Using the Equity in AS9100C to Implement CMMI-DEV Maturity Level 3

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Agenda

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TOPIC
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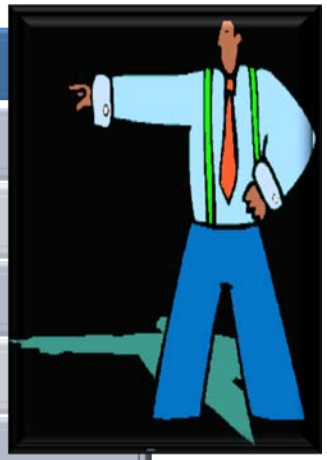
AS9100C PDCA Process
QMS Process Strategy
AS9100C Process Definitions
Monitoring and Measurement of Processes
Potential Reuse Mapping of AS9100C to CMMI-DEV Process Areas
Using the AS9100C Equity to Plan the CMMI-DEV Journey
Steps for Planning SCAMPIs in AS9100C Organizations
Lessons Learned in Using AS9100C to Implement CMMI-DEV ML 3



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AS9100C Overview

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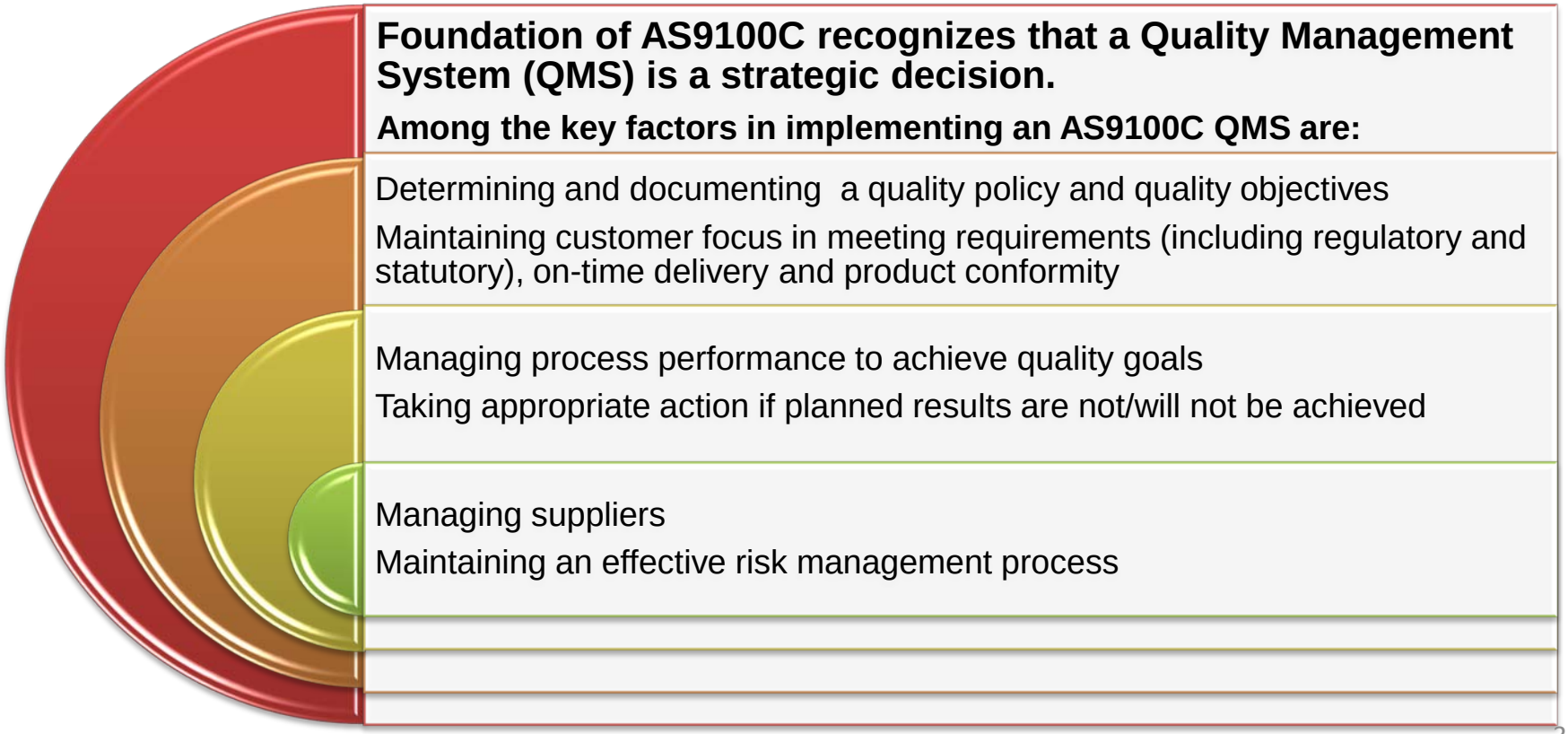
AS9100C
Quality Management Systems – Requirements for Aviation, Space and Defense Organizations

