Organizational Process Directives - One Size Fits All?

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One Set of Directives?

- Typical Medium/Large Programs
- Typical Small Projects
- Typical Research Programs
- Engineering Services

Goal: Develop a Single Directive System Scalable to Accommodate Diverse Types of Typical Programs
Typical Medium/Large Program Characteristics

- Staffing for 100 Engineers
- Program Life 5-10 Years
- Significant Proposal Activity
- Regular Customer Participation
- Significant Contract/Data Deliverables
- Customer Process Expectation
- Defined Requirements
- Defined Methods of Verifying Requirements
- Good Profit Opportunity
- Unique Facility and Resource Requirements

**Standards (CMMI, ISO) Written for Large Programs with Typical Program Phases**
Organizational Processes Derived From These Standards
Medium/Large Program Process

- Extensive Planning Phase
- Involve Stakeholders
- Extensive Schedule with Dependencies
- Program Managed with Metrics
- Formal Requirements Traceability
- Extensive Testing/test Levels
- Significant Management Interest
- Formal Communication Important to Keep Project Teams Together

Good Candidates for Appraisals
Small Program Characteristics

- Staffing for 3-8 Engineers
- Program Life 12 Months
- Small Proposal Activity
- Limited Customer Participation
- Single Product Deliverable/No Data Deliverables
- Little Customer Process Interest
- Limited Requirements
- Standard Facility and Resource Requirements

Standards (CMMI, ISO) Written for Large Programs with Typical Program Phases
Organizational Processes Derived From These Standards
Small Project Process

- Limited Planning Phase
- Involves Fewer Stakeholders
- Schedule with Major Milestones
- Metrics Used to Convey Program Status to Management
- Derived Requirements with Limited Traceability to Higher Documents
- Creative Methods of Verifying Requirements
- Limited Testing/test Levels
- Limited Management Interest
- Formal Communication is a Burden

Small Projects Can Follow Good Process, but …

• Do Not Need as Much Formal Communication Among Team Members
• Cannot Easily Afford to Produce Enough Artifacts to Make Good Candidates for Appraisals
Research Type Projects

- IR&D, CRAD, Proof of Concept, Demo, Algorithm Development
- Requirements Derived From Vague Goals Determined at Technical Meetings with Customer
- Meet as Many Goals as Possible with Fixed Funding
- Limited Customer Participation
- Single Deliverable Report
- Little Customer Process Interest
- Standard Facility/Limited Resource Requirements
Engineering Services

• Provide Personnel to Work on Customer IPT at Customer Facility
  – Contract Deliverable: Hours of skilled labor
  – Tasks, Process, Methodology to be assigned by Customer

• Requirements
  – Provide Labor with the Proper Skill Set to Help Staff Customer IPT
  – Meet Hourly Rate Commitment

• Work on Customer IPT
  – No Contractual Technical Requirements
  – No Contractual Process Requirements
  – No Technical Deliverables

• Metrics
  – Actual Rates Billed
  – Deviation from Negotiated Rate
  – Staffing Profile

• Customer Facility
Planning Phase

• **Medium/Large Program**
  – Extensive planning phase
  – Detailed IMP, IMS, staffing plan, interdependencies
  – Customer imposed requirement specification
  – Facility Plan

• **Small Project**
  – Brief planning phase
  – Schedule with major technical milestones, staffing plan
  – High level requirements
  – Facility planning

• **Research Program**
  – Brief planning phase
  – Schedule with major milestones, staffing plan
  – High level goals
  – Facility planning

• **Engineering Services**
  – Brief planning phase
  – Schedule with major contractual milestones, staffing plan
  – Staffing requirements
  – Facility?
Planning Phase

• Common
  – Planning Phase
  – Schedule
  – Statement of Work
  – Budget
  – Staffing Plan
  – Requirements
  – Facility Planning

• Different
  – Details
  – Interpretation
Metrics

- Medium/Large Program
  - Extensive Metrics (Technical, Programmatic, Quantitative)
  - Used to Monitor, Manage and Improve Program
  - Convey Status to Management and Customer Monthly
- Small Project
  - Limited Technical and Programmatic Metrics
  - Scoped Version of Standard Metrics
  - Convey Status to Management Quarterly
- Research Program
  - Limited Technical and Programmatic Metrics
  - Scoped Version of Standard Metrics with Some Changes
  - Convey Status to Management Quarterly
- Engineering Services
  - Limited Programmatic Metrics
  - Scoped Version of Standard Metrics with Many Changes
  - Convey Status to Management Quarterly
  - Used to Manage Program (Within Its Scope)
Metrics

