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Customer Success Is Our Mission

Enterprise Level of Process Improvement

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Introduction

- This presentation explains the Space and Airborne Systems (SAS) Opportunity Improvement Board (OIB) and its process for
  - Collecting process improvement proposals
  - Identifying innovations for the organization that will help its quality and process performance
  - Prioritizing and analyzing the proposals with respect to the organization's objectives
  - Selecting proposals for further consideration
  - Determining the cost and return on investment of the proposal
  - Piloting the implemented proposals to select which ones to deploy to the organization
  - Deploying improvements that provide positive impact to the organization's objectives
  - Measuring the effects of the deployed improvements

Benefits of Enterprise Level Improvements

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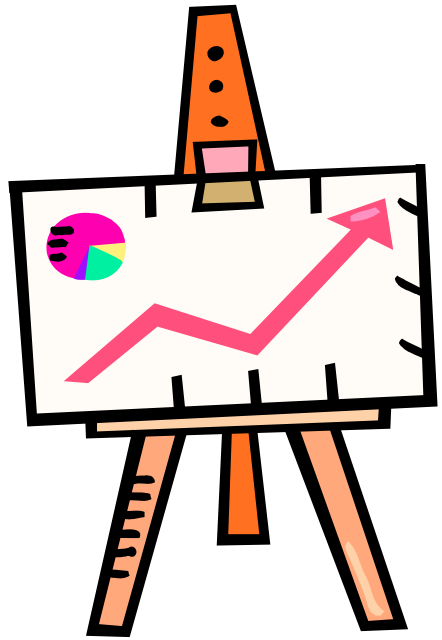
- The desire to help programs and the organization be successful drives organization improvement
- Improvements are implemented to
  - Help programs meet their quality and process-performance objectives
  - Improve the organization's performance on current and future programs
- A CMMI level 5 organization's focus is:
  - "… on continually improving the range of process performance through both incremental and innovative improvements." (Chrissis, p. 77)



Help programs succeed with improvements that are aligned with the organization's goals and objectives.

Identifying Improvement Opportunities

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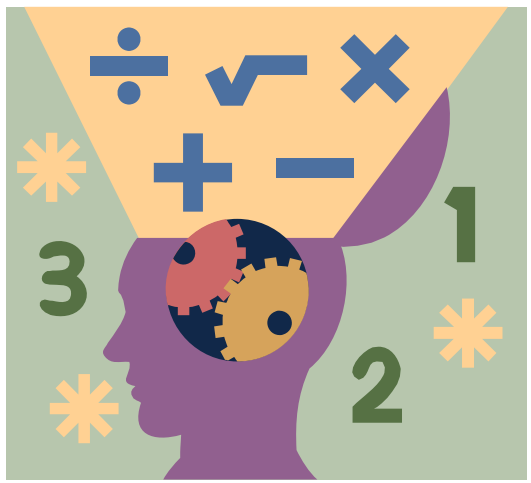
- Anyone in the organization can identify an enterprise improvement opportunity through
  - Process change requests
  - Data analysis (program level and organization level)
  - Symposiums and conferences (internal and external)
  - Lessons learned (programs and organization)
  - Other feedback to the organization
- Feedback is collected and tracked on-line as part of the SAS Enterprise Management System (EMS)

Prioritizing and Ranking

- The enterprise established an Opportunity Improvement Board (OIB) to prioritize and rank the submitted improvement opportunities with relationship to
  - The organization's goals and objections
  - The statistical understanding of the organization's current process capability
  - The estimated cost-to-benefit ratio



Stakeholder Involvement

- The Opportunity Improvement Board (OIB) membership includes key personnel from the Enterprise Process Group
  - EPG Lead is the Chair
  - All disciplines represented
  - All sites represented

- The OIB recommendations are reviewed and approved by the Integrated Process Steering Team (IPST) whose membership includes senior representation from
  - All engineering centers
  - Program management
  - Supply Chain Management
  - Quality
  - The EPG