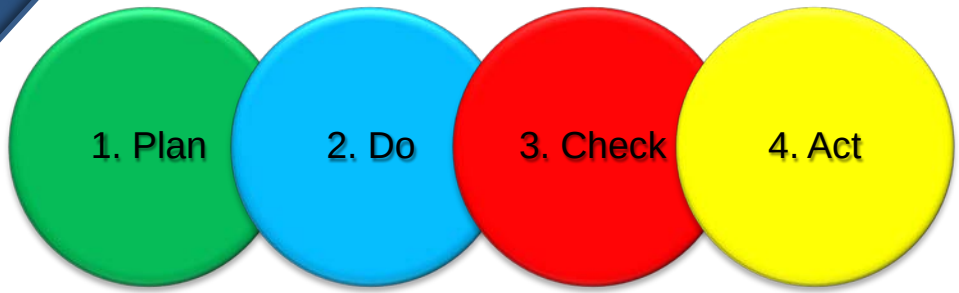
"This international standard promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system (QMS), to enhance customer satisfaction by meeting customer requirements."



AS9100C PDCA Process

AS9100C process improvement methodology PDCA
is similar to the CMMI-DEV IDEAL model for improving processes.

3. Monitor and measure processes and products against policies, objectives and requirements for the product and report the results.



1. Establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organization's policies.

2. Implement the processes.

4. Take actions to continually improve process performance.

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QMS Process Strategy

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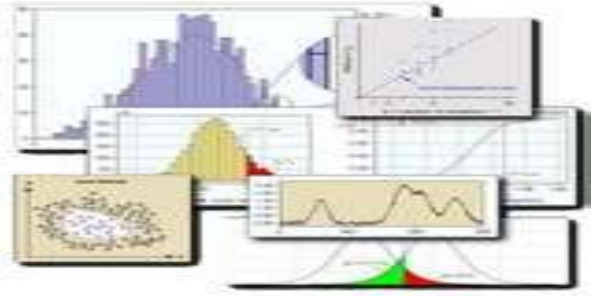
Quality Management Plan



1. • **Define Quality Policy and Quality Objectives**
2. • **Know customer, statutory and regulatory requirements**
3. • **Determine processes needed for the QMS**
4. • **Determine criteria and methods to ensure operation and control of processes are effective**
5. • **Ensure availability of resources and information to support operating and monitoring of processes**
6. • **Ensure integrity of the QMS is maintained when changes are planned and implemented**
7. • **Plan Management Reviews**

