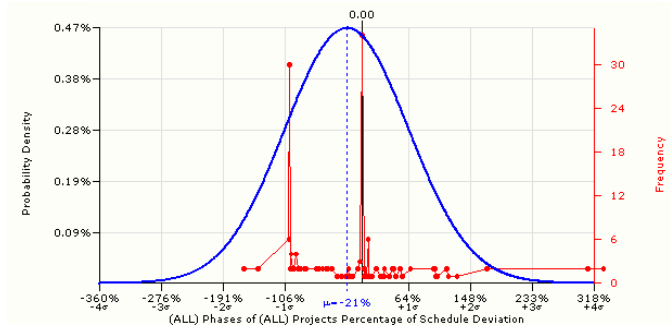


Project Performance

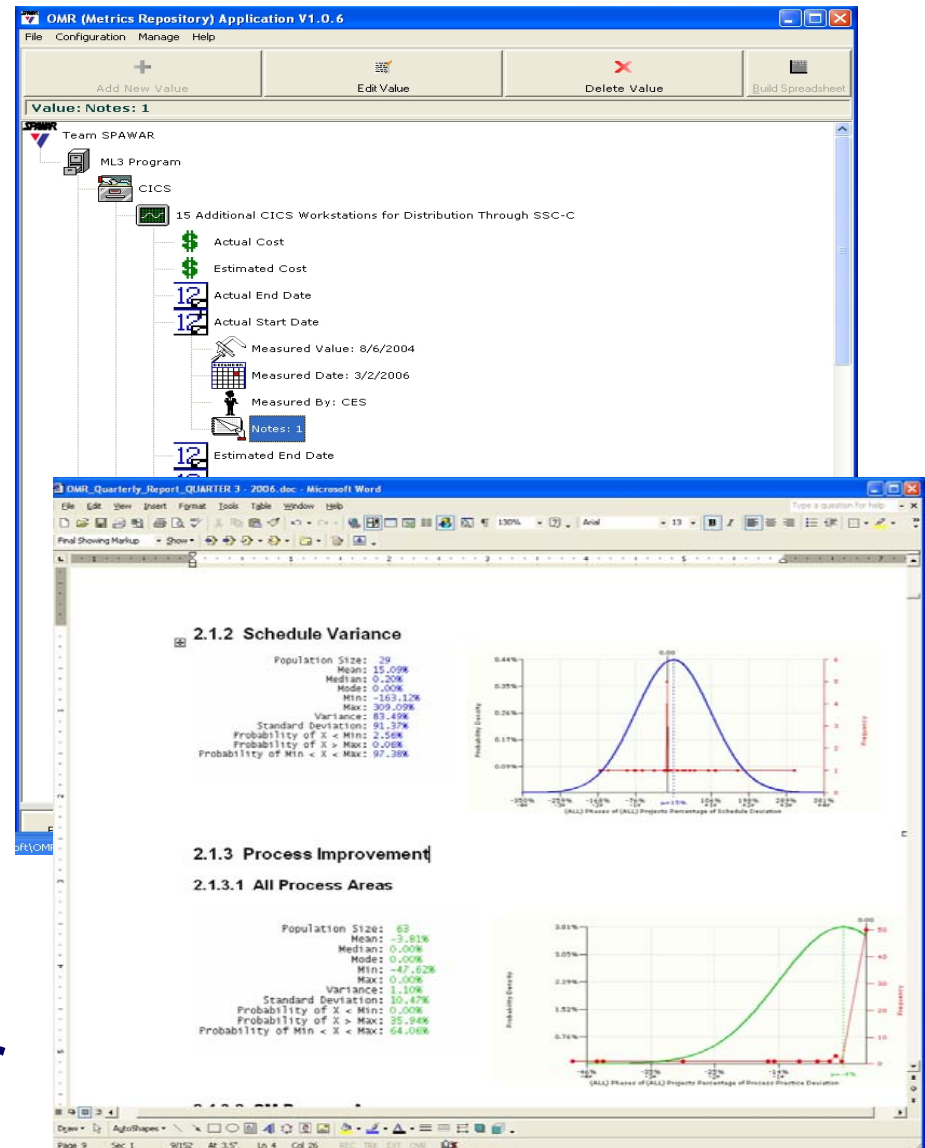


Organizational Performance & Analysis

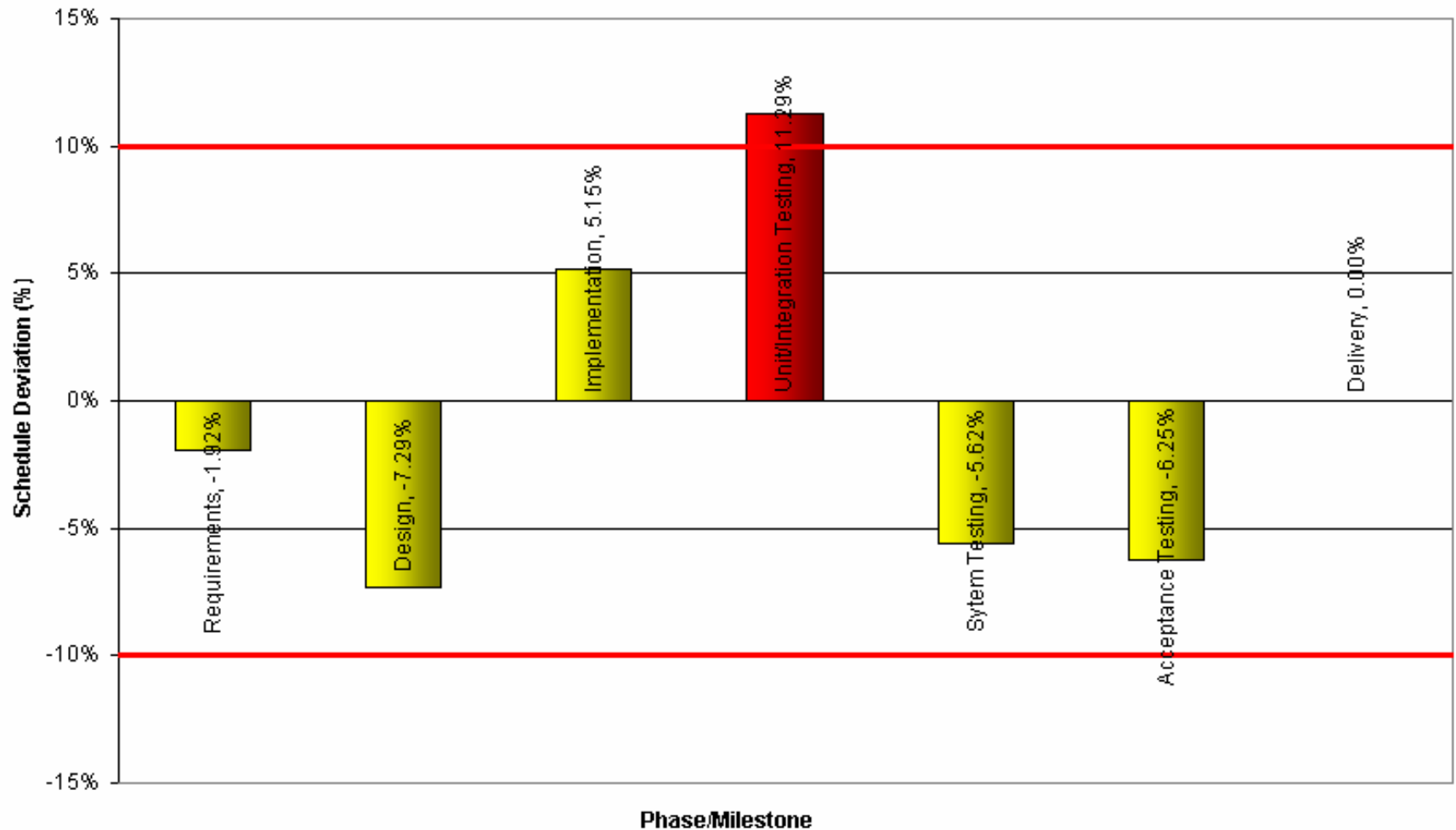
Population Size: 172
 Mean: -21.22%
 Median: -6.22%
 Mode: 0.00%
 Min: -163.12%
 Max: 330.77%
 Variance: 71.85%
 Standard Deviation: 84.76%
 Probability of X < Min: 4.75%
 Probability of X > Max: 0.00%
 Probability of Min < X < Max: 95.25%



