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Customer Success Is Our Mission

Easing project planning for Small Programs

Ken Weinberg

El Segundo, CA

kiweinberg@raytheon.com

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Agenda

- Small and Large Program Characteristics
- Comparison of Three Processes for Large and Small Projects
- Desired Single Process for Large and Small Projects
- History of Small Project Process
- Improved Process with Guidance for Small Projects
- Sample Small Project Templates

These thoughts are based on my experiences working with projects for over 20 years, and do not necessarily reflect experiences across Raytheon

Typical Small Program Characteristics

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

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

Org Process Designed for Medium/Large Programs

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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 Coordinated

Good Candidates for Appraisals

Small Project Process Needs

- 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
- Less Extensive 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

The Challenge

- Standards (CMM, CMMI, ISO, Corporate Initiatives) written for large programs
- Organization processes derived from these standards
- Small projects can follow good process, but
  - A large formal process may be a burden
  - Often find “process” intimidating

Comparison of Three Processes for Large and Small Projects

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- Planning Phase
- Metrics
- Testing/Requirements Verification

Planning Phase Characteristics

- **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 (or goals)
  - Facility planning

Planning Phase – Similarities and Differences

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

Metrics Characteristics

- 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 used to Monitor and Manage Program
  - Convey Status to Management

Metrics – Similarities and Differences

- Similar
  - All programs track progress with metrics
  - All programs report metrics to management
    - Consistent reporting format
    - Compare trends across organization
- Different
  - Details and frequency
  - Usage

Testing/Requirements Verification Characteristics

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- **Medium/Large Program**
  - Formal peer reviews
  - Multi Level Independent Reviews with Engineering Technical Experts and Management, and Customer
  - Extensive/multi-level testing
  - All requirements verified
  - Formal documentation/records
  - Customer participation
- **Small Project**
  - Informal peer reviews
  - Combined single Independent Review with Engineering Technical Expert and Management
  - Single level testing
  - All requirements verified
  - Informal documentation/records
  - Often no customer participation

Testing/Requirements Verification – Similarities and Differences

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- Similar
  - All programs conduct peer reviews
  - All programs conduct independent reviews
  - All programs verify requirements
- Different
  - Details

Common Process Themes From All Examples

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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

- Use the Same process for large and small projects
  - Compliant With the CMMI Model, ISO/AS9100, Corporate Standards
- Keep Directives Short and Simple
  - Provides project buy-in to process
  - Generic wording
    - Document Requirements in SRS ➔ Document Requirements
    - SOW ➔ Tasks
  - Almost no required formats
- Smaller projects rely heavily on supplemental non-directive guidelines and templates for tailoring and implementation guidance
- Pre-Tailor directives not used by most small projects (e.g. Formal Customer Reviews)
  - Scoped from full process to cover characteristics used by most small projects
  - Review scoped tailoring for further refinement
    - May add back in items tailored out when appropriate