High Level Opportunity Improvement Flow

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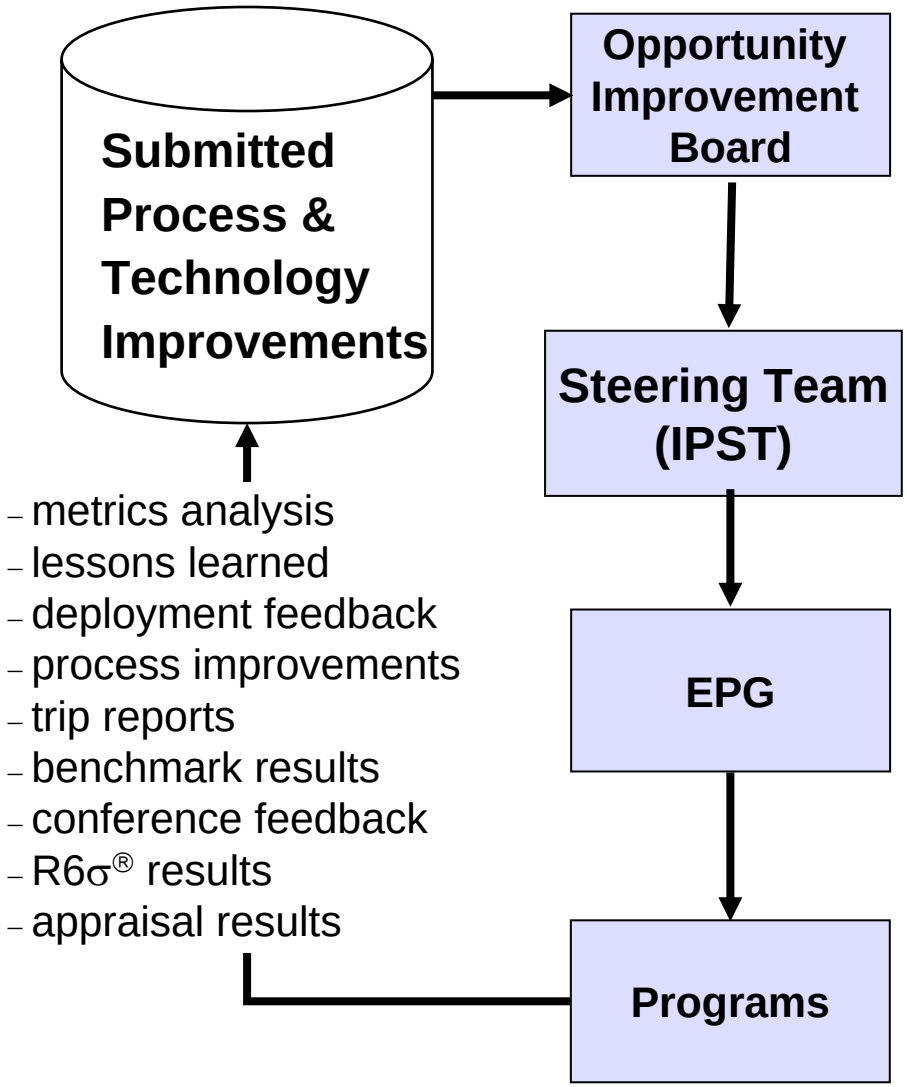


