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Systems Center  
Charleston

# Tools and Resources to Enable Systems Engineering Improvement

Michael T. Kutch, Jr.

SPAWAR Systems Center Charleston (SSC-C)  
Head, Intelligence & Information Warfare Systems  
Engineering Department

National Competency Lead for I/A 5.8

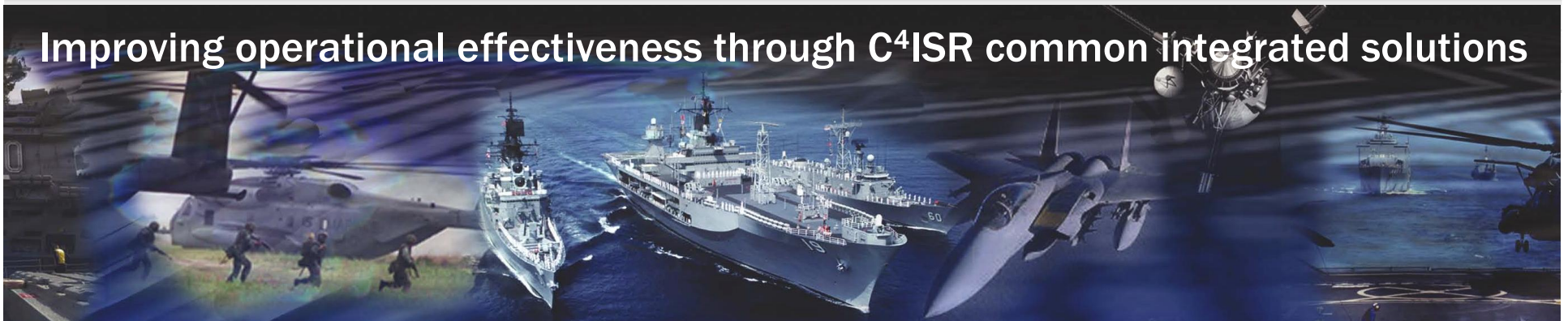
Deputy National Competency Lead for ISR/IO 5.6

Mike Knox

Technical Software Services, Inc.  
Director, Implementation and Support  
SEI Authorized Instructor

7<sup>th</sup> Annual CMMI Technology Conference and Users Group  
November 12-15, 2007

Improving operational effectiveness through C<sup>4</sup>ISR common integrated solutions



N65236-ENGOPS-BRIEF-0048-1.2

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**TECHSOFT**  
Technical Software Services, Inc.

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# Where We Fit

## SPAWAR Space and Naval Warfare Systems Command



President

non-DoD

Secretary of Defense

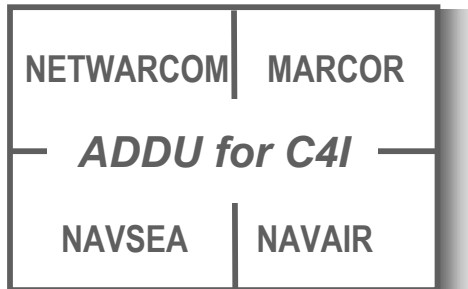
Secretary of the Navy

Other DoD

CNO

Fleet Support

ASN (RDA)  
Acquisition



SPAWAR  
San Diego, CA

NAVSEA  
Washington, DC

NAVAIR  
Patuxent River, MD

NAVSUP  
Washington, DC

NAVFAC  
Washington, DC

SYSCEN  
San Diego, CA

SYSCEN  
New Orleans, LA

SYSCEN  
Norfolk, VA

SFA  
Chantilly, VA

SYSCEN  
Charleston, SC

Network Centric  
Enterprise

# What We Do

Systems Center  
Charleston

## Connecting the Warfighter

**Mission-** We enable knowledge superiority to Naval and Joint Warfighters through the development, acquisition, and life-cycle support of effective, integrated C4ISR Information Technology, and Space capabilities.

**Vision-**  
Fully Netted  
in Three

**We are the Principal C4I Acquisition Engineering & Integration Center on the East Coast & Principal C4ISR ISEA for the Navy**



**MWR- MobileNet**





Leveraging Technology

**Body Worn Variant**





**NETCOP-Network Common Operating Picture**

**IR Pocketscope**



Rapid Prototyping



Speed to Capability





Connecting the Warfighter to the resources needed to win GWOT



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# Presentation Outline

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

# Process Improvement and Systems Engineering Strategy - 2003

## “ Vision

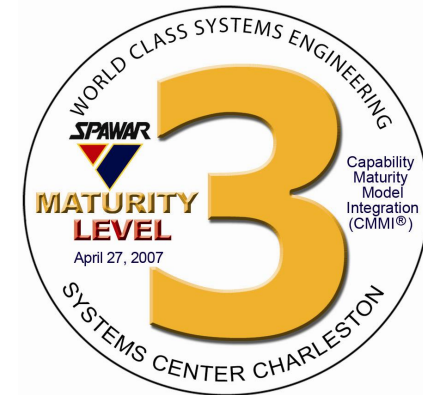
- . Develop and maintain a World Class Systems Engineering Organization

## “ 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



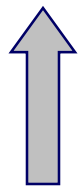
**Both Goals attained on schedule**  
**1<sup>st</sup> SPAWAR Systems Center to Achieve ML2 and ML3**  
**New Goal: Maturity Level 4 by 2010**

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# 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

