Raytheon’s Six Sigma Process and Organizational Innovation and Deployment A Perfect Fit
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Outline

- Raytheon Six Sigma (R6σ)
- The Basic R6σ Process and Tools
- R6σ and Organization Innovation and Deployment
- R6σ is Optimizing Processes- Level 5
Raytheon Six Sigma (R6σ)

R6σ is a Knowledge Based Process we will use to Transform Our Culture in order to Maximize Customer Value and Grow Our Business.
Raytheon Six Sigma
(R6σ)

• Tenets
  – Specify value in the eyes of the customer
  – Identify value stream
  – Simplify the steps and eliminate waste & variation along the value stream
  – Make value flow at the pull of the customer
  – Involve and empower employees
  – Continuously improve knowledge in pursuit of perfection

• Approach
  – Simple standard process
  – Tools to focus on measurements
  – Measures become knowledge

Tenets of Raytheon Six Sigma are the same as “Lean”
The Basic R6σ Process

**Achieve:**
- Data analysis
- Communication
- Celebrate success

**Visualize:**
- Business Goals
- Customer Needs
- Benchmarks
- Gap Analysis
- Business Issues

**Commit:**
- Team building
- Negotiation
- Contract for Change

**Improve:**
- New Processes
- Workplace organization
- Performance metrics
- SOP

**Prioritize:**
- Fishbone diagrams
- Pareto charts
- Balanced Scorecard
- 5 Whys
- Decision Matrix
- QFD

**Characterize:**
- Capacity Analysis
- Process Flow
- Time Value Map
- Metrics
- IPO
- Root Cause Analysis

The Basic R6σ Process

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Space and Airborne Systems

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The Basic R6σ Process

Provides the framework for activities . . .

- Improve metrics
- Share lessons, best practices
- Share Knowledge
- Celebrate

- Monitor metrics
- Train personnel
- Deploy
- Institutionalize

- Improve value stream
- Root cause analysis
- Assessment

- Problem Statement
- Vision of the Future
- Best Practice (model)

- All Stakeholders
- Sponsorship
- Resources

- Develop Criteria
- Decision Analysis
- Gap Assessment

. . . to make changes in an organizational process.

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The Basic R6σ Process

- Visualize
- Commit (Performance Gap)
- Prioritize
- Achieve
- Improve
- Characterize
- Root Cause Analysis

Goal vs. Projected

Pareto Analysis

“Big-Hitters”

Pressure Point

Improvement Plan

Achieve

Improve

Characterize

Root Cause Analysis
R6σ Applied to CMMI Process Improvement

- For Product Development Process
  - Knowledge Based Process (facts and measured process data)
  - Transform Culture (mature processes quickly in steps that provide sustained change)
  - Maximize Customer Value (discipline without bureaucratic waste)

- This institutionalized process is used to support rapid maturation and model compliance

- By application of the tenets, methods, process and tools in organizational business processes
R6σ and CMMI
Organizational Innovation and Deployment

- Organizational Innovation and Deployment
  - SG 1 Select Improvements
    - SP 1.1-1 Collect and Analyze Improvement Proposals V/P
    - SP 1.2-1 Identify and Analyze Innovations V/P
    - SP 1.3-1 Pilot Improvements C
    - SP 1.4-1 Select Improvements for Deployment C
  - SG 2 Deploy Improvements
    - SP 2.1-1 Plan the Deployment I
    - SP 2.2-1 Manage the Deployment I
    - SP 2.3-1 Measure Improvement Effects A

V= Visualize; Co= Commit; P= Prioritize; C= Characterize; I= Improve; A= Achieve
A Typical Project