Prioritizes and ranks

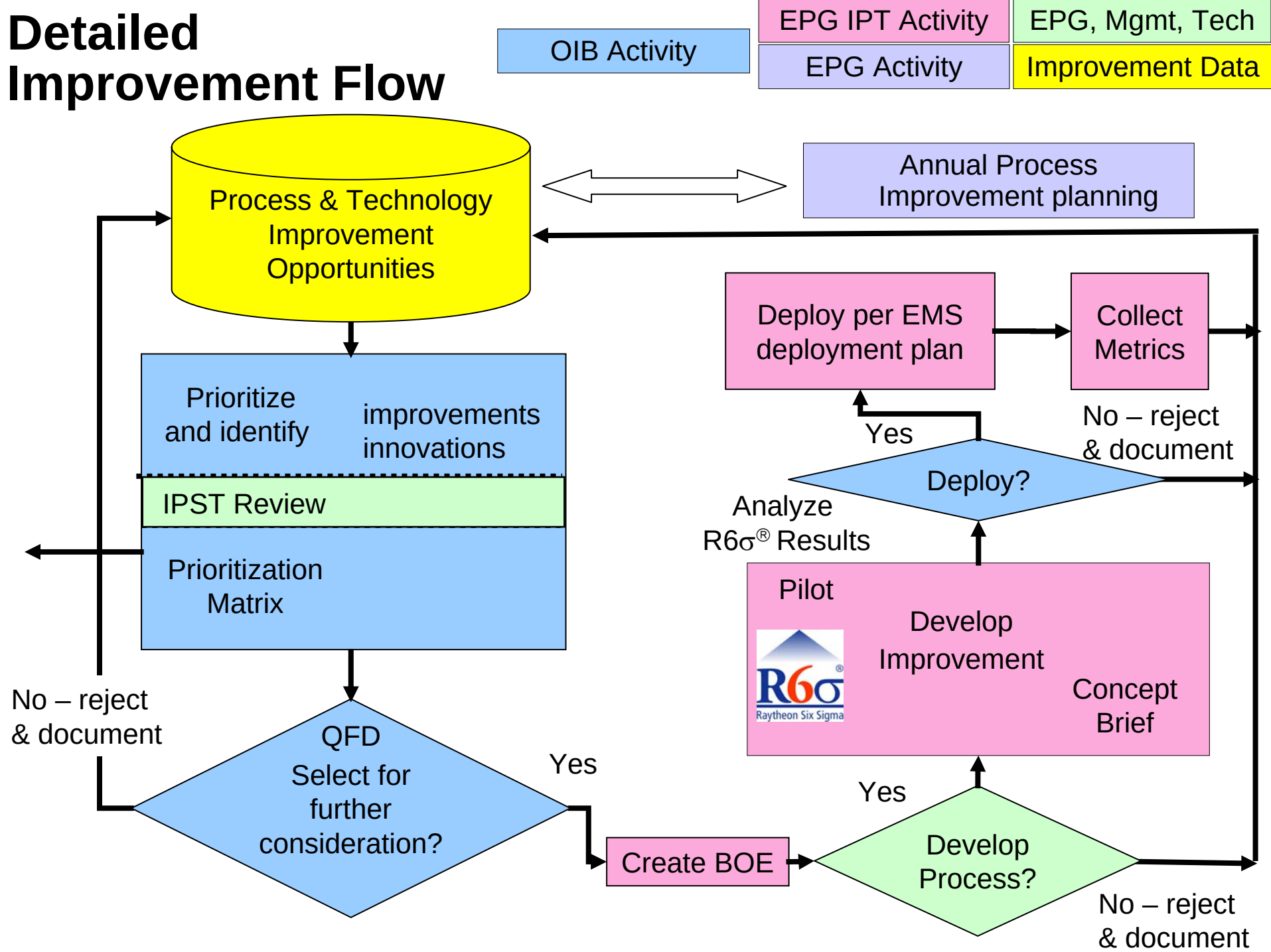
Reviews and Approves

Executes Improvement

- **Define**
- **Pilot**
- **Measure**
- **Deploy**

R6σ® Raytheon Six Sigma

Detailed Improvement Flow



Prioritization Details

OIB Activity | EPG IPT Activity | EPG, Mgmt, Tech | EPG Activity | Improvement Data

Prioritize and identify improvements innovations

Analyze cost & benefit of Proposals

No – reject & document

cost: benefit ratio sufficient ?