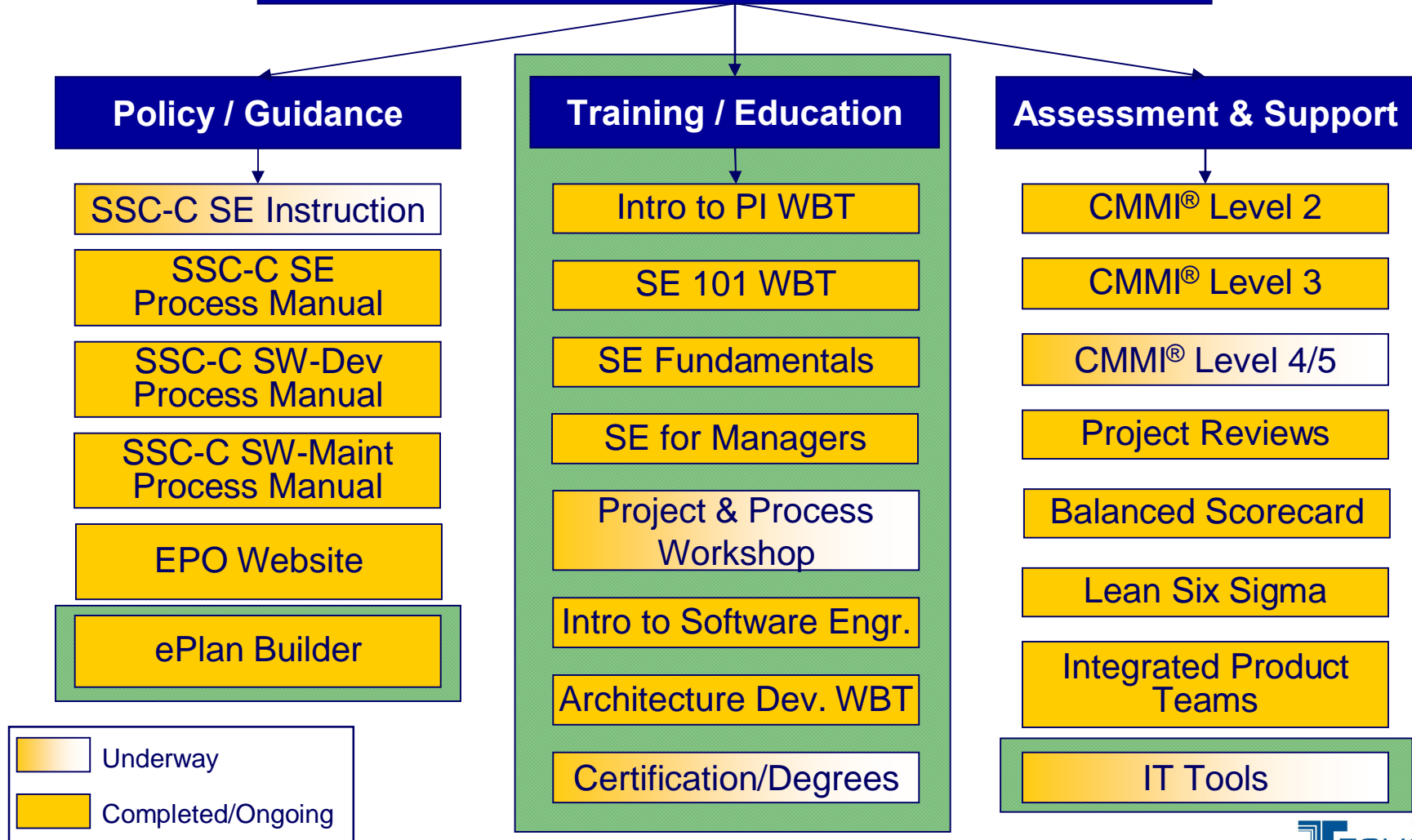
Permission to use NASCAR Technical Institute photo received from Popular Mechanics, 3/16/2007

# Critical Success Factors

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

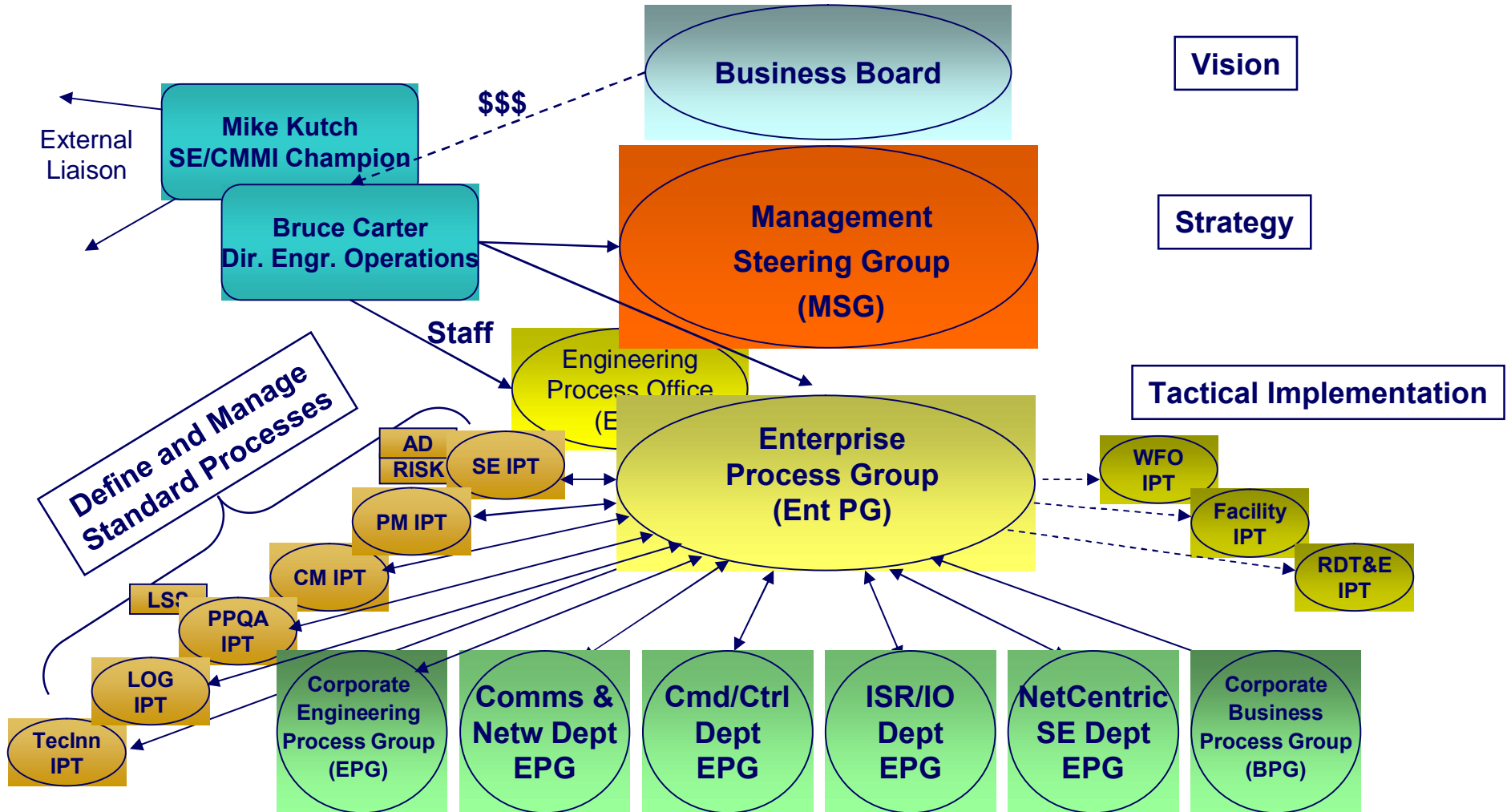
# SSC-C SE Revitalization Plan Aligned with DoD SE Revitalization