Organizational Innovation and Deployment

- SG 1 Select Improvements
  - SP 1.1-1 Collect and Analyze Improvement Proposals
    - Visualize- A Program has had a vendor supplied part which has failed in verification tests at a higher level of assembly
    - Visualize- Root Cause was determined to be a specification change that was not communicated
    - Commit- A team is formed to develop improvements
    - Prioritize- Brainstorming and current state characterization yield several ideas
    - Prioritize- The team prioritizes ideas based upon the difficulty and the benefit ratio
  - SP 1.2-1 Identify and Analyze Innovations
    - Characterize- One idea requires an automated tool shared with the vendor which was identified from another business (benchmarking)
  - SP 1.3-1 Pilot Improvements
    - Characterize- Develop a pilot to try out the new innovation (automated tool)
    - Characterize- During the usage it was determined that there would need to be an improved licensing arrangement and the training was inadequate
    - Characterize- Measure the current state requirements flowdown to the vendor
  - SP 1.4-1 Select Improvements for Deployment
    - Characterize- Lessons from the pilot are folded in to the improvement and the programs where this tool would have most benefit are selected by the team

- SG 2 Deploy Improvements
  - SP 2.1-1 Plan the Deployment
    - Improve- Assign personnel, educate the users, acquire licenses and install tools
  - SP 2.2-1 Manage the Deployment
    - Improve/Achieve- Monitor the number of programs using it, the number of people trained and assure compliance to the deployment plans
  - SP 2.3-1 Measure Improvement Effects
    - Achieve- Assure the measures of requirements flow down have improved
R6σ Applied to Organizational Innovation & Deployment

- Create an organization that selects and deploys improvements that can enhance the organization’s ability to meet its quality and process-performance objectives

- Measure the effects of the deployed process and technology improvements
- Analyze the progress toward achieving the organization’s quality and process-performance objectives and take corrective action as needed
- Capture decisions, results and revise as necessary

- Select process and technology improvement proposals for deployment and incorporate into organizational process assets, as appropriate
- Plan and manage the deployment

- Pilot improvements and analyze evaluation reports and lessons learned from pilots
- Analyze the organization’s set of standard processes to identify where innovative improvements would be beneficial
- Investigate innovative improvements that may improve the organization’s set of standard processes
- Analyze potential innovative improvements to understand their effects on process elements and predict their influence on the process
- Analyze the costs and benefits of potential innovative improvements
- Create process- and technology improvement proposals for those innovative improvements that would result in improving the organization’s processes or technologies

- Establish a method for collecting and analyzing process and technology improvement proposals, and for identifying and analyzing innovations
- Identify potential barriers and risks to deploying each improvement
- Estimate cost, effort and schedule required for deployment

- Identify process/technology improvements that are innovative
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**Raytheon**

Space and Airborne Systems

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R6σ Applied to Organizational Innovation & Deployment

Approach to OID

- Sponsor commitment
- Organizational commitment

- Measure the improvement effects

- Modify the organization’s standard process
  - Plan and manage deployment

- Collect improvement and innovation proposals
  - Prioritize improvements for deployment

- Analyze improvements and innovations for benefits to organization
  - Pilot Improvements

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Optimizing Processes

- At the peak of maturity and institutionalization, CMMI level 5 and Raytheon Six Sigma are very much aligned
- Process Capability ($C_{pk}$) applied to engineering processes
  - measured and controlled processes with process control limits
  - measured over a significant sample
  - engineering development process can be modeled statistically
  - measured and calibrated over time

*Raytheon Six Sigma is An Institutionalized Process to Achieve Level 5*
Summary

• R6σ is a knowledge based process transforming Raytheon culture to maximize customer value and grow our business.
• R6σ tenets are the same as “Lean”
• Basic R6σ process (visualize → commit → prioritize → characterize → improve → achieve) provides a framework for organizational process change.
• R6σ genesis was to:
  – Gain production benefits
  – Leverage improvements across the enterprise
  – Focus on the company’s value stream
• CMMI OID PA shares R6σ elements
• R6σ accelerates Raytheon’s process maturation, and it provides a framework to help drive CMMI efforts across all business areas and disciplines