AS9100C
Process Strategy

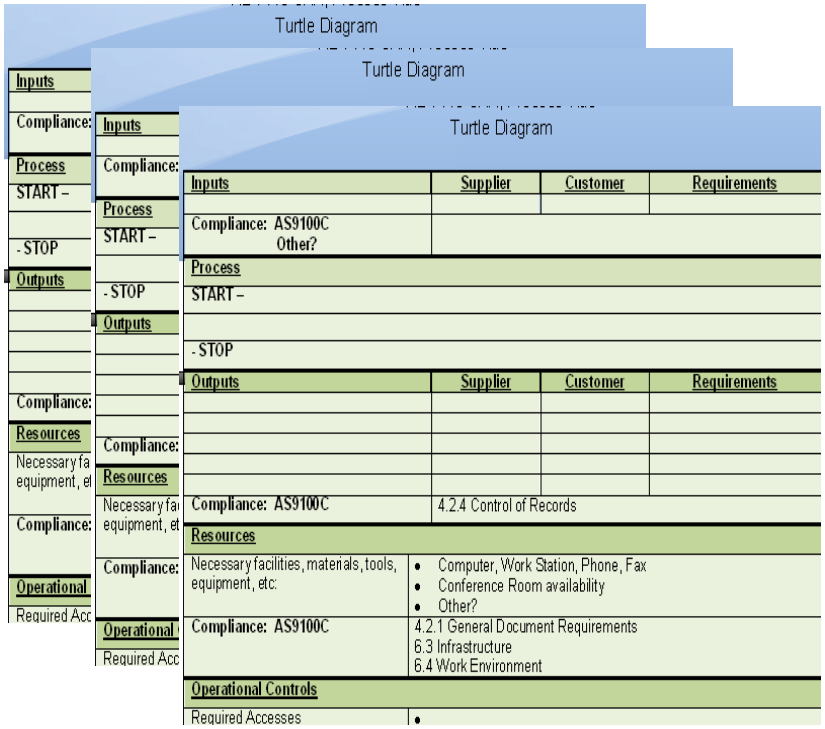
Quality Manual and Policies

Procedure Requirements

Control of documents and records
Control of nonconforming products
Implementing corrective and preventive actions
Internal audits

Record Requirements (implied processes):

Quality Policy and Objectives
Quality Manual
Management Review
Personnel education, training, skills, experience
Control of work transfers & Customer property
Risk Management
Configuration Management
Review of requirements
Selection and development of embedded software
Design and development inputs & changes
Design and development reviews
Verification and Validation
Purchasing
Release authorization of product



OPD, OPF, OT, MA, CM, PPQA, DAR, RD,REQM, TS,PI, PP, IPM, PMC, SAM, RSKM, VER,VAL CMMI-DEV… CL 3

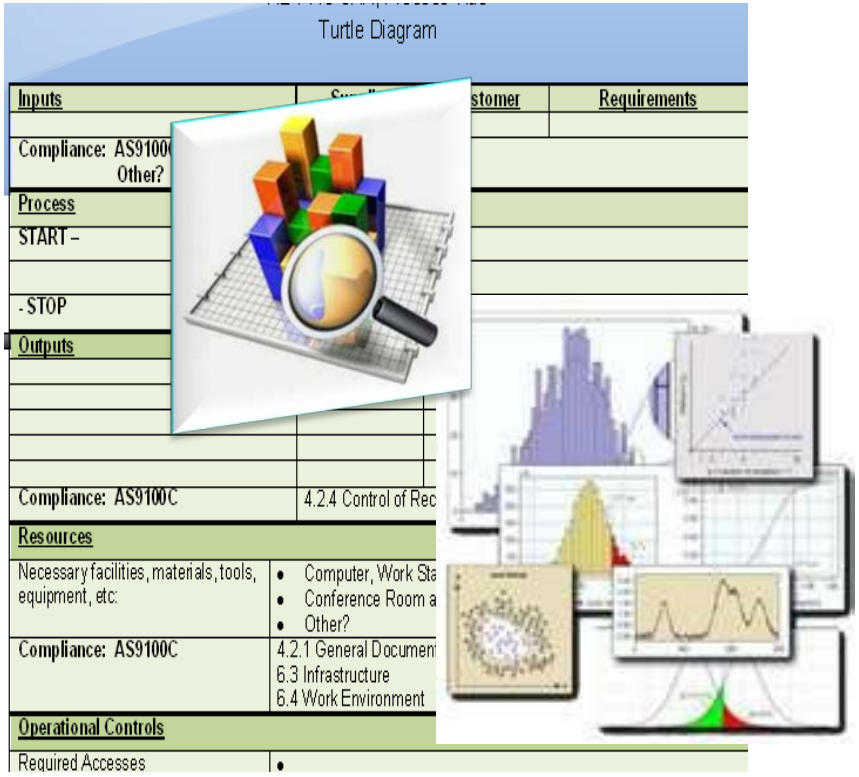
Monitoring, Measuring and Analyzing Process Performance

