intertek
Total Quality. Assured.

# ADVANCED PRODUCT QUALITY PLANNING & CONTROL PLANS IN THE AUTOMOTIVE INDUSTRY

**Carmine Liuzzi**
**Principal Consultant & Industry Leader**
**Learning Academy Services**

# ABOUT CARMINE LIUZZI

## Principal Consultant & Industry Leader
## Learning Academy Services at Intertek

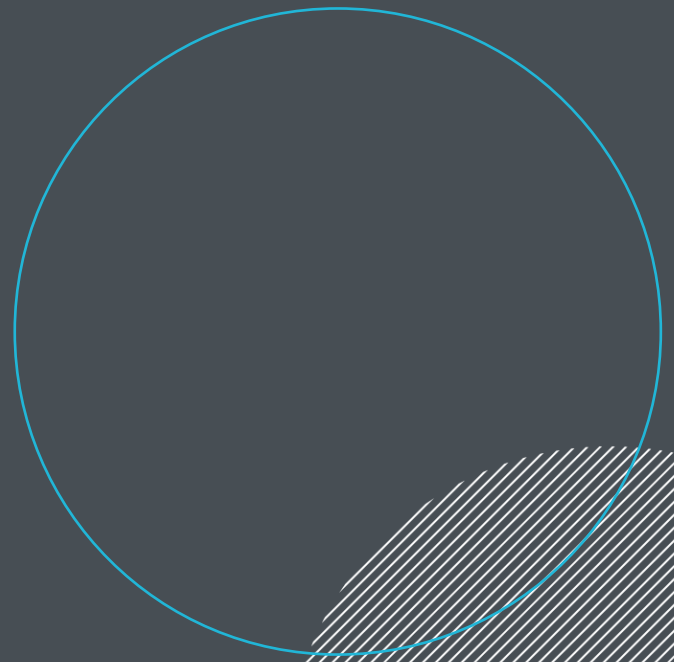
- 31+ year veteran with SAI Global / Intertek
- Master's degree In polymer chemistry from Long Island University and a bachelor's in biochemistry from Manhattan College
- Areas of specialty include ISO 9001, ISO 14001, IATF 16949, ISO/IEC 17025 and ISO 45001, as well as a wide range of process improvement techniques / tools such as Lean, and Kaizen
- Exemplar Global certified Lead Auditor for Quality and Environmental Management Systems, Automotive expert, including IATF 16949 and Quality Core Tools
- Coaches clients in all aspects of developing, implementing and integrating management systems, and provides services that range from customized training to consulting support for organizational transformation.
- Affiliate Director for New Jersey for Destination Imagination, a global non-profit education organization operating in over 80 countries

# WEBINAR OBJECTIVES

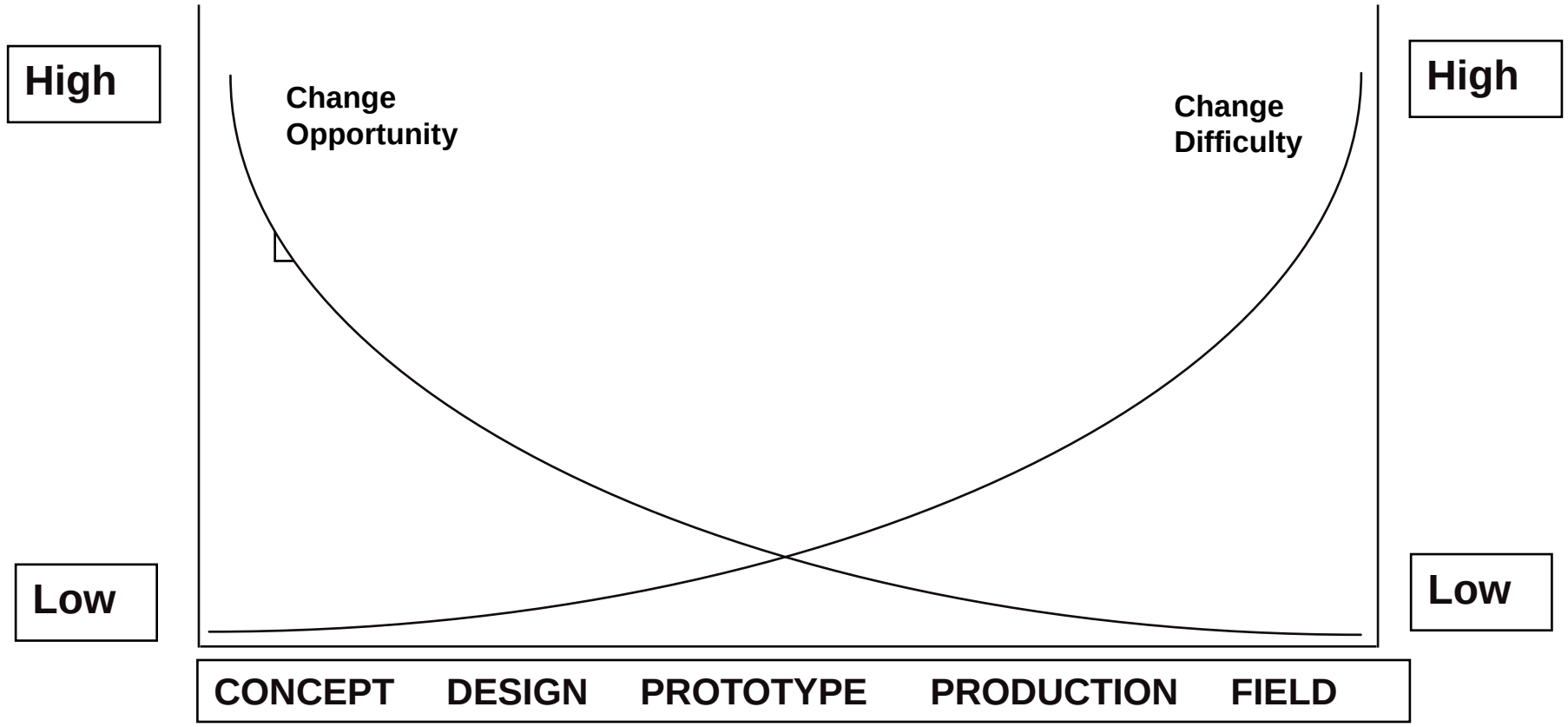
- Review the core elements and fundamentals of Advanced Product Quality Planning (APQP) and Control Plans (CP)
- Discuss the new APQP revision 3 and Control Plan revision 1 manuals
- Gain valuable insights into the Rules 6th edition for Registrars (available on March 31st, 2024, and effective as January 1st, 2025)
- Discuss challenges and best practices for effective APQP/CP deployment in automotive supply organizations

