Raytheon
Space and Airborne Systems

Raytheon's Six Sigma Process and Its Application for CMMI

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Outline

- Raytheon Six Sigma (R6σ)
- The Basic R6σ Process and Tools
- R6σ Applied to CMMI Process Improvement
- Optimizing Processes- Level 5

R6σ
Raytheon Six Sigma

Raytheon Six Sigma (R6σ)

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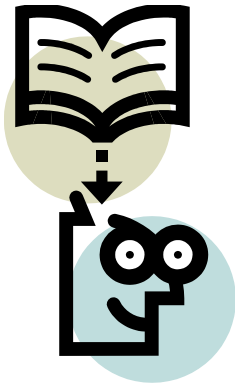
R6σ is a

Knowledge Based Process

we will use to

Transform Our Culture

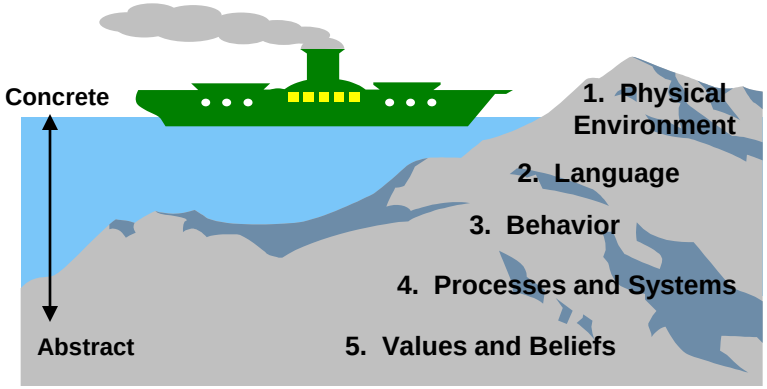
in order to



Maximize Customer Value

and

Grow Our Business



Raytheon Six Sigma (R6σ)

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- 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

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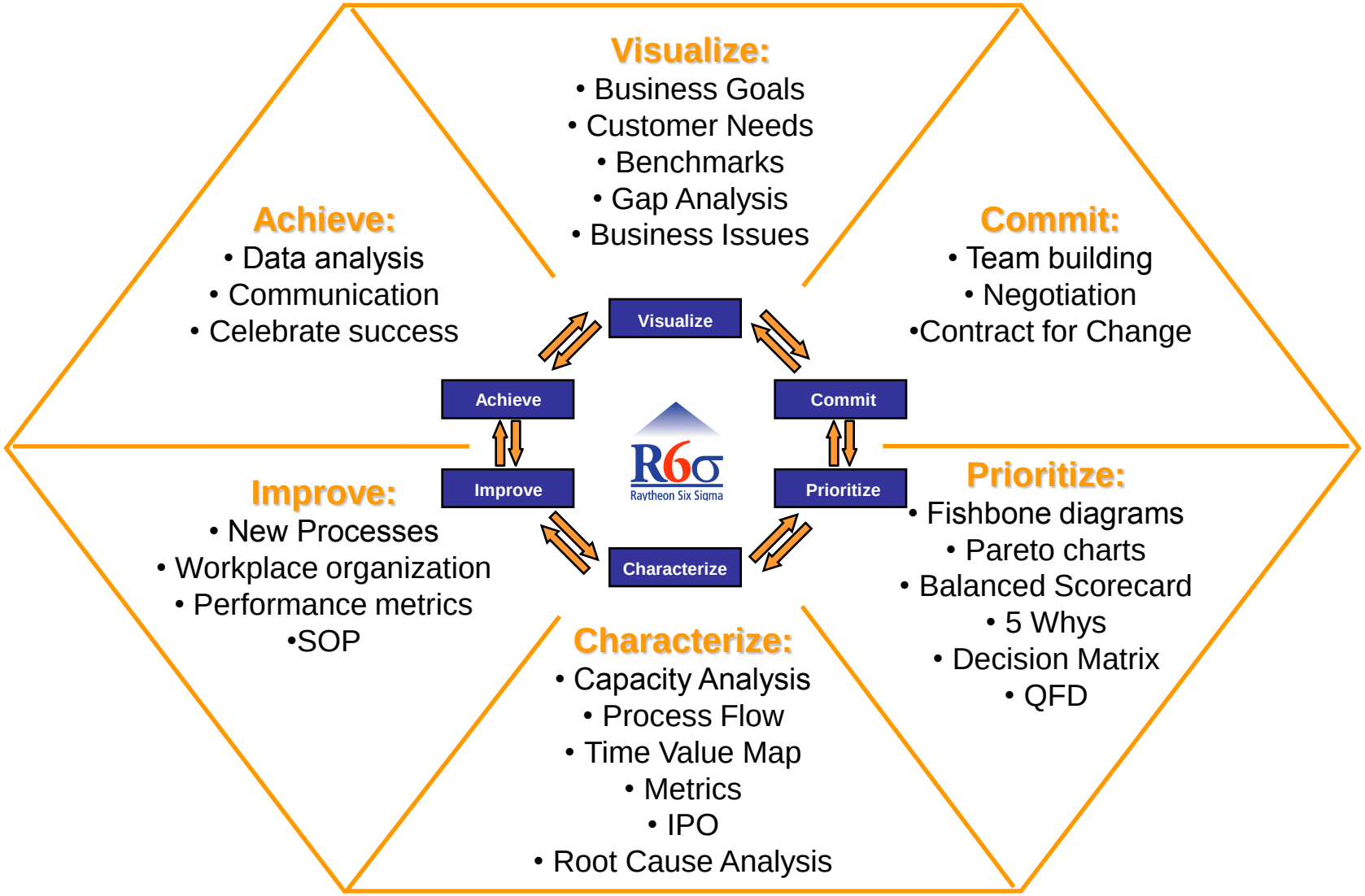