Yes

Improves Org's Processes?

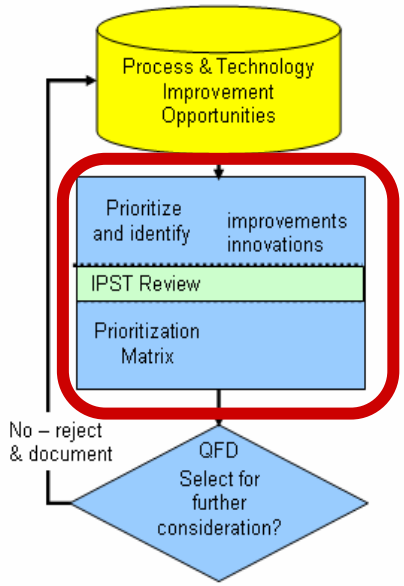
Yes

IPST review

Prioritization Matrix

Yes

QFD



Improvements are prioritized based on weighted criteria

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Supports Business Strategy (Goals/Metrics)
Scope of Improvement (Expected percentage of programs helped)
Urgency
Objective Data to Substantiate Need for Change
Probability of Successful Implementation
Proposal is Supported (by organization metrics)
Expected Return on Investment (ROI)

Priority improvements are mapped to Goals (QFD)

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WHAT vs. HOW

Value	Symbol	Strength of Relationship
9	H	High
3	M	Medium
1	L	Low

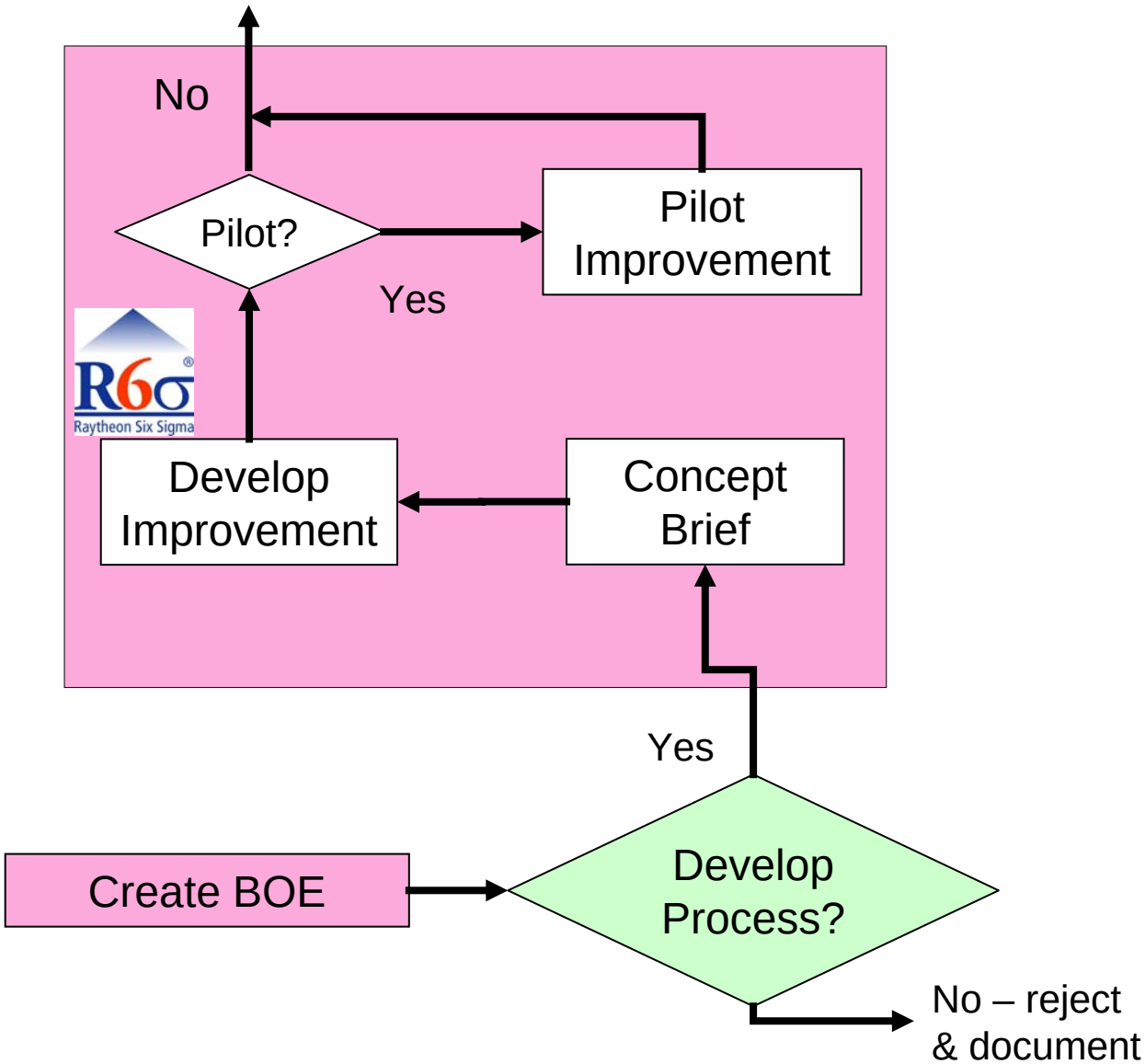
Title: SAS EPG OIB 2005 Selection
Project:
Name:
Date: 5/05/05

