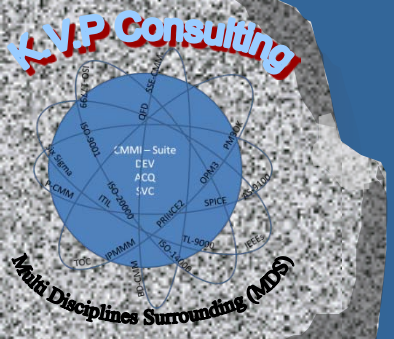
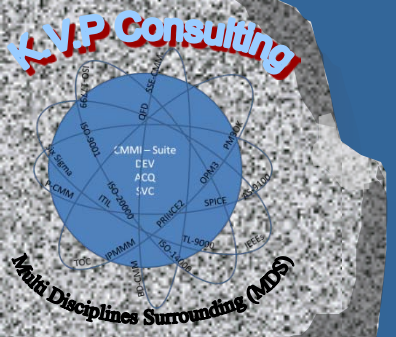


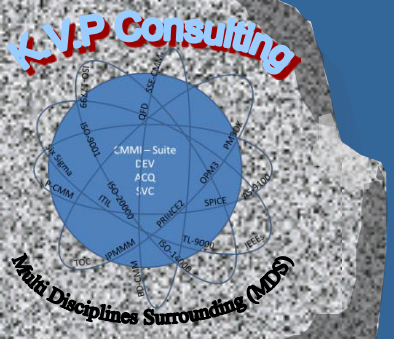
The Issue of Performance
Why
Do you need a Maturity Level 5

Achieving the Organizational Business Objectives Through Optimized Operational Processes



CMMI ML 4 & 5 PAs Recap

- Quantitative Project Management
- Organizational Process Performance
- Causal Analysis and Resolution
- Organizational Innovation and Deployment



Specific Practices of QPM

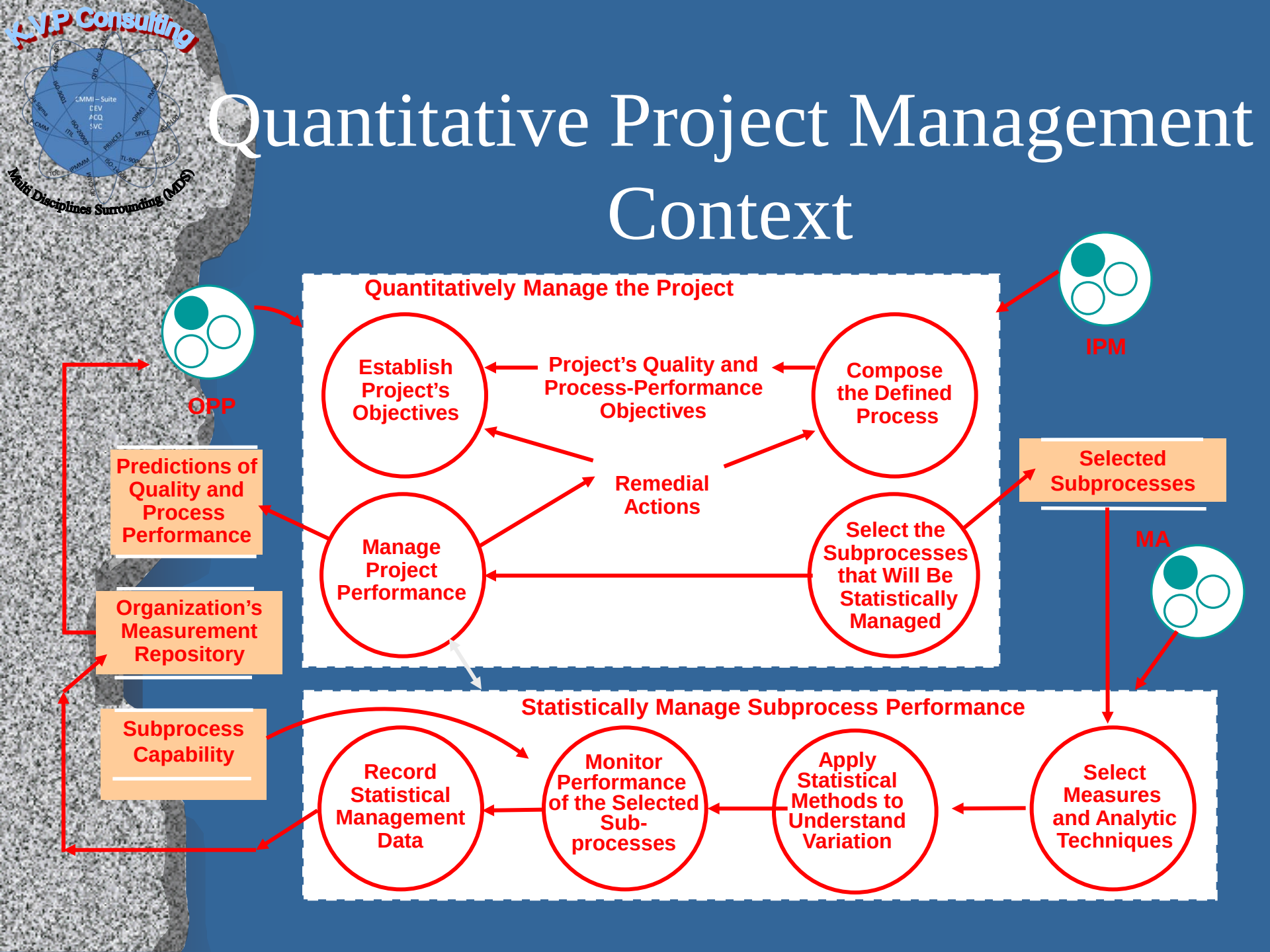
SG 1 Quantitatively Manage the Project

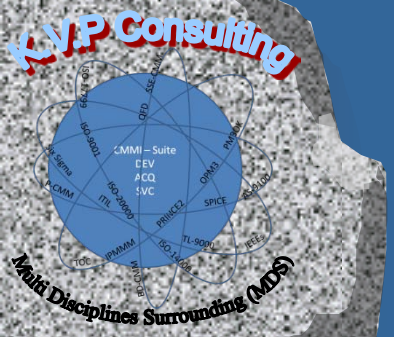
- SP 1.1 Establish the Project's Objectives
- SP 1.2 Compose the Defined Process
- SP 1.3 Select the Subprocesses That Will Be Statistically Managed
- SP 1.4 Manage Project Performance

SG 2 Statistically Manage Subprocess Performance

- SP 2.1 Select Measures and Analytic Techniques
- SP 2.2 Apply Statistical Methods to Understand Variation
- SP 2.3 Monitor Performance of the Selected Subprocesses
- SP 2.4 Record Statistical Management Data

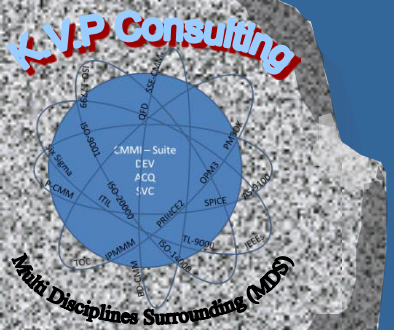
Quantitative Project Management Context





QPM Summary

- QPM involves both quantitative and statistical management. The project
  - establishes quantitative objectives based on the organization's business objectives and needs of the customer
  - composes a defined process based on historical capability data that will help it meet those objectives
  - monitors the project quantitatively to assess whether the project is on course to achieve its objectives.
- For each subprocess to be statistically managed,
  - objectives are established for its process performance
  - its variation is understood (subprocess is stable)
  - when the subprocess fails to achieve its objectives, corrective action is taken