# ADVANCED PRODUCT QUALITY PLANNING (APQP)

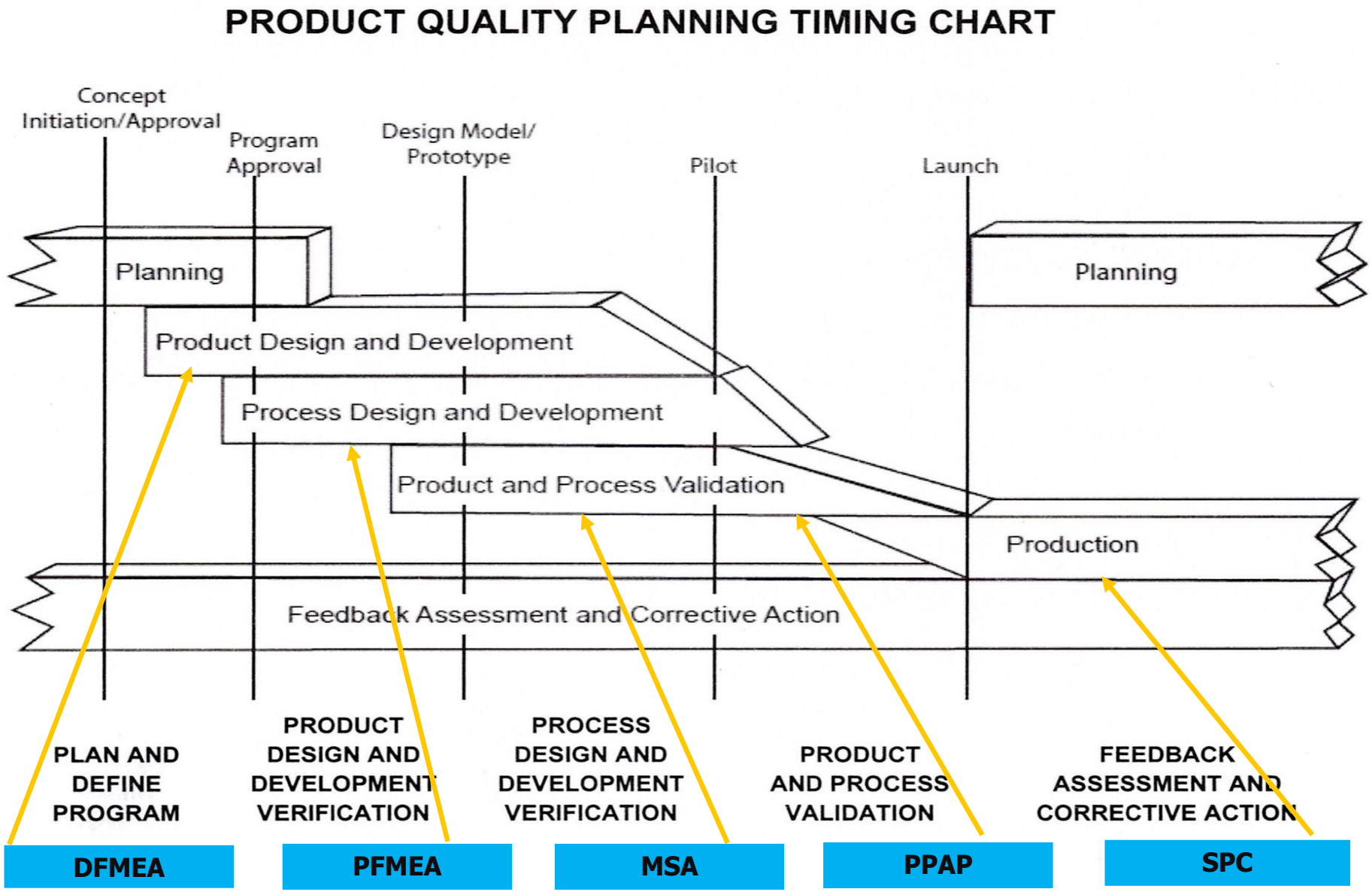
## Fundamental Concepts



# DESIGN CHANGE OPPORTUNITY



# APQP SEQUENCE & TIMING




AIAG APQP Reference Manual Revision 3

# APQP REQUIREMENTS ALIGNED WITH IATF 16949:2016

5.1.1.2 - Process Effectiveness and Efficiency

6.1 - Actions to Address Risks and Opportunities

7.1.3 - Infrastructure

8.1 - Operational Planning and Control

8.3 - Design and Development of Products and Services

8.4 - Control of Externally Provided Processes, Products and Services

8.5 - Production and Service Provision

8.7 – Control of Nonconforming Outputs

9.1 - Monitoring, Measurement, Analysis and Evaluation

10.1 - Continual Improvement

# ISO 9001:2015 – FEBRUARY 2024 AMENDMENTS & APQP

**4.1 Understanding the organization and its context:**

The organization shall determine external and internal issues that are relevant to its purpose and that affect its ability to achieve the intended result(s) of its XXX management system.

Added: The organization shall determine whether climate change is a relevant issue.

**4.2 Understanding the needs and expectations of interested parties.**

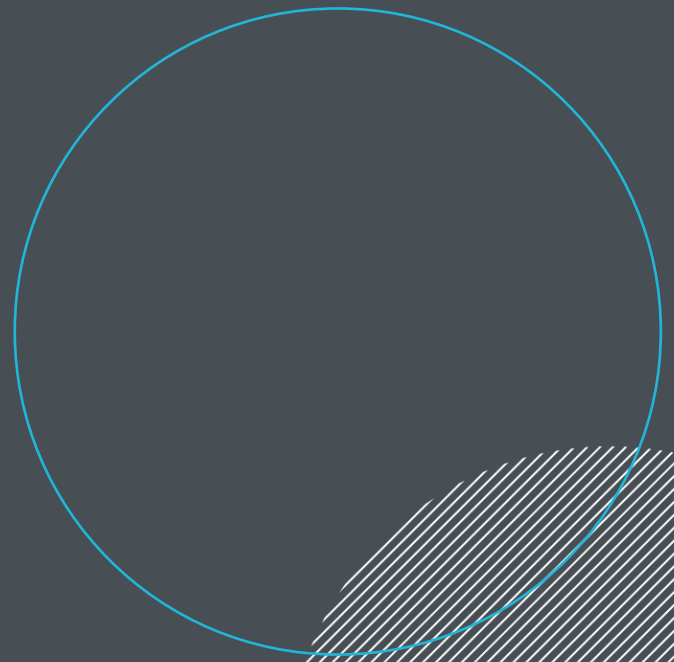
The organization shall determine:

- the interested parties that are relevant to the XXX management system.
- the relevant requirements of these interested parties.
- which of these requirements will be addressed through the XXX management system

Added: NOTE: Relevant interested parties can have requirements related to climate change.

# ADVANCED PRODUCT QUALITY PLANNING (APQP)

## Third Edition - Overview



# PURPOSE OF REVISIONS TO APQP & CP REFERENCE MANUALS

- Incorporate new technologies
- Harmonize Customer Specific Requirements (CSRs) for ease of understanding and consistency for the automotive supply network
