



Introduction to AS9017 Control of Aviation Critical Safety Items (CSI)

November 2009

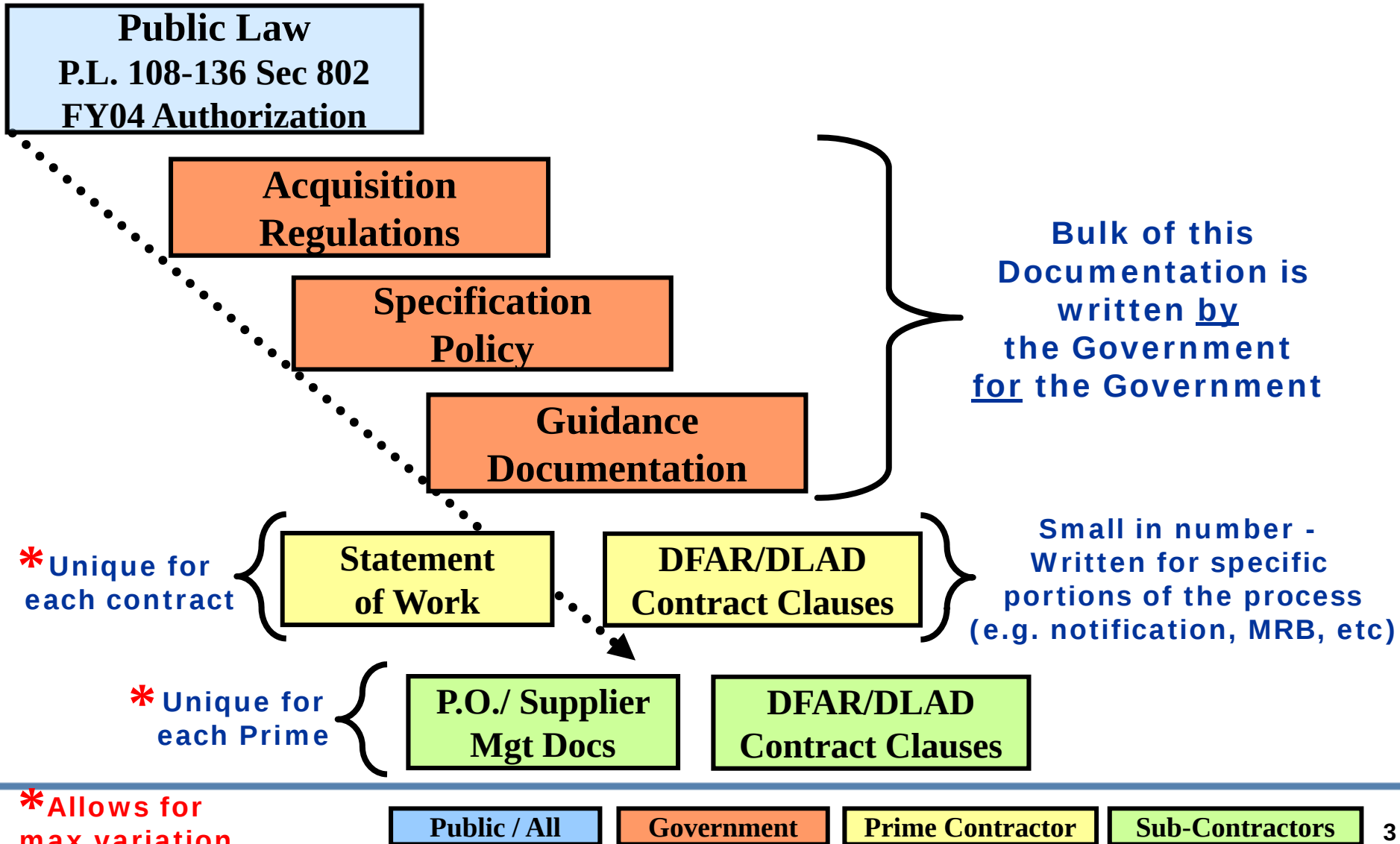


The heart of the matter.....