Section 8.2.3 Monitoring and Measurement of Processes

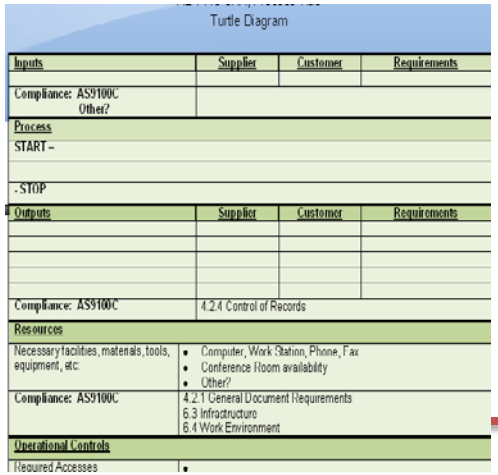
- Provides visibility into the effectiveness of processes
- Signals need for corrective action of non-conforming process
- Uses root cause analysis to determine the cause and potential effect on other processes

Section 8.4 Analysis of Data

- Provides information relating to customer satisfaction and to conformity of product requirements
- Identifies trends of processes
- Identifies opportunities for preventive actions
- Gives insight into the effectiveness and suitability of suppliers



Reuse candidates for MA, OPF, CAR, PMC, SAM

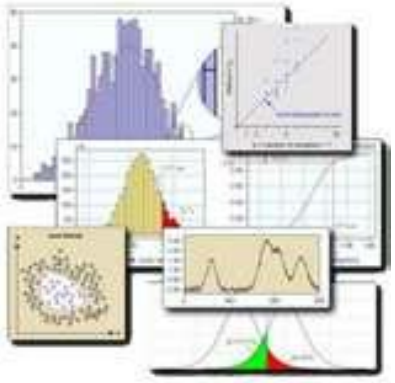


Turtles describe the elements of a process similar to CMMI-DEV process descriptions

Measurements and effectiveness thresholds are documented in turtles.

Process effectiveness is reviewed in planned meetings with upper level management

Project Management Plan					
	Performance Objectives	**Thresholds**	**Measure -ments**	**Method of Surveillance**	**Project Management Plan**
1	*Performance Thresholds: X of Y Total Contract Deliverables are Delivered on Schedule*	*100%*	*% X of Y*	*Monthly*	*Project Management Plan*
2	*Performance Thresholds: X of Y Contract Performance Objectives met Required Thresholds*	*95%*	*% (X of Y)*	*Monthly Status Reports*	*Project Management Plan*
3	*Software Reliability: X of Y software deliverables were reopened after being closed*	*≤3%*	*% (X of Y)*	*Monthly Status Reports*	*Project Management Plan*



★ ***Analysis***

★ ***Communication***

★ ***Corrective Actions***

Examples of Reuse Mapping

REUSE FUNCTION	CMMI-DEV PAs	AS9100C
Process Management	OPF, OPD, OT	Section 6.2.2 Competence, Training and Awareness Section 6.3 Infrastructure Section 6.4 Work Environment Section 8.1 Measurement, Analysis and Improvement Section 8.5.1 Continual Improvement Section 8.5.2 Corrective Action Section 8.5.3 Preventative Action
Measurement	MA	Section 8.2 Monitoring and Measurement Section 8.2.1 Customer Satisfaction Section 8.2.3 Monitoring and Measurement of Processes Section 8.2.4 Monitoring and Measurement of Product Section 8.3 Control of Nonconforming Product Section 8.4 Analysis of data
Support Functions (except MA)	CM, PPQA, DAR	Section 3.3 Critical Items Section 7.5.3 Identification and Traceability Section 7.1 Planning of Product Realization Section 7.1.3 Configuration Management Section 4 Quality Management System Section 8.2.2 Internal Audit

CMMI-DEV and AS9100C have different model structures. Do not expect to discover a one to one correspondence in the implementation of CMMI-DEV practices and AS9100C requirements. CMMI-DEV practices are often implemented by multiple AS9100 requirements.

