

Strategies for Successfully Implementing CMMI and Six Sigma

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Topics

- **Background**
- **Six Sigma and CMMI**
- **Process Hierarchy**
- **Process Management Responsibilities**
- **Summary**



TRW Systems

- A leading global integrator of complex systems
 - Based on information technology and systems engineering expertise
 - Integrated solutions: architecture, development and sustainment
- Many customers and markets in transformation
- Six Sigma and CMMI – cornerstones of our transformation



Treasury Communications System



Intercontinental Ballistic Missile Program



Ohio MARCS

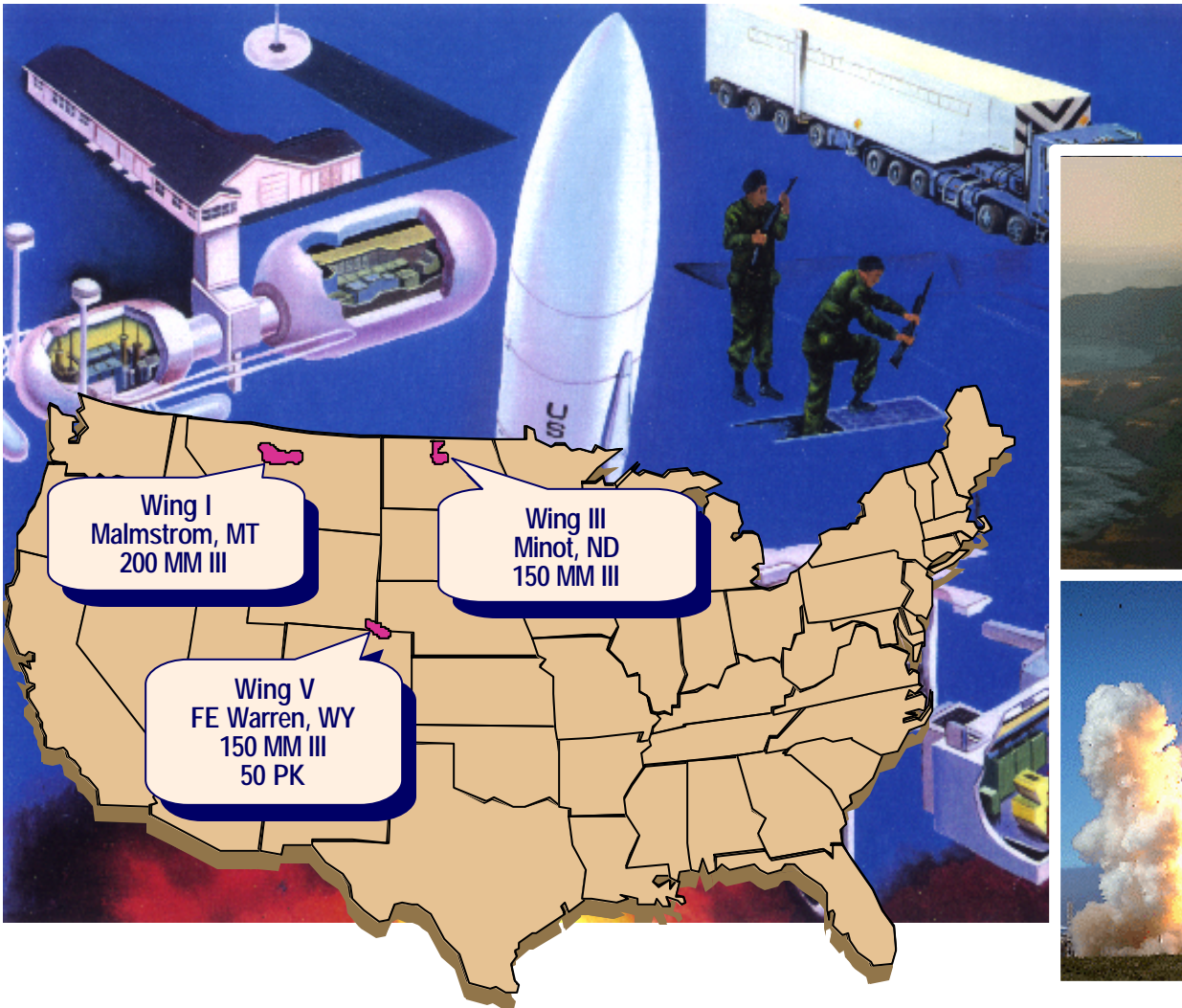


Business Drivers

- **Competitive advantage through lower costs and lower risks**
 - Ability to predictably deliver on time and within schedule
 - Increased customer satisfaction and associated growth
- **Better business management through management by data**
 - Quantitatively understand performance and quality drivers
 - More strategic and less tactical
- **Enterprise approach to process improvement**
 - Ability to capitalize on knowledge from all across the organization
 - Common infrastructure for all improvement initiatives
 - Common policies, processes, and training



