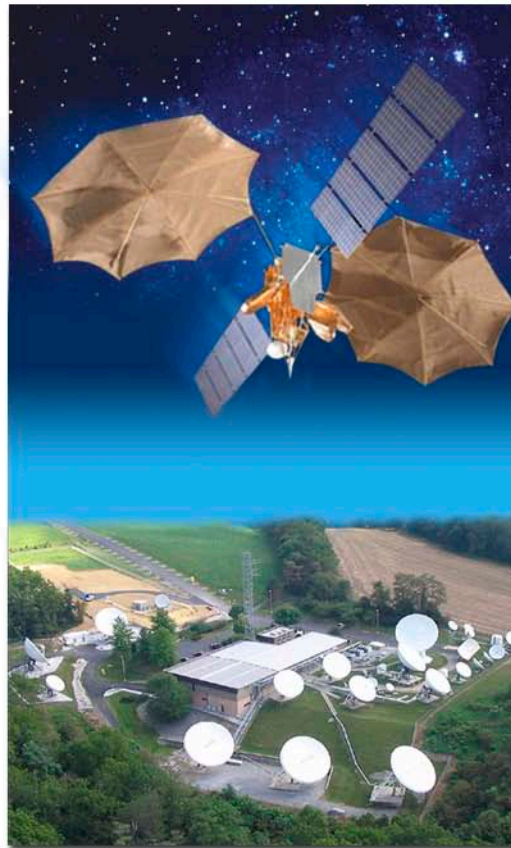# Leaner SCAMPI ^{SM} Preparation

Gary Natwick

Harris Corporation

16 November 2010

NDIA CMMI® Conference and User Group

Providing Value To Our Customers

HARRIS

Aviation electronics

Communications and information networks

Intelligence, surveillance, and reconnaissance

Space and ground satellite communications systems

Operations and support services

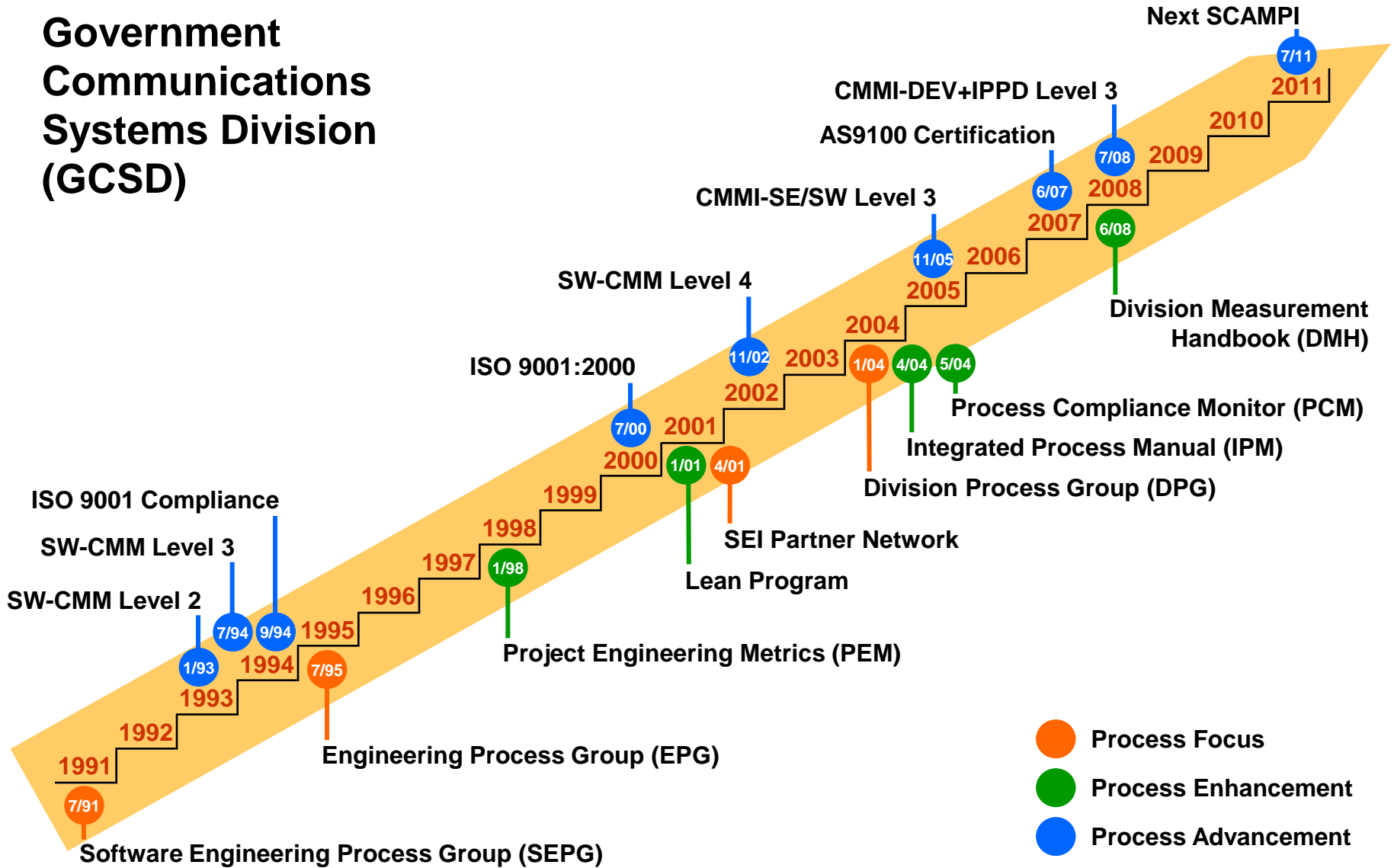## People – Innovation – Process