- Align with the requirements of IATF 16949:2016 and AIAG publications
- Recognize and incorporate best practices from other industries

# FUNDAMENTALS OF ADVANCED PRODUCT QUALITY PLANNING (APQP)

- Proactively assess and mitigate risk factors impact product launch
- “A structured method of defining and establishing the steps necessary to ensure that a product satisfies the customer and meets all performance and quality requirements.”
- “The goal of product quality planning is to facilitate communication with everyone involved to ensure that all required steps are completed on time.”
- “Effective product quality planning depends on a company’s leadership commitment to the effort required in achieving customer satisfaction.”

# BENEFITS OF PRODUCT QUALITY PLANNING

- Reduce the complexity of product quality planning
- Direct resources to satisfy the customer
- Promote early identification of required changes
- Avoid late changes
- Provide a quality product on time at lower cost

# OVERVIEW OF APQP REVISION 3 CHANGES

- Structure and overall intent of the APQP process has not changed
- Program Management
  - Risk assessment / Mitigation
  - Gate management
  - Defined key process Indicators (KPI) for APQP effectiveness
- Sourcing Requirements
  - Risk management
  - Gate management for sub-tier suppliers pulled ahead in the process
- New and revised checklists (appendices)

# OVERVIEW OF APQP REVISION 3 CHANGES

- Inclusion of “Lessons Learned” (Section 1.1)
- Change Management Process & Checklist (Section 1.15, Appendix A-8)
- Leadership Engagement in Gate Reviews (1.14)
- Appendix C – Analytical Techniques
  - Capacity Planning - OEE preferred methodology
  - Traceability Requirements
  - Verification of Error Proofing / Mistake Proofing Effectiveness
  - Risk Assessment Mitigation Plan

# OVERVIEW OF APQP REVISION 3 CHANGES

Sourcing (Section 0.5)