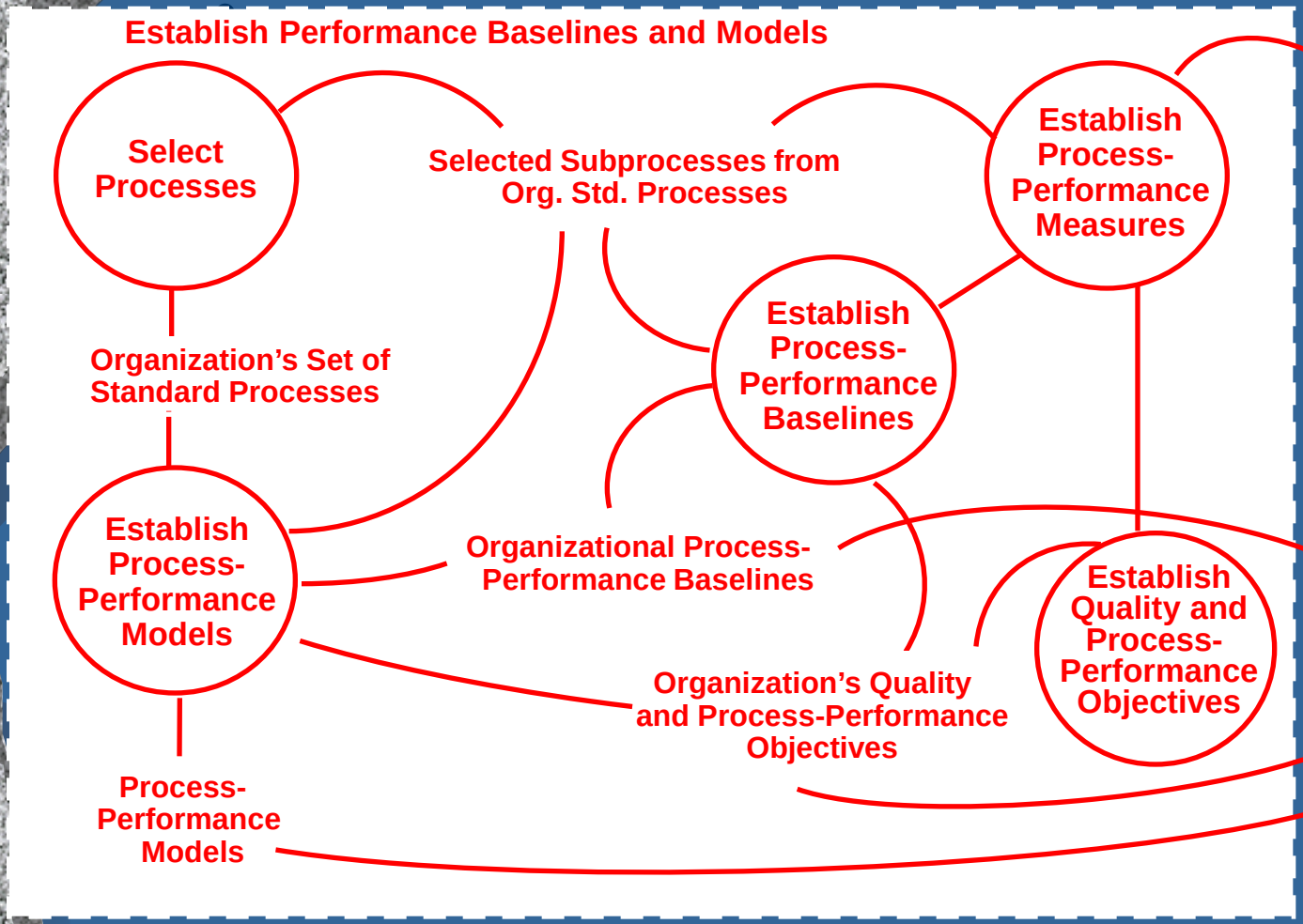


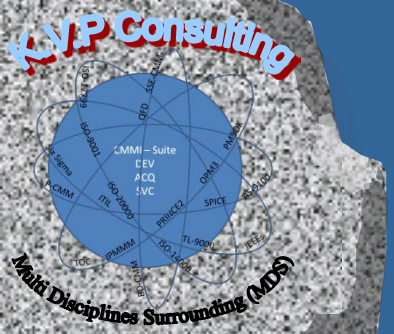
Specific Practices of OPP

SG 1 Establish Performance Baselines and Models

- SP 1.1 Select Processes
- SP 1.2 Establish Process-Performance Measures
- SP 1.3 Establish Quality and Process-Performance Objectives
- SP 1.4 Establish Process-Performance Baselines
- SP 1.5 Establish Process-Performance Models

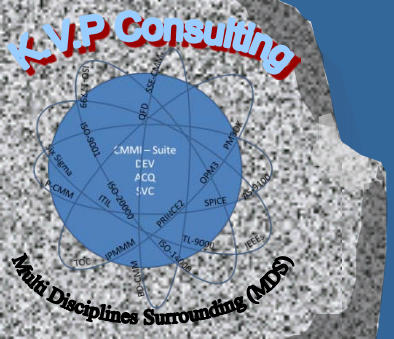
Organizational Process Performance Context





OPP Summary

- The first three SPs establish processes (subprocesses), measures, and objectives at the organization level that focus and align the quantitative management activities of projects (QPM) with the business objectives of the organization.
- The last two SPs take the actual results obtained from projects to create baselines and models that enable the next project to predict what performance to expect from selecting certain subprocesses for its use, and thereby assess its ability to meet its objectives.



Specific Practices of CAR

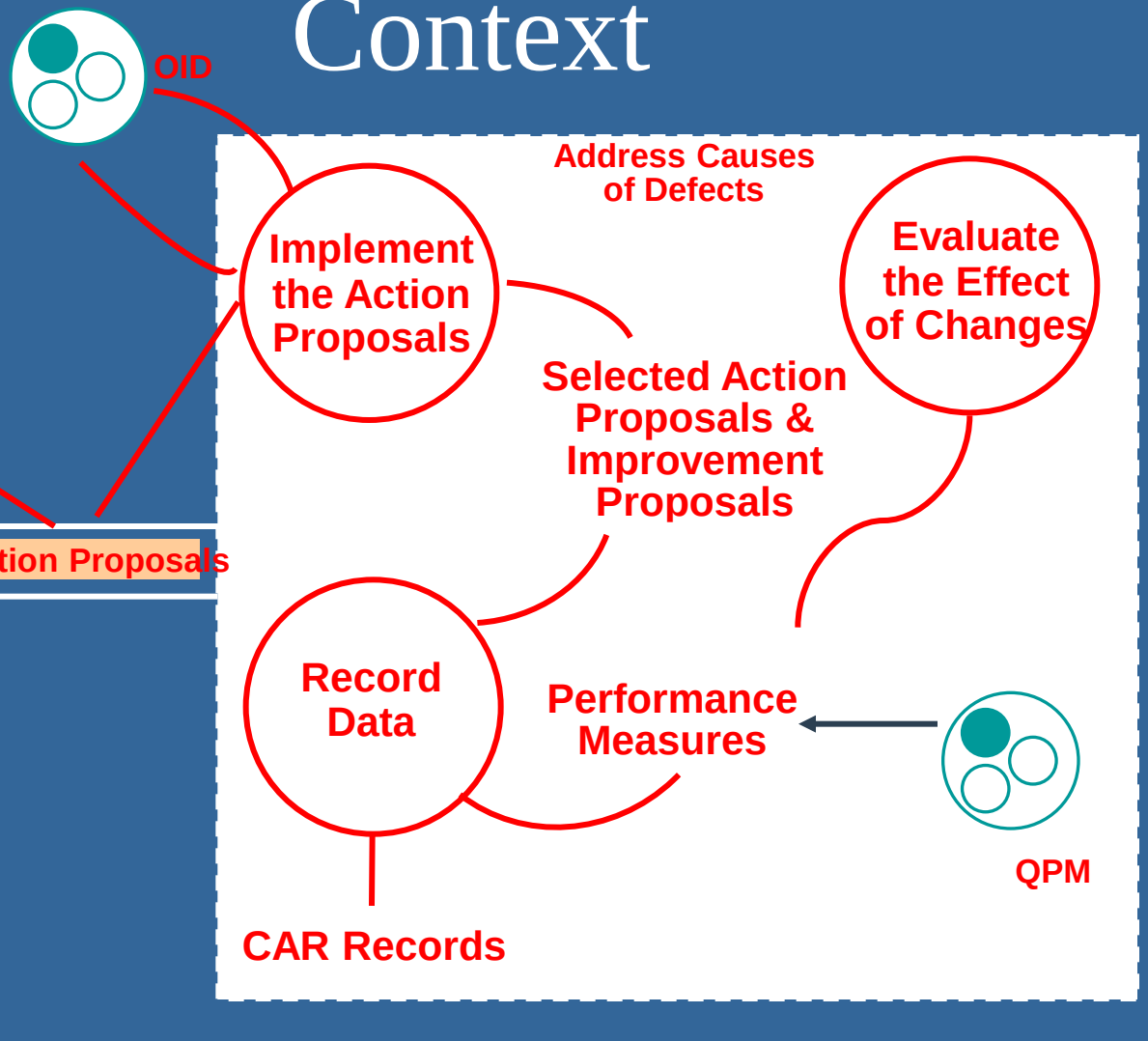
SG 1 Determine Causes of Defects

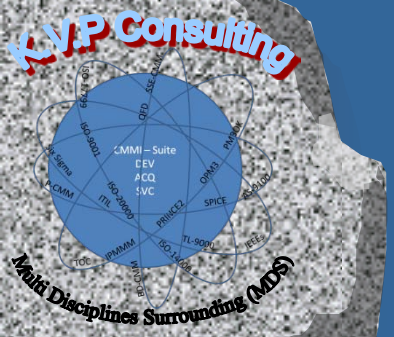
- SP 1.1 Select Defect Data for Analysis
- SP 1.2 Analyze Causes

SG 2 Address Causes of Defects

- SP 2.1 Implement the Action Proposals
- SP 2.2 Evaluate the Effect of Changes
- SP 3.2 Record Data

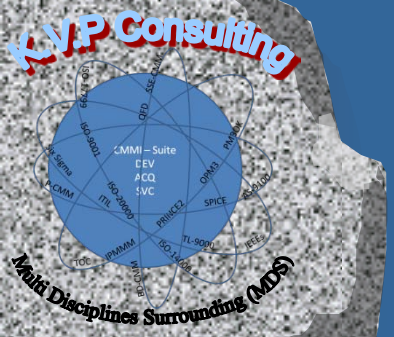
Causal Analysis and Resolution Context





CAR Summary

- CAR has its greatest value when performed in the context of a quantitatively managed process.
- CAR involves
  - a selection of defects or problems whose resolution would benefit the organization
  - a root cause analysis
  - development and implementation of an action plan to remove the root causes of the defects or problems