Agenda

- Background

- Challenge

- Approach

- Results

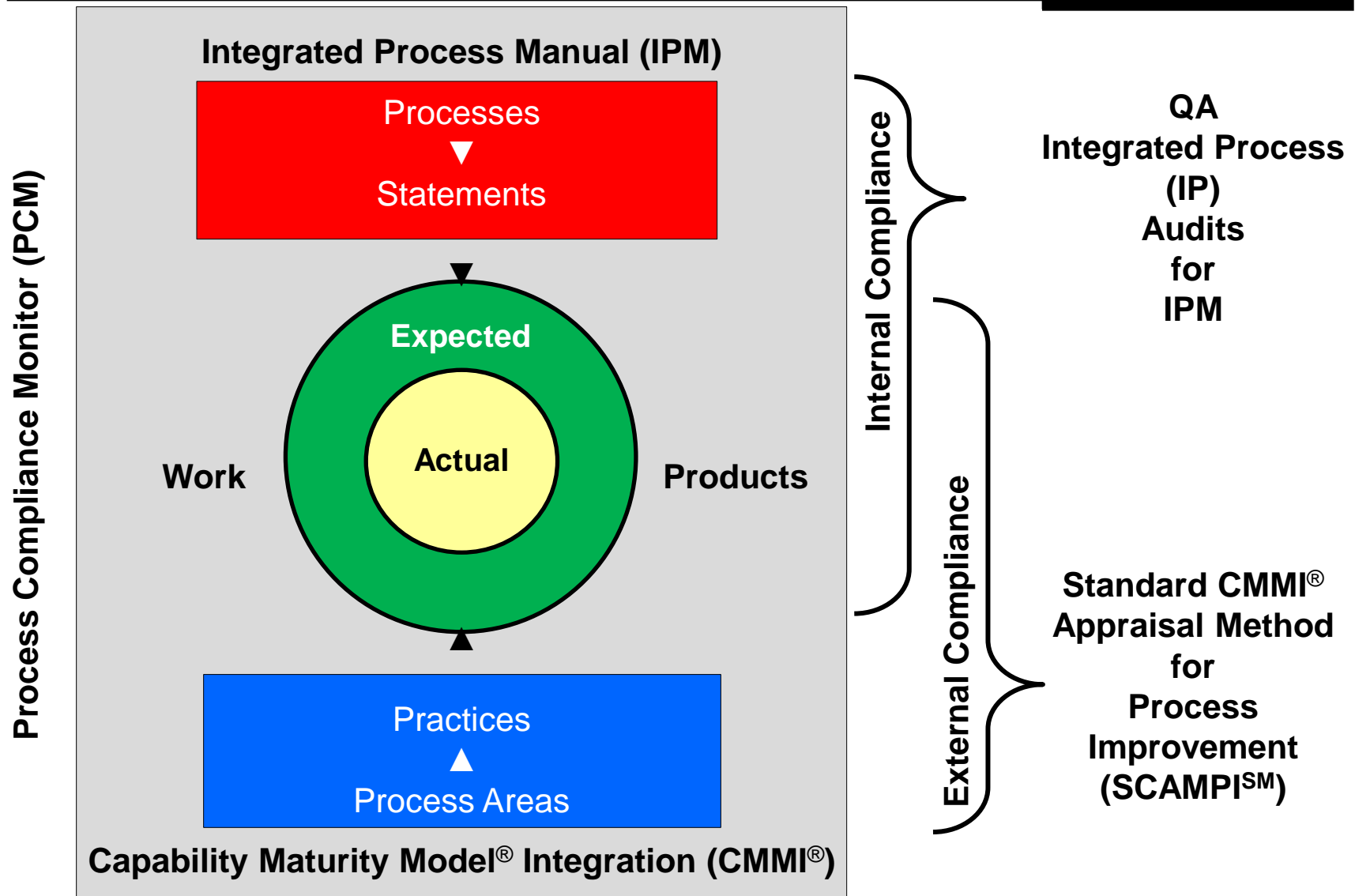- Conclusion

Process Improvement Timeline

HARRIS

Government Communications Systems Division (GCSD)

Next SCAMPI — 7/11 — 2011

CMMI-DEV+IPPD Level 3 — 7/08

AS9100 Certification — 6/07

CMMI-SE/SW Level 3 — 11/05

SW-CMM Level 4 — 11/02

ISO 9001:2000 — 7/00

ISO 9001 Compliance

SW-CMM Level 3

SW-CMM Level 2

2010
2009
2008 — 6/08 — Division Measurement Handbook (DMH)
2007
2006
2005
2004 — 1/04, 4/04, 5/04 — Process Compliance Monitor (PCM)
2003
2002
2001 — Integrated Process Manual (IPM)
2000 — 1/01, 4/01 — Division Process Group (DPG)
1999 — SEI Partner Network
1998 — 1/98
1997 — Lean Program
1996 — Project Engineering Metrics (PEM)
1995 — 7/94, 9/94
1994 — 1/93
1993 — 7/95
1992
1991 — Engineering Process Group (EPG)
7/91 — Software Engineering Process Group (SEPG)