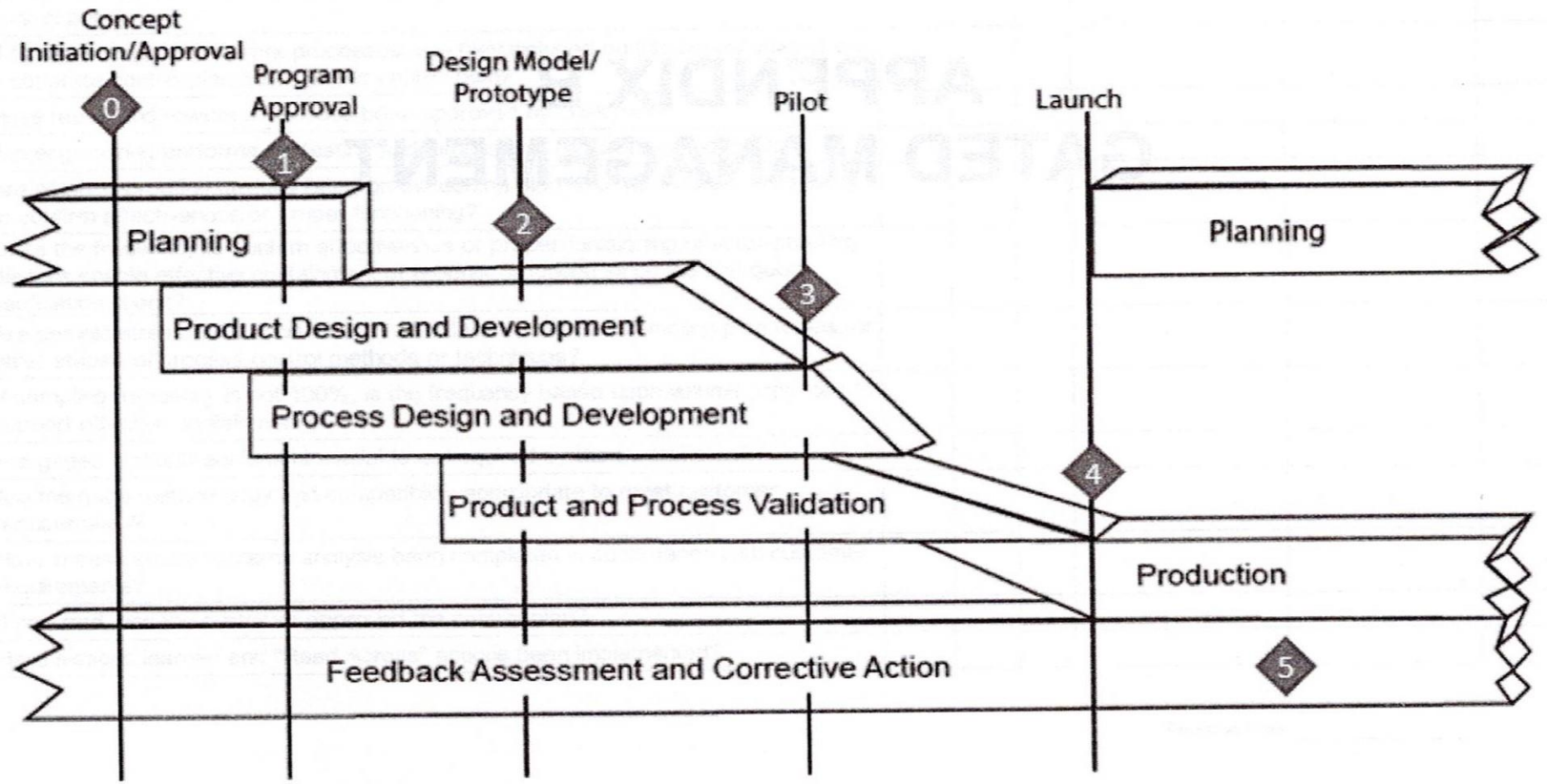
- Collaborative effort focused on quality
- Vetting of existing and new suppliers
  - Sourcing Checklist (Appendix A-9) or equivalent to confirm suitability
  - Action plans to mitigate identified risks
  - Evidence all actions from vetting effectively completed
  - Cascaded to supplier, confirmed by organization

# OVERVIEW OF APQP REVISION 3 CHANGES

High Risk Supplier Evaluation (Section 0.5.1)