Public Law 108-136 Sec 802

- **The Secretary of Defense shall prescribe in regulations a quality control policy for the procurement of aviation critical safety items**
- **Content of Regulations:**
 - **Head of design control authority for CSIs shall establish processes to identify and manage procurement, modification, repair and overhaul of CSIs**
 - **Head of contracting activity shall enter in a contract for CSIs only with a source approved by the design control activity**
 - **Delivered CSIs meet all technical and quality requirements specified by the design control activity**

CSI Law, Regulations, Policy, and Guidance



Potential Issues Driven by Policy

- **Government Program Office Engineering or DCMA Approval of Process Plans and subsequent changes for CSIs**
- **Government Program Office Engineering or DCMA Approval of Class II Engineering Change Packages**
- **Government Program Office Engineering or DCMA approval of minor nonconformances on non critical features on parts containing CSIs**
- **100 % Use of Government Contract QA for CSI Parts**
- **Government Program Office Engineering or DCMA witnessing of every First Article Inspection for CSI Parts**

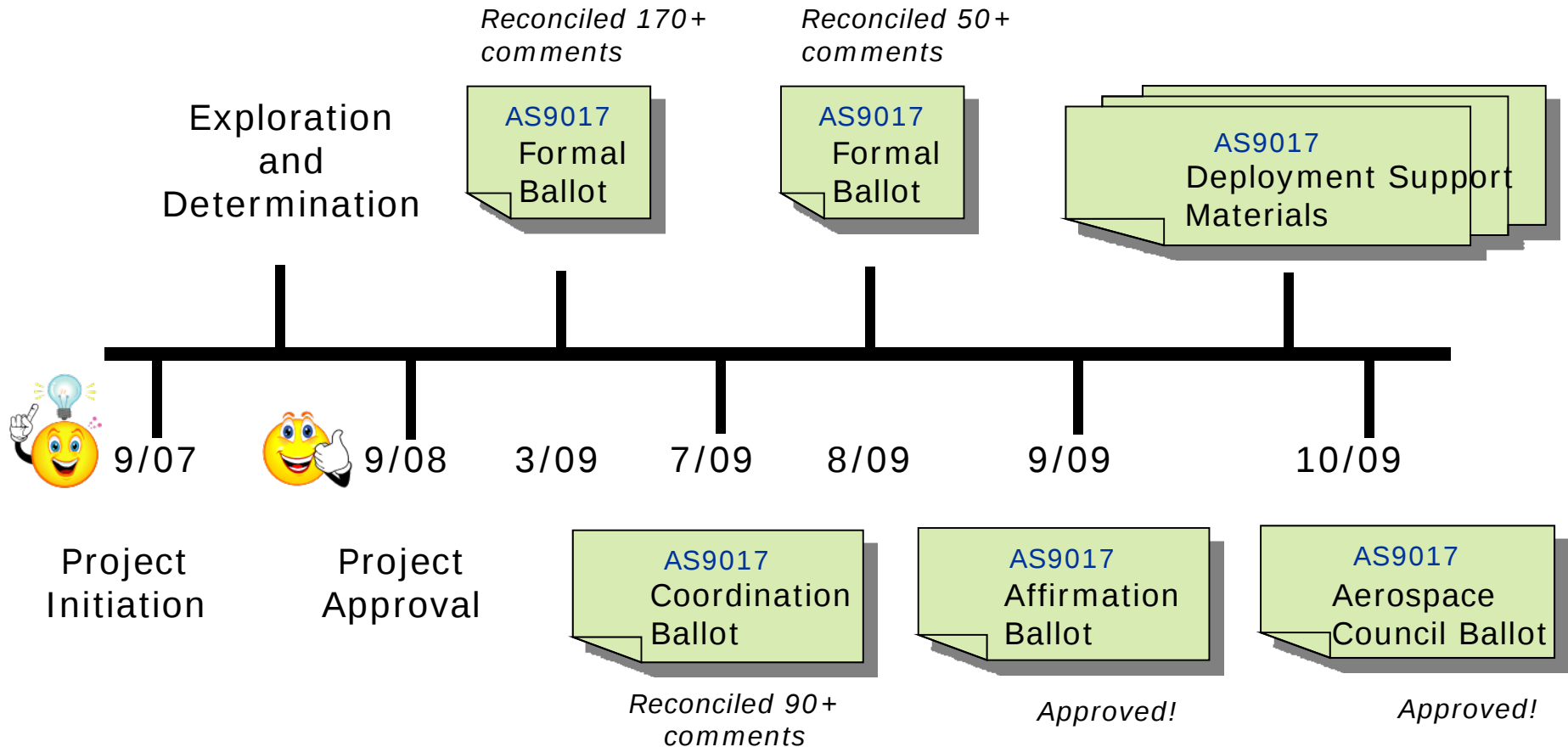
Case for Action

- **Multiple sets of requirements developed and flowed down to suppliers**
- **Common suppliers receiving different sets of flow down documents creates confusion and possible conflict**
- **Suppliers receive multiple CSI system audits from all primes**
- **Each prime has its own audit criteria and scheme**

Benefits of a Common Standard

- **Consistent requirements flowed down to shared suppliers**
- **Consistent evaluation criteria to audit for compliance**
- **Cost savings for suppliers and primes**
- **Prime evaluation on supplier can then be more product focused and less systems focused**

Process



Collaborative effort between AAQG members, AIA committees and government/regulatory agencies resulted in November 2009 publication of the standard

Writing Team Composition

- **12 Individuals representing the Americas**
- **8 Member Companies**
- **4 Government / Regulatory Agencies**
- **1 Trade Association / Multiple Committees**

Objective

- To harmonize requirements across the supply chain for management and control of Department of Defense Aviation Critical Safety Items (CSIs)

SAE Aerospace An SAE International Group	AEROSPACE STANDARD	SAE AS9017	
		Issued	2009-11
Control of Aviation Critical Safety Items			

RATIONALE