The Basic R6σ Process

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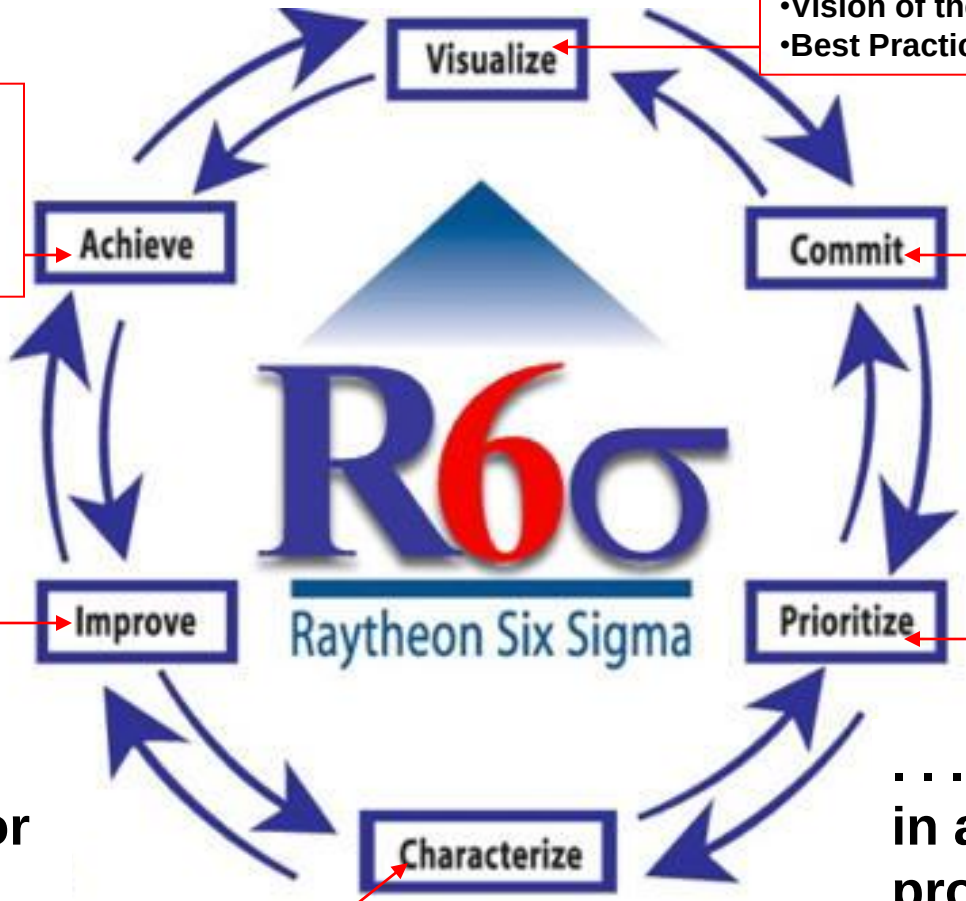

- Problem Statement
- Vision of the Future
- Best Practice (model)

- All Stakeholders
- Sponsorship
- Resources

- Develop Criteria
- Decision Analysis
- Gap Assessment

- Identify value stream
- Root cause analysis
- Assessment

- Monitor metrics
- Train personnel
- Deploy
- Institutionalize

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

Provides the framework for activities . . .