ICBM's Form Backbone of U.S. Strategic Deterrence



Minuteman

- Continued operational need through 2020

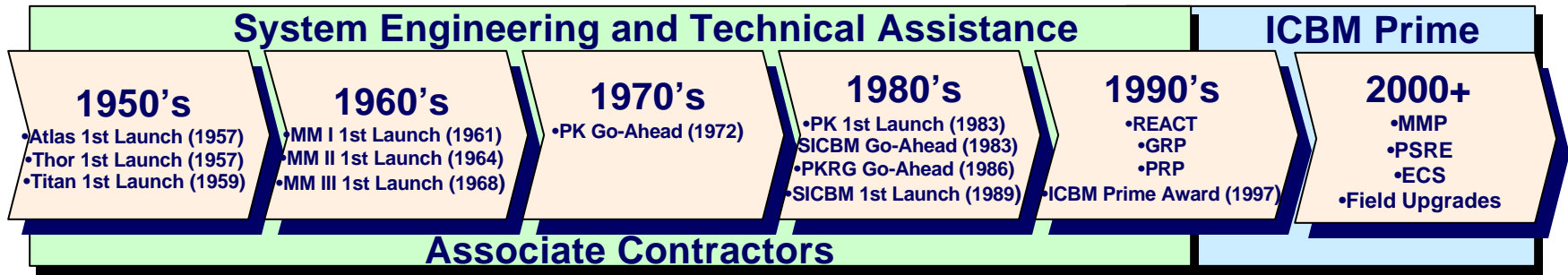


Peacekeeper

- To be eliminated under START II



The ICBM Program Is a Team Effort



TRW

Program Management,
Systems Engineering and
Integration

Boeing

Guidance Systems,
Ground Systems,
Systems Support

Lockheed Martin

Ground Systems,
RS/RV, PK IFSS

Thiokol/CSD

Joint Venture Propulsion



Aerojet

General Dynamics
Logicon
Northrop
Allied Signal
C.S. Draper Labs
Honeywell
Litton
Raytheon
ARC
Veridian
M-L Technologies
Dav-Lear
SAIC
PrimeTech