Legend:
- 🟠 Process Focus
- 🟢 Process Enhancement
- 🔵 Process Advancement

Background

- Process Improvement is a learned skill
- To increase awareness and capabilities Harris is using a Lean Six Sigma approach
  - Encourage team members to look for ways to improve processes by
    - Quantifying the process
    - Recommending a change
    - Measuring the improvement
  - Teach skills to assist in the efforts
    - Lean Fundamentals – eliminate waste
    - Simulation – understand system performance
    - Change behavior – people skills
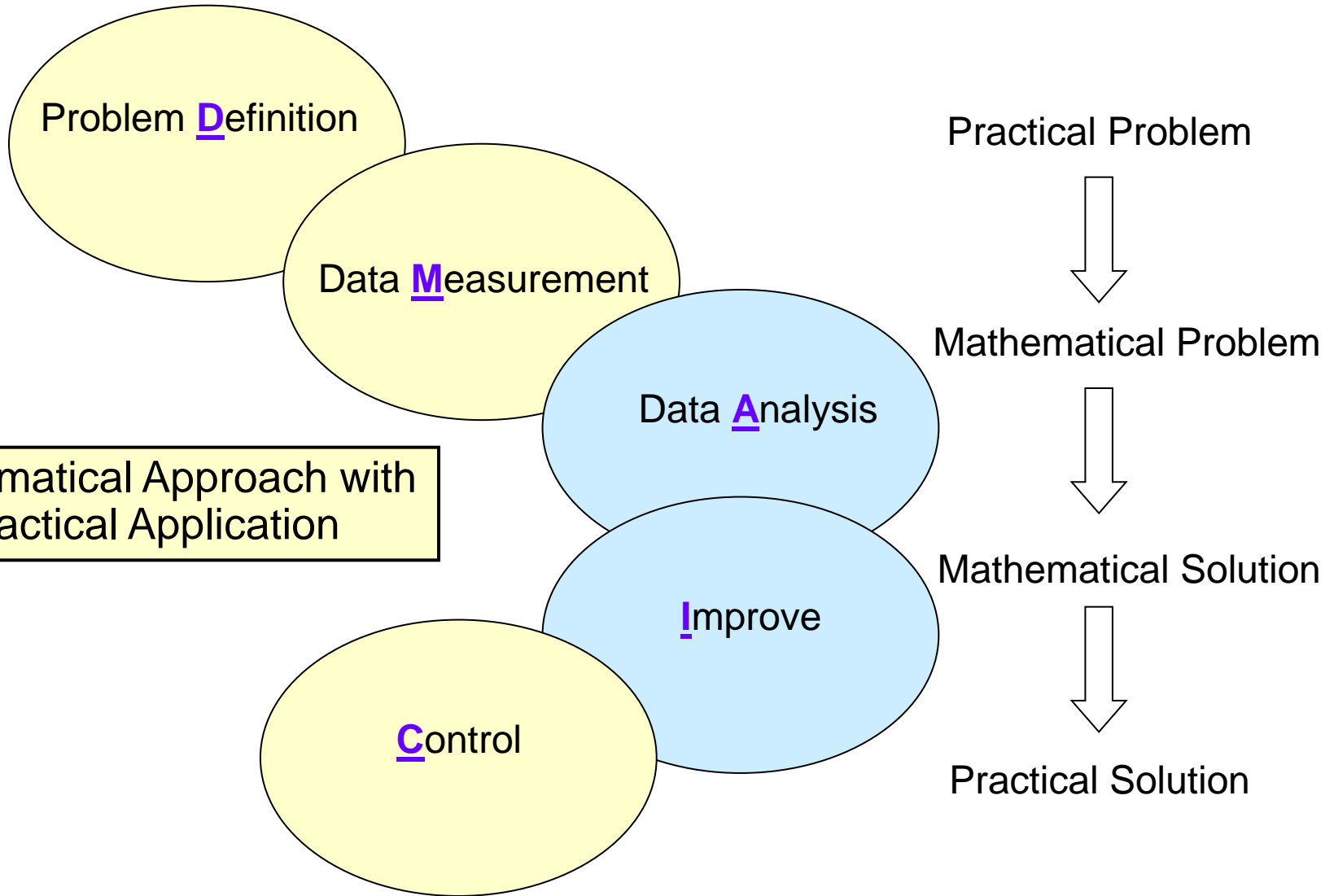   - Six Sigma tools – mathematical skills

Organizational Process Context

Process Compliance Monitor (PCM)

Integrated Process Manual (IPM)

Processes
▼
Statements

Expected

Actual

Work   Products

Practices
▲
Process Areas

Capability Maturity Model® Integration (CMMI®)

Internal Compliance

External Compliance

QA
Integrated Process
(IP)
Audits
for
IPM

Standard CMMI®
Appraisal Method
for
Process
Improvement
(SCAMPISM)

Challenge

- Problem
  - Total cost of SCAMPI^{SM} for division is significant and increases every SCAMPI^{SM} cycle (3-years)

- Goals
  - Reduce SCAMPI^{SM} preparation effort using Lean method

- Measurement
  - SCAMPI^{SM} preparation effort

- Benefits
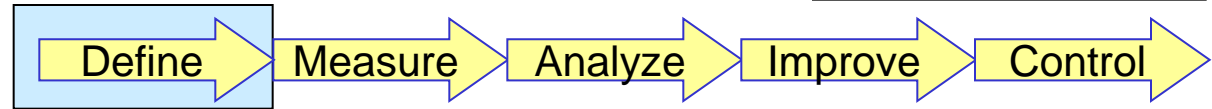 - More efficient SCAMPI^{SM} preparation process with earlier feedback for corrective actions

