17 November 2005

**Business Improvements**
**Achieving CMMI® Level 5 at SAIC**

**Who Keeps Moving My Process?**

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  Chief Engineer

*System and Network Solutions Group (SNSG)*
*Science Applications International Corporation (SAIC)*
About SAIC

- Science Applications International Corporation (SAIC)
- $7.2 Billion in Revenue
- 42,000+ Employees (Offices in >150 Cities Worldwide)
- Largest Employee-Owned Research & Engineering Company

Business Areas
- Criminal Justice
- Energy – Oil & Gas & Utilities
- Environment
- Homeland Security
- Healthcare
- National Security
- Space
- Telecommunications
- Logistics
SAIC and Process Improvement

◆ SEI CMMI® Partner Program Member
  – 5 Engineers authorized to teach the SEI Course
  – 8 Engineers authorized to provide SCAMPI(SM) appraisal services

◆ Long History of Internal Process Improvement
  – Organizations at CMMI® Higher Maturity Levels at more than 10 locations
  – Organizations at Software CMM® Higher Maturity Levels at more than 20 locations, including the U.K.
  – More than 20 organizations registered ISO 9001:2000

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CMMI SE/SW
Level 5

CMMI SE/SW
Level 4

CMMI SE/SW
Level 3

CMM-SW
Level 4

CMM-SW
Level 3

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ISO 9001

Time Line

SNSG
12/04

FEDCOM
BU 11/03

ASDI Ops 1/03

SNSG*
12/03

ASDI Ops 1/02

SNSG*
11/01

SNSG* 10/01

ISO

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The “Field”

◆ Risks
  – Balancing agility, robustness, inflexibility, discipline
  – Preventing “process for process sake”
  – Complacency in process
  – Benefiting one versus many (balancing benefits throughout the organization)

◆ Constraints
  – Cost
  – Resources
  – Career path
  – Size
  – Geographically dispersed (multiple locations)
  – Diverse business base
  – Broad customer base
  – Shifts in “team” composition
The “Plows”

◆ Mechanisms

- Monthly Executive Process Reviews (group president, deputy, staff)
- Monthly SNSG Process Group meetings and metrics meetings
- Measurement program/reviews; Training program/reviews
- Web-based tools and repositories; simple Microsoft® Office-based tools
- Process and tool to manage innovative suggestions
- Process action teams, Causal analysis teams
- Change control process
- Six Sigma®
- Horizontal and vertical participation

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“Growing the Crop”

SNSG Business Goals

SNSG Monthly Process Meeting
- Group President (Chair)
- Deputy Group President (Co-Chair)
- Process/Quality Management
- Program Management Oversight
- Chief Engineer

Corporate Systems / Software Process Group (CSSPG)
- Chair
- Metrics
- Process Training
- Group Representatives

SNSG SSPG
- Process/Quality Director (Chair)
- Group Participants (Various)
- Business Unit Representatives

Deployment

Tactical Action

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The “Harvest”

- Noticeable 54% drop in pre-release defects
- Steady increase in overall customer satisfaction
- Peer reviews are approximately 84% more efficient since 2002, even though there are fewer defects to find
  - Reviews are finding defects earlier in the process (costing less) when there are less defects to be found (improved product quality)
  - Reduction in training costs; increase in employee training
- Improved effectiveness of Bid and Proposal process
- On-demand knowledge-sharing (lessons learned process)
- Improved project performance
- Increased business opportunities
- Reduction of 39% in process improvement costs while steadily increasing training, maturity of process assets, and skill sets
- Improvements accomplished while exceeding financial goals
Some Trends Experienced Along the Way

Pre- and Post-Release Defects/KSLOC

Major Defects/KSLOC

Mean Pre-Release Defects/KSLOC

Mean Post-Release Defects (Quality)

Calendar Years

2001 2002 2003 2004

General trend of decreasing defects and increasing product quality over 4 years.

Peer Review Efficiency

Defects per Review Hour

Fiscal Years

2001 2002 2003 2004

Increase in peer review efficiency despite the fact that there are fewer product defects to find.

Overall Customer Satisfaction Trends

Average Ratings

Client Assessment Rating (Average)

Calendar Years

2001 2002 2003 2004

Customer satisfaction ratings have steadily increased.

Training Program Effectiveness

Number of Course Completions

AI Training

Process-Related Training Only

Calendar Years

2001 2002 2003 2004

Overall training accomplishments increase while maintaining focus on revenue, PBT, and process improvement investments.
The “Harvest” – a PAT Example

◆ Focus On Complex Problems That Must Be Solved Repeatedly
  – Active program to foster organizational learning
  – Use a PAT as a tool to foster continuous improvement by capturing new best practices

◆ Example: Performance & Scalability Testing & Optimization for Large-scale Web-based Systems
  – Driven by business processes, not technology ⇒ meaningful to business people
  – Rigorous instrumented test and in production representative environments, producing technical metrics that provide real insight into system behavior ⇒ meaningful to engineers and technologists
The “Harvest” – a PAT Example

◆ The Process

- Business Process (BP) Analysis
- Predicted BP Threads & Usage
- Heavy Use/Load BP Threads & Usage; 80/20 Rule
- Mapping to System User Interface
- Optimization
- Instrumented Performance & Scalability Test
- Peak Load Rqmts & Behavior for System “Killer Metrics”
- Observed Usage & Peak Loads
- “Next Stage” Rollout; Increasing User Population

The Process
The “Harvest” – a PAT Example

- **General Result:** Process Assets Evolved By PATs Over Multiple Projects
  - Continuous Improvement

- **Specific Result:** Repeatable Process to Achieve Scalability, Performance, & Robust System Behavior
  - Meaningful to Business Users
  - Meaningful to Engineers
  - Achieved Without Reinventing the Wheel on Each Project ⇒ Organizational Learning
Who Keeps Moving My Process?

- Reorganizations
- Mergers and Acquisitions
- Competing resources
- “Immediate needs” versus “time to pilot and deploy”

Continuous Adaptation to Change
Working with Change

◆ In Place:
  – Transitioning process
  – Improving process improvement
  – Streamlining processes
  – Integrating processes
  – Web-enabled learning management system
  – Empowerment with accountability (and quality reviews/audits)
  – “On-demand” process training
  – Proposal readiness review process
  – Process performance modeling tool
  – Web-enabled lessons learned database and process
  – Scalable process for large systems development environment

◆ In Work:
  – Document management collaborative review tool
  – Project review improvements/streamlining
SNSG Process Improvement: Looking Ahead

Time Line

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10/01 11/01 12/03 12/04 1/05
1/02 4/02 7/02 10/02 1/03 4/03 7/03 10/03 1/04 4/04 7/04 10/04

1/05

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