Aviation CSIs are defined by United States (U.S.) Public Law 108-136, Section 802. The law requires that the Secretary of Defense prescribe in regulations a quality control policy for the procurement of aviation CSIs. Department of Defense (DOD) policy and guidance documents implementing the law, prescribes for the government agencies the methodologies for implementing the CSI policy. This document is designed to be used as a flow down to the aviation supply base to ensure consistent management of CSI requirements in line with specified government policy.

FOREWORD

To assure customer satisfaction, aerospace industry organizations must produce and continually improve safe, reliable products that meet or exceed customer and applicable statutory and regulatory authority requirements. The globalization of the aerospace industry and the resulting diversity of regional/national requirements and expectations have complicated this objective. Organizations have the challenge of purchasing products from suppliers throughout the world and at all levels of the supply chain. Suppliers have the challenge of delivering products to multiple customers having varying quality requirements and expectations.

Industry has established the International Aerospace Quality Group (IAQG), with representatives from companies in the Americas, Asia/Pacific, and Europe, to implement initiatives that make significant improvements in quality and reductions in cost throughout the value stream. This standard has been prepared by the Americas Aerospace Quality Standards Committee (AAQSC).

This document standardizes, to the greatest extent possible, minimum requirements for the control of aviation Critical Safety Items (CSIs) throughout the supply chain. The establishment of common requirements, for use at all levels of the supply-chain, by organizations should result in improved quality and safety, and decreased costs, due to the elimination or reduction of organization-unique requirements and the resultant variation inherent in these multiple expectations.

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Rationale

- **Public Law 108-136, Section 802 requires that the Secretary of Defense prescribe in regulations a quality control policy for the procurement of aviation CSIs**
- **This document is designed to be used as a flow down to the aviation supply base to ensure consistent management of CSI requirements in line with specified government policy**

Scope

- **This document is intended to prescribe consistent requirements in the management of Critical Safety Items for organizations and suppliers who perform work for prime contractors receiving direct contracts from U.S. government agencies**
- **This standard will be auditable with the expectation that the prime contractor will flow CSI requirements to the supply chain and periodically assess, audit, validate, and recognize compliance to AS9017 per their own processes**