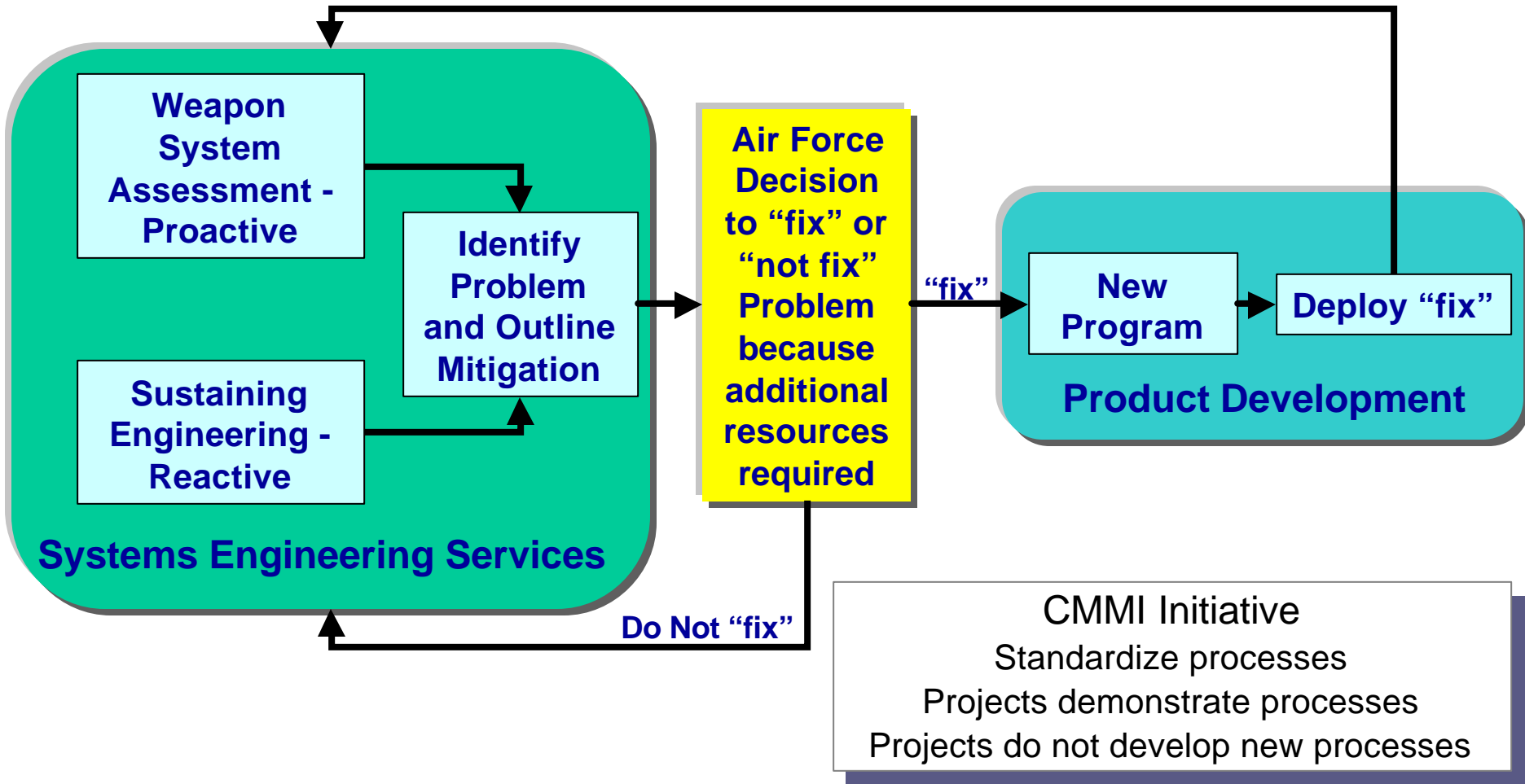
Integration Across
Programs

Accountability for
System Performance

Efficiency Through
Consolidation



“Program” (Contract) is a Set of Related Programs/Projects

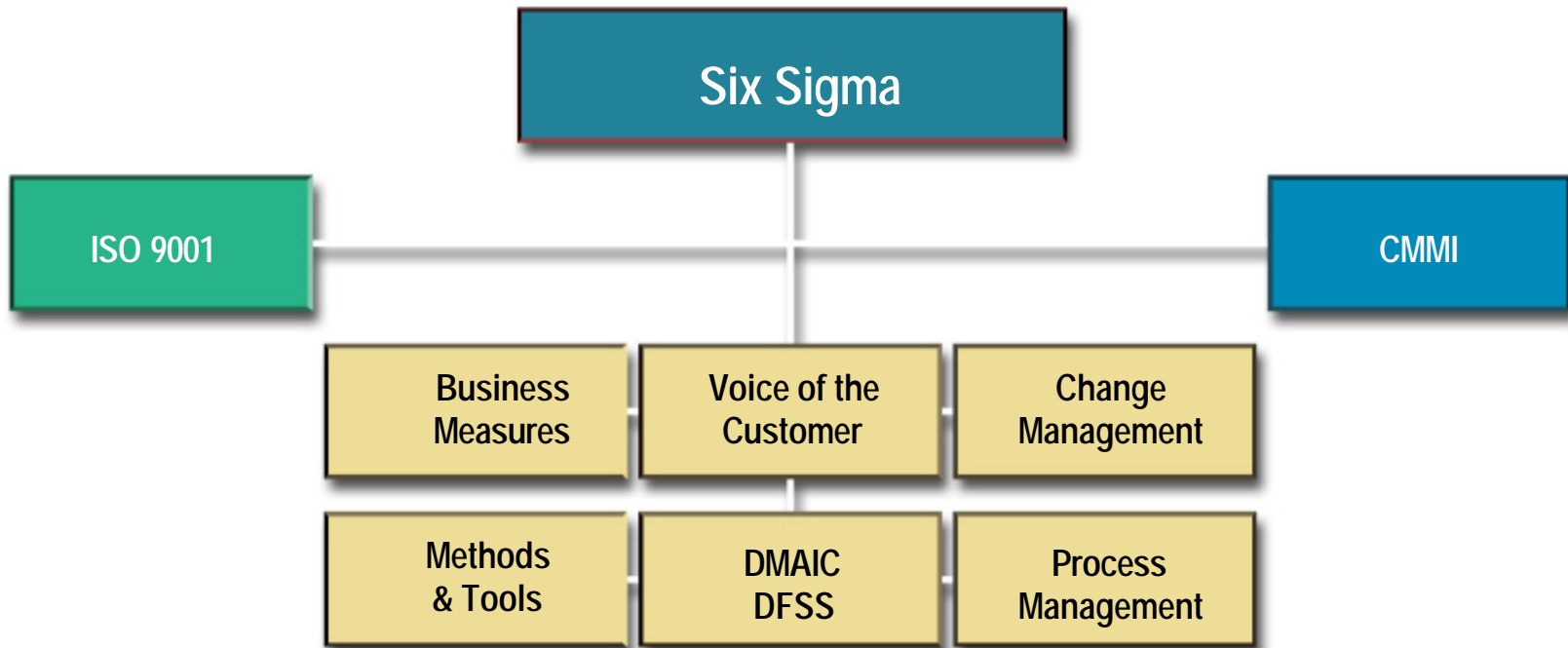




Six Sigma and CMMI



TRW Systems' Integrated Approach to Process Improvement



- ISO 9001 provides the quality management discipline for all project and functional areas
- Six Sigma provides a comprehensive framework for ensuring process improvements support corporate goals
- CMMI ensures the use of industry best practices in software and systems engineering



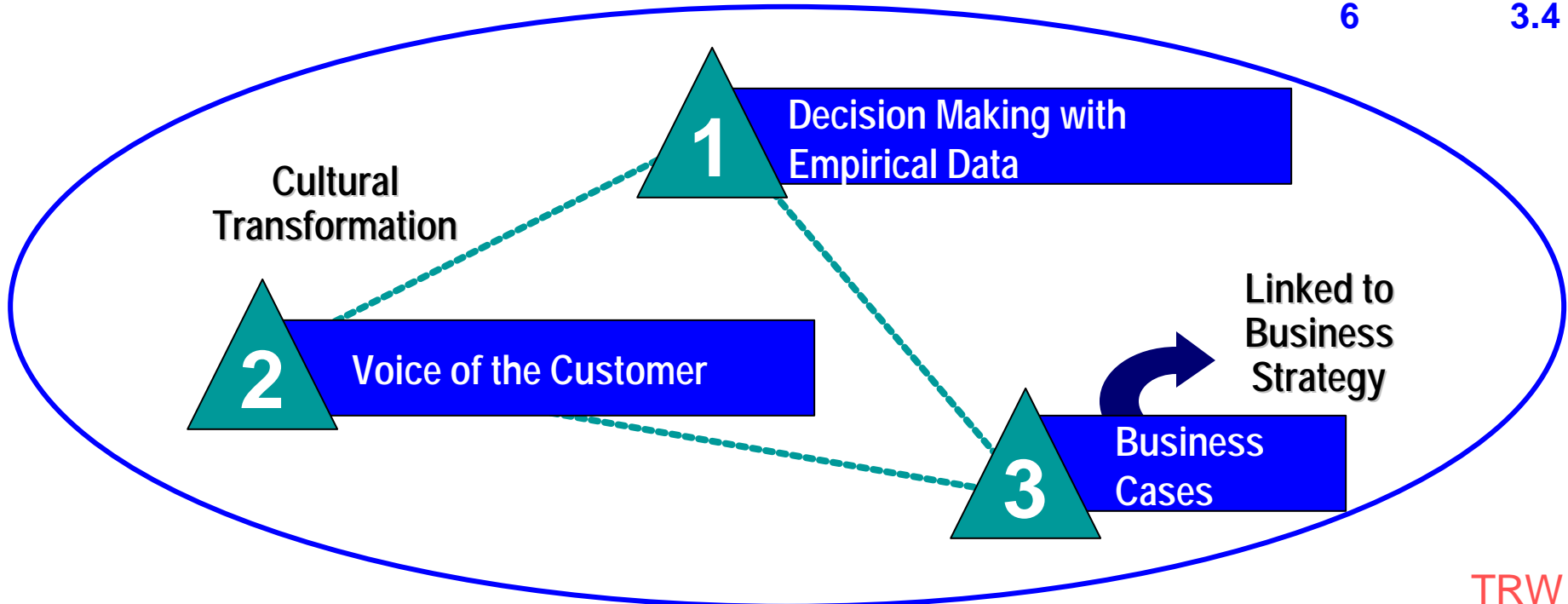
What is Six Sigma?

A Process Improvement Methodology

Like BPR, TQM, ISO 9000, CMM, etc.

