Electronic Component Management Plan (ECMP) Overview

April 17, 2016

ORIGINS OF THE UTAS WIDE ECMP

Prior to the creation of UTC Aerospace Systems (UTAS), business units had multiple ECMP's that were not necessarily in unison to each other. This included Obsolescence Management, Counterfeit Avoidance, and Lead-free Control plans. With the creation of UTAS and across the board customer requirements, the need for a uniform Electronic Component Management Plan (ECMP) became apparent. A Kaizen event occurred on January 28 – February 1, 2013 in Farmington, Ct to kick of the creation of an UTAS wide ECMP.

Kaizen Event - 2013

Problem Statement

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- UTAS currently (2013) does not have an enterprise wide solution for meeting the customer requirements detailed in the D6-55583 Rev C ECMP document
- A kaizen event is needed to ensure UTAS wide alignment and to develop UTAS wide compliance strategy that meets our customer requirmements.

Current State

- Different compliance efforts are being undertaken across UTAS, no enterprise wide solution
- Numerous versions of the ECMP, LFCP & CPPCP are being generated to document the spec

Desired State

- UTAS wide compliance plan, inclusive of sub-tier supplier compliance
- One ECMP, LFCP and CPPCP for all UTAS
- Develop Strategy and draft ECMP, LFCP and CPPCP at event
- Document naming convention for common documents/how to make them common
- Process for maintenance of common ECMP, LFCP, CPPCP
- Common standards developed for areas of non compliance to industry standards
- Schedule to submit plans to customer
- Schedule to complete ECMP, including IECQ certification of ECMP
- Strategy for incorporation of best practices into SBU standard work to maximize consistency
- Agreed upon definition of sub-tier supplier that are required to meet requirements of IEC, SAE, GEIA standards
- Common strategy for flowing down requirements of IEC, SAE, GEIA standards to sub-tier suppliers

ECMP

Industry Documents Utilized:

- IEC TS 62239-1
- STD-0016
- GEIA-STD-0005-1
- AS5553

Alignment to:

- IEC TS 62239-1
- D6-55583
- UTAS Document: UTAS-ENG-PRO-0001, UTAS-ENG-FRM-0001

UTAS-ENG-PRO-0001

Intent:

This plan serves as a vehicle to enhance United Technologies Corporation Aerospace Systems (UTAS) equipment in-service reliability. It specifically outlines specifications and requirements used to ensure that only qualified and reliable parts are used in the manufacturing of UTAS equipment.

This plan addresses the process of selecting, qualifying and continuously monitoring the reliability of Electrical, Electronic and Electromechanical (EEE) components in order to avoid or eliminate unreliable components.

While this plan outlines the requirements laid out in IEC TS 62239-1, there are extensive procedures that are used to meet these requirements across numerous UTAS Design Centers who maintain their own design control. To this extent, ownership of quality and reliability has been flowed down to the design centers.

UTAS-ENG-FRM-0001

Example of Document compliance to IEC TS 62239-1 specification.

UTC Aerospace Systems

IEC/TS 62239-1 / UTAS-ENG-PRO-0001 Requirements				Design Center's Method of Compliance	
Section	**Requirement ID**	**Subject**	**Requirement**	**Method of Compliance** (Process document number and section/page number)	**Comments** (If the requirement is not applicable to the Design Center rationale shall be provided in this column)
4.1	4.1A	Technical Requirements - General	These requirements shall apply to all EEE components, including off-the–shelf (COTS) components, which are defined by the component manufacturer data sheet, and custom components, which are defined by the Design Center's procurement specifications.		
	4.1B		The requirements in this plan shall be demonstrated by the Design Center's specific procedures identified in the compliance form in section 5.11.		
4.2	4.2A	Component Selection	All components shall be selected according to documented processes.		
	4.2B		All components shall satisfy the requirements of this sub clause regardless of additional criteria such as standardization, order of preference, etc.		
	4.2C		The termination finish of all components shall be identified and the risk of any lead-free finishes assessed.		
	4.2D		The conditions for use of the component shall be adequately identified, from the component specification based on the component manufacturer's data sheet and any additional requirements to ensure suitability in the end application.		
	4.2E		Components shall be selected within temperature ranges in excess or matching the temperature range required in the application.		
	4.2F		If additional performance is required (for example up screening, uprating, additional parameters defined), then the component shall be considered as a specific component.		