Key Terms & Definitions

- **Aviation Critical Safety Item (CSI)**
 - This is the item for which the whole process is established
 - If this item isn't manufactured and maintained per the original design, something catastrophic could occur
- **Critical Characteristic**
 - Of all the features of the item, the few that are the most difficult to manufacture, the likeliest to fail, or the most likely to cause failure

Key Points – Product Realization

- **5.1 Planning for Product Realization**
 - **Key Requirements:**
 - » Manufacturing plan for all operations to be submitted to the customer prior to production.
 - » Special processes, temporary or permanent work transfers require the same controls
 - **Rationale:**
 - » All manufacturing plans (temporary or not) should be developed in advance with customer concurrence, if required by contract
 - **Implementation / Audit Considerations:**
 - » Does the organization have a process that captures all planning activities and a process for customer interaction?
 - » Does the organization have a process that can identify all changes to CSI plans during the life cycle of the item?

Key Points – Product Realization

- **5.2 Review of Requirements Related to the Product**
 - **Key Requirements:**
 - » Organizations not responsible for design must have a robust contract review process that identifies customer CSI requirements
 - » Such organizations must also have a robust contract flow down process that ensures CSI identifications and controls from introduction to delivery
 - **Rationale:**
 - » Non design responsible organizations must be adept at identifying customer special requirements and ensuring that they are carried out throughout product realization
 - **Implementation / Audit Considerations:**
 - » Does the organization have a robust contract review process that ensures flow-down to all departments (e.g. planning and production) responsible for meeting customer requirements?

Key Points – Product Realization

- **5.3 Customer-Related Processes**
 - **Key Requirement:**
 - » The organization must have a process to ensure timely communication to the customer for differences in data discovered by the organization and for any significant facility changes that could impact CSI item production
 - **Rationale:**
 - » As with most CSI processes, seamless communication with the customer ensures appropriate collaboration to help ensure flawless CSI item production
 - **Implementation / Audit Considerations:**
 - » Does the organization have a process for identifying and communicating discovered data differences to the customer?
 - » Does the organization have a process for communicating major organizational & facility changes to the customer?

Key Points – Product Realization

- **5.4 Design and Development**
 - **Key Requirements for Design Responsible Parties:**
 - » **The organization must have a design process acceptable to the customer which;**
 - Evaluates & assesses the consequences of CSI failure during design
 - Ensures identification of critical characteristics
 - Ensures review of identified CSIs with the customer during design phases
 - Provides for reaching agreement with the customer on determination of all CSIs
 - Ensures CSIs and critical characteristics are identified in manufacturing plans and that production variation is controlled
 - Ensures appropriate Risk Management of CSIs
 - Evaluates all design changes for impact to CSIs and for securing customer approval (if required) of those design changes

Key Points – Product Realization

- **5.4 Design and Development (continued)**
 - **Rationale:**
 - » **Appropriate Design processes (for design responsible parties) are critical to the success of CSI management**
 - » **When delegated responsibility – the organization must have robust processes to provide the Government assurances that CSIs are properly designed, identified and managed**
 - **Implementation / Audit Considerations:**
 - » **Does the organization have a design process that provides for each of the major requirements?**
 - » **Does the organization have a risk management process with gates for ensuring identified CSIs enter the R / M process?**
 - » **Does the organization have formal process for variation reduction and methods for ensuring identified critical characteristics enter the process?**

Key Points – Product Realization

- **5.5 Purchasing**

- **Key Requirement:**

- » **The purchase of CSIs must be from sources approved by the original design authority**
 - If this is a new product, the manufacturer will have an approved supplier list including scope, etc. This list includes sub-tiers
 - If this is a break out purchase by the government, the CSI must be purchased from a source approved by the original design authority used and it must be manufactured to the process approved by that design authority

- **Rationale:**

- » **The original CSI was tested at the system level and it is important that every subsequent purchase of that item be equivalent to assure the system does not fail**

- **Implementation / Audit Considerations:**

- » **Verify that all sources being used are approved by the original design authority as required by the frozen process**

