

# **Organizational Process Directives - One Size Fits All?**

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## One Set of Directives?

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- 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

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- 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

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- 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**

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- 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

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- 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

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- 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

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- 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

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- **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

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- Common
  - Planning Phase
  - Schedule
  - Statement of Work
  - Budget
  - Staffing Plan
  - Requirements
  - Facility Planning
- Different
  - Details
  - Interpretation

# Metrics

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- 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

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- 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

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- **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

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- Common
  - All programs conduct peer reviews
  - All programs verify requirements
- Different
  - Details
  - Interpretation

# Common Themes

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- 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

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- 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

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- 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

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- 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

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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

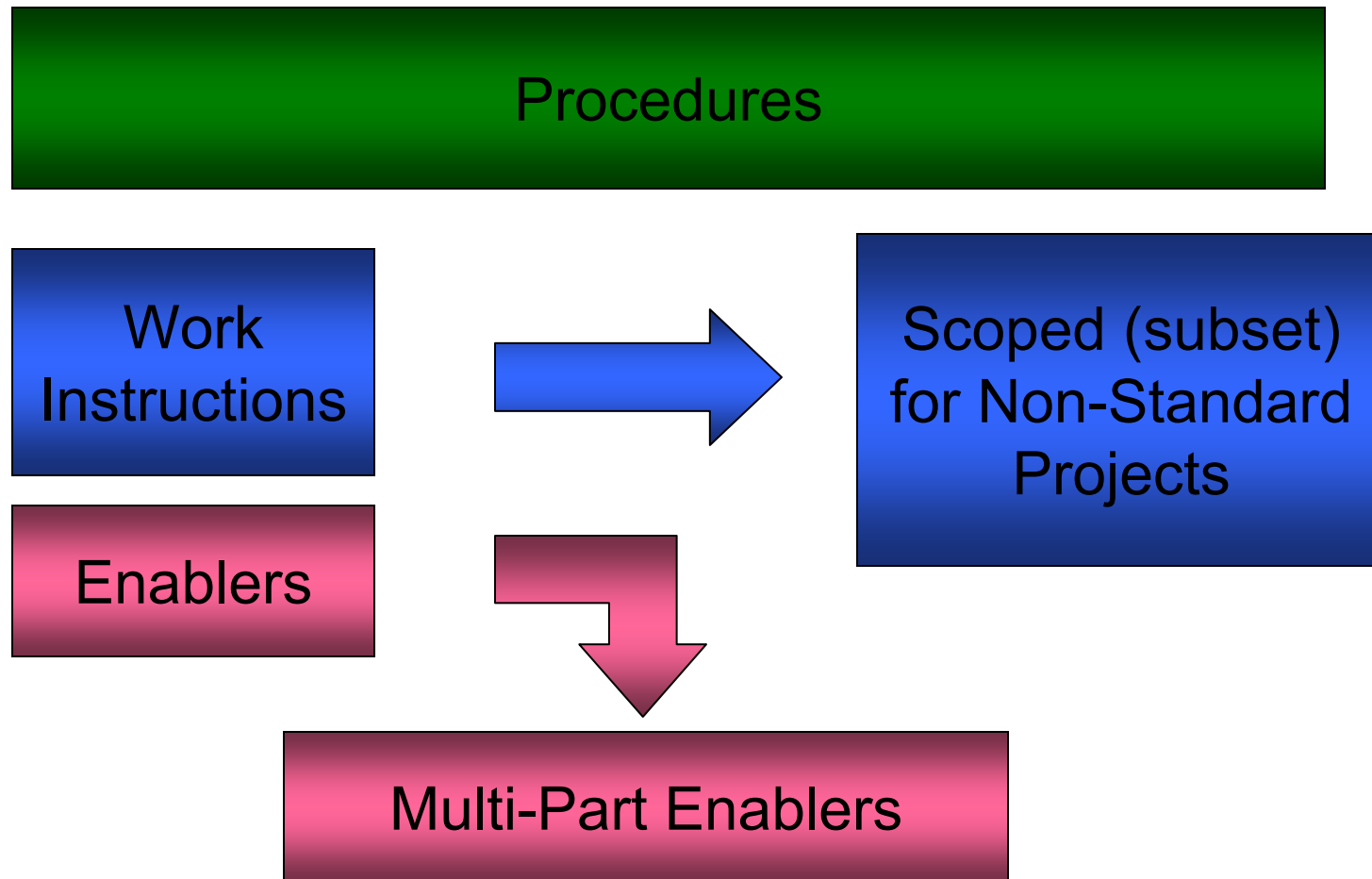
Enablers

Non-Directive

Guidelines/  
Templates

# Proposed Scalable Process

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# Scoped Process

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- 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

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- 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 ? ? ?