Specific Practices of OID

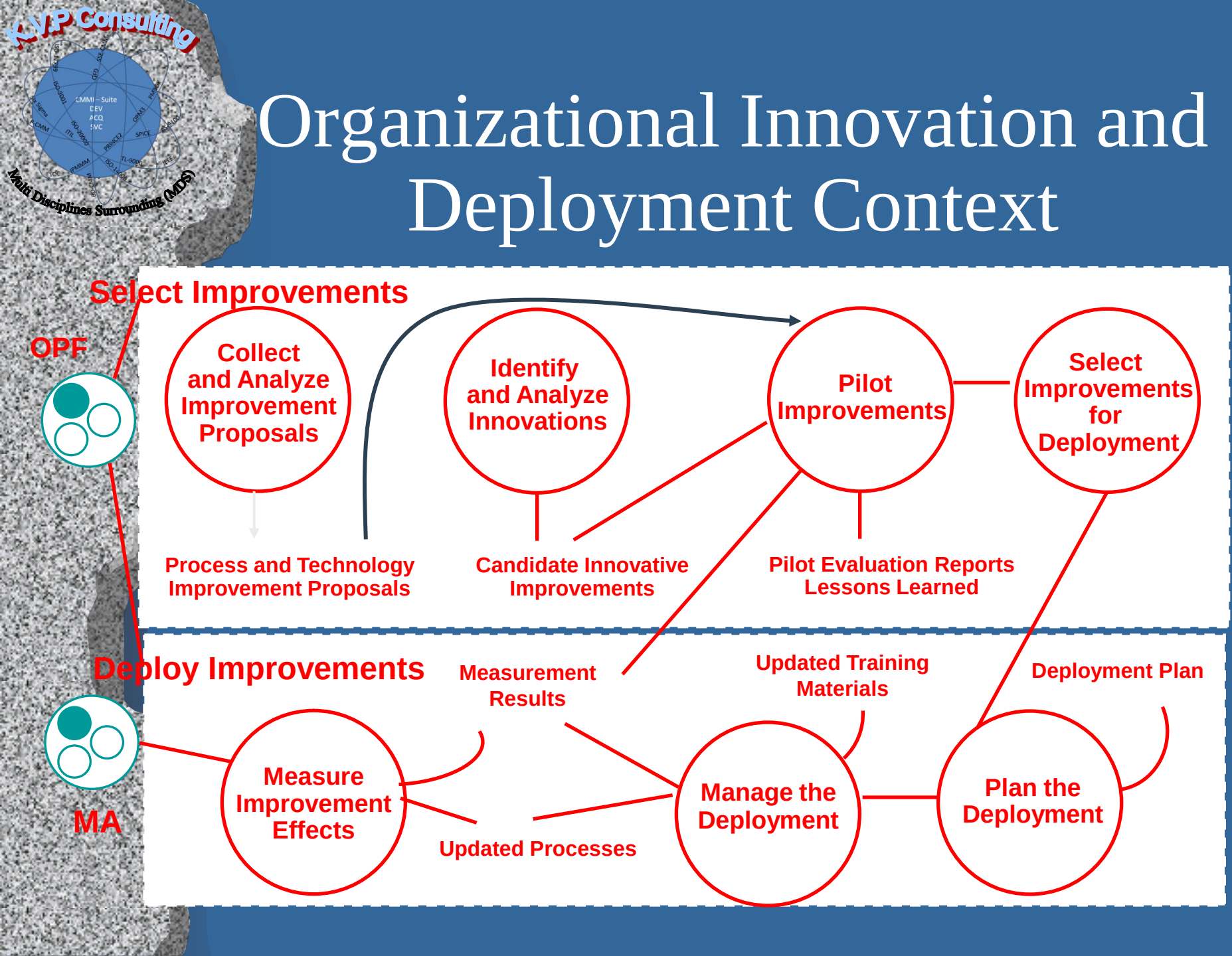
SG 1 Select Improvements

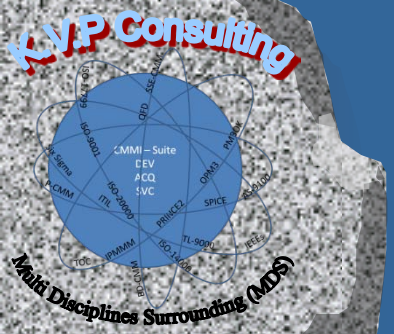
- SP 1.1 Collect and Analyze Improvement Proposals
- SP 1.2 Identify and Analyze Innovations
- SP 1.3 Pilot Improvements
- SP 1.4 Select Improvements for Deployment

SG 2 Deploy Improvements

- SP 2.1 Plan the Deployment
- SP 2.2 Manage the Deployment
- SP 2.3 Measure Improvement Effects

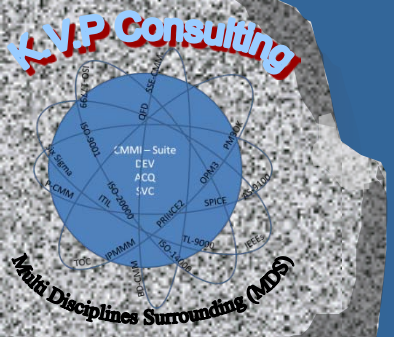
Organizational Innovation and Deployment Context





OID Summary

- OID uses the quantitative information developed at ML4 to identify, analyze, and select incremental and innovative improvements to the organization's processes and technologies.
- OID involves both incremental improvement (everyone in the organization is involved) and revolutionary improvements (outward looking and opportunistic) to targeted processes.
- Improvements are introduced systematically in the organization by conducting pilots, analyzing costs and benefits, and planning and managing deployment.
- OID embodies continuous improvement that results from implementing all the PAs in the model.

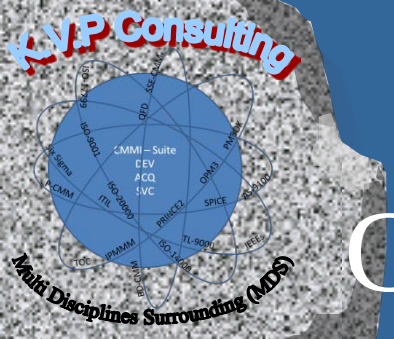


The Theory in the Model is Nice

However

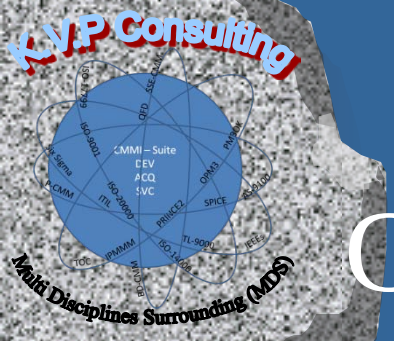
Real Life is More Complicated

Much More



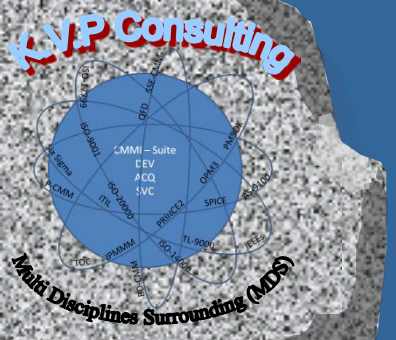
Considerations for Optimization

- Optimization is successful when the cost of manufacturing will drop and your profit will increase
- Produce high-quality products within shorter time lines
- To Correct balance between time and cost *versus* yield and quality is essential to maximize return on investment



Considerations for Optimization

- Demonstration of the scalability
- Partial selection of what to optimize
  - Material
  - Cost of product
  - Design for
    - Scalability
    - Availability
    - Reliability
    - Serviceability
    - Maintainability
    - Supportability
    - Stability
    - Reusability
  - Sustainability of the Technology as a solution



Main Steps for High Maturity Process Improvement

- During our analysis and planning, we were able to identify improvement targets in main lifecycle areas such as
  - operations,
  - information,
  - governance,
  - people
  - organizational structure,
  - portfolios,
  - project execution,
  - finance.
- And as in core process that are critical to the system success such as stakeholder management, technical interfaces and integration.

Integrated Defense Acquisition, Technology, and Logistics Life Cycle Management System

Following the Material Development Decision, the Milestone Decision Authority may authorize entry into the acquisition process at any point, consistent with phase-specific entrance criteria and statutory requirements

Material Solution Analysis Phase | **Technology Development Phase** | **Engineering & Manufacturing Development Phase** | **Production & Deployment Phase** | **Operations & Support Phase**

MDD | MS A | MS B | Post-CDR A | MS C | FRP DR

Integrated System Design | System Capability & Manufacturing Process Demonstration | Low-Rate Initial Production | Full-Rate Production/Deployment | Life Cycle Sustainment | Disposal

Joint Capabilities Integration & Development System (need-driven)

Initial Evolutionary Acquisition Strategy | Evolutionary Acquisition Strategy

Increment 2 | Increment 3

Total Life Cycle Systems Management

Oversight & Review

Contracting

Technology Development Contract | Engineering & Manufacturing Development Contract | LRIP Contract | Production Contract | Post-Production Software Support Contract | Sustainment Contract

Major Products

Alternative Material Solutions | Material Solution | Prototypes | System Performance Spec | Prototypes | Initial Product Baseline | Production Representative Articles | Low-Rate Initial Production Systems | Full-Rate Production Systems

Logistics/ Sustainment

Define Program Sustainability Objectives | Evaluate Product Support Capabilities | Develop Initial Product Support Strategy | Initiate Product Support BCA | Demonstrate Product Support Capability | Product Support Plan | Performance-Based Logistics (PBL) Strategy | Product Support PBL Management | Sustainment Contracts

Defense Acquisition System (event-driven)

MDD | A | B | Post-CDR A | C | FRP DR

Technical

Systems Engineering, Test and Evaluation, Supportability

Financial Management

Cost Estimation Methods: Analogy | Parametric | Engineering | Actual Costs

Types of Funds: RDT&E – Advanced Technology Development | RDT&E – Advanced Component Development and Prototypes | RDT&E – System Development & Demonstration | Procurement | Operations and Maintenance | RDT&E – Management & Support

PNC/PCM Input | PNO Budget Estimate

Appropriated Funds To Support Contracts

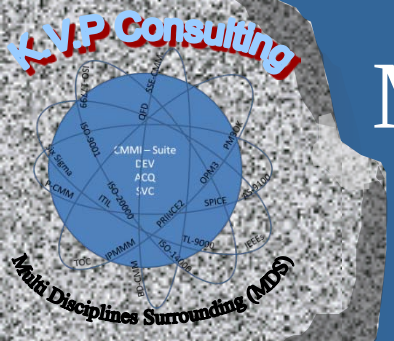
Planning, Programming, Budgeting & Execution Process (annual-calendar-driven)