- Provides interface for input and query functions
- Generates quarterly organizational report
- Projects can use to manage own projects
 - Capture standardized cost, schedule, and process performance
- OMR implementation included hands-on training
- Laying the groundwork for higher maturity



Project Phase Schedule Deviation



Additional/Modified Measures To Be Implemented in OMR

Category	Core Measure
Cost Performance (More granularity)	<ul style="list-style-type: none"> • Government vs Contractor budget <ul style="list-style-type: none"> – ODC – Travel – Training – Materials
Quality	<ul style="list-style-type: none"> • Peer Reviews <ul style="list-style-type: none"> – Effectiveness – ROI (hours expended vs hours saved) • Pre-Deployment Defect Detection/Prevention <ul style="list-style-type: none"> – Defect decrease for successive phases – PITCO vs SOVT defects • Post-Deployment Defects

Need improved project and organizational measures to address Maturity Level 4/5 requirements

Appraisal Wizard Tool Used for SCAMPI Appraisals

- Designed for CMMI appraisals
- Link to project documents
- Easy to configure
- Captures team comments
- Improves efficiency of appraisal team

Appraisal Wizard v7

Element Review (AM009) Element: PP SP 2.1-1

Options Record View Document Filtering Document List

Model CC11 Element Type Practice Rating Level Appraisal Element Color

Record Filter NONE State View

Element Records Element Documents Document List

Drag a column header here to group by that column

Rec ID	Record Ty	Status	Verifica	Record Text
107	Compliant	Accepted	Yes	ICIS PDAMS and Budget reports are direct OE that budgets and schedules are established.
667	Compliant	Accepted	Yes	CICS Schedule FY2007 and Budget breakdown for 06 are direct OE. Funding summary provides
985	Compliant	Accepted	Yes	MS Project schedules for various years including FY07 plan; Requirements Baselines show training
1346	Compliant	Accepted	Yes	Monthly JTWS Financial Report - March 2006 and JTWS Master Schedule are direct OE that budget
4727	Compliant	Accepted	Yes	Cost Report, and Schedules are direct OE. Spend plans (05 and 06) provides budgets (direct OE).
4990	Compliant	Accepted	Yes	and LPD Sked (8-25-06) are direct evidence that budget
5386	Compliant	Accepted	Yes	UILD 3 are all direct OE.

Practice Characterizations

Individual Project Records per Practice

SP 2.1-1 Establish the Budget and Schedule

Establish and maintain the project's budget and schedule.

The project's budget and schedule are based on the developed estimates and ensure that budget allocations, task complexity, and task dependencies are appropriately addressed.

Specific Practice Description

Evidence List by Practice & Project

Title	Doc ID	Doc-Rec Comment	File Name or URL	Evidence T	Doc Type	Owner	Comments (D
Final MEP 4Aug03rev2	PP SP 3.3-1		D:\LPD 17 Artifacts\CMM	Direct		SCN	
MCS Test plan schedule	PP SP 2.1-1	Top level integration	D:\LPD 17 Artifacts\CMM	Direct		SCN	
CYN 77 PDAM w Recov	PP SP 2.1-1		D:\LPD 17 Artifacts\CMM	Direct		SCN	
LPD 17 Class Sked	IPM SP 1.4-1	Q master schedule	D:\LPD 17 Artifacts\CMM	Direct		SCN	
CAEI IPMP	3157		X:\LPD 17 Artifacts\CMM	Indirect		SCN	
SCN PMP 2AUG06	0115		D:\LPD 17 Artifacts\CMM	Indirect		SCN	