History

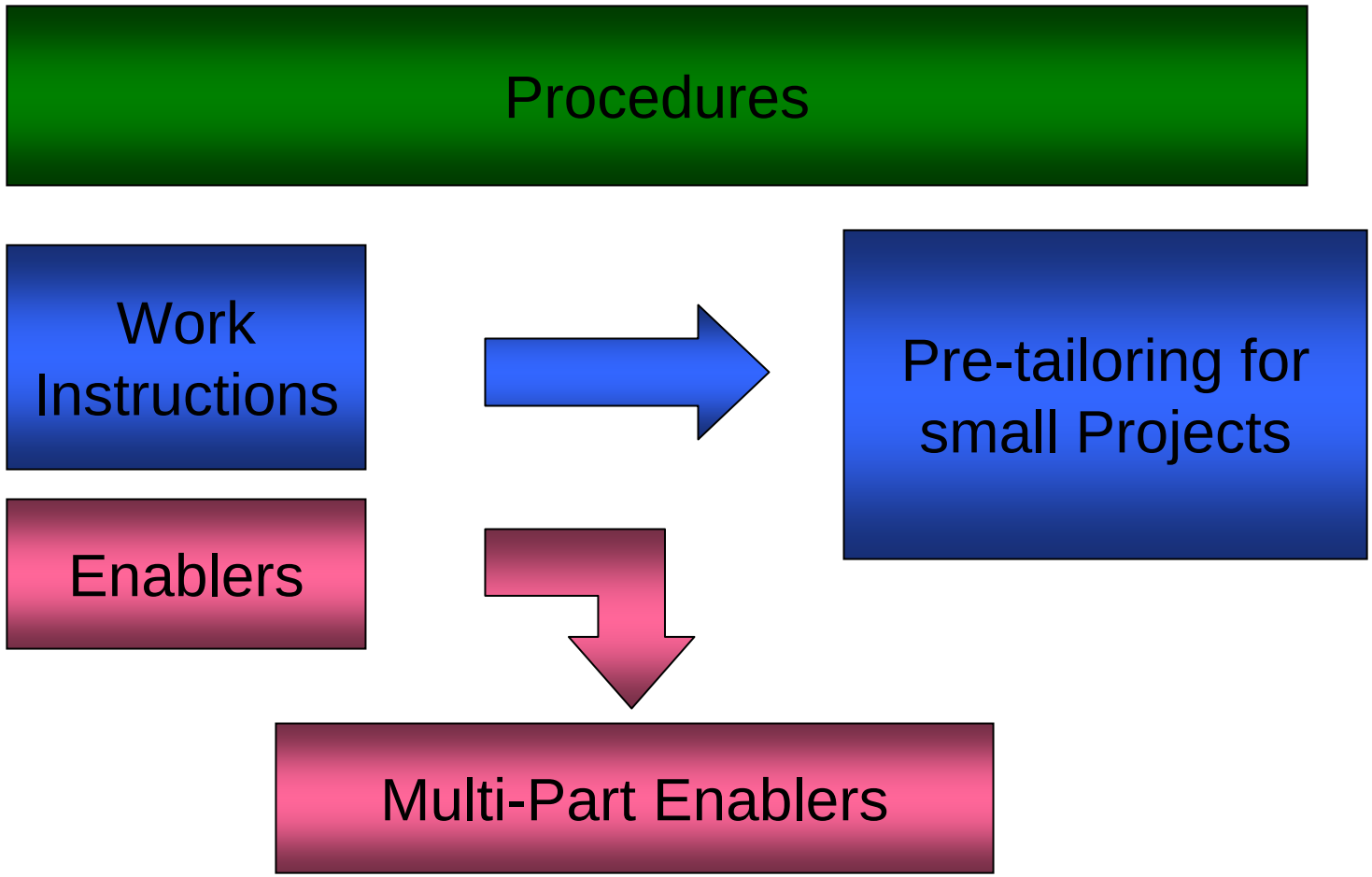
- Large Process
  - Fully compliant with CMMI models
  - Produced artifacts to make assessments/appraisals easier for appraisal teams
  - Used model “jargon”
  - Overwhelming for small projects
- Initial Small Software Process – Based on Products: Requirements Document, Test Plan, Version Description 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
- Separate Software Small Process – Scoped Specified Directives Into New Directive System
  - Used existing infrastructure support
  - Achieved over a 75% reduction in directives, pages and paragraphs
  - Still a separate directive system

Improved Single Process with implementation guidance for smaller 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

Improved Process



Tailoring Template Example

DOCUMENT	NAME	A	C	R	N/	Comments
EI-01-16	Cost Estimating		X			Small projects only need one costing procedure (see Par. 5.10a). Cost realism analysis (Par. 5.11) not required. All bids need mgt approval; projects <$1 require Dept. Mgr approval, projects >$1M require Center Mgr approval
EI-01-21	Process Tailoring	X				Comb
EI-01-23	Project Management Team	X				
EI-01-29	Work Product Management and Stakeholder Involvement	X				See s
EI-01-30	Objective Evaluation	X				See d
EI-01-31	Program Management Plan		X			Folde
EI-01-34	Project Teaming				X	Not ap
EI-01-35	Program Data Archive		X			Will us
EI-10-02	Project Measurement & Analysis		X			Repor
EI-11-01	Formal Decision Making		X			See s
EI-14-01	Start-up Management Review	X				(Not r
EI-14-02	System Functional (Requirements or Concept) Management Review				X	Not re
EI-14-03	Prelim. Design Management Review				X	Not re
EI-14-04	Critical Design (Detail Design and Build Readiness) Management Review				X	This S
EI-14-05	Test Readiness Management Review				X	Not re
EI-14-06	Production Readiness Management Review				X	Not ap
EI-14-07	Transition & Closure Management Review	X				(Not r
EI-14-08	Independent Review of Start-up Plans		X			Small
EI-14-09	Independent Reviews of Product Design and Production Readiness		X			Peer reviews will be expanded to include Systems Engineering and any other applicable SME
EI-15-01	Peer Review	X				If effort is upgrade of existing system, only changes and interfaces need be reviewed.