Military Departments and Defense Agencies: PDM Budget Formulation | PDM Budget Submit (July) | Defense Planning & Programming Guidance | Integrated Program/Budget Review (August – November) | Decisions (November) | DRB (December) | DoD Budget | Fiscal Guidance (April) | FYDP updated | DoD Testimony | DoD Appeals | Allocation | Apportionment

Office of the Secretary of Defense and Joint Staff: National Military Strategy | National Defense Strategy | National Security Strategy

White House: Fiscal Guidance (March) | OMB (January) | President's Budget to Congress (February)

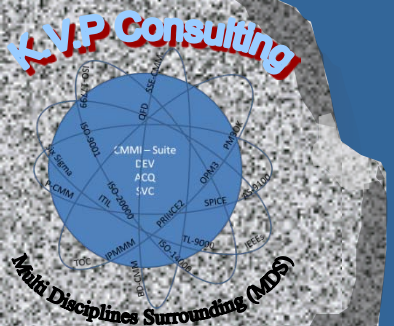
Congressional Budget Process (February – September): Budget Committees | Authorization Committees | Appropriation Committees | Authorization/Appropriation Acts Passed



Main Steps for High Maturity Process Improvement

As the result of this observation we have built an action plan,

- Then in the second step we have built a interfaces map using the lifecycle model, which enable us to begin the improvement journey, and manage the transformation to higher maturity by building on each successive step, and ultimately delivering the benefits expected:
  - reuse
  - improved compatibility and quality
  - response time
  - interoperability
  - business agility.
- Process performance and its impact on the organization governance is a significant part of that journey

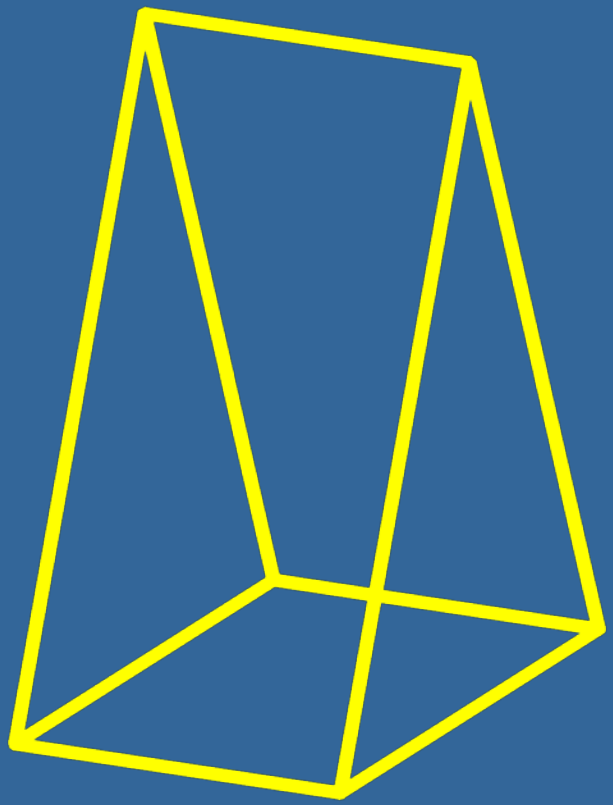


- Case Studies
  - Process Optimization (Brief Walkthrough)
  - Product Optimization (Brief Walkthrough)
  - Product Optimization Which Leads to Process Optimization (Detailed Walkthrough)

Suggested Measures

Planned and Managed Process

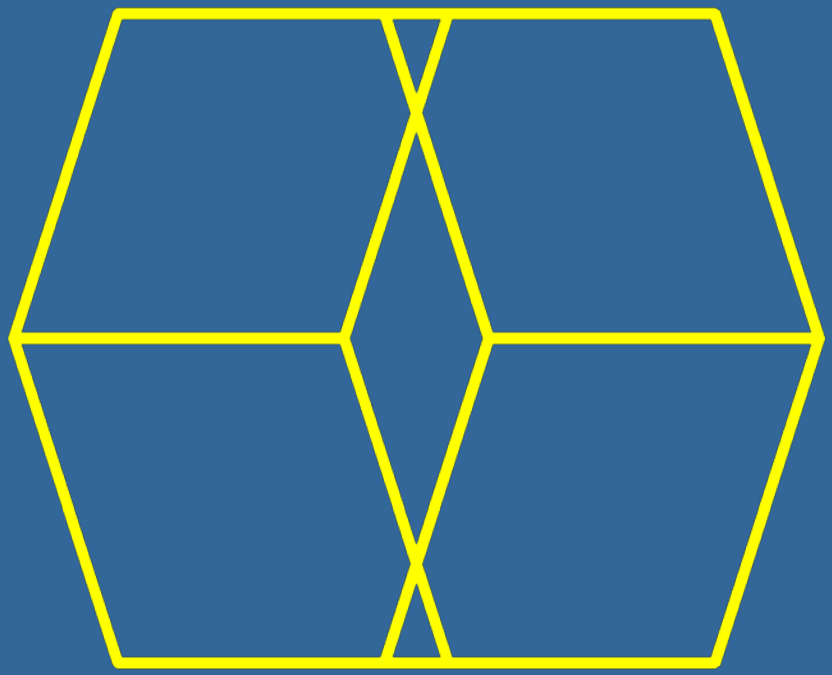
- Availability and completeness of plan
- Plan for resource
- Overall performing time
- Omissions in performance
- Compliance to plan

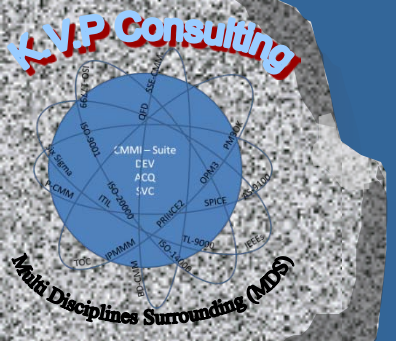


Process Levels and Dimensions

Architected and Improved Process

- Objectives
- Structured
- Monitored / Measured
- Effective / Efficient
- Process Interfaces and Integration in Lifecycle
- Prioritize and Balance Resource Utilization within Larger Context

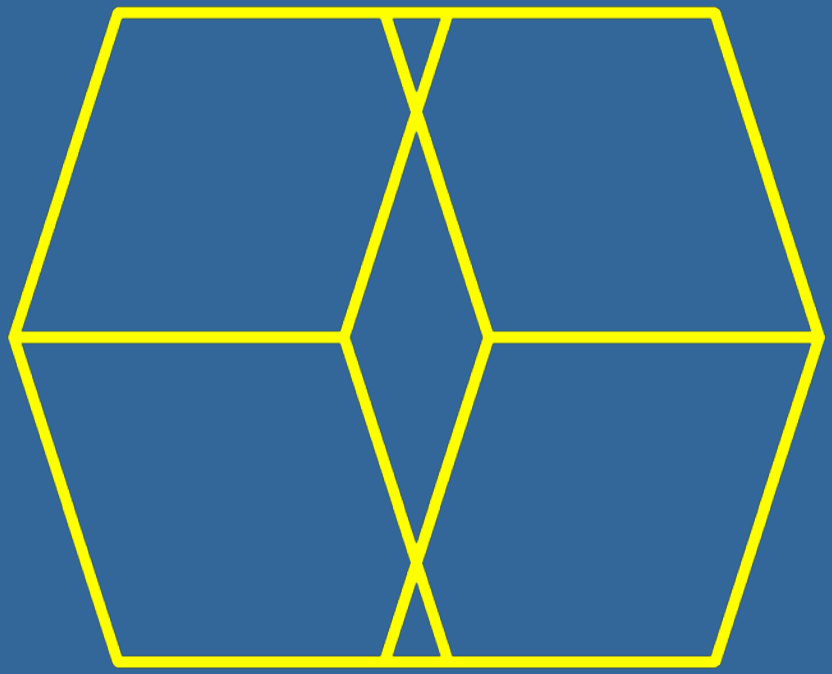




Suggested Measures

Architected and Improved Process

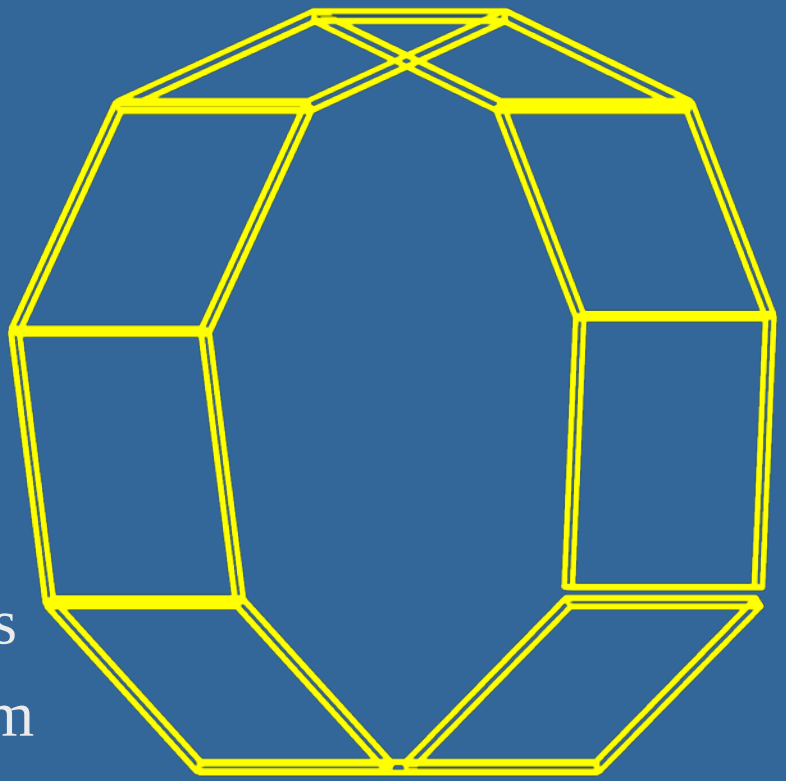
- Process productivity
- Process resources utilization effectiveness
- Process resources utilization efficiency
- Meeting the process objectives
- Other processes interfaces efficiency
- Process related defects density