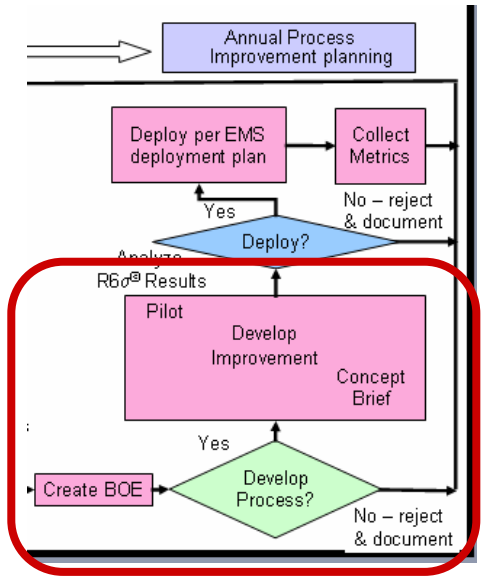
Hows

			Importance	1 Test Verticality Methodology	2 High Reliability & Space Program Processes	3 Develop ARD Template	4 Cleanroom Process	5 Appraisal Tool	6 ME EMS Process	7 PMP Engineering Merge	8	9	10	11	12
Whats	1	CMMI Level 5 Subprocesses	5	H		H	H								
	2	Stabilize Level 3	4	H	H	H			H	H					
	3	CMMI Level 3 in HW	3	H	H	H			L	L					
	4	One SAS	2						H	H					
	5	IPDS Alignment	1						L						
	6	Maintain ISO Compliancy	5												
	7		0												
	8	**Other**	0												
Technical Planning	**Technical Weights**	**Absolute**		108	63	108	45	0	58	57	0	0	0	0	0
		Relative		25%	14%	25%	10%	0%	13%	13%	0%	0%	0%	0%	0%
		Importance		5	3	5	3	0	3	3	0	0	0	0	0
	Technical Targets	**Value**													
		Unit													
		Direction													
	Competitor Benchmark	1													
		2													
		3													
	Select Hows to Flow Down to Next Level			keep	keep	keep	keep	discard	keep	keep	discard	discard	discard	discard	discard

Implementation Details

OIB Activity | EPG IPT Activity | EPG, Mgmt, Tech | EPG Activity | Improvement Data