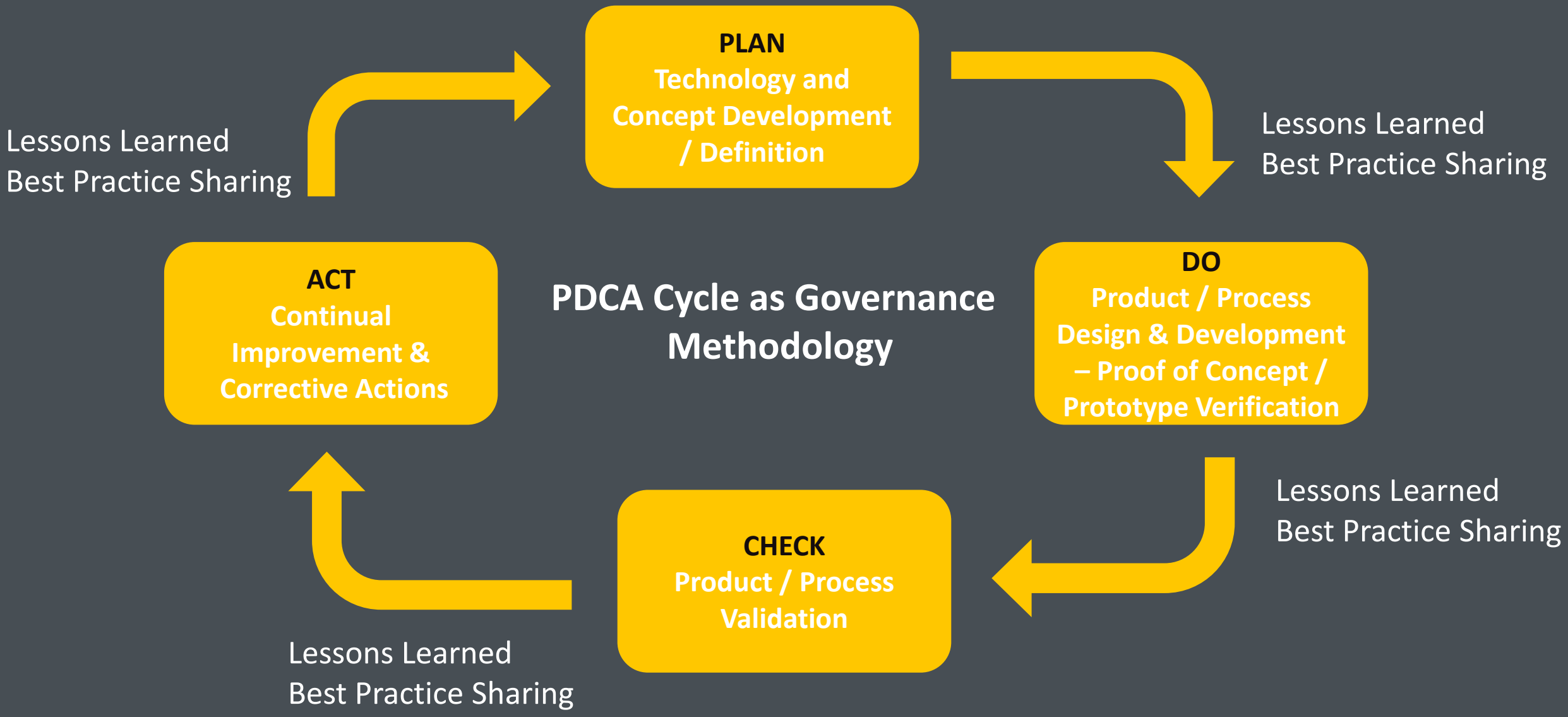
- Method to identify and criteria to define “high risk”:
  - New supplier to the organization
  - New supplier location or site (greenfield or brownfield)
  - Past poor quality performance
  - Historical issues resulting in quality spills at customer
  - Responsible for one or more incidents of field actions
  - Safety or regulatory requirements for supplied components
  - Failure of components with FMEA rated severity of 8+
  - Historical poor launch performance
  - New technology
  - Not certified to ISO 9001 or IATF 16949