Process Levels and Dimensions

Operationally Optimized Process

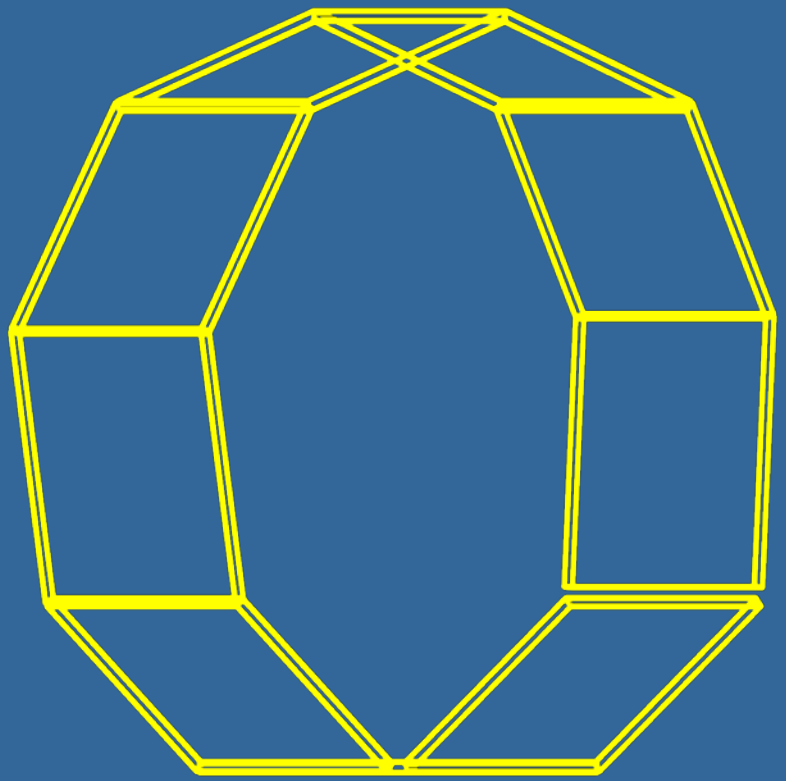
- Known Capability and Stable
- Defined Ingredients
- Known Critical Elements
- Meeting Objectives
- Controlled Interfaces
- Responsive / Modifiable
- Resilience / “Agile”
- Relevant ‘What If’s Scenarios
- Accepted Tolerance / Freedom Boundaries
- Predictable Outcomes

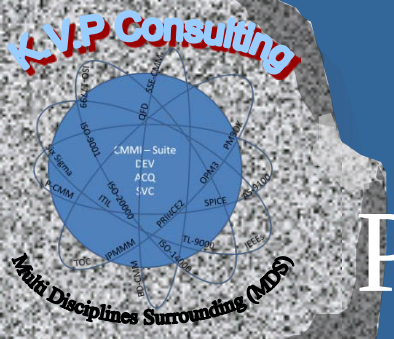


Suggested Measures

Operationally Optimized Process

- Influence of Critical Elements on process output
- Process resources utilization ‘What If’s Scenarios
- Process elements capability
- Quantitative definition of process ingredients





Product Levels and Dimensions

- Planned and Managed System
- Architected and Engineered System
- Operationally Operated and Optimized System

Suggested Measures

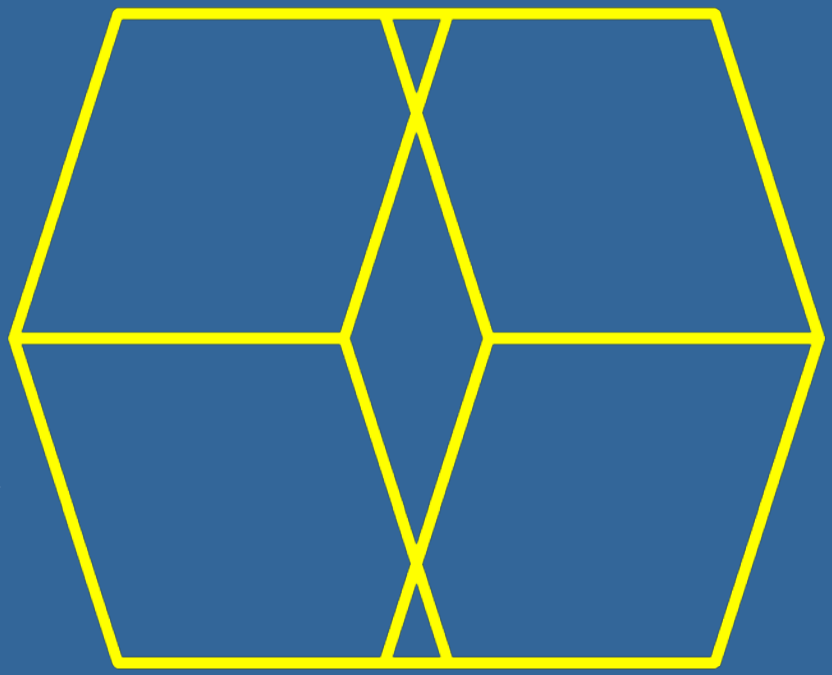
Planned and Managed System

- Requirements Status
- Change Request Status
- Component Status
- Increment Content - Components
- Increment Content - Functions
- Technical Performance
- Standards Compliance
- Requests for Support
- Support Time Requirements

Product Levels and Dimensions

Architected and Engineered System

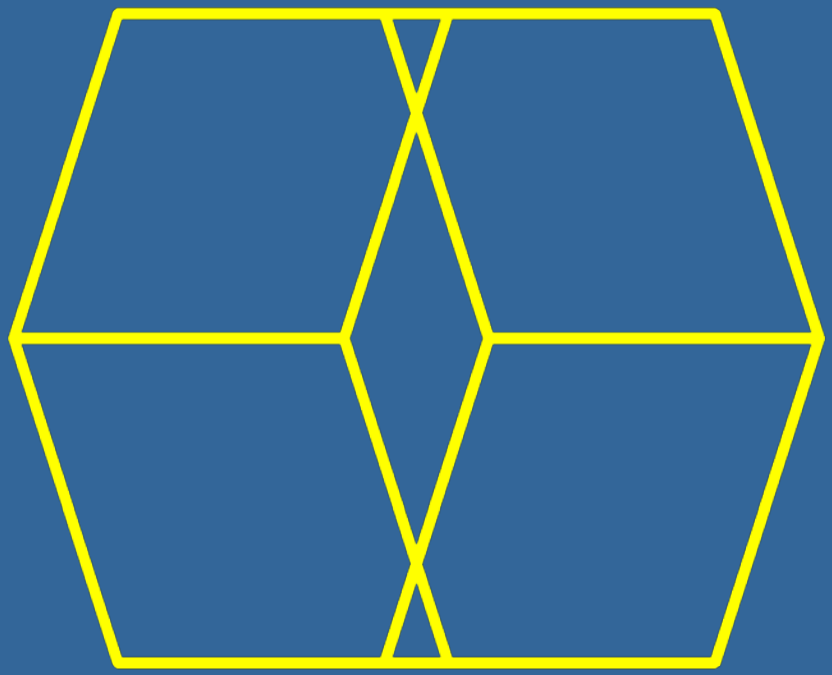
- Operational Needs and Scenarios
- System Architecture
- System Interfaces and Integration
  - Validity / Verifiability
  - Compliance with CONOPS



Suggested Measures

Architected and Engineered System

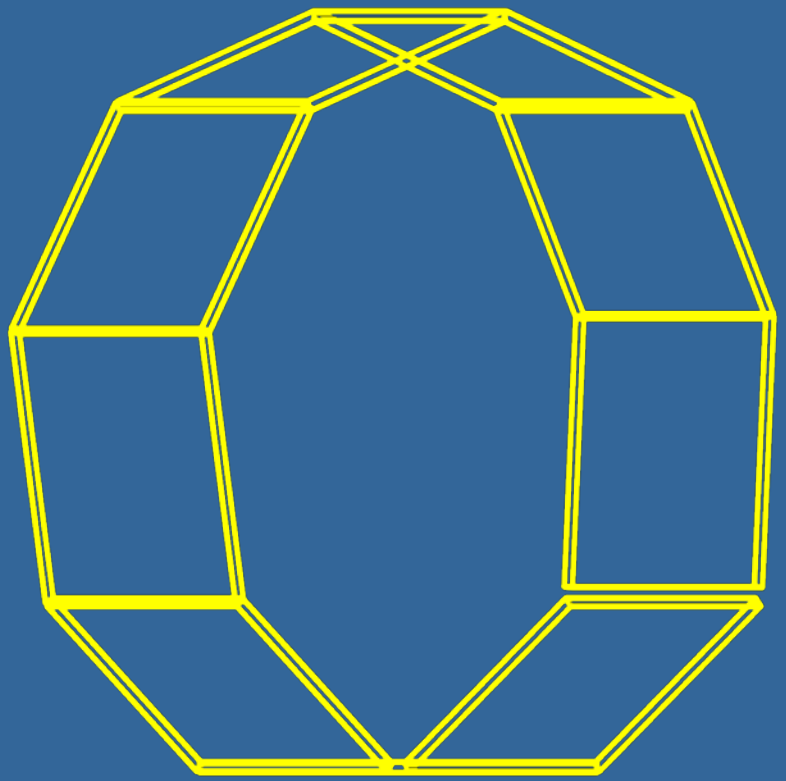
- Maintenance Actions
- Technical Performance
- Performance Rating
- Requirements Coverage
- Defect Containment
- Utilization
- Reuse level
- Interfaces performance
- Validation accuracy