BOEs include:
- Barriers/Risks
- Cost
- Schedule
- Expected ROI

Concept Brief

- The Concept Brief describes the proposed implementation including:
  - The benefits to the programs and organization
  - The impact to the practitioners
  - The transition and deployment plans
  - Implementation details
  - Schedule
  - Resources

- Concept briefs are reviewed with the stakeholders prior to implementing the improvement

EPG Oversight

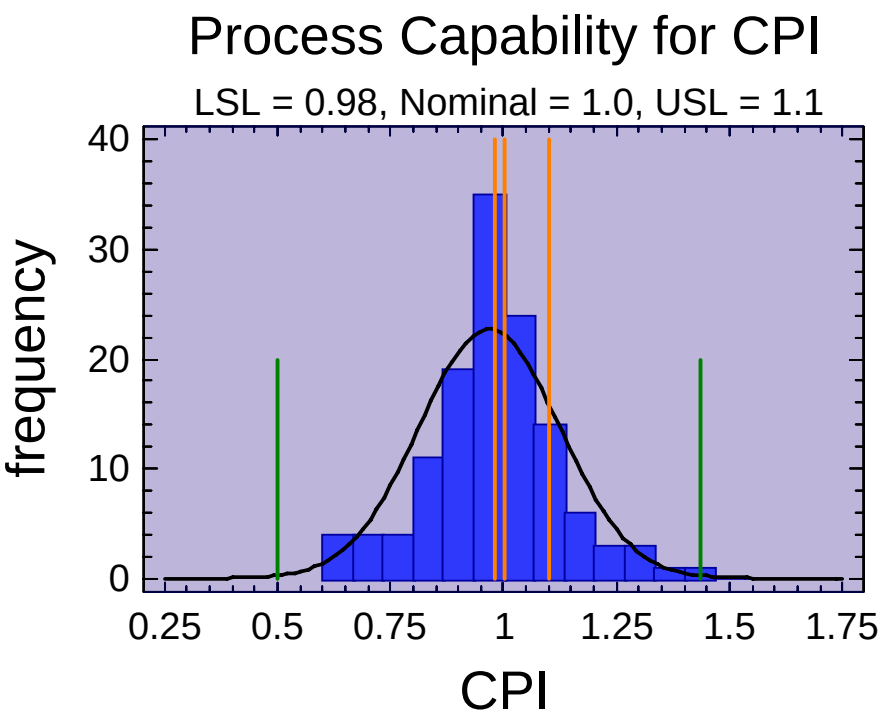
- The Enterprise Process Group (EPG)
  - Implements the selected improvement projects
  - Monitors the status of the improvement projects
  - Manages the deployment of the implemented improvement projects that are chosen for full scale deployment
  - Measures the impact of process improvements on the organization's capability
  - Manages the OIB process throughout the year
  - Reviews opportunity improvement suggestions as part of its annual planning