• Common
  – All programs track progress with metrics
  – All programs report metrics to management
    • Consistent reporting format
    • Compare trends across organization

• Different
  – Details and frequency
  – Interpretation
  – Usage
  – Quantitative
Testing/Requirements Verification

- **Medium/Large Program**
  - Formal peer reviews
  - Extensive/multi-level testing
  - All requirements verified
  - Formal documentation/records
  - Customer participation

- **Small Project**
  - Informal peer reviews
  - Single level testing
  - All requirements verified
  - Informal documentation/records
  - Often no customer participation

- **Research Program**
  - Informal peer reviews
  - Extensive/multi-level testing
  - High level requirements/goals verified
  - Limited documentation/records
  - Customer participation varies

- **Engineering Services**
  - Customer participation/direction
Testing/Requirements Verification

• Common
  – All programs conduct peer reviews
  – All programs verify requirements

• Different
  – Details
  – Interpretation
Common Themes

• All Types of Programs Benefit From Process Discipline
• All Types of Programs Follow Core Process
  – Planning
  – Requirements
  – Metrics
  – Testing/Verification
  – Configuration Management

• Different
  – Scope/Details
  – Interpretation
The Goal

• Develop a Process With Built in Scoping for Various Types of Projects

• Compliant With the CMMI Model, ISO/AS9100, Corporate Standards

• Keep Directives Short and Simple
  – Provides project buy-in to process

• Rely heavily on supplemental non-directive guidelines and templates for program guidance
History

• Large Process
  – Fully compliant with CMM/CMMI models
  – Produced artifacts to make assessments/appraisals easier for appraisal teams
  – Used model “jargon”
  – Overwhelming for non-standard projects

• Initial Small Software Process – Based on Products: Requirements Document, Test Plan, Version Description Document, etc.
  – Used only portions of directives related to products
    • Used large process - unclear which portions applied
    • Non-uniform process – not applied consistently
    • Not conducive to process improvement
    • Not compliant with standards

• CMM Based Software Small Process – Scoped Specified Directives Into New Directive System
  – Used existing infrastructure support
  – Achieved over a 75% reduction in directives, pages and paragraphs
  – Separate directive system
  – Needed to be adapted on a case-by-case basis for other non-standard projects (Research, Engineering Services)
Software Small Project Process Experience

- Deployed on Over 100 Small Programs
- Consistency - Most Programs Use Process “As Is” Without (or With Very Limited) Tailoring
- Overwhelming Positive Response From Program, Quality and Line Management
- Tailoring Time Reduced From an Average of 160 Staff-hours (Standard Project) to Average of 10 Staff Hours (Small Project)
- Lessons Learned – Implemented in Future Process Activities

Separate Directive System Not Useable As-is for Other Non-standard Projects
Full Process

- Procedures:
  - Directive/Non-Tailorable
  - High Level Directly Traceable to CMMI, ISO, Corp Stds

- Work Instructions:
  - Directive/Tailorable
  - Lower Level, Further Direction on “How” to Meet Requirement

- Enablers:
  - Non-Directive
  - Guidelines/Templates
Proposed Scalable Process

Procedures

Work Instructions

Scoped (subset) for Non-Standard Projects

Enablers

Multi-Part Enablers
Scoped Process

- Process for Planning and Managing Projects
  - High level procedures apply to all projects
  - New lower level work instructions scoped for non-standard projects
- Built in Scoping for Directives Not Used by Non-standard Projects
- Word Generically
  - Create a Facilities Plan ➔ Document Facility Planning
  - SOW ➔ Tasks
- Limited Mandated Formats/Templates
- CMMI/ISO/AS9100 Compliant

Not All Programs Make Good Appraisal Candidates
Summary

• Goals
  – ISO/AS9100, Corporate Standards, CMMI model compliant, as scoped
  – Non-standard projects not planned to major role in appraisals

• Method
  – Start with full process
  – Scope for non-standard projects
  – Use generic wording where possible
  – Keep it short and simple ➔ really short and simple
  – Rely heavily on non-directive templates and guidelines
Questions ? ? ?