## Elements of SSC-C SE Revitalization





# Process Improvement Infrastructure: Organization



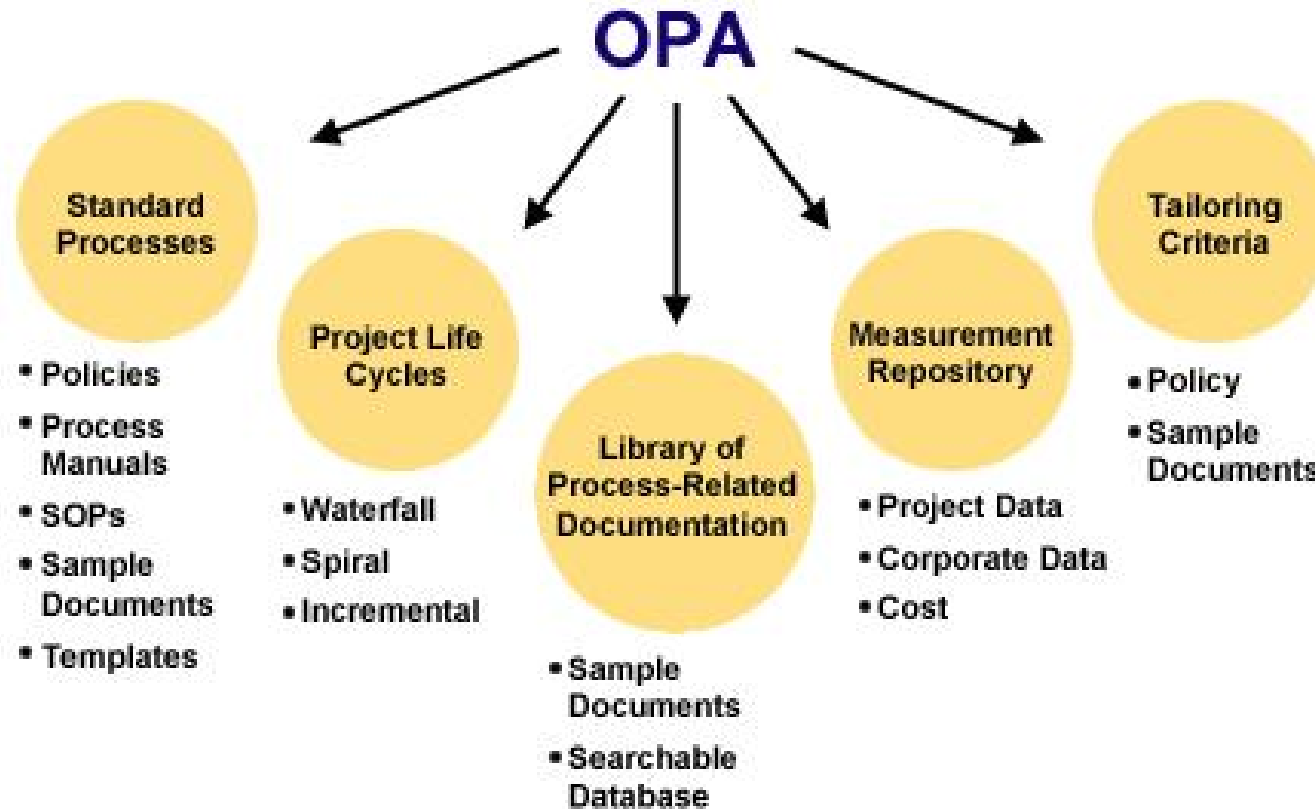
# Engineering Process Office (EPO)

Engineering  
Process Office  
(EPO)

- “ **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**

# Process Asset Library

## Recognized early need for central repository for Organizational Process Assets





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# EPO website provides access to all SC-C's organizational process assets

Approximately 100 pages of content; over 1000 documents available

**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
- Process Improvement Teams
- Organizational Measurement Repository
- Training
- Innovation Program
- References

**Comments**

Please direct comments about or problems with this site to the EPO Webmaster.

**EPO Home**

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.

**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 S<sup>2</sup>e](#)



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# Process Area Pages

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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**

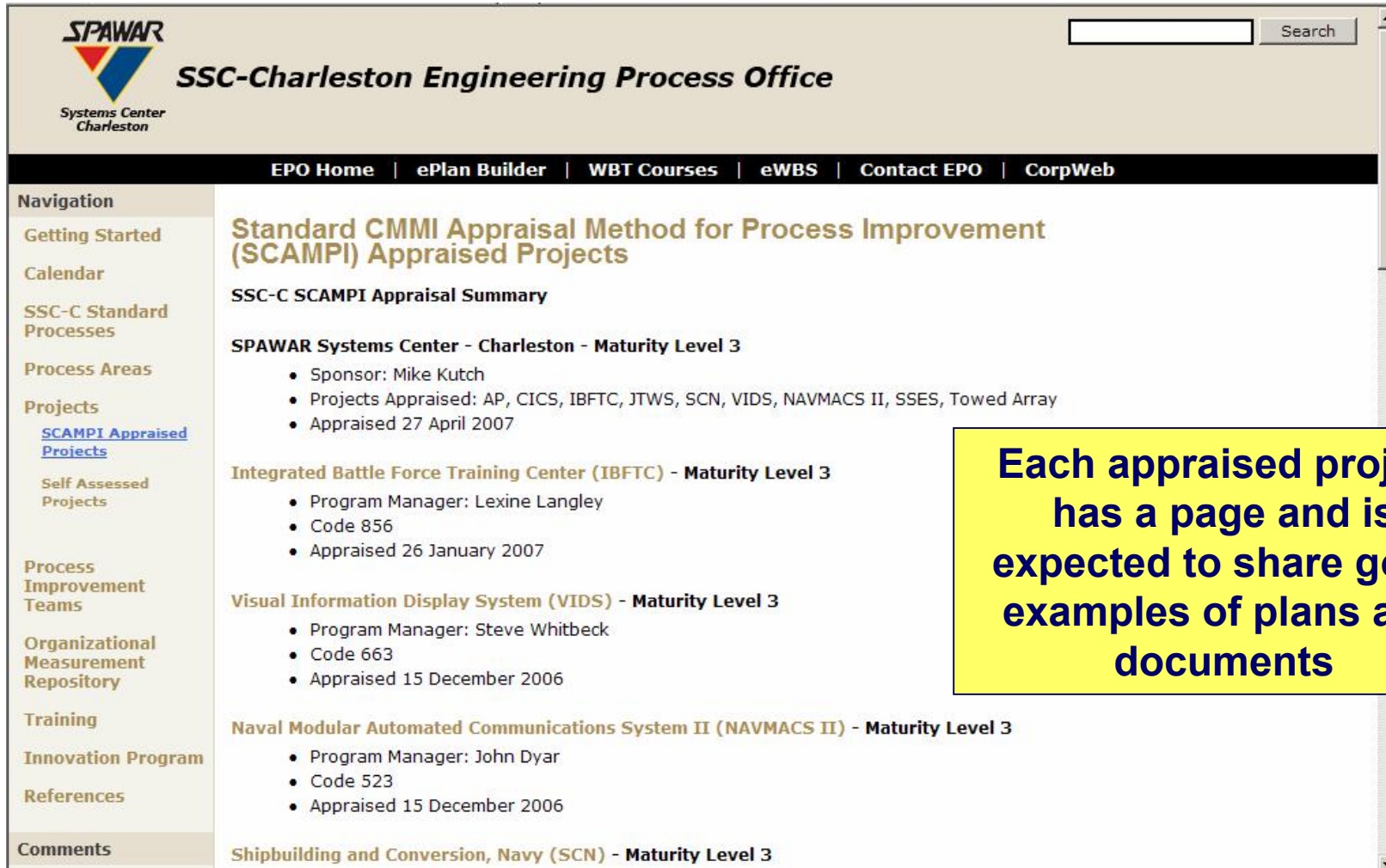
- PMP Plan

**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**

# Projects Section



**SPAWAR**  
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**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



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# Tools

- **ePlan Builder**
- **Organizational Measurement Repository**
- **Appraisal Wizard**



**N65236-ENGOPS-BRIEF-0048-1.2**

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Technical Software Services, Inc.