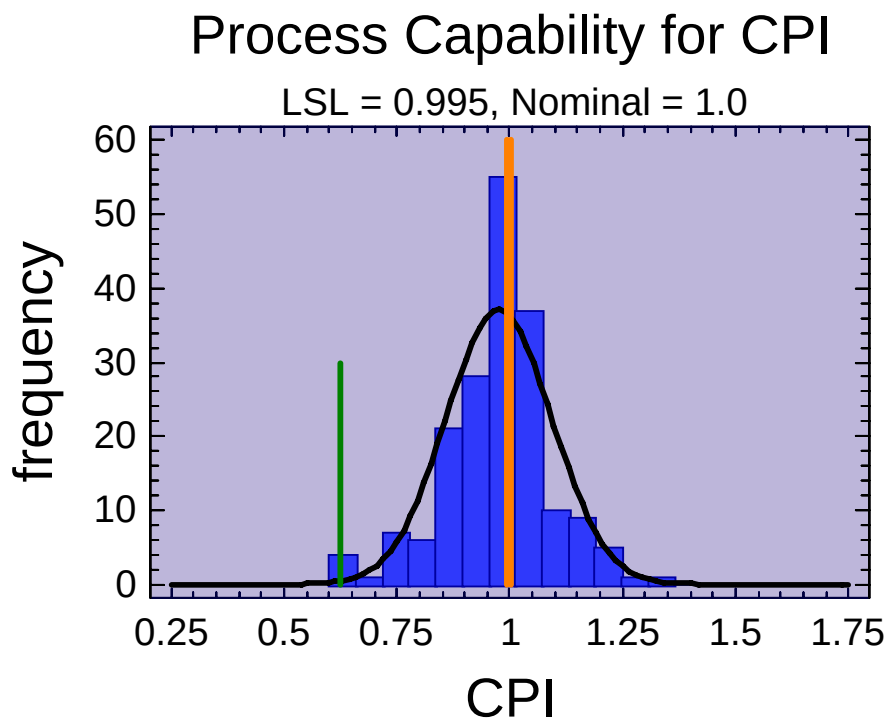
Measurement

- Improvements are measured collectively
- The organization's process capability is measured and analyzed quarterly to understand the impact of the collective improvements

Expected Range of Values	0.50 to 1.44
February 2005	$\overline{X}$ = 0.97, s = 0.16
	n = 133, C_{pk} = -0.02

Expected Range of Values	0.62 to 1.33
December 2005	$\overline{X}$ = 0.98 s = 0.12
	n = 185 C_{pk} = -0.05





Process Improvement shown in Program Cost and Schedule Performance

Nov 2004 - Mar 2005

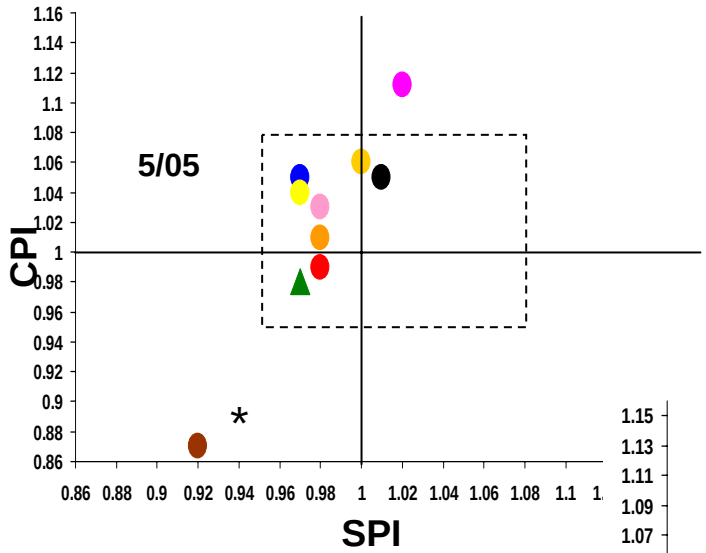
- Supply Based Optimization
- Objective Evaluations
- Program Planning
- EMS Process Tailoring
- Peer Review
- Defect Logger
- Integrated Mgmt Review
- Work Product Mgmt
- Technical Solution Data
- Statistical Process Control
- Process Assets Library
- HW Development Planning
- Managing with Metrics