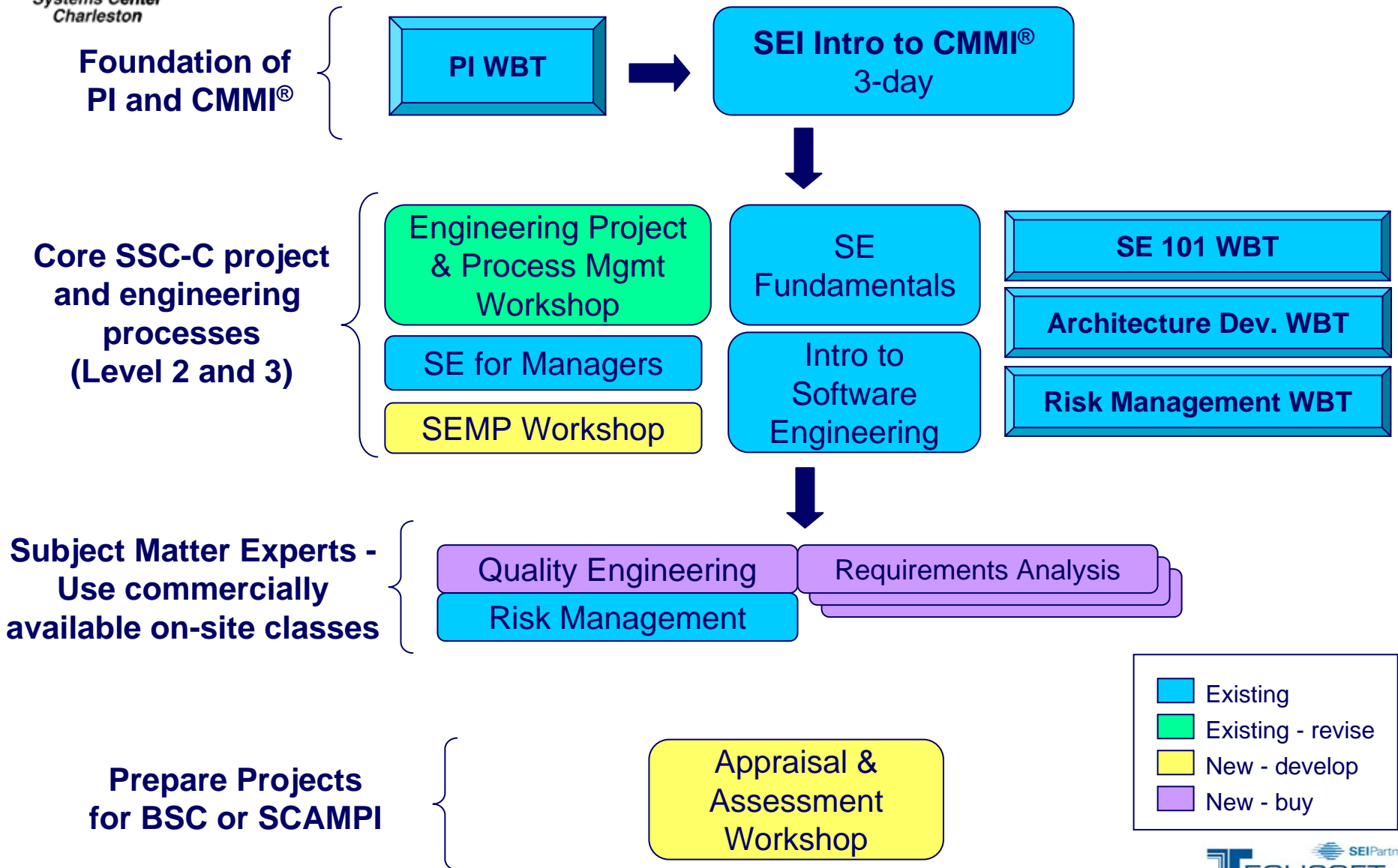
Appraisal Wizard is a product from Integrated Systems Diagnostics, Inc.
<http://www.isd-inc.com>

Training

- Training Architecture
- Courses



SE & PI Training Architecture



Make a Selection

SPAWAR



Introduction to SSC-C Process Improvement

- [Courseware Operations](#)
- [Course Introduction](#)
- [Introduction to Process Improvement](#)
- [Terminology](#)
- [The CMMI® Model](#)
- [SSC-C Implementation](#)
- [Organizational Implementation](#)
- [Process Manuals](#)
- [Course Summary](#)