SITE COMPLIANCE STATUS

Site	Site Lead	D6-5553 Requirement	ECMP Cert	Boeing LFCP Approval	Boeing CPPCP Approval	ECMP Approval	Notes
Windsor Locks							
Rockford							
Nord Micro							
SIS - VT							
Int-Cargo							
Int-Lighting							
Electronic Systems Center							
Kidde-NC							
SIS-MN							
ISR Systems							

ECMP

Methodology

Component Selection

Electromagnetic Compatibility (EMC)

Thermal Analysis

Testing, Testability and Maintainability

Management of Lead-Free Termination Finish and Soldering

Component Qualification – General

Quality System

Component Manufacturer Process Management Approval

Component Manufacturer Technology Qualification Data

Similarity

Distributor Process Management Approval

General Quality Assurance Requirements

Component Quality Assurance Data

Component Design and Man. Process Change Monitoring

Component Obsolescence

Component Dependability

Reliability Assessment

Component Application – General

De-rating and Stress Analysis

Mechanical Analysis

Avionics Radiation Environment

Counterfeit, Fraudulent and Recycled Component Avoidance

General Component Qualification Requirements

Quality System Assessment

Demonstration of Component Qualification - General

In-service Experience

Qualification of Components from a Supplier that is not Qualified

Subcontractor Assembly Facility Quality and Process Management Approval

Component Manufacturer Quality Assurance

Design Center In-House Continuous Monitoring

Component Availability and Associated Risk Assessment - General

Reporting

Semiconductor Reliability and Wear-out

OBSOLESCENCE

UTAS Obsolescence Philosophy:

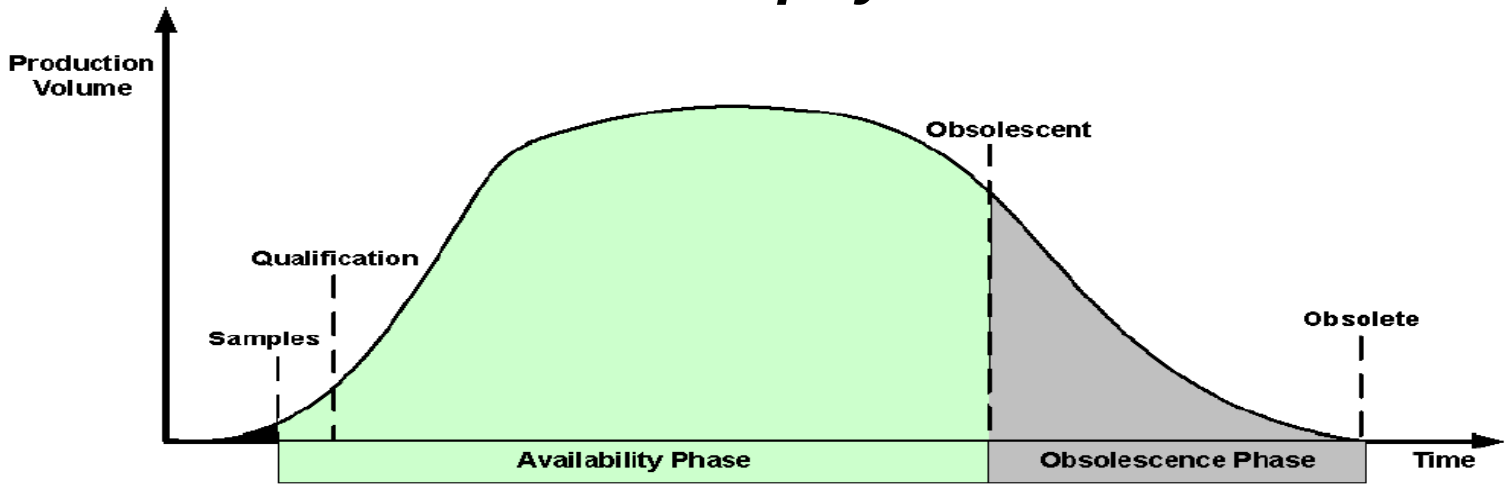

Figure 1 - Component Obsolescence Phases (International Electrotechnical Commission. IEC/CEI 62402 Obsolescence management – Application guide, 2007)

The obsolescence phase of a component begins immediately after the information about discontinuance is issued and the component is considered as obsolescent, as shown in Figure 1. The information at the obsolescent phase transition point is often in the form of a product discontinuance notice, end-of-life notification or lifetime buy notification. A product change notice may also cause a product to enter the obsolescence phase for certain manufacturers (OCM or OEM).