Product Levels and Dimensions

Operationally Optimized System

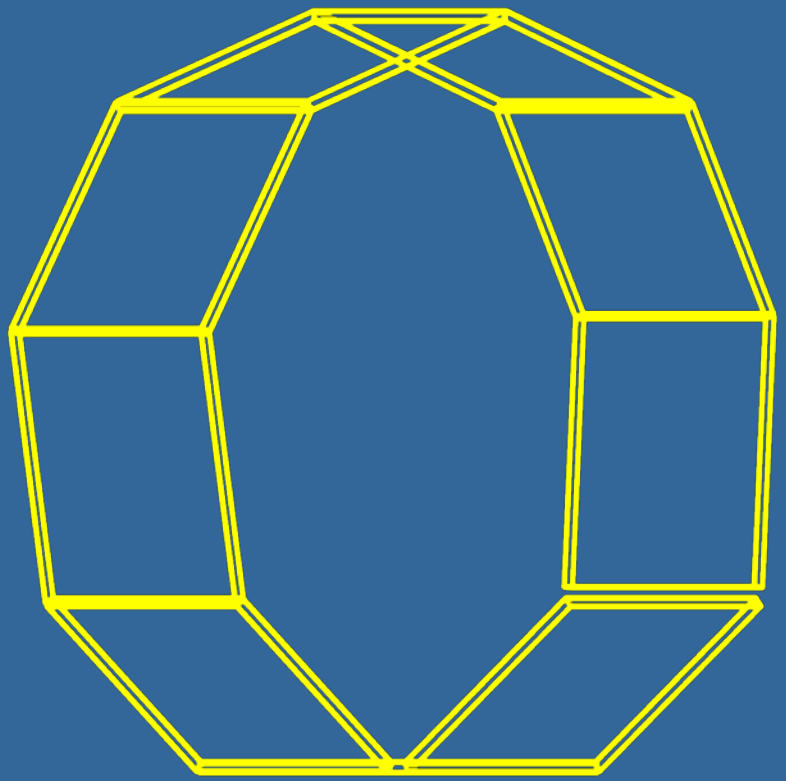
- Scalability
- Availability
- Reliability
- Serviceability
- Maintainability
- Supportability
- Stability
- Reusability
- Soundness of Technology Future

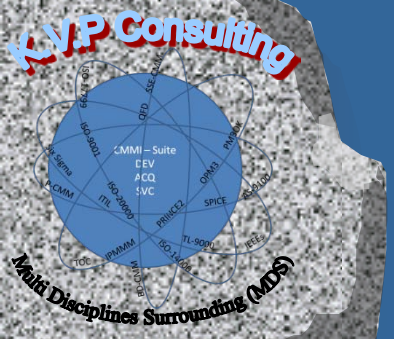


Suggested Measures

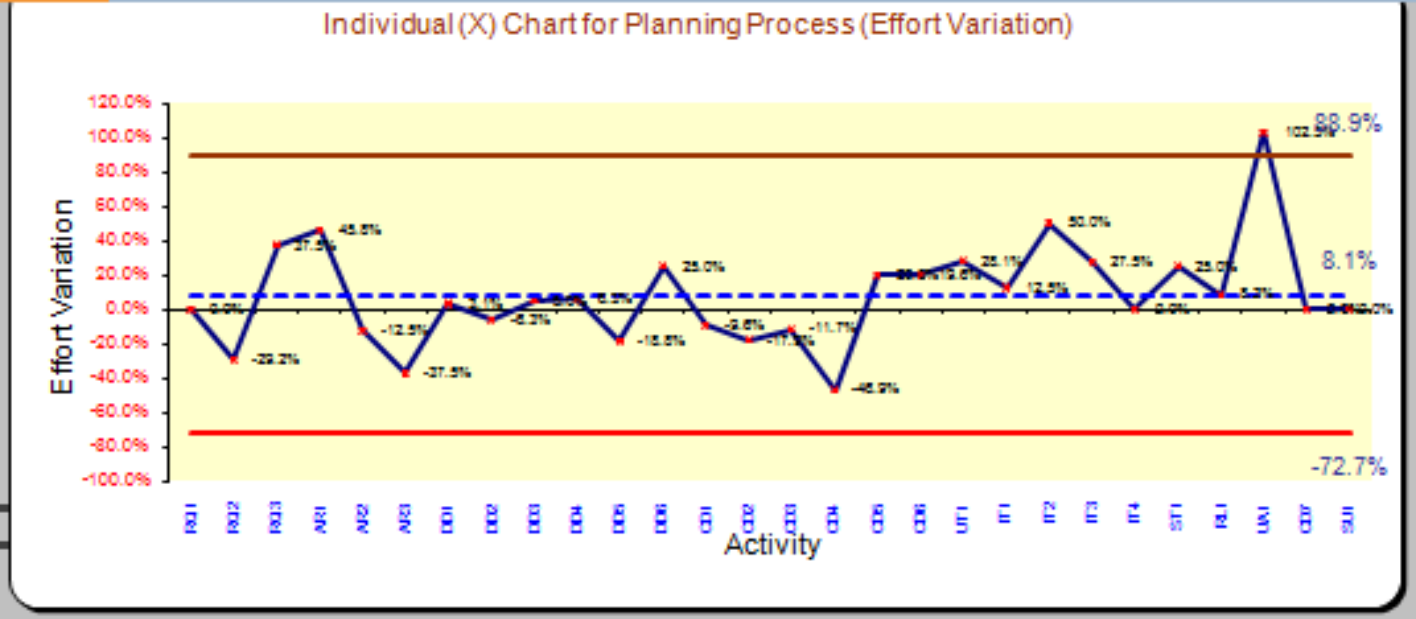
Operationally Optimized System

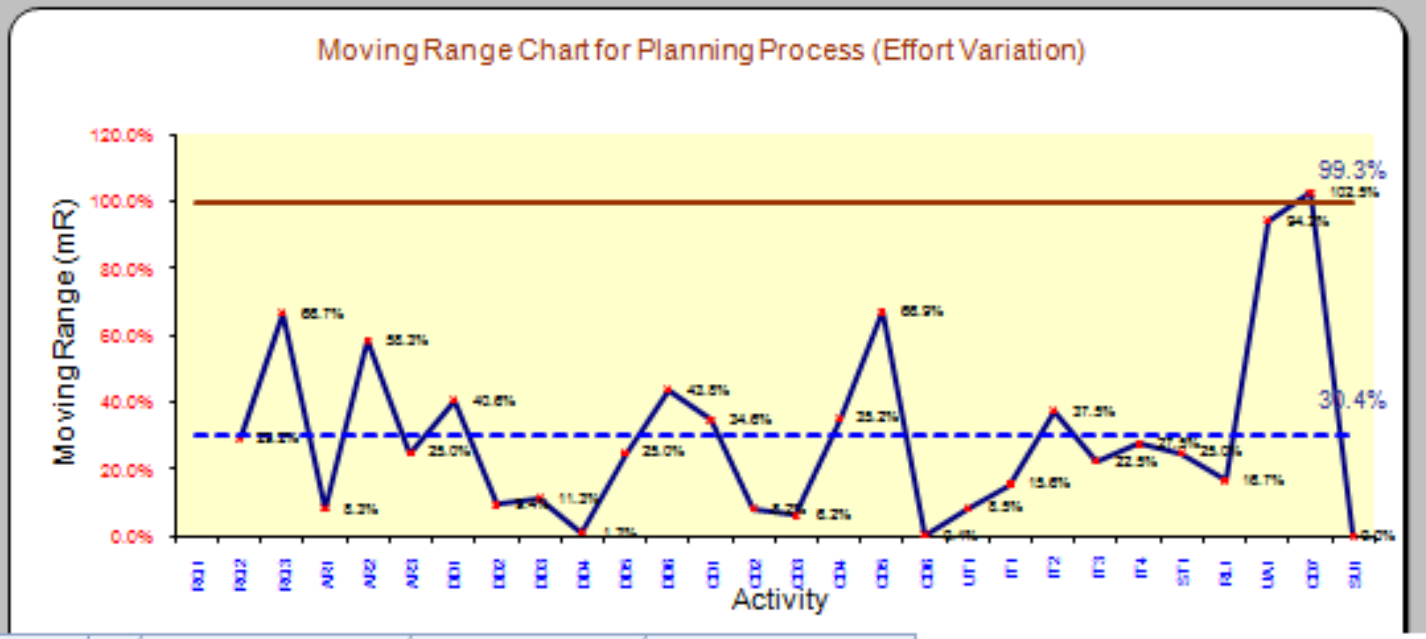
- Technology flexibility
- Capacity growth models
- System (size) growth models
- Time to Restore
- Down time
- MTBF
- Support calls causes and density
- Technology extendibility