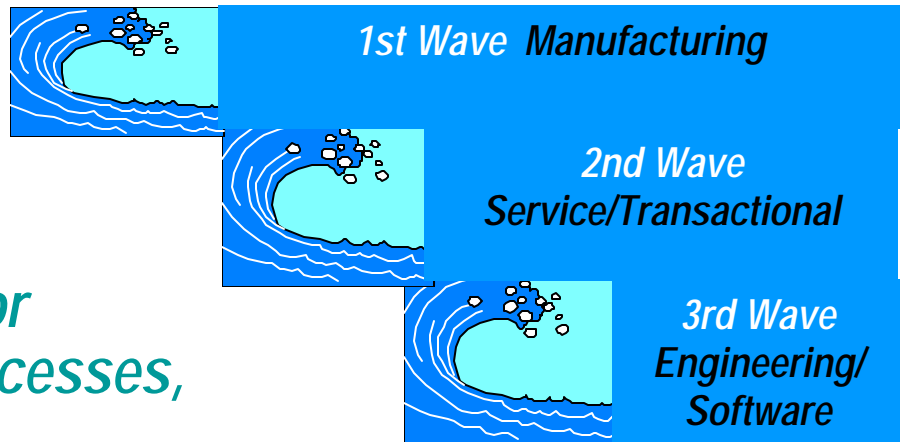
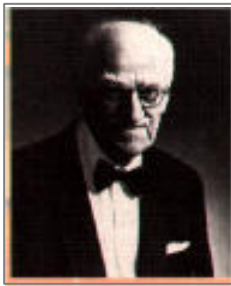
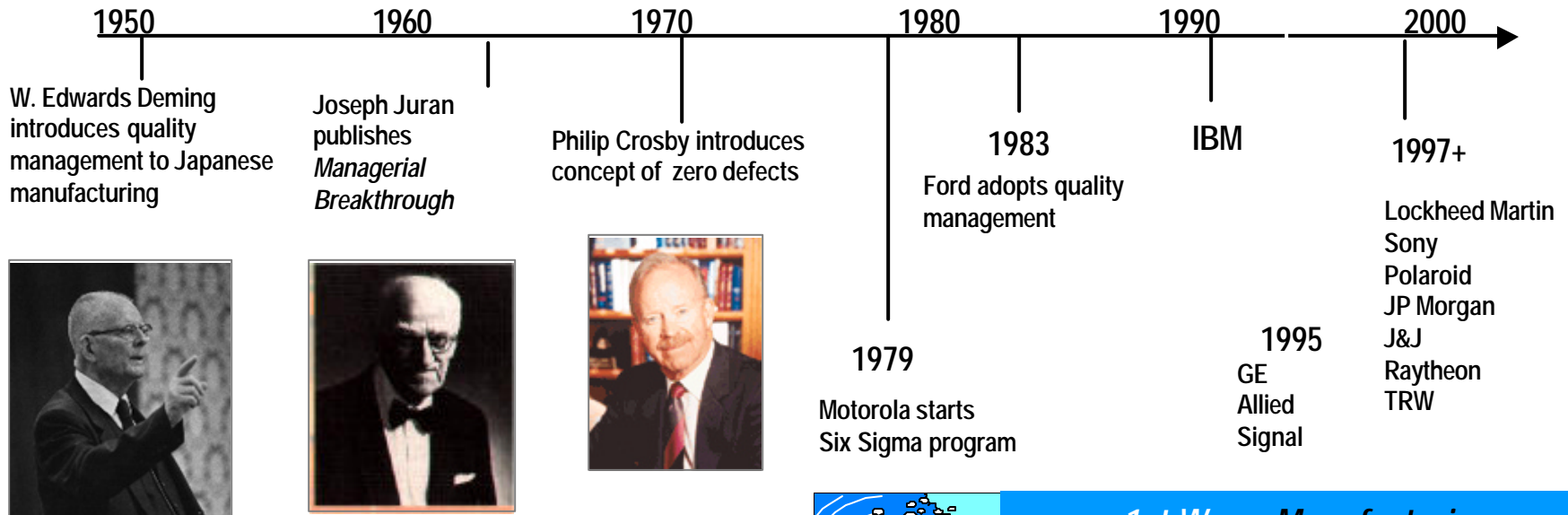
Has Three Major Elements

Sigma	DPMO
1	680,000
2	298,000
3	67,000
4	6,000
5	400
6	3.4





History of Six Sigma



Six Sigma

A best-in-class change strategy for accelerating improvements in processes, products, and services



How Six Sigma Compliments CMMI

For an individual process:

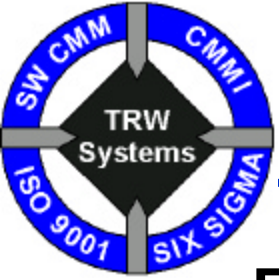
- CMM/CMMI identifies *what* activities are expected (industry best-practice)
- Six Sigma identifies *how* activities might be improved (more efficient, more effective, ...)

Example – Project Planning in CMMI

SG 1	Establish Estimates
SP 1.1	Estimate the Scope of the Project
SP 1.2	Establish Estimates of Project Attributes
SP 1.3	Define Project Life Cycle
SP 1.4	Determine Estimates of Effort and Cost
SG 2	Develop a Project Plan
SP 2.1	Establish the Budget and Schedule
SP 2.2	Identify Project Risks
SP 2.3	Plan for Data Management
SP 2.4	Plan for Project Resources
SP 2.5	Plan for Needed Knowledge and Skills
SP 2.6	Plan Stakeholder Involvement
SP 2.7	Establish the Project Plan
SG 3	Obtain Commitment to the Plan
SP 3.1	Review Subordinate Plans
SP 3.2	Reconcile Work and Resource Levels
SP 3.3	Obtain Plan Commitment

Could fully meet CMMI goals and practices, but still write poor plans

Six Sigma can be used to make planning process more efficient and yield better plans