Comments Section:

- Blank (initially) for Large Projects
- Template for Small Projects Contains Scoping and Implementation Guidance

Sample Tailoring Template Detail

DOC Number	NAME	TAILORING CODE	Comments
EI-14-04	Critical Design (Detail Design and Build Readiness) Management Review	**ACCEPT**	See small project template
EI-14-05	Test Readiness Management Review	**N/A**	Not required for projects designated Technology Demonstration
EI-14-08	Independent Review of Start-up Plans	**ACCEPT**	Small Project Templates Used for plans
EI-15-01	Peer Review	**CHANGE**	If effort is upgrade of existing system, only changes and interfaces need be reviewed.
EI-02-01	Software Requirements	**ACCEPT**	This need not be a formal document with a specific format. DOORs or an EXCEL spreadsheet are OK as long as they are controlled after baseline.
EI-03-05	Software Preliminary Design	**ACCEPT**	Preliminary and Detailed Design Phases are often combined on small projects
EI-04-01	Software Integration and Testing	**CHANGE**	Software Test Plan and Software Test Description may be combined, or included in another document. Software Test Report may be red-lined Software Test Description
EI-04-13	Software Unit Test	**CHANGE**	Plan for regressing test is re-running selected sections of Software Test Description, if analysis shows regression testing is required. Unit testing (and unit test documentation) may be combined with integration
EI-04-14	Software Corrective and Preventative Action	**ACCEPT**	This is generally accomplished during monthly project leadership meetings.

Work Product Management Plan Example Template

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Work Product Control Level Checklist/ Stakeholder Involvement		Note: Unless otherwise noted, all items are stored on the project server											
Project Name: Sample	Date: December 12, 2005						**Stakeholder Roles/Disciplines**						
	Control Level				Function	Peer		Program	Line org	SE	SW	Config/	
Name of Work Product	Create	Eng	Develop	Formal	Responsi	Rev	Customer	Manager	Center/Dept	IPTL	IPTL	Data Mgt	Quality
Software Development Plan (SDP)			x		SW					A	A,R	S	S
SW Schedule	x				SW			S	I	I	A,R	I	I
EMS Tailoring Report		x			SW			A	A	S	A,R	S	S
SW Meeting Minutes, Agenda, Action Items	x				SW						R	S	S
SCCB Package/Minutes		x			CM						A	R	
ToX Agenda, Minutes, Action Items		x			SE/SW				R,S,I,F	S	S	I	I
Software Problem Reports (SPR)			x		SW					I	A,R	S	I
SW Quality Plan			x		QE					I	A,R	S	R,A
SW Code			x		SW						A,R	S	I
SW Version Description Document			x	x	SW/CM					A	A,R	S	A
SW CM Reports		x			CM						I	R	I
SW Coding Standards		x			SW						A,R		I
SW CM Plan			x		CM					I	I	A,R	S,I
SW Peer Reviews	x				SW	X				C	A,R		I
Work Product Management/Stakeholder Plan		x			PM/SW					S	A,R	I	I
Software Requirement Documentation			x		SW	X				A	A,R	S	I
Software Design Documentation		x			SW	X				I	A,R	S	I
Software Test Documentation			x		SW	X				I	A,R	S	I
Software Test Report			x		SW	X				I	A,R	S	I

When Identifying Stakeholders use the following codes

R = Responsible for producing the completed work product

A = Responsible for approving the work product

S = Provides support in the production of the work product

C = May be consulted in the generation of the work product

I = Needs to be informed of the completion of the work product or any changes to the work product

F = Can be used to facilitate the development of the work product

N = Not applicable to the development of the work product. This code may be used to provide clarity when several stakeholders are involved in the generation of a work product

Summary

- Goals
  - ISO/AS9100, Corporate Standards, CMMI model compliant, as scoped
  - Smaller projects not planned to major role in appraisals
- Method
  - Start with full process
  - Use generic wording where possible
  - Keep it short and simple ➔ really short and simple
  - Scope for smaller projects
  - Rely heavily on non-directive templates and guidelines

Questions ? ? ?