# APQP TIMING – GATED MANAGEMENT FRAMEWORK (APPENDIX B)




From: AIAG APQP Reference Manual Revision 3, Appendix B

# PRODUCT QUALITY PLANNING CYCLE



# CONTROL PLAN REFERENCE MANUAL

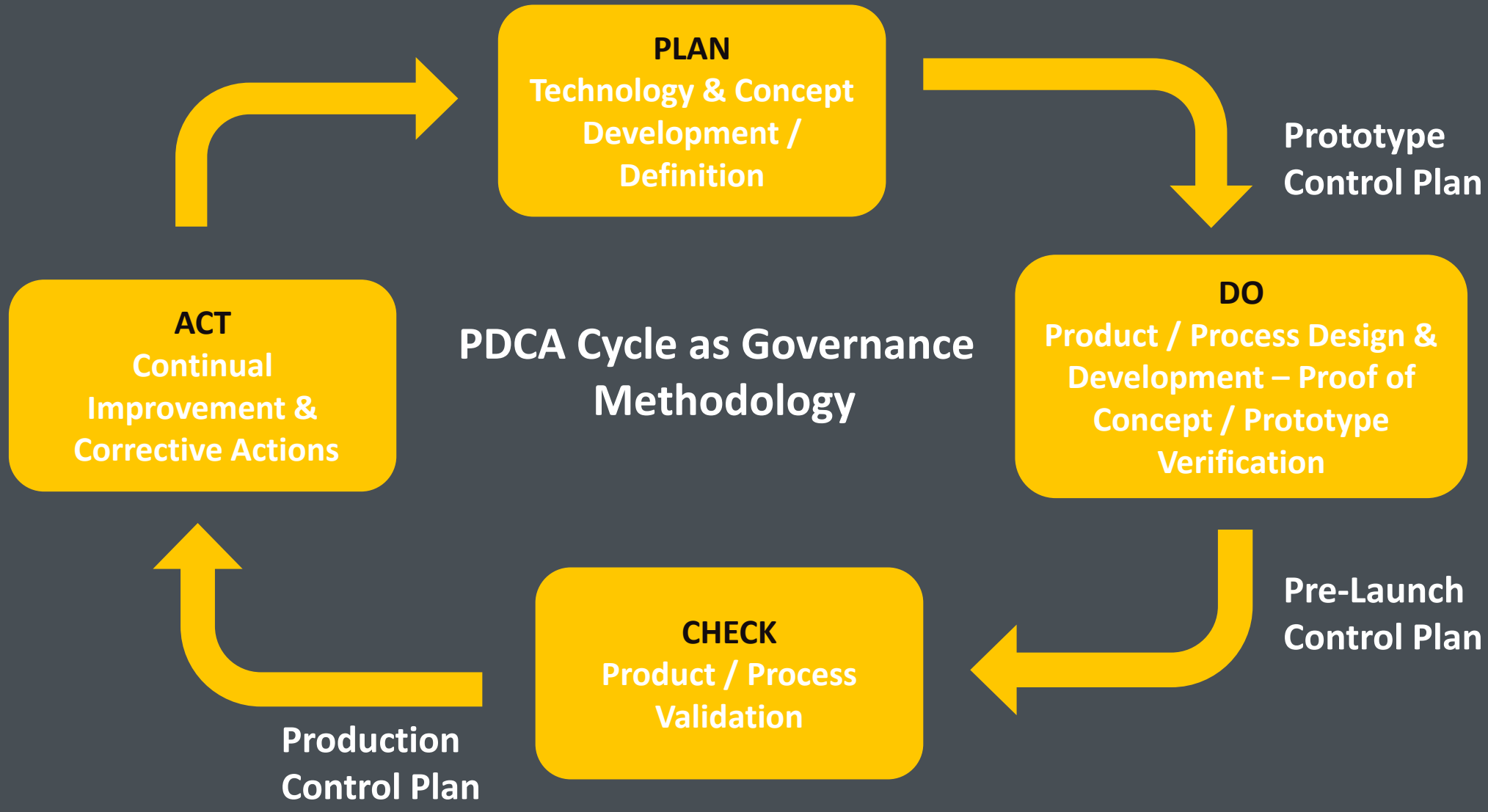
## Initial Issue - Overview

# SEPARATION / INITIAL ISSUE OF CP REFERENCE MANUAL

- Communicate best practices for developing, implementing and improving control plans
- Support the requirements for control plans in IATF 16949 and applicable customer specific requirements (CSRs)
- Facilitate timely updates as the systems / standards evolve
- Changes to reference manuals AIAG & VDA FMEA Handbook and other Ford, General Motors and Stellantis core tool manuals
- Incorporate lessons learned from other past projects
- Clarification of “Safe Launch” requirements
- Due diligence methodology for known risk factors
- Recognition of new technologies

# PRODUCT QUALITY PLANNING CYCLE WITH CONTROL PLANS

Living Control Plans Incorporating “Lessons Learned”



# STRUCTURE OF CP REFERENCE MANUAL

- Divided in four (4) Chapters and six (6) Appendices
- **Chapter 1- Control Plan Requirements and Guidelines**
  - Harmonized customer specific requirements (CSRs) from Ford, General Motors and Stellantis
- **Chapter 2 – Control Plan Development**
  - Process to develop control plans leveraging the process approach utilizing output from APQP
- **Chapter 3 – Control Plan Phases**
  - Harmonized CSRs for Safe Launch
- **Chapter 4 – Effective Use of Control Plans**

# STRUCTURE OF CP REFERENCE MANUAL

## CHAPTER 1: Control Plan Requirements and Guidelines

- Characteristic Management
  - Designation of Special Characteristics (SC) (1.2)
  - Pass Through Characteristics (PTC) (1.3) – process to identify and effectively control PTC throughout the supply chain
  - PTCs must be communicated to customer
  - “Last point of control” method approved by customer
  - Use of AIAG CQI-19 – “Supplier Pass Through Characteristic Matrix” to ensure consistent delivered product quality (or equivalent) is encouraged
- Confirmation of Error-Proofing (1.4)
  - Method and frequency to confirm effectiveness is defined on control plans

# STRUCTURE OF CP REFERENCE MANUAL

## CHAPTER 1 (continued)

- Reaction Plan Details (1.8)
  - Specific actions, responsible individual for taking action and responsible owner of action defined on the control plan
- Directed Supply (1.12)
  - Supplier has responsibility to obtain the necessary information from the directed supplier to develop control plans
  - May be necessary to coordinate with customer
- Use of Software to Develop and Manage Control Plans (1.13)
  - Customer may require use of software for version control and related document linkage (i.e. FMEA)