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## ePlan Builder

Electronic CMMI<sup>®</sup> Compliant Documentation Application

Save Quit Help

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

# ePlan Builder Tool

## ePlan Builder tool

- . An interactive, web-based application that leads the user through a structured interview process (like TurboTax<sup>®</sup>) to generate a CMMI<sup>®</sup>-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)



# EPB – Select Tasks for each Role

Systems Center Charleston



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

Home Project Setup Document Setup Build Generate

**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

# Work Breakdown Structure (WBS) in a Project Management Plan

Choose the WBS Source

Add Fiscal Year

000 Leadership/Management		2007	<input type="text" value="1900"/> K
001 Leading	2007	<input type="text" value="\$500"/> K	
002 Management	2007	<input type="text" value="\$900"/> K	
003 Personnel Management Activities	2007	<input type="text" value="\$500"/> K	
004 Communications	2007	<input type="text"/>	
100 Project Management		2007	<input type="text" value="2490"/> K
110 Management Documentation		2007	<input type="text" value="\$500"/> K
111 Programming & Budgeting	2007	<input type="text" value="\$200"/> K	
112 Program Planning Documents	2007	<input type="text" value="\$200"/> K	
113 Acquisition Documents	2007	<input type="text" value="\$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.

# Risk Identification in PMP

## 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	Impact/Concern	Level	Mitigation Approach
Schedule	Products are required by the customer by 10/1/06	High	Be prepared to provide draft materials if development of
Quality	Will products be ready for 10/15/06 in a condition	Medium	Provide technical data to contractor in accordance with schedule with
Technical	Ability to get teh technical ata from the	High	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**

# Measurement & Analysis Plan

**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%

# Systems Engineering Plan (SEP)

## 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

**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.

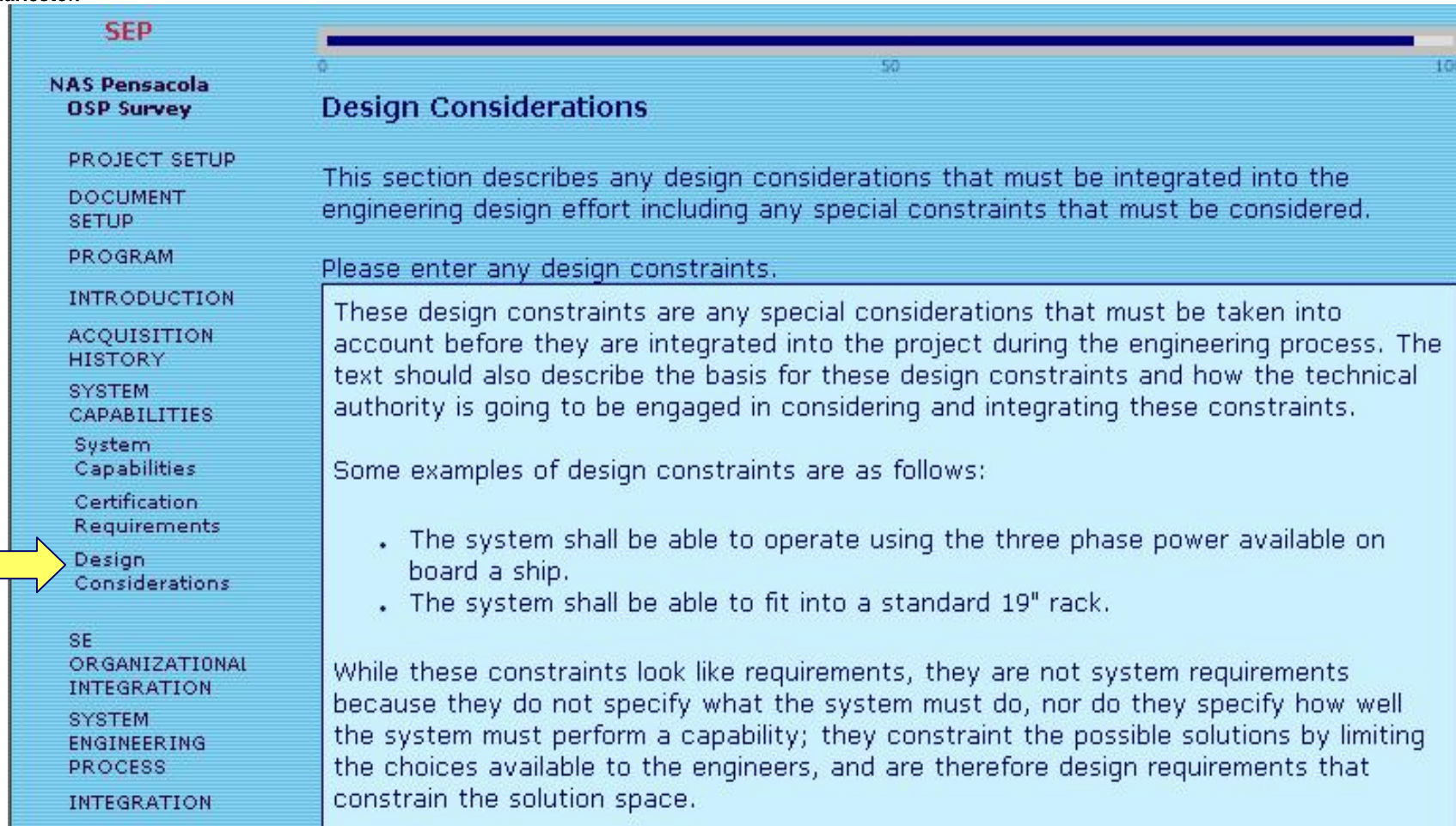
Life-Cycle Phases (in hierarchical order):

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

Show Hidden Text

# Systems Engineering Plan (SEP)

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Charleston



**SEP**

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.

