Using Six Sigma to Accelerate CMMI Adoption (and Vice Versa)

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Northrop Grumman Mission Systems

• A leading integrator of complex, mission-enabling systems
• 2003 Sales - ~$4.1B
• 18,000 employees in 50 states and in 23 countries
• 1500 active contracts
• Deep, legacy domain expertise in priority, high-growth segments
• Premier provider of mission critical end-to-end solutions

Focused on program performance
Mission Success Requires Multiple Approaches

- Risk Management
- Systems Engineering
- Independent Reviews
- Training, Tools, & Templates
- Dashboards for Enterprise-Wide Measurement
- Communications & Best-Practice Sharing
- Robust Governance Model (Policies, Processes, Procedures)
- CMMI Level 5 for Software, Systems, and Services
- ISO 9001 and AS-9100 Certification
- Six Sigma
Program Effectiveness

- Six Sigma connects process improvement and business value

**DEFINE**
- Charter team, map process & specify CTQs

**MEASURE**
- Measure process performance

**ANALYZE**
- Identify & quantify root causes

**IMPROVE**
- Select, design & implement solution

**CONTROL**
- Institutionalize improvement, ongoing control

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- Six Sigma projects can help focus and measure CMMI-driven process improvements
  - Identify the customer’s needs, maximize the value/cost
  - Tools for management by variation (CMMI Levels 4 and 5)

- **Results to date**
  - Over 3500 Green Belts, 200 Black Belts, 10 Master Black Belts
  - 529 completed Six Sigma projects, 234 in progress
  - Significant benefit to our customer – lower costs, better performance

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**Assuring mission success by identifying the customer’s needs and reducing defects**
How CMM/CMMI Helps Six Sigma Efforts

- CMM/CMMI focuses on organizational change
  - Provides guidance on many dimensions of the infrastructure

**Process Areas**
- Organizational Process Focus
- Organizational Process Definition
- Organizational Training
- Organizational Process Performance
- Organizational Innovation and Deployment

**Generic Practices (all process areas)**
- GP 2.1 Establish an Organizational Policy
- GP 2.2 Plan the Process
- GP 2.3 Provide Resources
- GP 2.4 Assign Responsibility
- GP 2.5 Train People
- GP 3.1 Establish a Defined Process
- GP 2.6 Manage Configurations
- GP 2.7 Identify and Involve Relevant Stakeholders
- GP 2.8 Monitor and Control the Process
- GP 3.2 Collect Improvement Information
- GP 2.9 Objectively Evaluate Adherence
- GP 2.10 Review Status with Higher-Level Management
Barriers and Challenges

• Capturing the first, “low hanging fruit” makes Six Sigma implementation look easy…
  – Clearer problems, simpler solutions, bigger payoffs
  – Little need for coordination

…but later projects are tougher
  – Keeping projects appraised of similar efforts, past and current
  – Focusing on “the pain”, not the assumed solution

• Engineering process measurements are often difficult to analyze
  – Dirty (or no) data, human recording problems
  – May necessitate Define-Measure-Analyze-Measure-Analyze-etc.

• Must demonstrate the value of quantitative data to managers
  – Management style - reactive vs. proactive vs. quantitative
  – Less value in a chaotic environment
  – Must engage customers
Benefits

Based on 16 Northrop Grumman CMMI Level 5 organizations

• Having multiple improvement initiatives helps encourage a change in behavior as opposed to “achieving a level”
  – Reinforces that change (improvement) is a way of life

• The real ROI comes in institutionalizing local improvements across the wider organization
  – CMMI establishes the needed mechanisms

• CMMI and Six Sigma compliment each other
  – CMMI can yield behaviors without benefit
  – Six Sigma improvements based solely on data may miss innovative improvements (assumes a local optimum)

• Training over half the staff has resulted in a change of language and culture
  – Voice of Customer, data-driven decisions, causal analysis, etc.
  – Better to understand and use the tools in everyday work than to adopt the “religion”