**Originally given as a podium
course, converted to Web
Based Training in 2004
Now required for all
employees**



- **3-day *Introduction to CMMI[®]* course teaches the full CMMI[®] model**
 - Students learn how the best practices build and relate across process areas
 - Learn the terminology
- **SEI-Authorized instructors are well-versed in our implementation to augment material with SSC-C specific content**
 - Highlight SSC-C tools and resources
 - Actively involved in projects, teams, and infrastructure
- **Over 350 employees trained**
 - Want to build a cultural foundation within the engineering departments

3-day on-site, classroom course

- Based on SMU SE Masters course
- Customized to incorporate SSC-C SE process
- Over 340 SSC-C engineers trained

1-day SE for Managers course added

- Over 60 SSC-C managers trained



Began in
Dec. 2004

“It was extremely beneficial to have a professor with extensive knowledge of the subject matter and one who could apply it to the SPAWAR methods.”

“The most positive aspects I took from the class was the visual correlation with what was asked for and what was produced.”

“I would recommend it to all the program leads/engineers.”

Student Feedback

- **Risk Management**

- Piloted in September, 2007
 - 4-day course
- Designed for Risk Managers or Project Managers

- **Engineering Project & Process Mgmt Workshop (aka SE Process Improvement)**

- Focus on how to use the SSC-C processes on your project
 - Using ePlan Builder to develop plans
 - How to establish your CM and PPQA procedures
- Round 2 of curriculum review completed in September

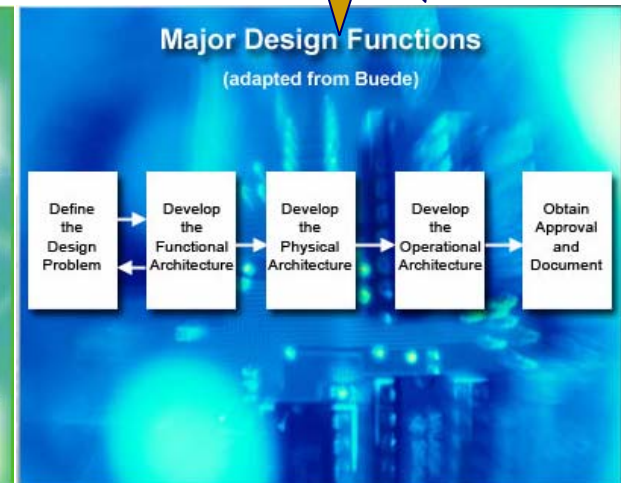
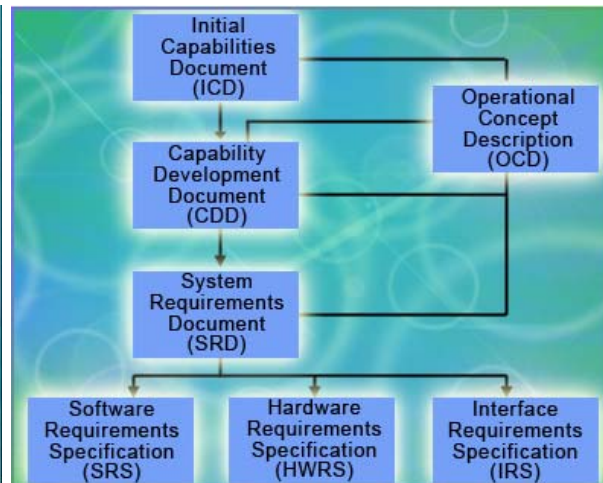
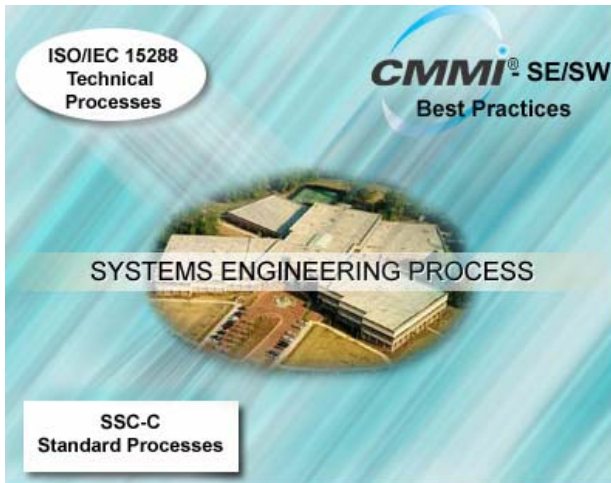
- **Quality Assurance (FY2008)**