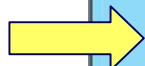
**The nature of the SEP requires more open input text fields, but EPB helps by providing elaborations and examples for the user**

# SEP – Planned Trade Studies

## 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



## 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

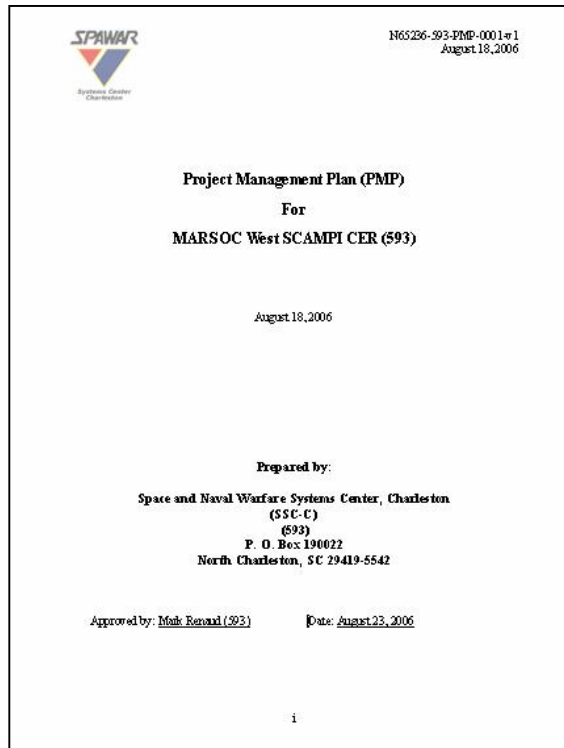
Trade Study

Research on different conduit installation

# ePB Output SEP Table of Contents

## Table of Contents

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





# 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**

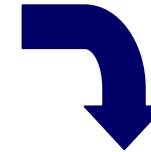
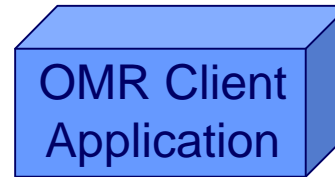
**(No matrix for SEP)**

# Organizational Measurement Repository (OMR)

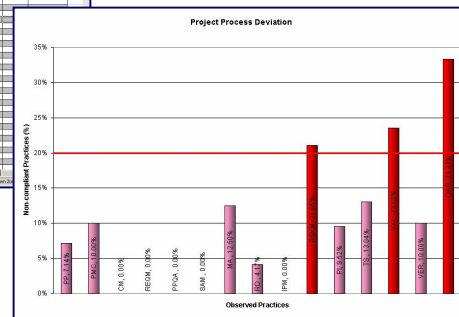
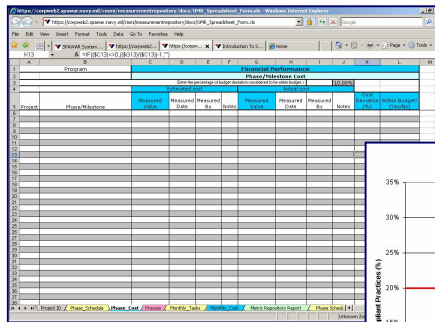
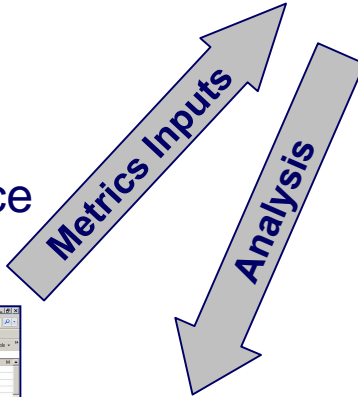
- ” **Organizational database for collecting standard project measures and providing analysis**
- ” **Currently, the OMR accepts the following standard project measures**

Category	Core Measure
Schedule Performance	” Estimated vs. Actual Milestone dates
	” Estimated vs. Actual Monthly Task completions
Cost Performance	” Estimated vs. Actual Milestone costs
	” Estimated vs. Actual Monthly costs
Process Performance	” Total # of noncompliance issues

# OMR Structure

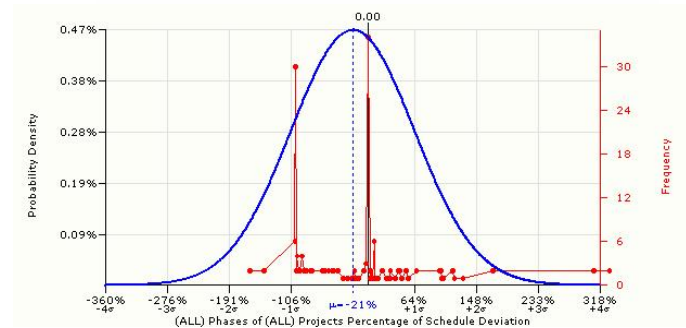


Project Performance



## 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

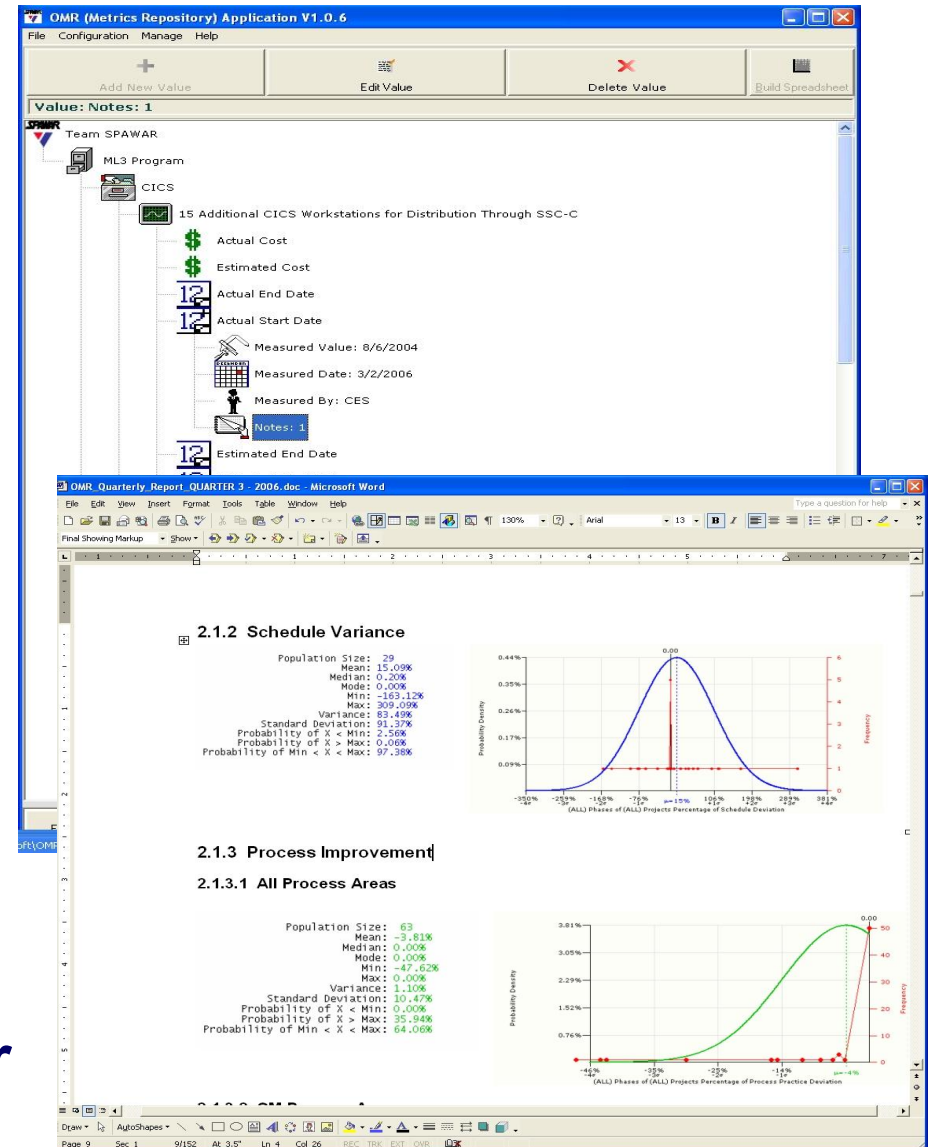
“ Generates quarterly  
organizational report