Approach

- Objective
  - Reduce effort in conversion for work products from internal organizational requirements to CMMI® Practices
  - Establish a work product priority to focus on the number of CMMI® practices affected by each work product
  - Reduce the rework in discovering the correct work product
- Implementation
  - Automate the conversion process
  - Prioritized work product review
  - Utilize process experts to data mine for work products
  - Complete improvements prior to next SCAMPI[SM]
  - Establish more detailed measurements of SCAMPI[SM] activities for future improvements
- Validation
  - SCAMPI[SM]

Lean Six Sigma

- A set of principles, concepts, and techniques designed to enable key processes to produce an optimum system that we'll deliver to our customers:
    - Exactly what they need
    - When they need it
    - In the quantity they need
    - In the right sequence
    - Without defects
    - And at the lowest possible cost

Six Sigma DMAIC Process

Problem Definition

Data Measurement

Data Analysis

Mathematical Approach with Practical Application

Improve

Control

Practical Problem

⇩

Mathematical Problem

⇩

Mathematical Solution

⇩

Practical Solution

SIPOC

HARRIS

Define → Measure → Analyze → Improve → Control

| **S**upplier	**I**nput	**P**rocess	**O**utput	**C**ustomer
- SCAMPI Projects - Organizational (HR, DPG)	- SCAMPI Projects - Program Work Products - Organizational Work Products	- **Characterize and reduce the frequency to review each work product** - Work products into PCM - **Export from PCM into Excel** - **Compare deltas from last PCM export** - **CMMI® conversion mapping macro** - Review & identify corrective actions - **Map corrective actions back to PCM**	- Corrective Actions - CMMI® Progress Report	- Program Team - Management - Independent Appraiser

Export, conversion and mapping of work products is Non-Productive

Rework in discovering the correct work products is Non-Productive

Brainstorming

Define → **Measure** → Analyze → Improve → Control
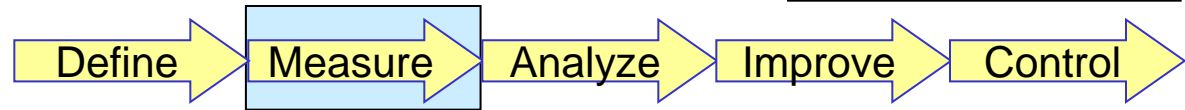
- Facilitated session with team resulting in 42 items
  - Identified 3 possible Lean applications
    - Reduce effort in PCM to CMMI® conversion for projects work products
    - Establish a work product priority to focus on the items that typically have issues and minimize the amount of effort appraising
    - Reduce the frequency of discovering correct work products
  - No detailed measurement breakdown available from previous SCAMPI^{SM} components or subparts
    - Planning
    - ✓ Preparation
      - ✓ PCM to CMMI® conversion
      - ✓ Discovery of work products
      - ❑ Review work products for corrective action
      - ✓ CMMI® to PCM conversion
    - Conduct
    - Closeout

Limited Historical Data to Demonstrate Measureable Improvement

Improvement Basis

Define → Measure → **Analyze** → Improve → Control
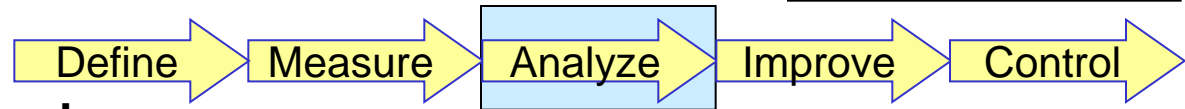
PCM to CMMI Conversion