Key Points – Product Realization

- **5.6 Production and Service Provision**

- **Key Requirement:**

- » **The engineering definition and manufacturing plan shall note all applicable data, equipment, and manufacturer and/or processor information used for all operations performed on CSIs**
 - **Manufacturing plans will be approved and frozen prior to first delivery of a CSI**
 - **Any major changes to the manufacturing plans must be resubmitted to the customer**

Key Points – Product Realization

- **5.6 Production and Service Provision (continued)**
 - **Rationale:**
 - » Ensures all necessary information is included on the engineering definition and manufacturing plan and the plan is used without change on future deliveries
 - **Implementation / Audit Considerations:**
 - » Verify that the data, equipment, and manufacturer and/or processors used to manufacture the plan are the same as those called out
 - » Verify that frozen planning was maintained and used per customer requirements

Key Points – Product Realization

- **5.6 Production and Service Provision**

- **Key Requirement:**

- » **Production process verification must be performed by the organization for all manufacturers that were not previously approved for a specific CSI, have not produced that CSI within the past 2 years, have unfavorable quality history, or have made any changes to the item, manufacturing processes, or sources previously used**
 - » **Unless a CSI is specifically designed for modification during installation, then modification of CSIs during installation is prohibited**

Key Points – Product Realization

- **5.6 Production and Service Provision (continued)**
 - **Rationale:**
 - » The organization must ensure that the production process is both verified and controlled to ensure parts are consistently manufactured to the customer's original requirements
 - **Implementation / Audit Considerations:**
 - » Validate that the organization has a process in place to verify the production process for sources without recent manufacturing history or have made process changes for a specific item
 - » Verify that installation procedures prohibit the modification of a CSI, unless the item is designed to be modified to fit during installation

Key Points – Product Realization

- **5.6 Production and Service Provision**
 - **Key Requirement:**
 - » **The customer shall be notified within 72 hours of the organization learning of nonconforming product that has already been delivered**
 - » **The organization shall have a system allowing for part traceability from the specific lot of raw material or heat lot all the way through the final part, assembly, or installation supplied to the customer**

Key Points – Product Realization

- **5.6 Production and Service Provision (continued)**
 - **Rationale:**
 - » When nonconforming product is discovered post delivery, prompt notification is necessary to ensure that proper risk mitigation efforts are undertaken
 - » In the instance that nonconforming raw material is used in the manufacture of a CSI, it is important to be able to track down which lots of parts were manufactured from that bad batch of raw material
 - **Implementation / Audit Considerations:**
 - » If the organization had shipped product that was later found to be nonconforming, ensure that proper notification was given to the customer in a timely manner
 - » Ensure that the organization has a documented process and implements the process for part traceability as defined in the standard

Key Points – 6.0 Measurement, Analysis and Improvement

- **Key Requirement:**
 - Processes that control the manufacture of CSIs shall be included in the internal audit program of the organization
- **Rationale:**
 - Internal audit is an existing and established process that can provide early notification of process noncompliance
 - AS9017 requirements should be treated as any other customer defined requirement & integrated into overall QMS
- **Implementation / Audit Considerations:**
 - Validate that key requirements of AS9017 are included in organization's audit criteria / checklists
 - Verify that the audit process is checking for CSI compliance

Key Points – 6.0 Measurement, Analysis and Improvement

- **Key Requirement:**
 - All critical characteristics, which can be non-destructively inspected / tested, shall be subject to 100 % inspection / test by the CSI producer, unless sampling or Statistical Process Control (SPC) approaches have been approved by the customer
- **Rationale:**
 - Critical characteristics have been identified by Engineering and must be inspected 100 % to ensure that the risk of a catastrophic failure is averted
 - Sampling can only be done when approved by relevant authority
- **Implementation / Audit Considerations:**
 - Verify that records show 100 % inspection / test of critical characteristics
 - If sampling is being used, then records should verify approval by relevant authority

Key Points – 6.0 Measurement, Analysis and Improvement

- **Key Requirement:**
 - The customer must approve any variance to the approved work plan or frozen manufacturing plan in advance, unless delegated to the organization, including rework planning to return the CSI to original design configuration or repair planning to return the CSI to an acceptable condition
- **Rationale:**
 - The control of the mfg process is essential when dealing with CSIs in order to minimize variation.
 - Control of planning needs to be understood between the customer and organization
- **Implementation / Audit Considerations:**
 - Ensure agreement for plan approval is documented in QMS documentation and consistent with customer requirements
 - Verify that the mfg process has been approved and that records show that any subsequent changes have been approved by (defined) relevant authority