How CMMI Compliments Six Sigma

For the organizational infrastructure:

- Six Sigma identifies *what* activities are used for improvement (DMAIC, DFSS)
- CMM/CMMI identifies *how* those activities might be implemented (Process Groups, Training Offices)

Example – Organizational Process Focus in CMMI

SG 1 Determine Process Improvement Opportunities

- SP 1.1 Establish Organizational Process Needs
- SP 1.2 Assess the Organization's Processes
- SP 1.3 Identify the Organization's Process Improvements

SG 2 Plan and Implement Process Improvement Activities

- SP 2.1 Establish Process Action Plans
- SP 2.2 Implement Process Action Plans
- SP 2.3 Deploy Process and Related Process Assets
- SP 2.4 Incorporate Process-Related Experiences into the Organization's Process Assets

GG 3 Institutionalize a Defined Process

Six Sigma doesn't assess overall organizational capability

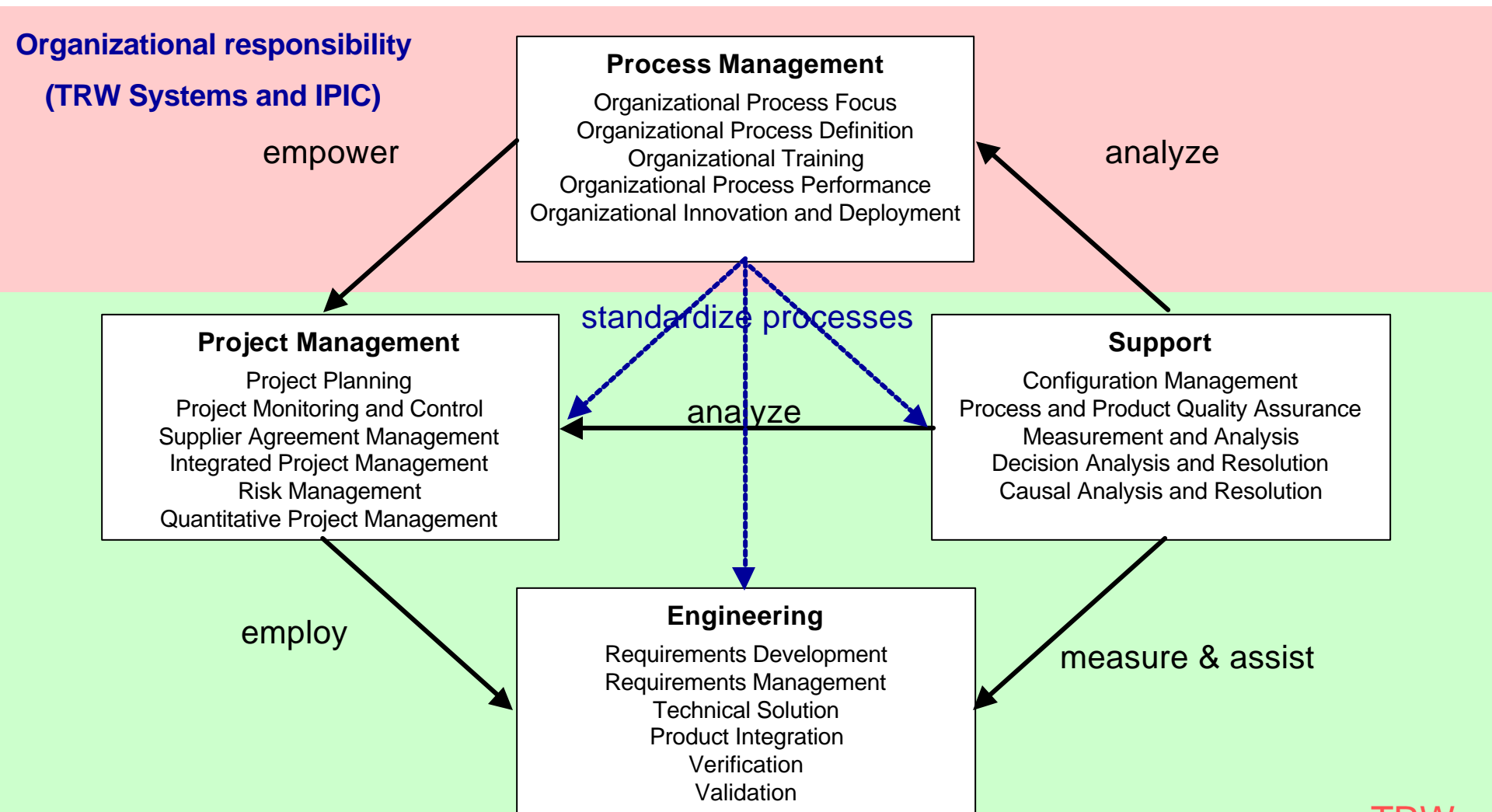
CMMI provides an approach to setting up the infrastructure