. . . to make changes in an organizational process.

The Basic R6σ Process

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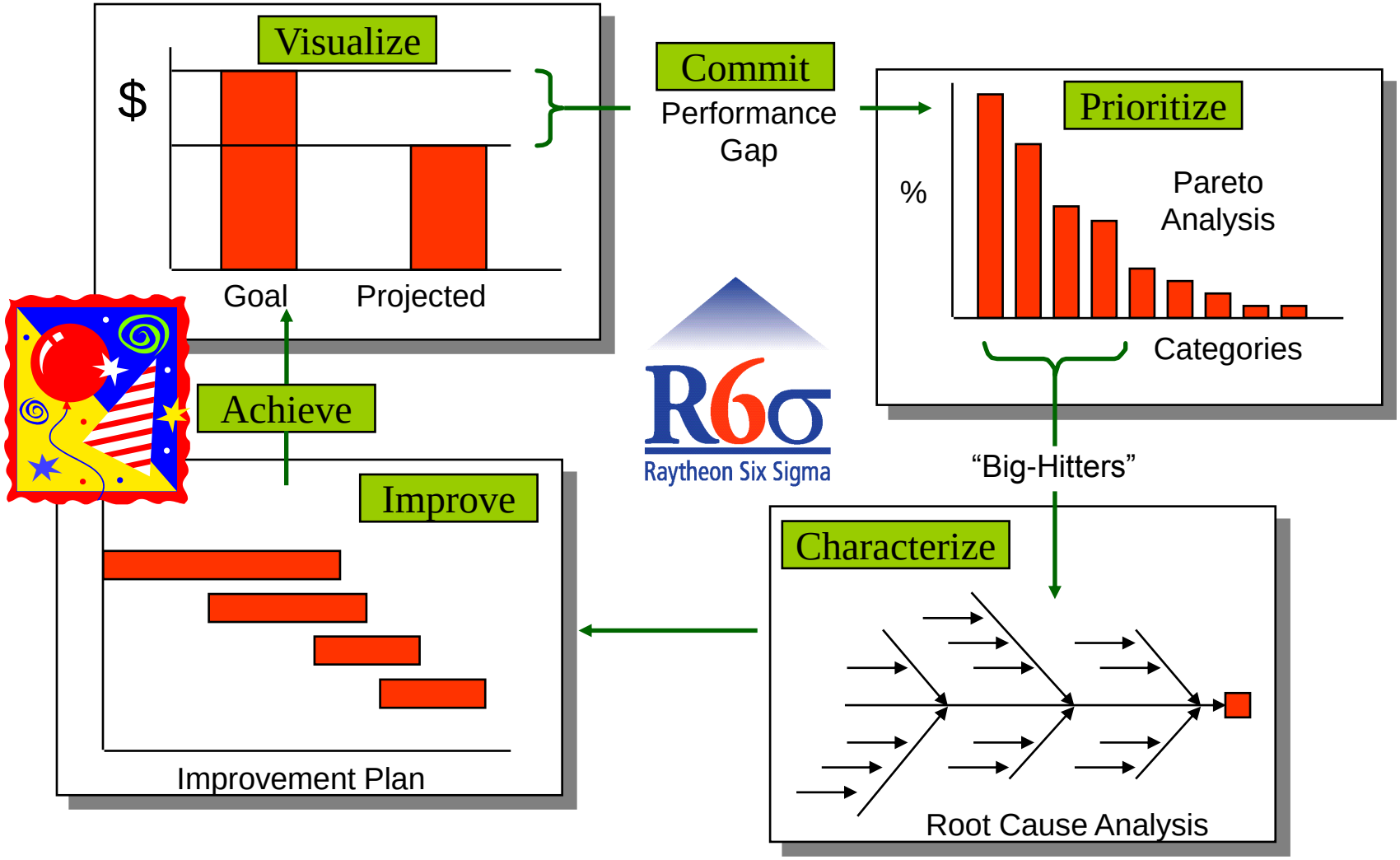