Critical Items / Critical Safety Items

ISO 9001 “Generic” QMS Reqmts

- Must identify customer requirements
 - No differentiation of types of customer requirements
- Ensure control over processes for product realization
- No reference to “key”, “critical” or “variation control”

AS9100 Aerospace QMS Reqmts

- Introduces special requirements & critical items
 - Subset of customer requirements
- Introduces key characteristics
 - For the purposes of controlling variation

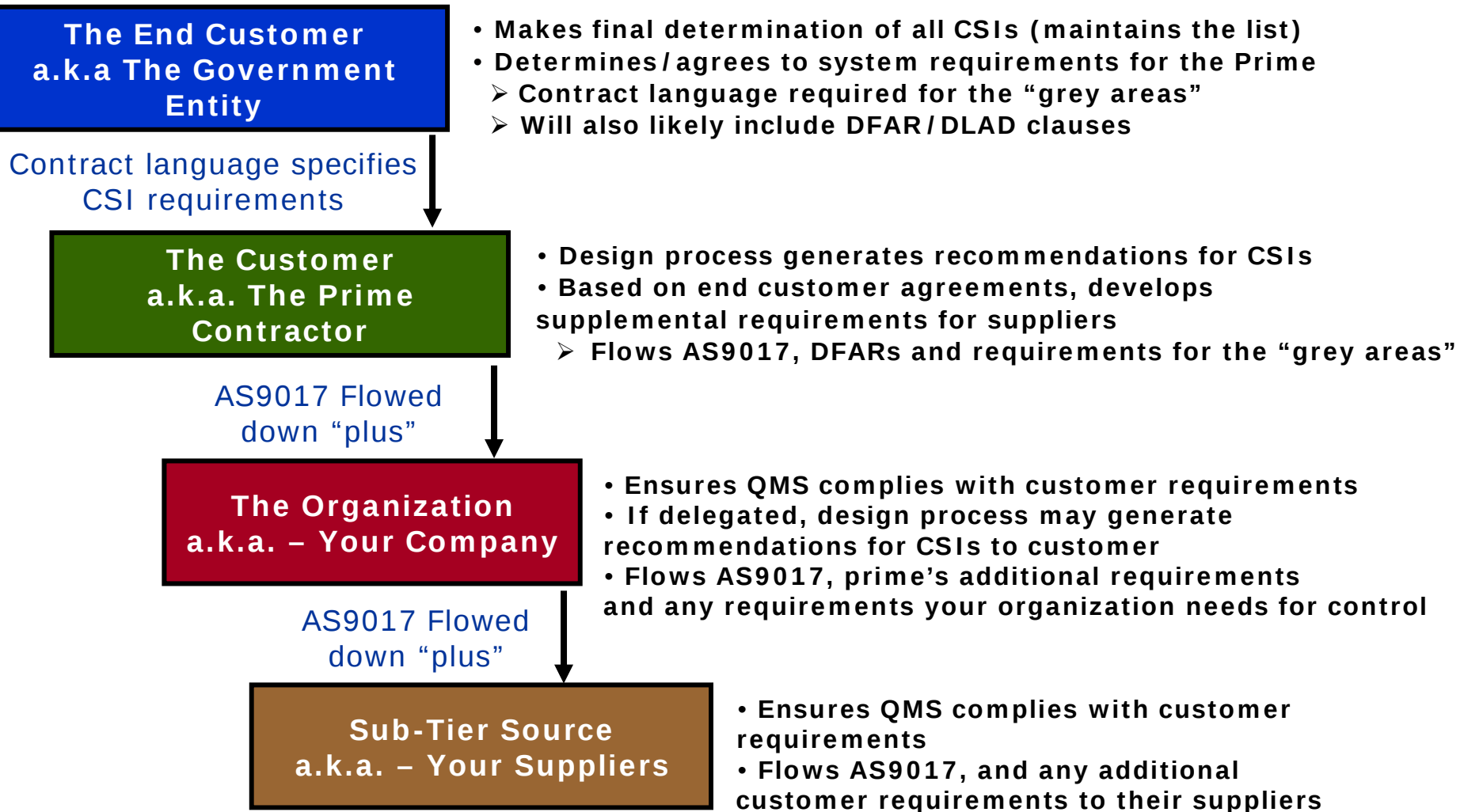
AS9017 Control of Aviation CSIs

- Introduces critical safety items
 - Subset of AS9100 critical items
- Introduces critical characteristics
 - Subset of AS9100 key characteristics
- Mandates process controls for CSIs and critical characteristics

Contractor QMS Requirements

- Documents “how” an organization satisfies generic & specific customer requirements (to include the above)

Point of Emphasis – The Process Players



Note: If YOU flow AS9017, then from their perspective YOU are the customer and THEY are the organization

Point of Emphasis – The “Grey Areas”

- **Not all CSI Process Requirements are identical**
- **Variation in requirements from organization to organization exists based on organization history, reliability and experience in identifying and managing CSIs**
 - This is consistent with Government policy and guidance
- **AS9017 provides (and allows) for variation in these areas**
 - Identified by “as required”, “if/unless delegated”, etc. in AS9017
- **It is critical that an understanding is reached with the customer, and, if applicable, the end customer on each of these process areas during contract review**
- **Agreement must be documented between you and your customer**
 - In contract language or other customer approved documentation

The “Grey Areas”

- **Special Processes**
 - 5.1 – **Definition** of “Special Processes” (by customer or organization)
- **Control of Work Transfers**
 - 5.1.1 – Changes to process plans for transferred work must be approved by the customer, **unless delegated**
- **Customer Communication**
 - 5.3.1 – Communication time frame **as specified by contract** (most often augmented by DFAR 252.246-7003)
- **Design and Development**
 - 5.4.1.1 – Design process (**if delegated**) must be approved and:
 - » Review CSIs at intervals with customer / end customer, **as required**