- Sampled 4 months of SCAMPI[SM] effort for 2 individuals involved in conversion and applied 50% to represent best estimate of time spent
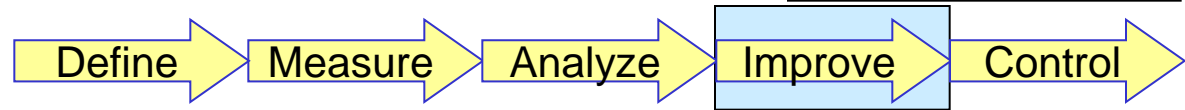 - Averaged 115 hours/month

Work Product Priority

- Analyzed the number of CMMI® practices affected by PCM default work products to prioritize

Work Products vs. CMMI Practices
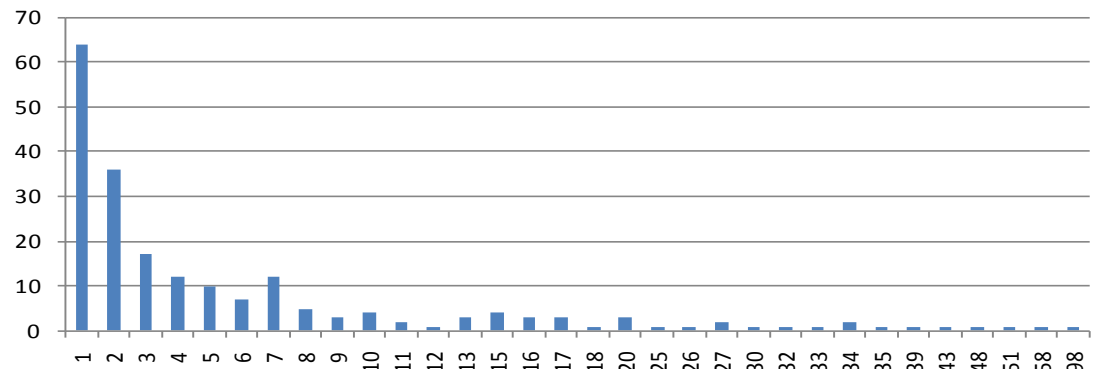
Sample to Establish Measureable Improvement

Improvement Approach

Define → Measure → Analyze → **Improve** → Control

- PCM to CMMI® conversion for projects work products
  - Reduced to a one time event
  - Alternative communication used for corrective actions
- Establish a work product priority
  - Focus on the items that typically have issues and minimize the amount of effort appraising
- Find the correct work products the first time
  - Utilized process experts to data mining based upon standard organizational tools and standard program directory structure
  - Eliminated "bring me a rock"

> **Piloted on Next SCAMPISM Event**

Implement Process Controls

Define ➤ Measure ➤ Analyze ➤ Improve ➤ Control ➤
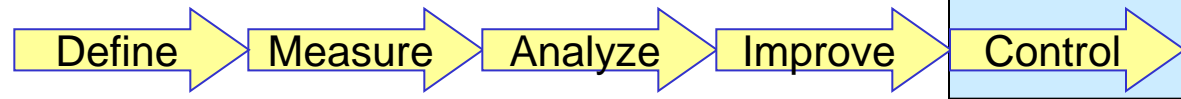
- Let's Not Do This Again
  - One time event for PCM to CMMI® conversion of projects work products
  - Establish a work product priority
  - Utilized process experts to data mining
- Setup work codes to measure SCAMPI^{SM} activities for future improvements:
  - Planning
  - Preparation
  - Program Support
  - Reviews (Readiness & On-Site)
  - Closeout

Continuous Process Improvement

Results

- Results through 1st SCAMPI^{SM} Readiness Review compared to previous 2008 SCAMPI^{SM} event
  - Preparation hours reduced by 59%
  - Cost reduced by 51%
  - Readiness of work products was improved
- Additional benefits
  - Reduced rework in discovering work products
  - Improved consistency in work products discovered across programs

Conclusions

- Lean Six Sigma provides
  - Ability to look at things differently and question habits
  - Ability to look for ways to improve how we do business
  - Tools to enable facilitating change
    - People skills
    - Mathematical skills
    - Modeling skills
    - Increased awareness of available resources
  - Data to show it pays for itself!

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- **Harris SEI Partner Business & Technical Point of Contact**

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