“ Projects can use to  
manage own projects

- Capture standardized cost,  
schedule, and process  
performance

“ OMR implementation  
included hands-on  
training

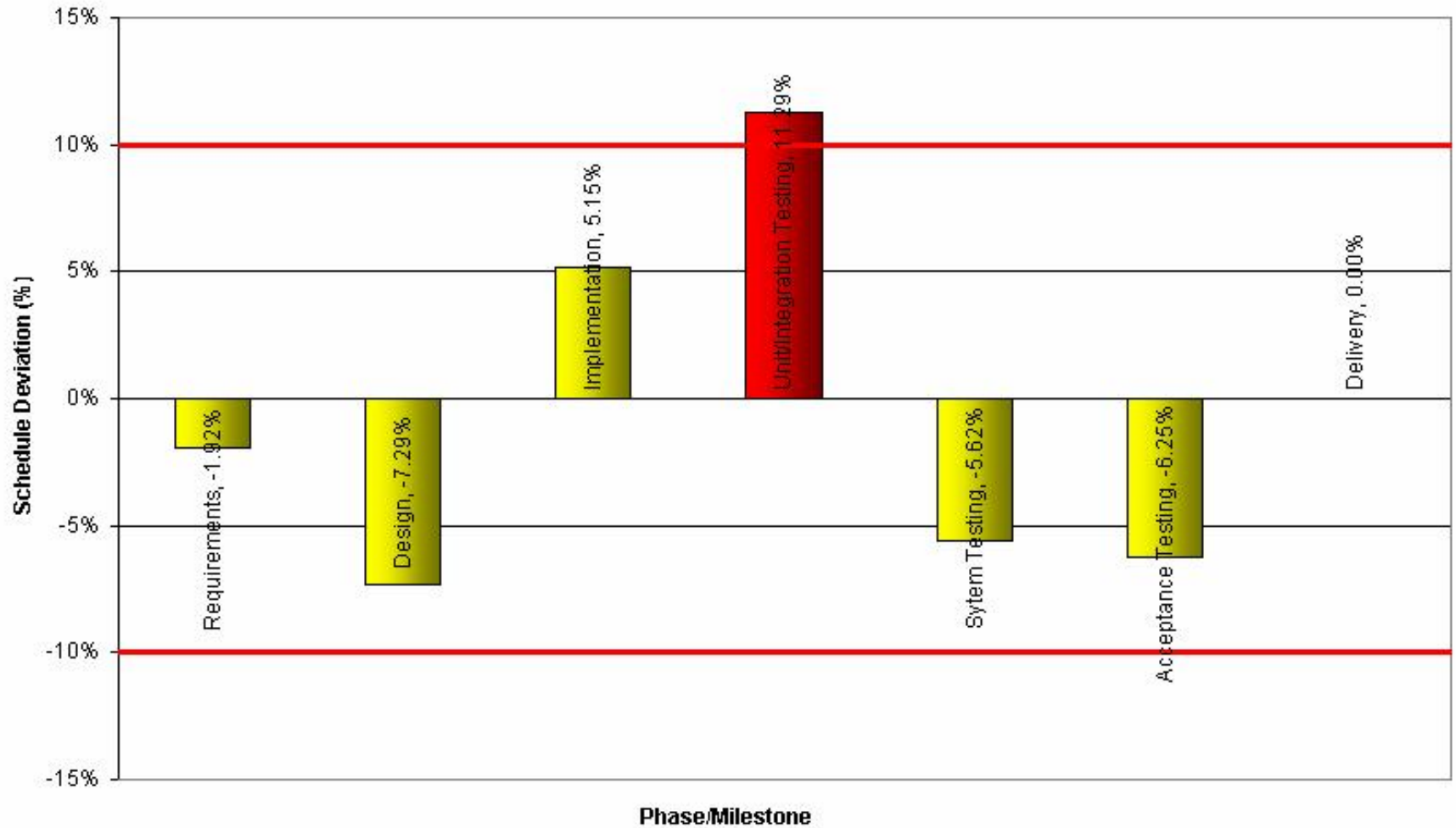
“ Laying the groundwork for  
higher maturity