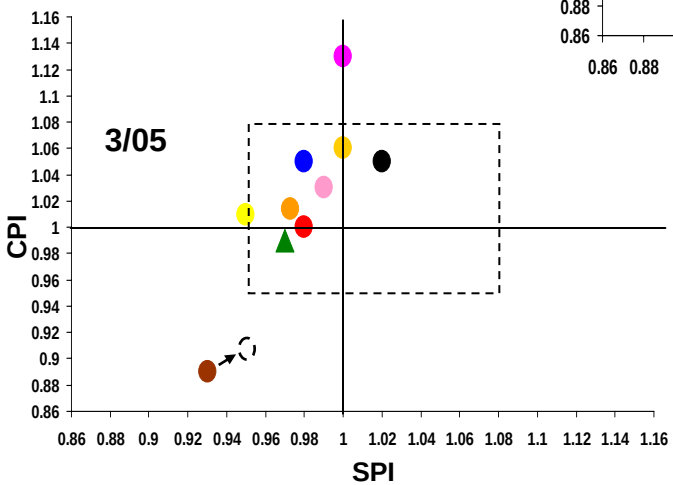
Mar 2005 - May 2005

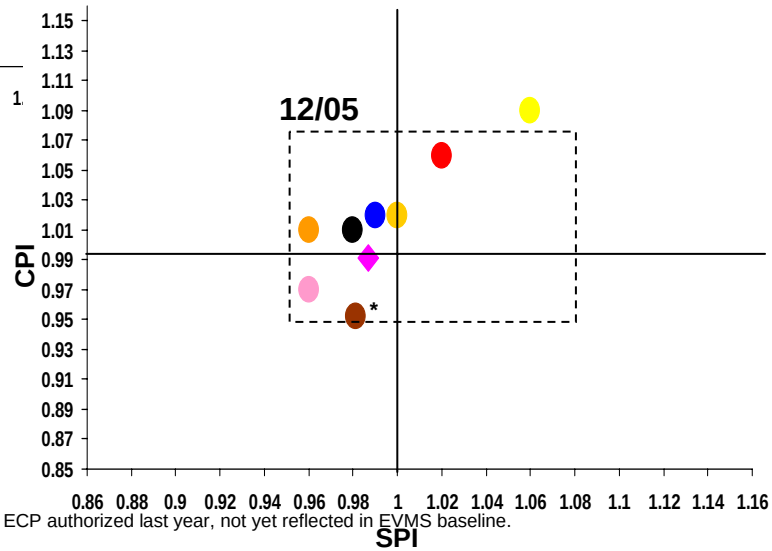
- Structured Decision Making
- Lessons Learned
- Risk and Opportunity Management
- SW Integration & Test
- FRACAS

May 2005 - Dec 2005

- Interface Management Process
- Qualification by Similarity
- Update Gap Tailoring Tool
- Cost Collection
- FRACAS
- PLE
- RMS
- Mechanical Engineering
- High Reliability
- Systems Safety – Phase I
- COTS
- Updated Lessons Learned Database







*Major ECP authorized last year, not yet reflected in EVMS baseline.

Summary

- The SAS organization improvement process
  - Designed to help the programs succeed
  - Supports the Organization's goals and objectives
  - Involves appropriate stakeholders
  - Results in improvement to the organization's process capability

Questions

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Biography

- Linda Kovar is a Senior Manager of Programs at Raytheon Space and Airborne Systems in El Segundo, California. She is the Enterprise Process Group (EPG) lead for their process improvement activities. In August 2005, she successfully led the activities in achieving a combined Systems, Software and Hardware CMMI Level 3 for the business unit which encompasses 7000 engineers in several states. She is currently leading the Enterprise Process Integration activities to focus on a CMMI Level 5 maturity across all of SAS Engineering. Linda has 25 years with Raytheon where she has held positions in Program Management, Functional Management, Technical Staff, Test Program development and software engineering. She is a certified Raytheon Six Sigma expert, has a BS degree in Computer Engineering from the University of California Los Angeles and is a graduate of the Anderson School of Executive Management.

- Nancy Raymond is the Deployment Support Cross Product Team Lead in the Space and Airborne Systems Enterprise Process Group. Nancy has been with the company for 28 years. For most of her time at Raytheon, Nancy has been a software and process engineer on programs and within the organization. Nancy's specialties include software planning, estimation, and metrics. Nancy has been involved with the development and deployment of CMM/CMMI compliant processes for more than 10 years. Nancy has a Masters Degree in Mathematics from Carnegie-Mellon University.