# STRUCTURE OF CP REFERENCE MANUAL

## CHAPTER 2: Control Plan Development

- Defines the steps for control plan development

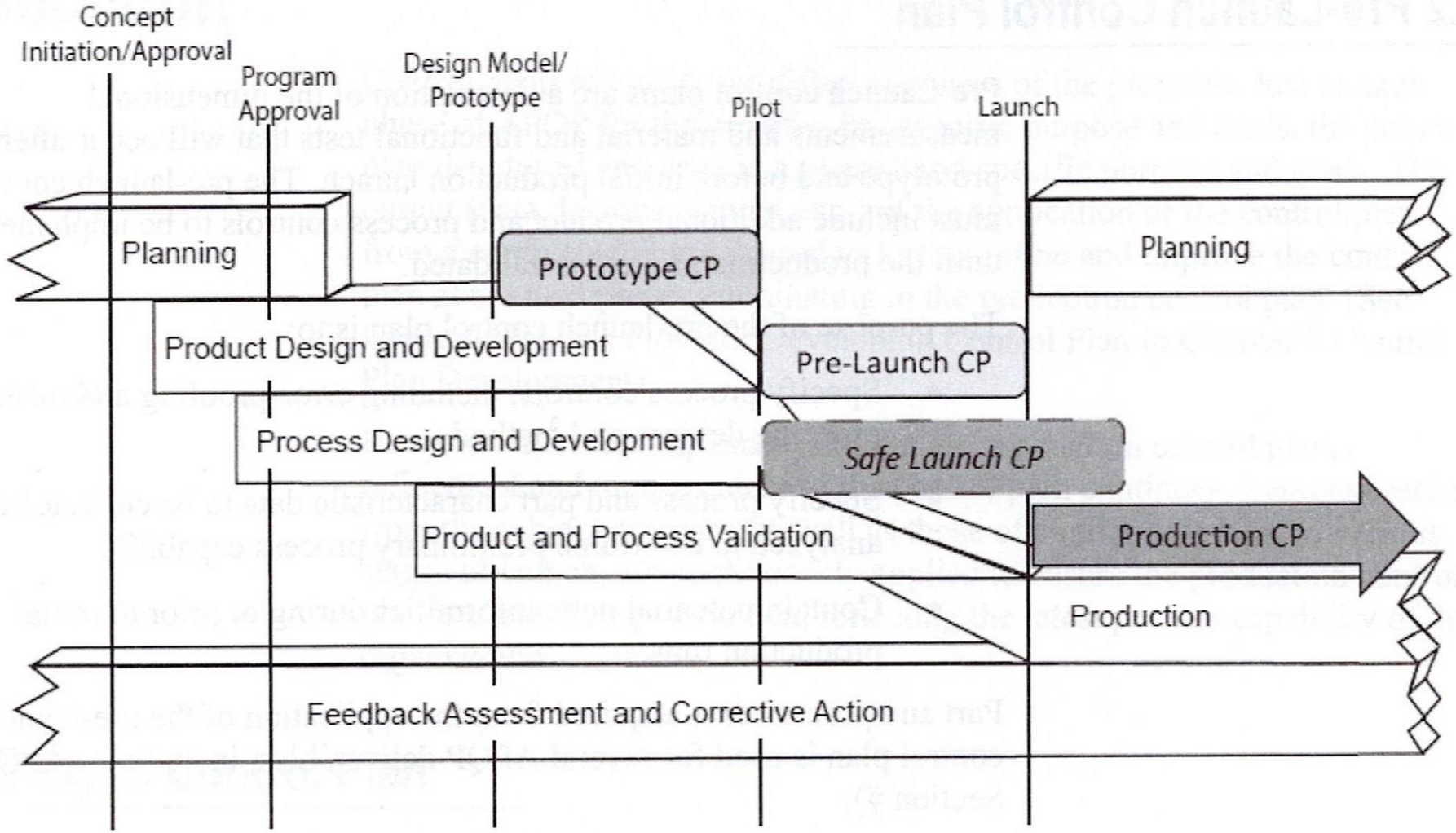
## CHAPTER 3: Control Plan Phases

- Addition of “Safe Launch” requirements (3.2 – 3.3)
- Customer may require Safe Launch program in addition to Pre-Launch control plan requirements

## CHAPTER 4: Effective Use of Control Plans

- Guidance / best practices on use of control plans in relation to the overall quality process
- Seven (7) specific topics
  - Definition / key concept of the topic
  - Why the topic is important
  - What to do and how to do it

# TYPICAL APPLICATION OF SAFE LAUNCH CONTROL PLANS




AIAG CP Reference Manual Revision 1

# RULES FOR ACHIEVING & MAINTAINING IATF RECOGNITION –

## Sixth Edition for IATF 16949

## Overview

# REASONS FOR REVISION - RULES 6TH EDITION

- Strengthen/clarify numerous requirements and IATF intentions
- Improve the IATF 16949 certification scheme
- Incorporate existing Rules 5th Edition Sanctioned Interpretations (SIs) and Frequently Asked Questions (FAQs)
- Change eligibility requirements for IATF 16949 certification
- Improve, add, and further clarify various processes, approaches, and requirements, including:
  - New contract requirements between certification bodies and their clients
  - New requirements for audit planning

# RULES 6TH EDITION HIGHLIGHTS

- Automotive Products include (1.0):
  - Production parts / Production materials
  - Accessory parts
  - Replacement parts and materials for automotive vehicles including remanufactured parts
- Certification structure for certification requirements (1.1)
  - Single Manufacturing Site
  - Single Manufacturing Site with Extended Manufacturing Site(s)
  - Corporate Scheme
- Appeals and Complaints process (2.8)
- Enhanced contract requirements between client and CB (3.0)
- Defined CB Resource responsibilities (4.0)

# RULES 6TH EDITION

- Auditor qualification requirements (4.2 – 4.4)
  - Initial and ongoing auditor qualification
  - Witness auditor and Internal auditor criteria (4.5 – 4.6)
- Determination of audit duration (5.2 – 5.4)
  - Minimum additional audit hours added when quality / delivery performance targets are not being met (dependent on number of personnel and OEM customers)
  - Specific requirements for Stage 1 & Special Audits
  - Enhanced requirements for auditing supporting functions
  - IATF Observers
- Auditing Support Functions (5.5)

# RULES 6TH EDITION

- Audit Planning
  - Required Audit Planning information (5.7.1) to be provided to CB thirty **(30)** calendar days prior to the audit
  - Audit plan to be provided to client fourteen **(14)** calendar days before the audit
  - Expanded audit plan content (5.7.2)
- Requirements on Conducting Audit Activities (5.8)
  - Change Management
  - Customer Risk
  - Continual Improvement, PDCA
  - Systematic Problem Solving
- Audit results input into IATF Common Audit Report Application (CARA) (findings and audit reports)

# RULES 6TH EDITION

## NONCONFORMITY MANAGEMENT (5.11)

- **Major nonconformity**
  - Client to provide with fifteen **(15)** calendar days from closing meeting (5.11.1)
  - Containment actions & effectiveness
  - Implemented correction
  - Root cause analysis methodology and impact on other processes and products
  - Systematic corrective action plan including method(s) to verify effectiveness
  - Sixty **(60)** days – verification of implementation and effectiveness of corrective actions