# OMR Reports

## Project-Level Schedule Deviation

Project Phase Schedule Deviation



# Additional/Modified Measures To Be Implemented in OMR

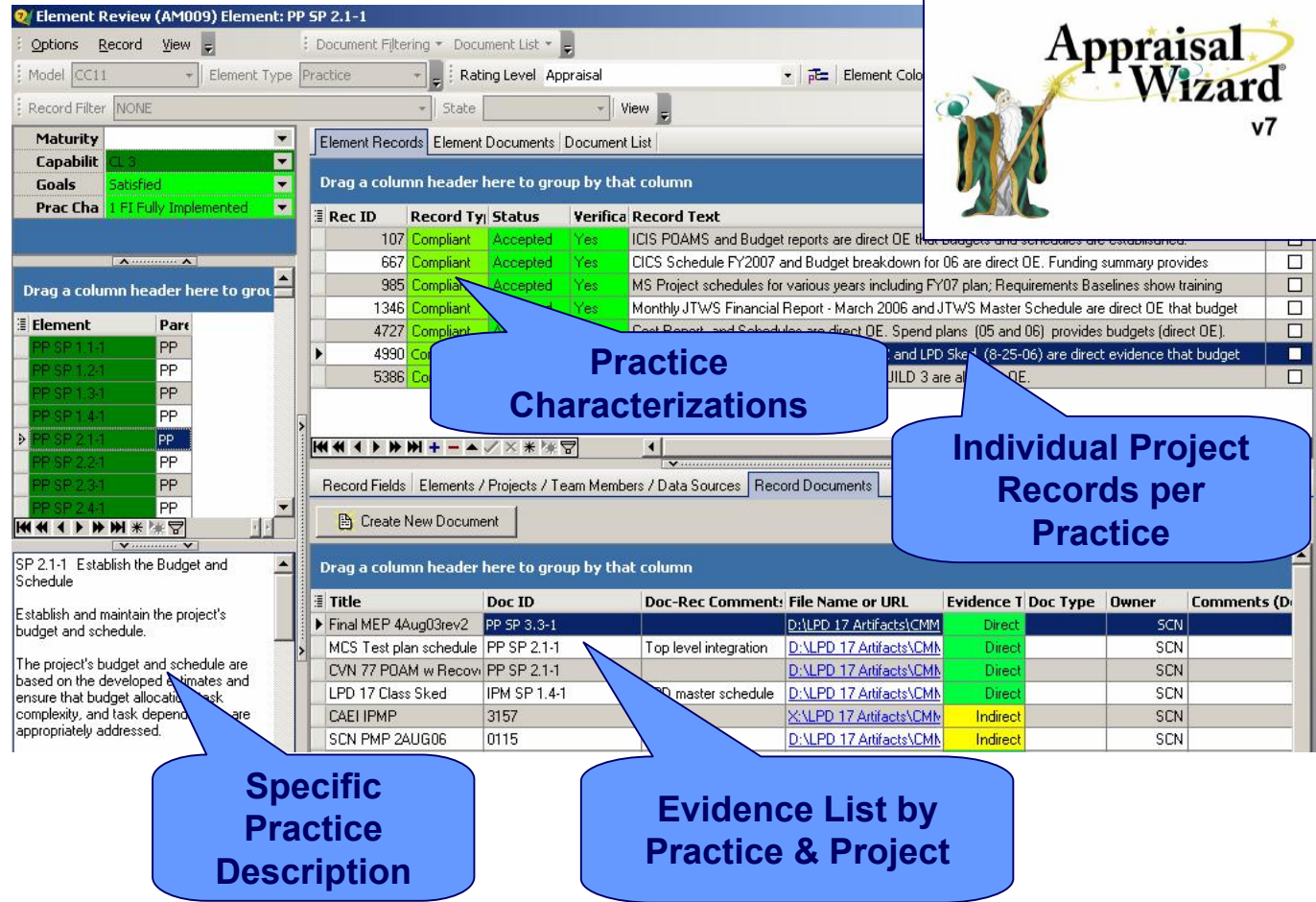
Category	Core Measure
<b>Cost Performance (More granularity)</b>	<b>“ Government vs Contractor budget</b> <ul style="list-style-type: none"> <li>. ODC</li> <li>. Travel</li> <li>. Training</li> <li>. Materials</li> </ul>
<b>Quality</b>	<b>“ Peer Reviews</b> <ul style="list-style-type: none"> <li>. Effectiveness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


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

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# 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





**Practice Characterizations**

**Individual Project Records per Practice**

**Specific Practice Description**

**Evidence List by Practice & Project**

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	JILD 3 are al

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 5ked	IPM SP 1.4-1	0 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>



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# Training

- Training Architecture
- Courses



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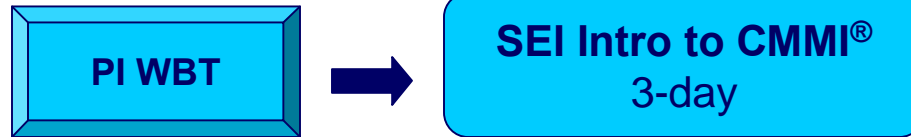
 SEI Partner  
**TECHSOFT**  
Technical Software Services, Inc.



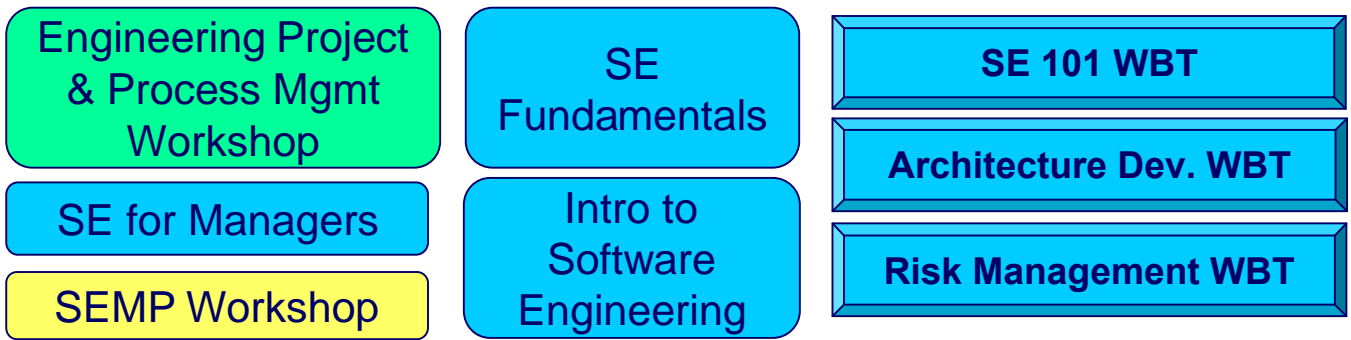
# SE & PI Training Architecture

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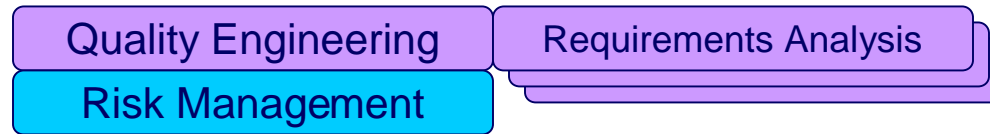
Foundation of  
PI and CMMI®



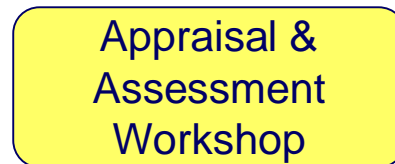
Core SSC-C project  
and engineering  
processes  
(Level 2 and 3)