Process Hierarchy



CMMI Process Area Relationships





Process Life-Cycle

Industry/Government Standards



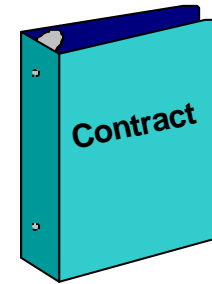
Organizational Policies & Processes



Organizational Training & Tools



Project Plans



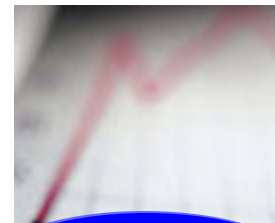
Project Schedules & Budgets



Metrics Database



Project Results



Our approach supports continual process improvement



Organizational Performance

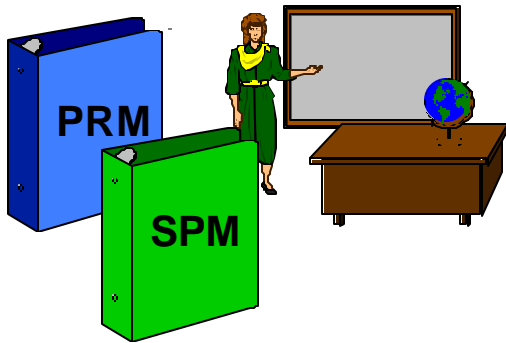
Project Performance



Highlights of Our Approach

Enterprise-Wide Institutionalization

- Policy & Requirements Manual
- Standard Process Manual
- Training

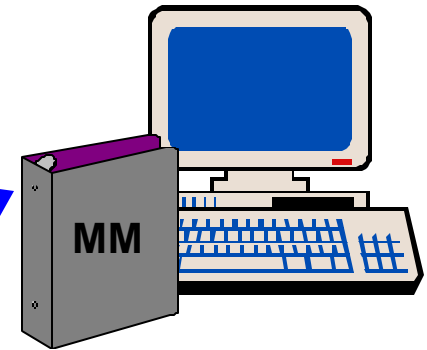


Six Sigma projects:

- Fill CMMI gaps
- Improve CMMI processes
- Applies Six Sigma methods and tools to Levels 4 and 5