# RULES 6TH EDITION

- **Major nonconformity** (continued)
  - CB rejects initial response  - client has maximum of thirty **(30)** days to revise and resubmit (5.11.3)
  - CB rejects sixty (60) day information – client has a maximum ninety **(90)** days to revise and resubmit
  - On-site verification cannot proceed until sixty **(60)** response has been accepted
  - On-site special audit for verification will occur within ninety **(90)** days of the closing meeting (5.11.4)
  - If timeframes are not met, audit will be deemed failure and certification immediately withdrawn

# RULES 6TH EDITION

## NONCONFORMITY MANAGEMENT (5.11) (CONTINUED)

- **Minor nonconformity**
  - Client to provide within sixty **(60)** calendar days from closing meeting (5.11.2)
  - Containment actions & effectiveness
  - Implemented correction
  - Root cause analysis methodology and impact on other processes and products
  - Implementation of systematic corrective action plan to eliminate the root cause
  - Methods used for verification of effectiveness of systemic corrective actions and verification result

# RULES 6TH EDITION

- **Minor nonconformity** (continued)
  - CB rejects sixty **(60)** day response – client has ninety (90) days to resolve the reason(s) for rejection and submit an acceptable response (5.11.3)
  - If resolution cannot be achieved, the response will be rejected, audit result designated failure, the certification decision will be negative and any certificate withdrawn
  - CB will issue final nonconformity management records within seven (7) calendar days of certification decision

# RULES 6TH EDITION

- **Minor nonconformity** (continued)
  - Effectiveness of corrective actions will be verified on the next audit (regular schedule or special audit) (5.11.4)
  - Corrective actions implemented but not effective
    - Major nonconformity against 10.2 will be issued
    - Previous minor nonconformity reissued as a major and the decertification process initiated
  - Reviewing minor nonconformities during a special audit
    - New major nonconformity found will not impact certification decision from original audit

# RULES 6TH EDITION

## NONCONFORMITY MANAGEMENT (5.11) (continued)

- **100% Resolved Conditions (5.11.3.1)**
  - If planned corrective actions cannot be completed in ninety **(90)** days due to complexity of the actions, the nonconformity can be considered 100% resolved if the following criteria are met:

- Acceptance of fifteen **(15)** day response for majors and sixty (60) day for minors
- Client provides evidence containment remains in place until completion and verification of actions
- Client provides detailed corrective action plan including responsibilities and timing
- CB records justification in CARA
- One-time special audit scheduled no less than ninety **(90)** days from next audit

# RULES 6TH EDITION

- **100% Resolved Conditions (5.11.3.1)** (continued)
  - Client to provide updated information to CB on implementation and verification of effectiveness no less than thirty **(30)** days before the special one-time audit
  - Information to be utilized by CB for Audit Planning
  - Final Special Audit result will be considered a failure, certification decision negative any existing certificate immediately withdrawn when:
    - Ninety **(90)** day audit timeframe is exceeded
    - Corrective actions have been determined to be not effective

# RULES 6TH EDITION

## Two (2) Step Technical Review Process (5.12)

- **Step 1** – Review Audit Package
  - Ensure all required information has been provided
  - Approve draft audit report and issue the Final Audit Report within fifteen **(15)** days of closing meeting
- **Step 2** – Certification Decision
  - All responses to nonconformities have been reviewed, accepted and verified for effectiveness (per 5.11)
  - Decision to accept response as 100% resolved per 5.11.3.1
- Specific requirements for organizations when relocating manufacturing operations (5.15)

# RULES 6TH EDITION

## Expanded information provided for:

- Certification Application process (6.1)
- Initial certification process (6.2)
- Transfer Audit process (7.1)
- Special Audits (7.2)
- Addition of requirements for conducting remote audits (7.3)
- Decertification process requirements (8.0)
- Terms and Definitions (10.0)

## Annexes

- Audit Day Calculation Examples (Annex 1)
- List of Support Functions (Annex 2)
- Table Documenting the Output of The Audit Planning Process (Annex 3)

# NEXT STEPS

- Obtain the APQP and CP Manuals
- Review to become comfortable with the concepts and content
- Train personnel
- Conduct a comprehensive gap assessment of your current  APQP process against the new requirements
- Revise internal process as needed
- Develop Key Process Indicators for APQP process effectiveness
- Work with customers to determine their expectations for implementation
- Develop an implementation plan
  - Pilot a less complex program as a “learning line” to evaluate and determine “Lessons Learned”
- Incorporate “Lessons Learned’ for process improvement
- Cascade revised / enhanced requirements to the supply chain
- Expand to all programs / projects
- Relentlessly identify opportunities to improve efficiency and effectiveness of the process

# SUMMARY

- It is no longer adequate to simply meet program timing
- Revisions to APQP and Control Plan Manuals represent a catalyst for an organization evaluate their current Product and Process development processes
- Opportunity to implement a robust “Lessons Learned” process and share best practices to fully support the goals of an Agile organization
- Clarification of requirements from OEMs

# THANK YOU!

# QUESTIONS & ANSWERS

**CARMINE LIUZZI**
Principal Consultant & Industry Leader
Learning Academy Services

carmine.liuzzi@intertek.com

intertek

Total Quality. Assured.