- Initial discussions held with ASQ certified instructor to tailor course for Quality Managers at the project level

- **Developed to directly meet SSC-C's needs**
 - Embedded links directly to SSC-C documents and SOPs
 - DAU too ACAT-level/large program oriented
- **WBTs feature extensive branching and rollovers**
 - Better course flow and maintains interest
 - Provides more detail for those interested
- **Audio summary on many pages**
- **Bookmark progress – come back later**
- **Courses developed to be NMCI and 508 compliant**
 - Utilize HTML, JavaScript, and ASP pages with SQL Server database
 - Designed for Internet Explorer (5.5 +), Flash (5.0 +), Windows Media Player (9.0 +)

Introduction to Systems Engineering

- 10-module web-based training (~16 hours)
- Closely aligned to SSC-C SE Process, SE Fundamentals Course, ISO/IEC 15288 and IEEE standards
- Includes hotlinks to referenced documentation
 - Process manuals, policies, standards
 - Great for Topic-specific refresher training



- **Topics**

- Risk identification
- Analysis tools and techniques
- Mitigation planning
- Risk monitoring

- **Section Test Questions**

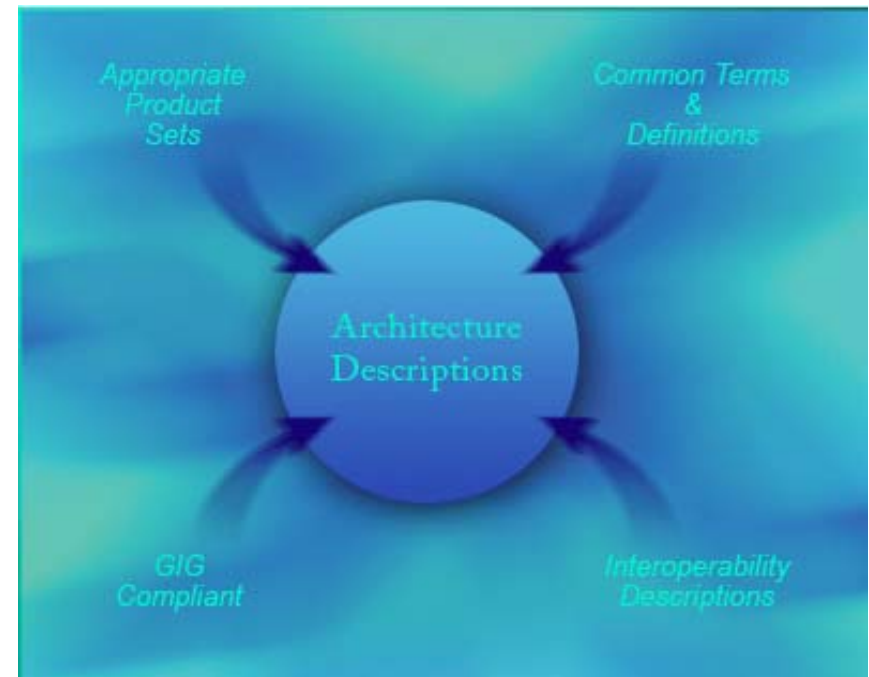
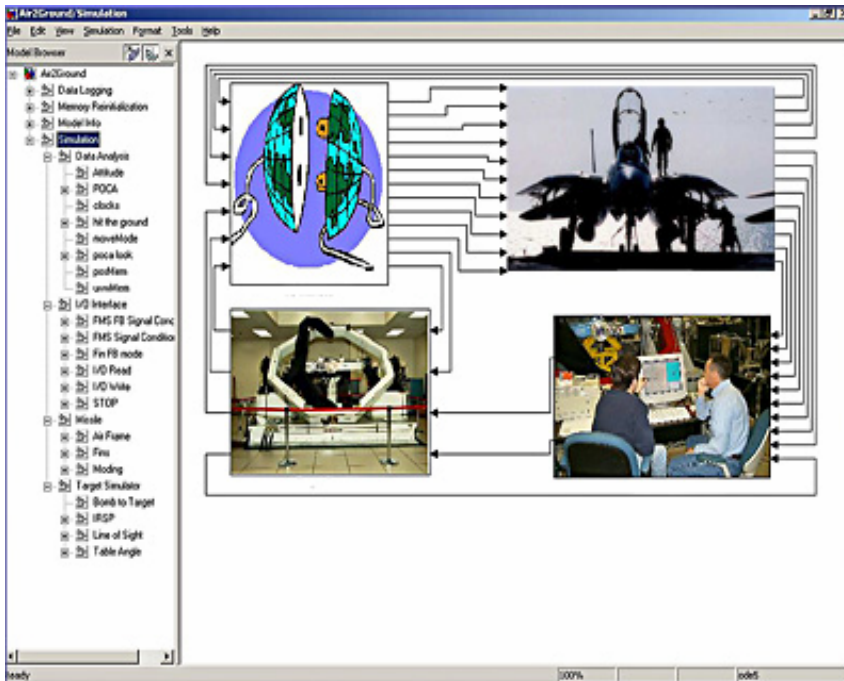
- **Hot Links to Examples**