A device is defined as obsolete once it is no longer available from the original manufacturer, even though some product is still in the supply chain.

UTAS understands the risk obsolescence poses to our products/business, as well as the effect it may have on our customers and their business. Thus, we make every effort to predict, prevent, and resolve obsolescence in our products in efficient and effective ways.

OBSOLESCENCE MANAGEMENT GENERAL PRINCIPLES

Industry Documents Utilized

- IEC CEI 62402
- IEC/TS 62239-1

Alignment to IEC CEI 62402

- HSER32492 – Items Included but not limiter to:
  - Skills Training
  - Contract Support
  - Procurement Structure
  - UTAS Obsolescence Management
  - Proposal, Concept and Definition Phase
  - Proactive Strategy - Proposal, Concept and Definition Phase
  - Reactive Strategy - Proposal, Concept and Definition Phase
  - Design and Development, Implementation and Production Transition Phase
  - Proactive Strategy - Design and Development, Implementation and Production Transition Phase
  - Reactive Strategy - Design and Development, Implementation and Production Transition Phase
  - Serial Production and Support Phase
  - Proactive Strategy – Serial Production and Support Phase
  - Reactive Strategy – Serial Production and Support Phase

Counterfeit Avoidance

UTAS Counterfeit Avoidance Program:

To mitigate the risk of receiving and installing counterfeit electronic components in UTAS equipment, the plan addresses the process of parts management, supplier management, procurement, inspection, test/evaluation, and response strategies when suspect or confirmed counterfeit parts are discovered.

Industry Documents Utilized

- AS5553
- AS6081
- AS6496
- AS6171
- DFAR 252.246-7007

Alignment to:

- AS5553
- DFAR 252.246-7007
- UTAS-ENG-PRO-0003, UTAS-ENG-FRM-0003: UTAS Windsor Locks is HSER33475

COUNTERFEIT AVOIDANCE

UTAS-ENG-PRO-0003 Methodology

Training
- UTC Employees
- External - DQR

Procurement
- Approved Supplier List
- Authorized Distribution List and Controls
- Global Purchase Order Flow-down
- Approved Broker List
- Supplier Audit requirements
- C of C Requirements
- Original Manufacturer Warranty
- Sub-Tier Flow-down Requirements
- Test House Approval

Industry Monitoring
- GIDEP
- ERAI….

Communication Tool
- Internal workflow including risk assessment
- External Supplier Chain (SRI- Supplier Request for Information.

COUNTERFEIT AVOIDANCE

Workflow

- Part Shortage Review (Obsolescence)
- Risk Assessment
- Reliability / Safety Review
- Deviation Requirement
- Request for Quote (AS6081 Supplier)
- Broker Part Test Plan
  - Package Inspection
  - Paper Work Review
  - Visual Inspection
  - Remarking / Resurfacing
  - Evidence of Prior Use
  - DPA
  - Electrical Test
  - Physical Analysis
  - Plan Approval
  - Failure Analysis
  - Acceptance or Rejection / Final Disposition

LEAD FREE COMPONENT PLAN

Industry Documents Utilized:

- GEIA-STD-0005-1 and -2
- IPC-2221, 4552
- J-STD-609, 001
- JESD201, JESD22-A121, JESD46

Alignment to:

- GEIA-STD-0005-1 and -2
- D6-55583
- UTAS-ENG-PRO-0003, UTAS-ENG-FRM-0003

This Plan describes the policies, processes, and reference documents that UTAS uses to assure that our products will satisfy the applicable requirements for performance, reliability, airworthiness, safety, and certifiability throughout the specified life of performance, as the global electronics industry transitions to the use of lead-free electronics.

ECMP ASSESSMENT

Initial Assessment

Initial Assessment performed in June 2014 by:

bsi.

IECQ Certification Body

IEC IECQ

IECQ Avionics ECMP