Case studies



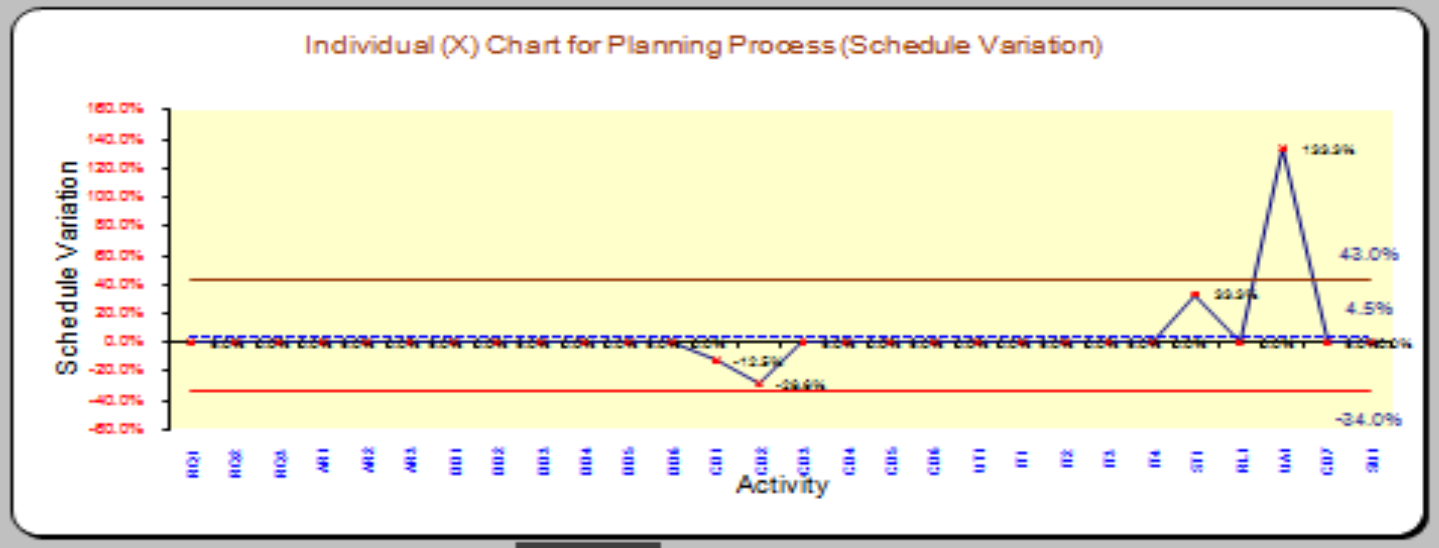


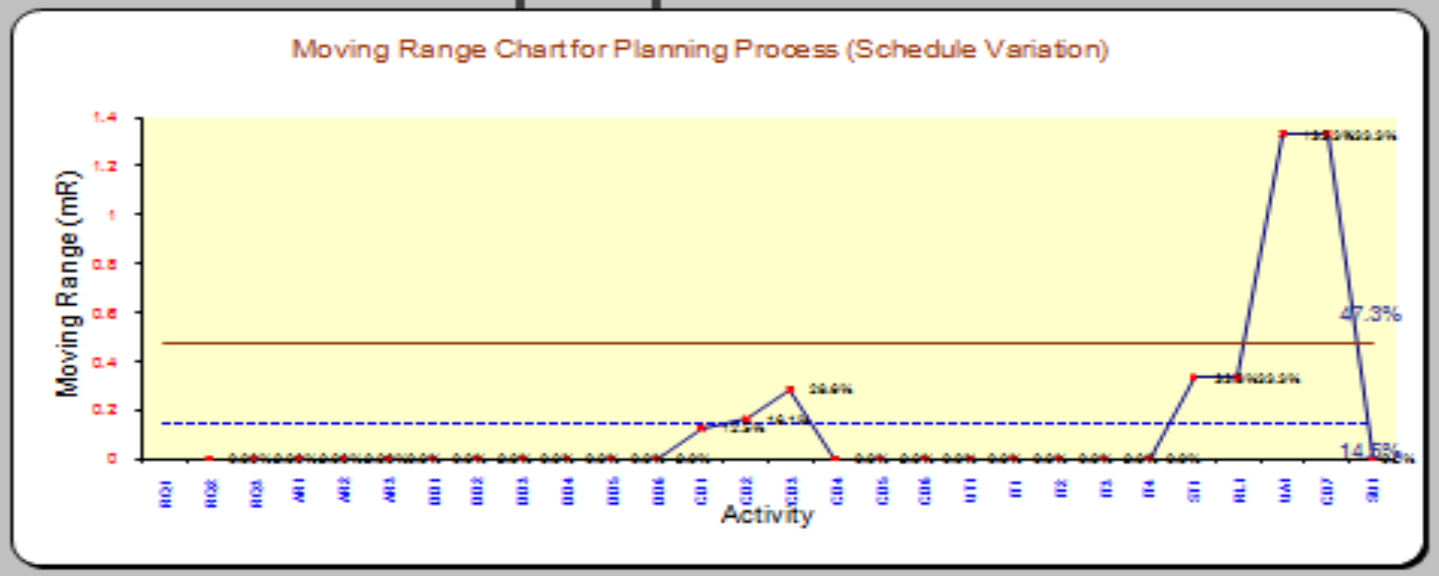
Mean
UCL
LCL

RQ1	Requirement Elicitation
RQ2	Requirements Analysis
RQ3	Requirements Review
AR1	Architecture
AR2	Architecture Review
AR3	Architecture Rework & Baseline
DD1	File Design
DD2	DB Design
DD3	Componenent Design
DD4	UI Design
DD5	Detailed Design Review
DD6	Detailed Design Rework
CD1	File Management & Conversion to XML
CD2	Data Processing Implementation
CD3	Gateway Services
CD4	Reports & Scheduler
CD5	Code Review
CD6	Rework on Code
UT1	Unit Testing
IT1	IT Test Case Preparation
IT2	IT Test Case Review
IT3	Integration Testing
IT4	Fixing IT Test Case Defects
ST1	System Testing
RL1	Release & Deployment
UA1	UAT (First Level)
CD7	Fixing Post Release Defects

Planning Data | Defect Data | Defect Seepage | XmR Chart for Effort Variation | XmR Chart for Sch Variatio

Link 2 File





Mean
UCL
LCL

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DD3	Component Design
DD4	UI Design
DD5	Detailed Design Review
DD6	Detailed Design Rework
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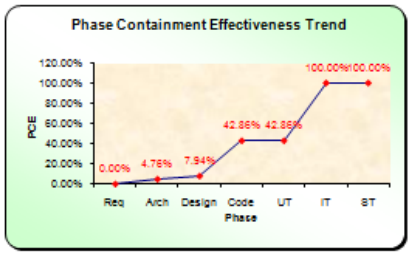
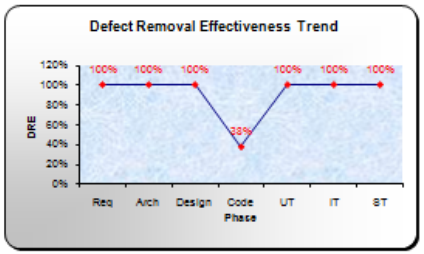
CD2	Data Processing Implementation
CD3	Gateway Services
CD4	Reports & Scheduler
CD5	Code Review
CD6	Rework on Code
UT1	Unit Testing
IT1	IT Test Case Preparation
IT2	IT Test Case Review
IT3	Integration Testing
IT4	Fixing IT Test Case Defects
ST1	System Testing
RL1	Release & Deployment
UA1	UAT (First Level)
CD7	Fixing Post Release Defects
SU1	Support

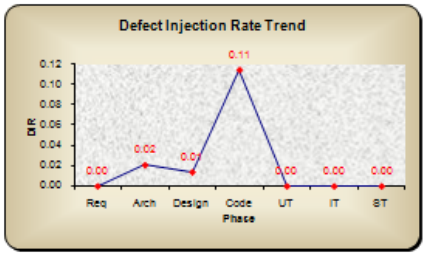
Link 2 File





Project Phase Containment Effectiveness 100.00%

Other Project Performance Indicators	
Review Effectiveness	42.86%
Testing Effectiveness	57.14%
Project Efficiency	85%
Cost of Quality	47%
Cost of Good Quality	38%
Cost of Poor Quality	9%
Productivity *	1.36 FPs/Per.Day
Req. Stability Index	78%
Design Stability Index	79%
First Pass Yield	71%

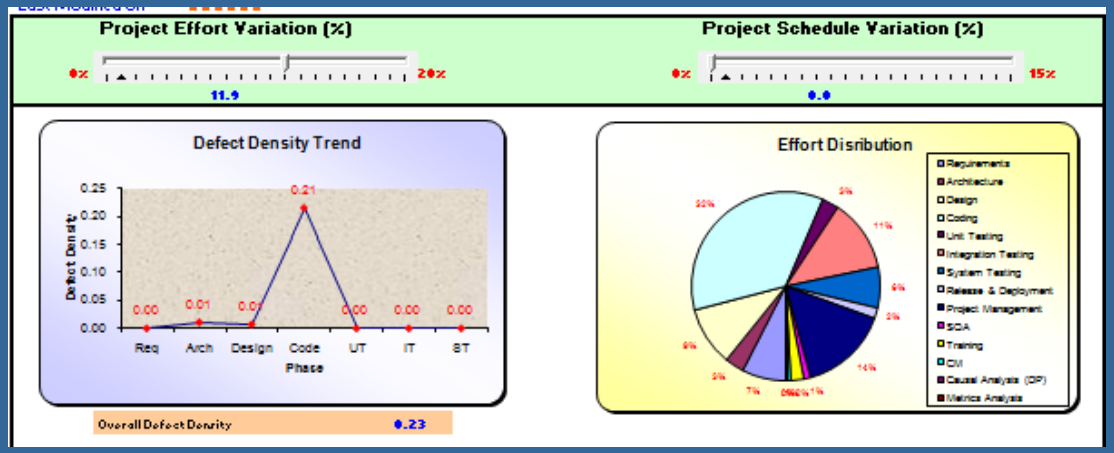


Planning Data | Defect Data | Defect Seepage | XmR Chart for Effort Variation | XmR Chart