Subject Matter Experts -  
Use commercially  
available on-site classes



Prepare Projects  
for BSC or SCAMPI



# Intro to Process Improvement WBT

Make a Selection

**SPAWAR**  
 eTraining

## 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**

 Exit  Feedback  Audio  Bookmark

## SEI Intro to CMMI® for SSC-C



Taught on-site  
since Apr. 2004

### “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

# Systems Engineering Training

## 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**



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# New On-Site Courses

## ” 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

# Web Based Training (WBT) Modules

## ” 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

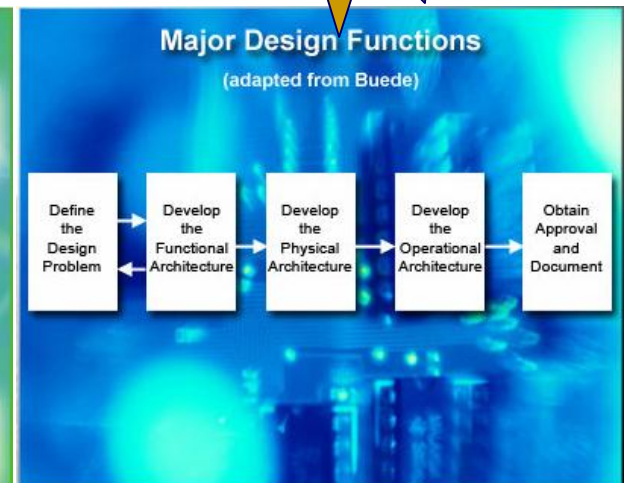
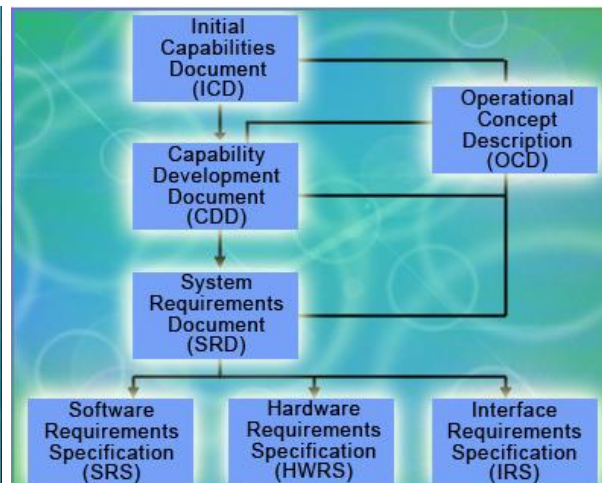
- . Utilize HTML, JavaScript, and ASP pages with SQL Server database
- . Designed for Internet Explorer (5.5 +), Flash (5.0 +), Windows Media Player (9.0 +)

# SE 101 Web-Based Training

## 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

Released in Jan. 2006



# Risk Management WBT

## ” 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



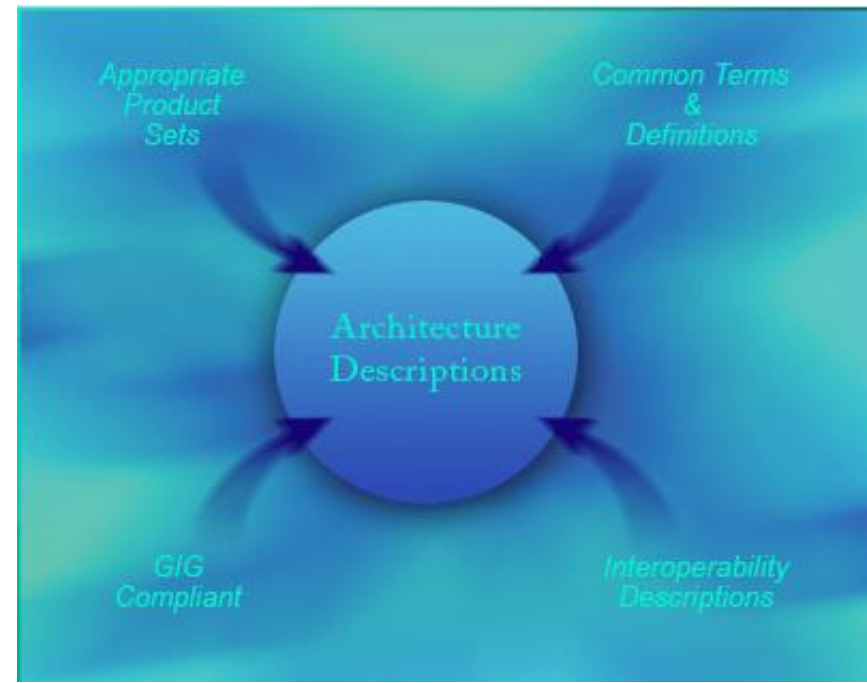
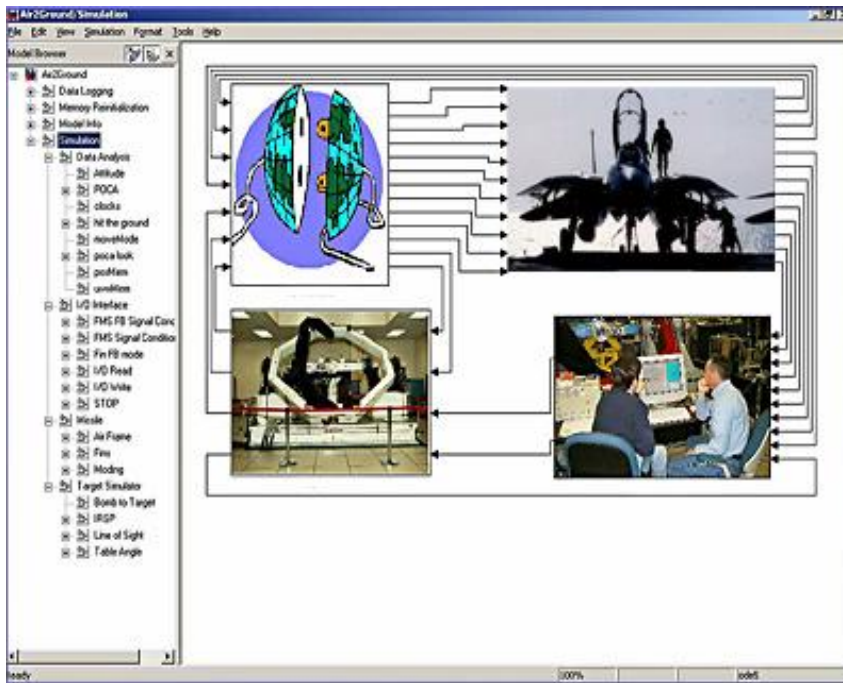
**More relevant and understandable for  
SSC-C than the DAU module**



# Architecture Development WBT

## “ 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





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# Summary and Results



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# What We Have Accomplished

## “ 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

# Is the SE Revitalization Working ?

## ” Recognition of SE and CMMI effort

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



# Is the SE Revitalization Working ?

## ” 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 successõ +

## ” 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**



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# Any Questions?

## Contact Information:

**Michael T. Kutch, Jr.**  
**SPAWAR Systems Center Charleston**  
**Email: [michael.kutch@navy.mil](mailto:michael.kutch@navy.mil)**  
**Phone: 843-218-5706**

**Mike Knox**  
**TECHSOFT, Inc.**  
**Email: [mjknox@techsoft.com](mailto:mjknox@techsoft.com)**  
**Phone: 850-469-0086**



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