Examples of Reuse Mapping

REUSE FUNCTION	CMMI-DEV PAs	AS9100C
Engineering	RD, TS, PI, VER, VAL	Section 7 Product Realization Section 7.2 Customer-Related Processes Section 7.3 Design and Development Section 7.4.3 Verification of Purchased Product Section 7.5 Production and Service Provision Section 7.5.3 Identification and Traceability
Project Management	PP, PMC, IPM, RSKM, SAM, REQM	Section 4.1 General Requirements Section 4.2.3 Control of Documents Section 4.2.4 Control of Records Section 5.6 Management Review Section 7.1 Planning of Product Realization Section 7.1.1 Project Management Section 7.1.2 Risk Management Section 7.4 Purchasing Section 7.5.3 Identification and Traceability Section 8.1 Measurement, Analysis and Improvement Section 8.2.3 Monitoring and Measurement of Processes

Using the AS9100C Equity to Plan the CMMI-DEV Journey

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- Understand the business case
- Obtain higher management support
- Provide CMMI-DEV and SCAMPI training
- Plan and manage CMMI-DEV implementation as a project

Keys to Success

Which way to CMMI-DEV ?

Focus on “reuse” of AS9100C equity such as:
processes, forms, templates, measurements, Turtles, SIPOCS, CPARs, etc.)

Do not throw existing assets away!

Steps for Implementing CMMI-DEV Practices AS9100C organizations

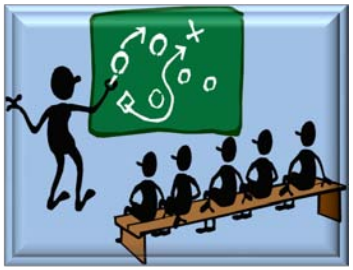
Lessons Learned

What did we do well?

What do we need to improve?

Where were we lucky?

market area
revenue/profit
projected growth
quality factors



QA, engineering staff

Where to start?

CMMI-DEV SCAMPI training for QM staff

Inventory AS9100C assets using CMMI-DEV

Do not use CMMI-DEV to inventory AS9100C assets

What is missing?
e.g. Where is process Improvement planning data?

Estimate cost, time & resources

Develop CMMI project plan

Monitor project performance

Understand the Commonality with AS9100C Business Goals !

Steps for Planning SCAMPIs in AS9100C organizations

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CMMI-DEV v1.3 Maturity Level 3

- QMS
- Processes
- Measures
- Training
- CPARS
- ……

What do we have?

SCAMPI Mantra

What is the plan?

What do we "need"?

Process Improvement Plan

- ★***Tasks***
- ★***Schedules***
- ★***Reviews***
- ★***Risk***
- ★***Resources***

Turtle Diagram

	Supplier	Customer	Requirements

	Supplier	Customer	Requirements

4.2.4 Control of Records

Necessary facilities, materials, tools, equipment, etc:	• Computer, Work Station, Phone, Fax • Conference Room availability • Other?
Compliance: AS9100C	4.2.1 General Document Requirements 6.3 Infrastructure 6.4 Work Environment
Operational Controls	
Required Accesses	•

Complete continuous process improvement planning data to include SCAMPI tasks, such as PIID preparation, ATM training, readiness reviews, sampling factors, subgroups, project selection and data collection strategy.

Lessons Learned in Using AS9100C To Implement CMMI-DEV ML 3

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AS9100C requirements map closely to the practices in CMMI-DEV 1.3

AS9100C practices are used in both manufacturing and services domain. Manufacturing processes are highly disciplined and rigorously controlled to meet performance and quality factors.

ASC9100 organizations often implement six sigma projects as an integral part of continuous process improvement and measurement capabilities to reach higher than CMMI ML 3.

Inventory by mapping your AS9100C practices to CMMI-DEV.

Avoid mapping the CMMI-DEV practices to your assets.

Plan on an aggressive reuse campaign of AS9100C process assets. Do not disregard the potential value to achieving CMMI-DEV v1.3 goals.

The End

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You have just seen key benefits of using AS9100C to reach CMMI-DEV ML 3 from the "30,000 feet" level.

Questions or Comments ?