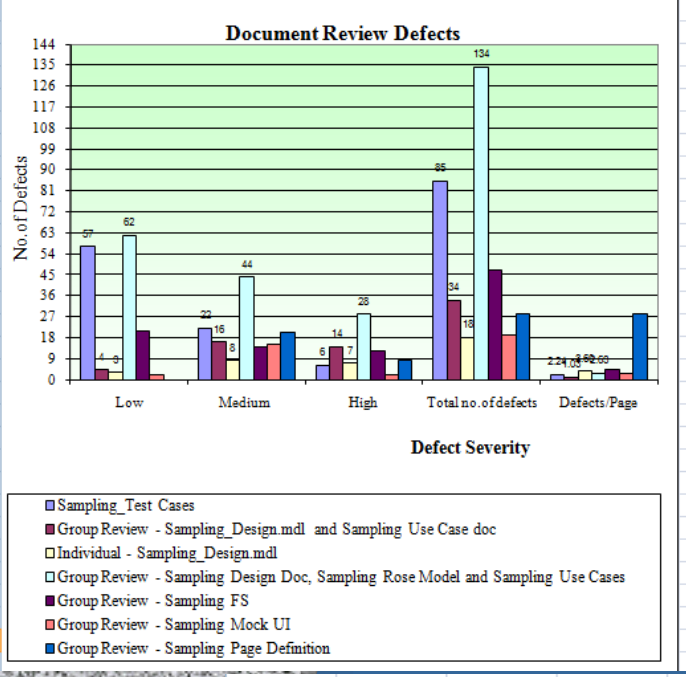
Defect Seepage Table Data

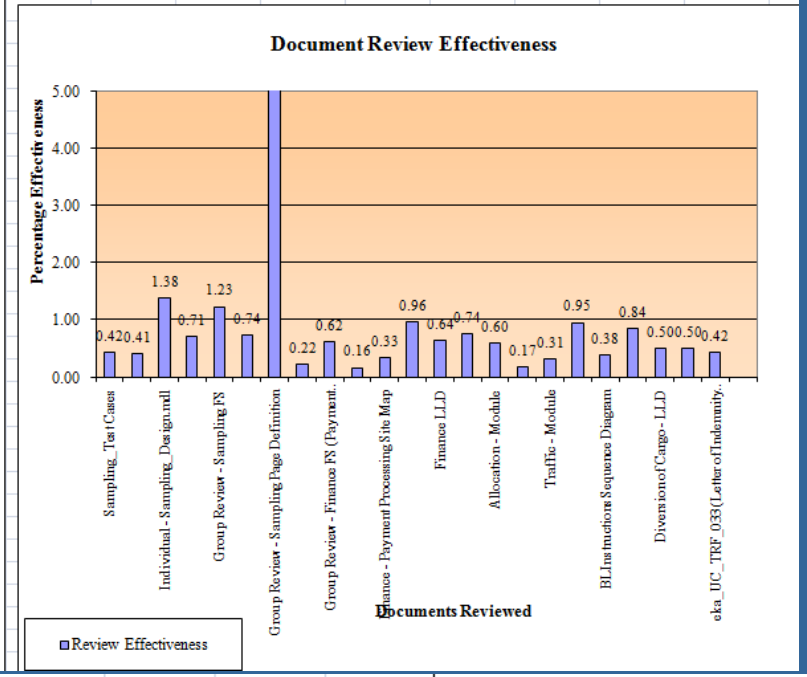
Last modified on 02-Sep-08

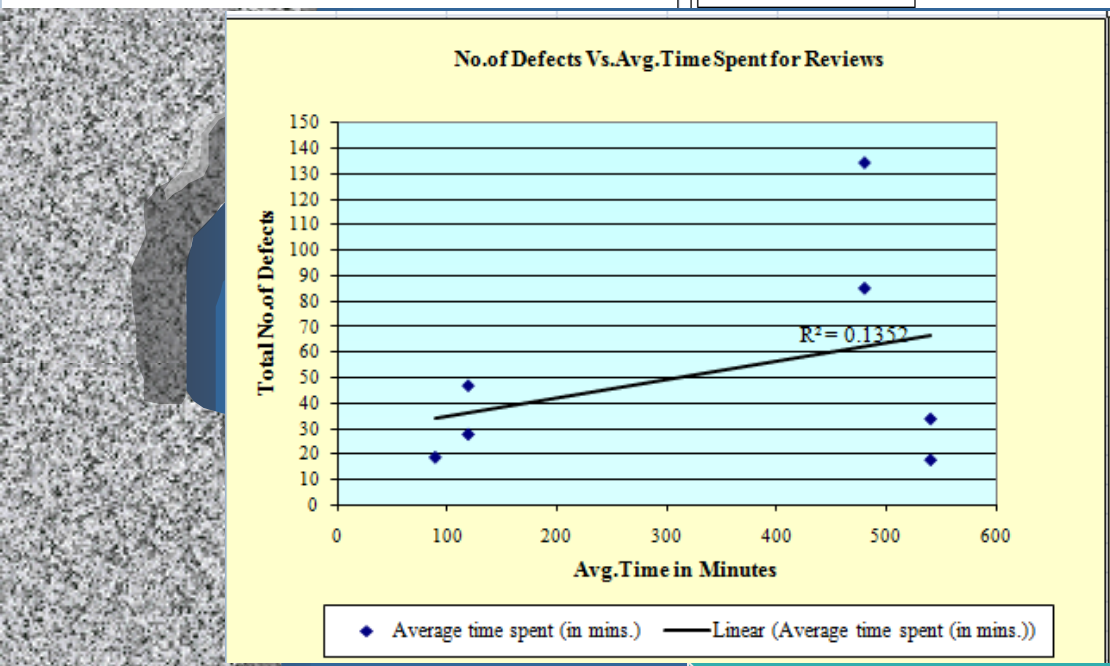
Activity	Total	Defects (shaded cells MUST NOT contain entries) Deliverable: Req	Arch	Design	Code	UT	IT	ST
Total	63	0	3	2	58	0	0	0
Defect Distribution		0.00%	4.76%	3.17%	92.06%	0.00%	0.00%	0.00%
Defect Density	0.23	0.00	0.01	0.01	0.21	0.00	0.00	0.00
Defect Removal Effectiveness (DRE)		100%	100%	100%	38%	100%	100%	100%
Phase Containment Effectiveness		0.00%	4.76%	7.94%	42.86%	42.86%	100.00%	100.00%
Review Effectiveness	42.86%							
Testing Effectiveness	57.14%							
Defect Injection Rate		0.00	0.02	0.01	0.11	0.00	0.00	0.00

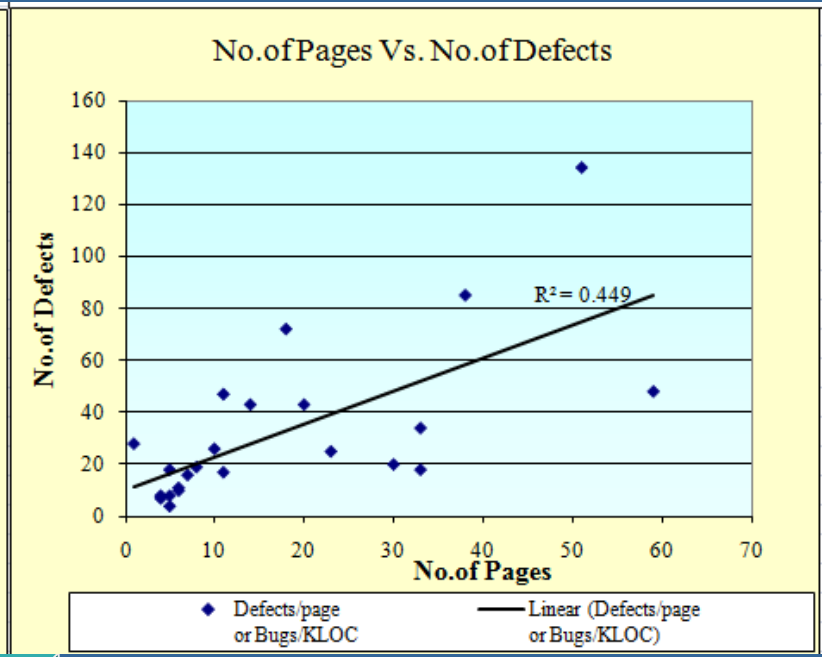


Link 2 File

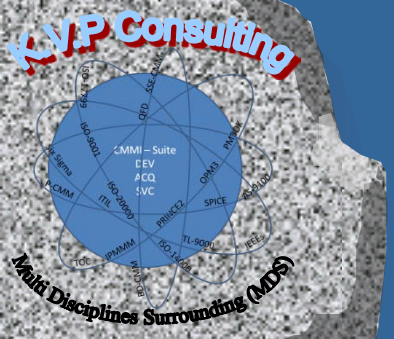

Document Review Defects
No.of Defects
Low
Medium
High
Total no.of defects
Defects/Page
Defect Severity
Sampling_Test Cases
Group Review - Sampling_Design.mdl and Sampling Use Case doc
Individual - Sampling_Design.mdl
Group Review - Sampling Design Doc, Sampling Rose Model and Sampling Use Cases
Group Review - Sampling FS
Group Review - Sampling Mock UI
Group Review - Sampling Page Definition


Document Review Effectiveness
Percentage Effectiveness
Sampling_Test Cases
Individual - Sampling_Design.mdl
Group Review - Sampling FS
Group Review - Sampling Page Definition
Group Review - Finance FS (Payment..
Finance - Payment Processing Site Map
Finance LLD
Allocation - Module
Traffic - Module
BLInstructions Sequence Diagram
Diversion of Cargo - LLD
eka_UC_TRF_033(Letter of Indemnity..
Documents Reviewed
Review Effectiveness


No.of Defects Vs.Avg.Time Spent for Reviews
Total No.of Defects
Avg.Time in Minutes
R² = 0.1352
Average time spent (in mins.)
Linear (Average time spent (in mins.))


No.of Pages Vs. No.of Defects
No.of Defects
No.of Pages
R² = 0.449
Defects/page or Bugs/KLOC
Linear (Defects/page or Bugs/KLOC)

Link 2 File


S.V.P. Consulting
CMMI – Suite
DEV
ACQ
SVC
Multi Disciplines Surrounding (MDS)

Questions