- SSC-C Formats
- Project Risk Reports
- Tools
- DAU / External resources



**More relevant and understandable for
SSC-C than the DAU module**

- **Introduction to Architecture Development and DoDAF**
 - Designed to educate and promote value of system architecture to non-architects and new engineers
 - Tests for understanding after each section



Summary and Results



- **Process Focus**
 - Defined Policies and Processes
 - Aligned with DoD and SPAWAR guidance
 - Aligned with industry standards and CMMI® model
 - Built organization structured around processes and process improvement
- **Training is Critical**
 - Providing Fundamentals of Engineering for new and old professionals
 - Developed web-based training for “self-paced” and refresher training
 - Defining a structured technical career development path for engineers
- **Tools for the Engineers**
 - Developed *ePlan Builder* application to generate planning documents
 - Developed templates, checklists, and web-based document repositories to link standards and DoD guidance to day-to-day tasks and processes

Early and persistent Systems and Software Engineering applied to programs and projects

- **Senior Management support is critical to success**
- **Training**
 - Everyone needs to be engaged – “train the masses”
 - Specific training for process owners/subject matter experts
- **Utilize Teams (IPTs) as champions of specific processes**
 - Multi-department representation
 - Change agent mentality
 - Process-focused charters
- **Resource Properly**
 - Implement with projects that want to improve, can benefit from efforts, and that recognize own weaknesses
 - EPO staff provided skilled coaching, resources, support, and tools
 - Project members learned by doing and maintaining
- **Goals and Publicity**
 - Keep goals to sizable bites (projects)
 - Publicize successes; Share best practices

- **Recognition of SE and CMMI effort**

- 1st SPAWAR Systems Center to achieve Maturity Level 2 (2005)
- 1st SPAWAR Systems Center to achieve Maturity Level 3 (2007)
- Multiple presenter at NDIA SE and CMMI conferences
 - High interest in Tools, Training, and Implementation



• Business Results

- SCN: “They see us as a model and want to increase our efforts.”
- Automation Program: “We had hundreds of sites and there was a need for a structured organization to put a ‘wrapper’ around that and control it. CMMI became the wrapper.”
- CICS: “CMMI was key to achieving the project goal.”
- VIDS: “The VIDS failure (2000) motivated implementing CMMI because the team needed to change course or the customer would have no confidence in system development. It was a tremendous success...”

• Others Asking for Help

- PMS 408 – CREW program
- SESG / NAVAIR / NAVSEA
- Marine Corp – Quantico
- Air Armament Center, Eglin AFB

- **Increase usage of tools across departments/projects**
- **Add additional plans to ePlan Builder as needed**
- **Continue internal CMMI Level 3 mini assessments**
- **Enhance/Expand OMR**
- **Command and Department Project Reviews process**
 - Look at quality of plans and implementation of best practices
 - Reviews of project status by management driven by project metrics
 - More Peer Reviews to measure “saves”
- **Better tailoring guidance for smaller projects**

Begin Maturity Level 4/5 implementation

Any Questions?

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