Quantitatively Measured

- Metrics Manual
- Measurement repository



Projects



Six Sigma Teams

- DMAIC/DFSS
- Tools & methods



CMMI Assessments

- Self-Assessment Tool
- Internal/external formal assessments

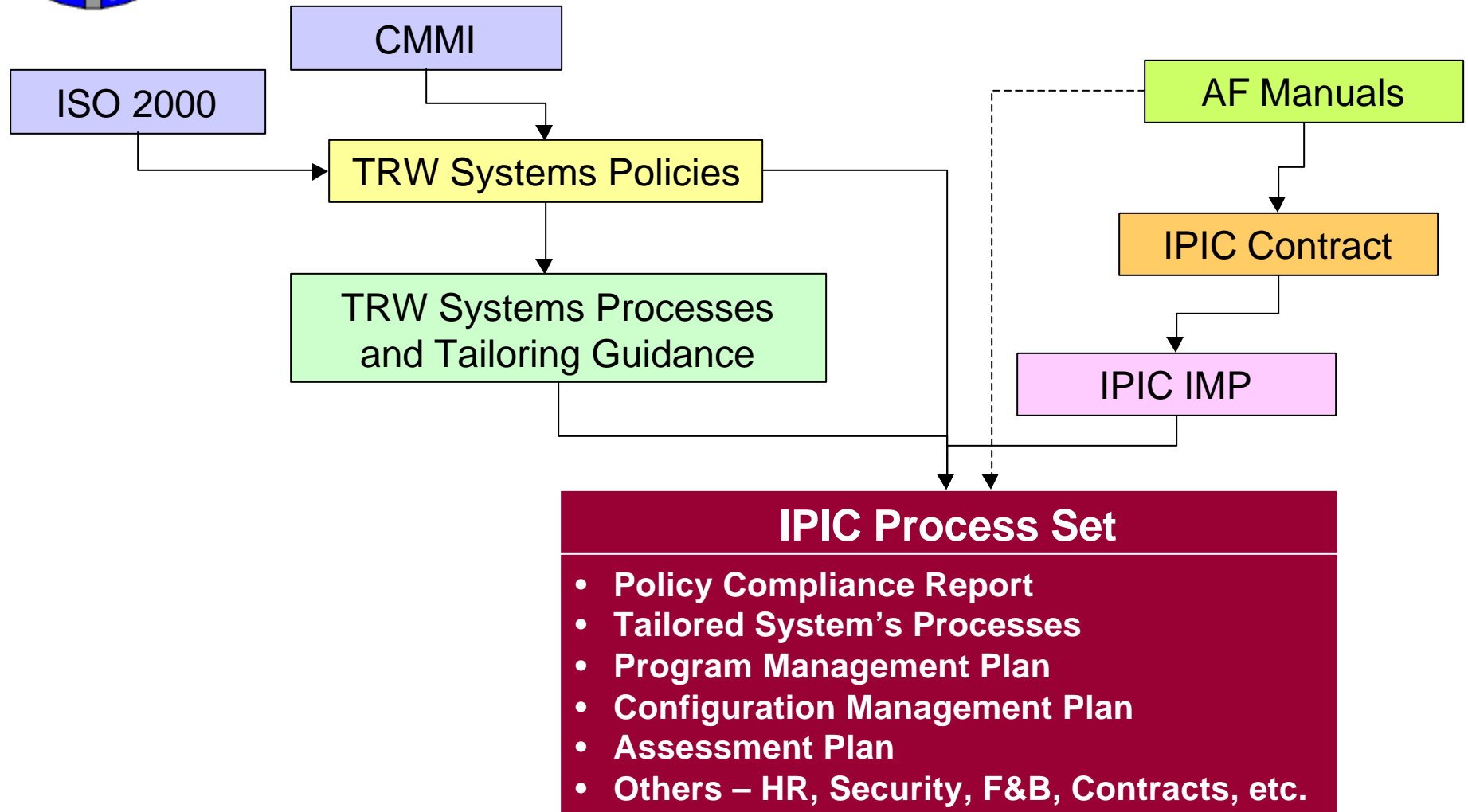


CMMI/Six Sigma Synergy

- Project Reviews/Summits
- Integrated strategies

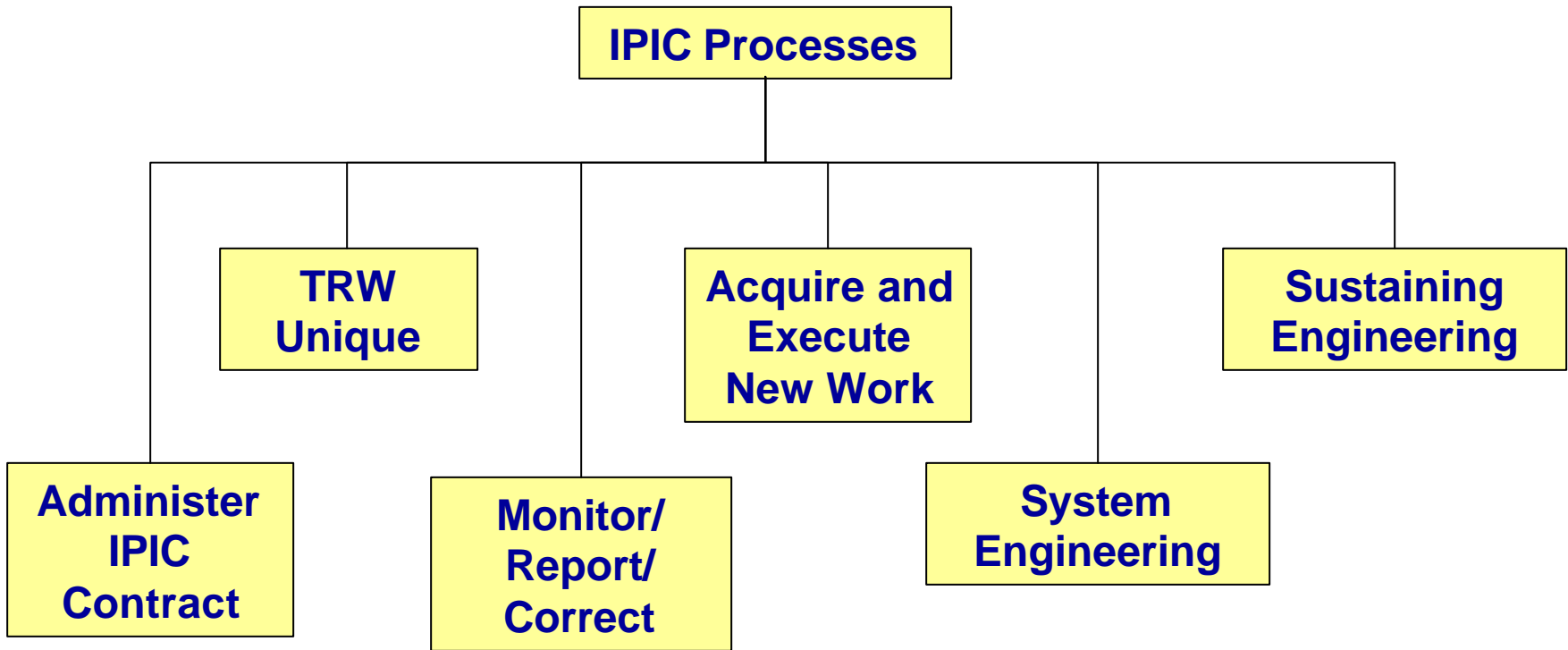


IPIC Process Requirements Hierarchy





Working Level Architecture



Make it easy for the employees



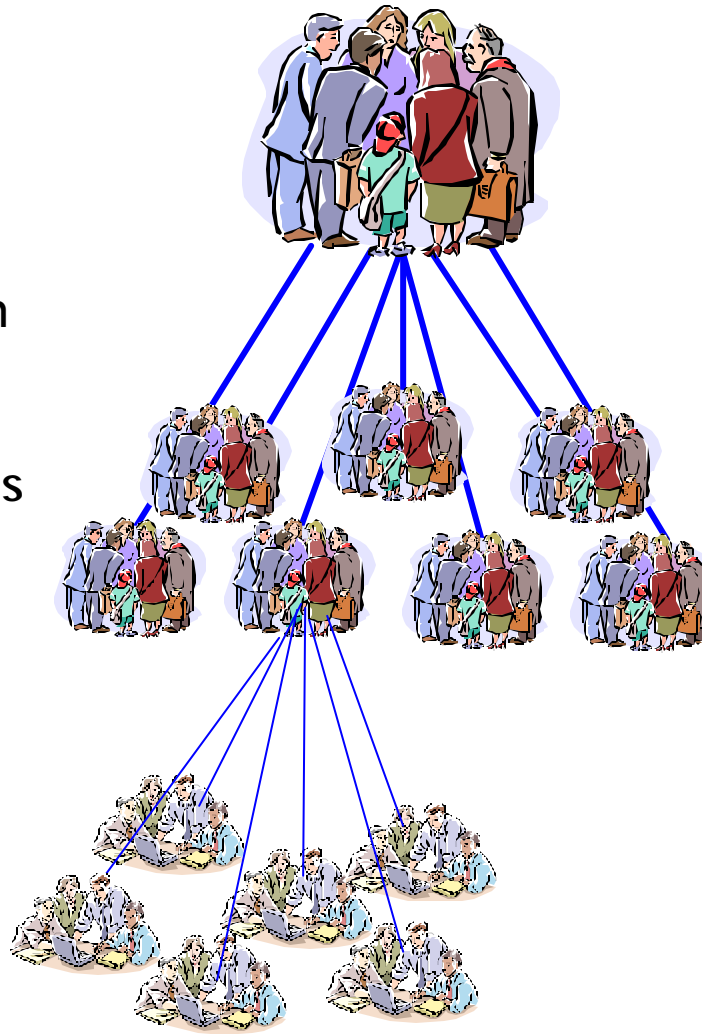
Process Management Responsibilities



Enterprise Process Management Infrastructure

We leverage our Six Sigma efforts off our successful CMMI infrastructure

- Common Process Management program office and reporting structure
- Shared staff with skills in both areas
- Information sharing from Enterprise to Division to Project



TRW Systems

- Process Management staff
- TRW Systems Process Group
- Office of Cost Estimation
- Six Sigma Training Office
- Dashboards

Divisions

- Division Champions
- Division Process Groups
- Training Offices
(engineering, management)