R6σ Applied to CMMI Process Improvement

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- 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 Applied to CMMI Process Improvement

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•Improved deployment metrics
•Share lessons, best practices
•Share Knowledge throughout Raytheon
•Celebrate Ratings

•CMMI level 3 to remain competitive
•Stable performance- reduce process variation
•Program Managers (WIIFM)- Cost and Schedule Performance Improvement

•VP Level Oversight Team Appointed
•Leadership Briefings and Meetings
•Resources Allocated-Budget/Staff
•Steering Committee Established
•Program Leadership Council Established

•Deploy the process
•Measure the process
•Collect Artifacts
•Train the practitioners

•SOW for the Enterprise Process Group (EPG)
•Process Improvement Plan
•IPI Appraisals (4) (Class B)
•Gate 5 (PLAN) Review
•Gap Assessment to model
•Cost/Benefit Analysis

•Examine existing processes to leverage - document (eg. IPDS, Team of X, SW CMM)
•Revise existing processes to address gaps from CMMI model
•Find best practices to steal from other Raytheon organizations
•Scorecards for monitoring progress
•Risk Analysis and mitigation

R6σ Applied to CMMI Process Improvement

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Many CMMI process areas have elements of R6σ

- Measurement and Analysis (MA)
- Decision Analysis and Resolution (DAR)
- Causal Analysis and Resolution (CAR)
- Organization Innovation and Deployment
- Collect Improvement Information (GP 3.2)

R6σ Applied to CMMI Process Improvement

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- Measurement and Analysis
  - **Develop and sustain a measurement capability that is used to support management information needs**

- Raytheon Six Sigma
  - **Develop (Characterize, Improve) and sustain a measurement capability (Achieve) that is used to support management information needs (Visualize, Commit)**
  - **Achievement requires a sustained metric**

R6σ Applied to CMMI Process Improvement

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- Decision Analysis and Resolution
  - **Analyze possible decisions using a formal evaluation process that evaluates identified alternatives against established criteria**
- Raytheon Six Sigma
  - **Analyze possible decisions using a formal evaluation process (Prioritize) that evaluates identified alternatives against established criteria**
  - **Every employee is trained in six sigma methods and tools for prioritizing: making decisions about what has priority**
  - **Decision Tools include QFD, OPM, Balanced Scorecard, Ishikawa, Decision Tree, Pareto, FMECA**

R6σ Applied to CMMI Process Improvement

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- Causal Analysis and Resolution
  - **Identify causes of defects and other problems and take action to prevent them from occurring in the future**

- Raytheon Six Sigma
  - **Identify causes of defects (Characterize) and other problems and take action to prevent them from occurring in the future (Improve)**
  - **Every employee is trained in six sigma methods and tools to determine root cause**
  - **Characterization Tools include Gemba, Value Stream Mapping, FMECA, Root Cause Analysis (5 Whys)**

R6σ Applied to CMMI Process Improvement

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- Organization Innovation and Deployment
  - **Select and deploy incremental and innovative improvements that measurably improve the organization's processes and technologies, aligned to organization's business objectives**

- Raytheon Six Sigma
  - **Select (Visualize, Commit, Prioritize) and deploy incremental and innovative improvements (Characterize, Improve, Achieve) that measurably (Achieve) improve, aligned to organization's business objectives (Visualize, Commit)**

R6σ Applied to CMMI Process Improvement

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- Collect Improvement Information
  - **Collect work products, measures, measurement results, and improvement information derived from … process to support future use and improvement of the organization's processes and process assets.**
- Raytheon Six Sigma
  - **Collect work products, measures, measurement results, and improvement information (Achieve)**
  - **All six sigma work is stored in a Power Steering Database- providing leadership with aggregated financial improvement data**
  - **Knowledge sharing is a core tenet of six sigma: to share best practices and lessons learned**

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 statistically 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 process areas share R6σ elements: MA, DAR, CAR, OID, GP 3.2
- R6σ is an institutionalized process to achieve CMMI Level 5
- R6σ accelerates Raytheon's process maturation, and it provides a framework to help drive CMMI efforts across all business areas and disciplines