 - » Secure customer approval of design changes, **as required**

The “Grey Areas” (continued)

- **Purchasing Processes**
 - 5.5.1.2 – Sub-tier sources to be approved by customer, **unless delegated**
- **Control of Production and Service Provision**
 - 5.6.1.2, 5.6.1.3 – Frozen process control methodology **must be defined**
 - 5.6.1.4 – Customer approval of initial manufacturing plans and plan changes to be secured, **as required**
- **Production Process Verification (a.k.a. First Article Inspection)**
 - 5.6.2 - Nonconformances to be reviewed and dispositioned by the customer and end customer’s design authority, **if required**

The “Grey Areas” (continued)

- **Monitoring and Measurement of Product**
 - 6.1.2.1 – Critical characteristics subject to 100 % inspection / testing unless sampling or SPC has been **approved by the customer**
 - » Sampling for Critical characteristics requiring destructive testing **must be defined**
- **Control of Nonconforming Product**
 - 6.2.2 – MRB process and delegation **need to be defined**
 - » General guidance (not in AS9017)
 - N/C Critical characteristics **require end customer approval**
 - Major N/C on non-critical characteristics **require DCMA/End customer approval**
 - Minor N/Cs on non-critical characteristics **may be delegated** to the organization
 - 6.2.4 - Rework or repair plans varying from initially approved process plans must be approved by the customer, **unless delegated**

The “Grey Areas” – Bottom Line

- Agreement must be documented between you and your customer
 - In contract language or other customer approved documentation
- In doing so, you will leverage your capability and history in producing CSIs
- Failure to do so may result in implementation of a strict interpretation of the requirement



Summary

- AS9017 harmonizes requirements across the supply chain for the management and control of U.S. Department of Defense (DoD) aviation critical safety items (CSIs)
- The standard will minimize the variation in actual contract requirements issued to contractors along with variation in governmental oversight
- AS9017 is intended to be flowed to suppliers by the prime or first tier contractor and will be auditable for compliance as a customer requirement as part of a quality management system audit