Projects

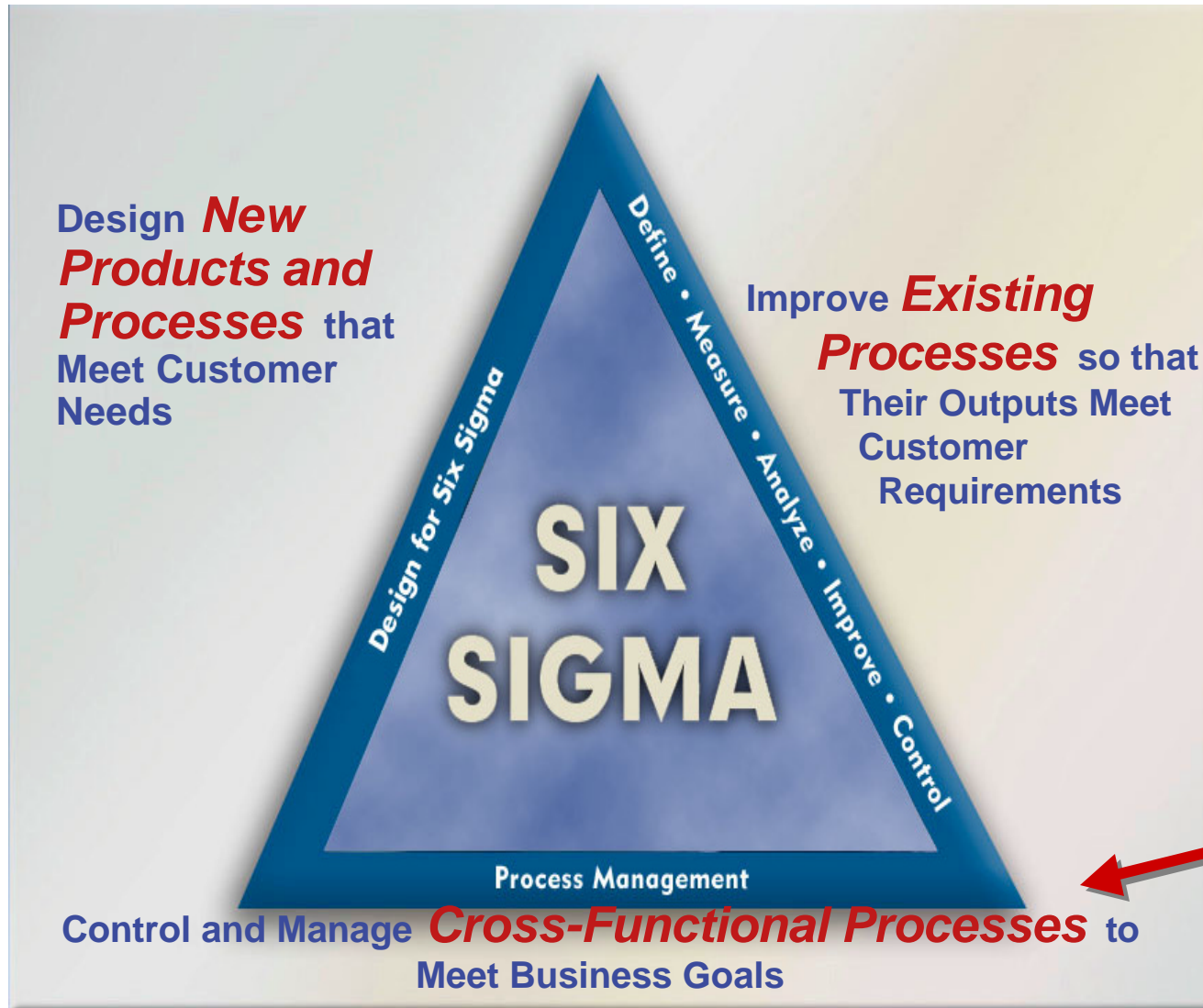
- Self-Assessment Tool
- Corrective Action System

Six Sigma Projects

- Startit! Data base
- Best Practice Sharing



Making it Stick



D - Each Project Must Have a Business Case and Sponsor

M - "You can't manage what you don't measure."

A - "Solve the problem, not the symptoms."

I - Push for Innovations, Breakthrough Thinking

C - Who Is Accountable for Making the Fix Stick?



IPIC Process Roles and Responsibilities

Process Leader

- Monitors Process Continually
- Influences resources executing the process
- Trains process
- Documents the process
- Responsible for stakeholder management of the process
- Reports to process reviewer the health of the process
- Integrates with integrating process leaders and functional managers
- Responsible to maintain/implement changes

Process Reviewer

- Reviews status of the process as deemed necessary with the process leader – generally 1 per week to 1 per month
- Assists the process leader with stakeholder management
- Assists the process leader with endorsement of roles and responsibilities within the process
- Understands interfaces between this process and other processes and functions
- Maintains “vision” of the process

**Highly Matrixed Organization –
Typical “Process Owner” did not apply**



Additional Process Roles and Responsibilities

Process Implementer

- Executes the process
- Examples –
 - PM and PMT execute the Acquisition Strategy process
 - Hiring Manger executes the staffing process
 - PM/PMTs execute the design and development process
 - TO team executes the TO process

Process Auditor

- Independently assess compliance to the process and quality of the product

Upper Management Reviewer

- Reviews process and product metrics of selected processes (leader, reviewer and auditor may be asked questions)
- 1x per month to 1x per quarter

Supplier

- Provides data or material into process

Customer

- Receives data or material from process

Stakeholders

- Determined by the process leader with the process reviewer
- Includes all the above and may extend from supplier of suppliers to customer of customer



Summary of Key Strategies

- **Establish an enterprise approach**
 - Process improvement
 - Process management
- **Leverage initiatives to obtain goals**
 - Six Sigma is a great set of tools to support CMMI implementation
- **Don't expect projects to be able to implement everything**
 - Some things are better implemented at an organizational level
- **Make it easy for the employees**
- **Document process roles and responsibilities early**
- **Process improvements are sustained by process management**
 - Six Sigma Control
 - CMMI Generic Practices
- **Overall approach supports continual process improvement**