WELCOME
AESQ Supplier Forum
LOGISTICS
Logistics
Facilitators in the room

AESQ – Aerospace Engine Supplier Quality Strategy Group

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PROTOCOLS
Code of Conduct

Audio/video recording of meetings is not permitted

No Commercialism

No discussion of cost, pricing plans, pricing policies, product usage surveys, marketing plans or any related topics

Presentations must focus on technical issues (not on marketing aspects of products) and relate to or support the development or maintenance of G-22 Committee work

Be aware of and follow ITAR & EAR rules and regulations governing export control

Discussions should be open and follow the agenda or other legitimate direction agreed upon by consensus of the committee - avoid unauthorized or ‘private’ meetings
**Code of Conduct**

Respect basic meeting etiquette:
- Only one person speaking at any given time
- Attack the issue, not the person
- Be on time...returning from breaks/lunch
- Respect all ideas & comments
- No silent skepticism, be candid
- Do not dominate discussions
- Stay focused on the meeting & agenda
- Strive for high-quality standards to benefit all stakeholders – users, customers, suppliers and the industry as a whole
- Strive for an open atmosphere that promotes a free-flowing interchange of standards technical information
Commercial aviation – a growth market

7,100 billion passenger km in 2016
17,000 billion passenger km in 2036

23,000 active aircraft in 2016
45,000 active aircraft in 2036

4.5%/yr Increase in Passenger Traffic
2 X active aircraft worldwide

Quelle: Ascend, IATA, MTU
The Quality of our products and services are extremely important. Quality and continuous improvement are an absolute must! Link

Statistically two aircraft would crash every week unless reliability is further improved.

Increase in flight movements: 4-5% p.a.
Chain of events

In many cases, it is not a single malfunction, error or failure that leads to a crash.

It is a **sequence of events** involving

- hidden (latent) failures
- errors of judgment/action
- a failure of the failure
AESQ Vision

“To establish and maintain a common set of Quality Standards that enable the Global Aerospace Engine Supply Chain to be truly competitive through lean, capable processes and a culture of Continuous Improvement.”

In Detail:
• create common quality standards for engine manufacturers & their supply chains
• deploy together the written standards throughout our supply chains
• establish capable quality processes and a culture of continuous improvement

Main Targets:
• to improve quality within the supply chain
• improve on time delivery and minimize costs through a reliable quality performance
• gain efficiency by standardized processes
AESQ Key Quality Elements

→ Aligned to AS9146 APQP & PPAP

Design Risk Assessment

Product KCs

Risk analysis and control required
Production risks identified & mitigated ensuring capable & stable manufacturing processes

Product and Process KCs

Capable measurement systems required
Measurement systems are capable & repeatable ensuring effectiveness of inspection processes

Process Control required
Manufacturing processes under variation control produce consistent product at rate

Supporting Standards: AS13000 Problem Solving; AS13001 DPRV Training; AS13002 Inspection Frequency; In process → AS13005 Audit; AS13007 Supplier Management
AESQ will drive progress

- AS13000 & AS13001 & AS13002 & AS13003 are all contractually flowed down by all AESQ members and part of your purchase Order

- AS13004 & AS13006 will follow shortly
The Need for Defect Prevention

John Calder
Head of Supplier Quality
Rolls-Royce Civil Aerospace
How do we achieve Perfect Quality?

100% inspection

Sorting good from bad

Concessions to accept non-conforming product

Overrun parts to ensure delivery commitments

3rd Party inspection
Focus on Defect Prevention
How effective is 100% inspection?

Individually inspect the image to the standard

Items needed

Standard

Marking sheet and a pen

Compare the image to the standard and check “pass or fail”
Standard
How did you do?
Focus on defect prevention – How effective is 100% inspection?

Mark both answer sheets against the answers below

<table>
<thead>
<tr>
<th>Slide</th>
<th>Answer</th>
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<tbody>
<tr>
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<td>19</td>
<td>✗</td>
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<tr>
<td>20</td>
<td>✔</td>
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</tbody>
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How did you get on?

100% effective?
Did you see them?
How did you do?

Discuss on your tables how effective is 100% inspection

Would 200% be better?

What can we do as part of defect prevention?

Prepare for feedback
Focus on Defect Prevention

Defect Prevention
No room for customer disruption
Capacity released
Predictable planning
Cost challenges supported
Focus on growth opportunities
MANUFACTURER’S PERSPECTIVE

DELE AWOFALA
PRATT & WHITNEY
SR. DIRECTOR – SUPPLIER QUALITY
MEETING CUSTOMER EXPECTATIONS

Drive and sustain superior value and a perfect customer experience

What we are committed to

PERFECT PRODUCTS
Living up to the dependable engine promise

PERFECT SUPPORT
Perfect quality in all its forms

PERFECT EXPERIENCE
“Everything you need, More than you expect”
2020 Goal:
- 50/50 Gold & Performing

Quality Enablers:
- Advanced Product Quality Planning (APQP)
- PPAP (Process Capability)
- PFMEA (Risk Reduction)
- Process Control \ Key Product Characteristics
SUPPLY CHAIN OPPORTUNITIES

Common drivers identified

Supplier Assessment Questionnaire

Contract Flow down….Production Planning……PPAP…..Process Control

Supplier Audit Findings
PERFECT QUALITY ENABLERS

Advanced Product Quality Planning (APQP)

Deploy Effective PPAP

Drive PFMEA Process

Leverage Process Control / KCs

Proactive tools to deliver to customer expectations
**APQP/PPAP PROCESS**

Aligns with Aerospace Standard AS9145

Automotive “Bluebooks”
APQP/PPAP timeline

- MSA
- SPC
- APQP
- FMEA
- PPAP

Year: 1990 92 93 94

JD Powers Initial Quality Study

- US Brands
- Imports

IQ Study Redesign

Aerospace APQP/PPAP timeline

Using automotive processes as a benchmark for quality enhancement
APQP/PPAP PROCESS AND BENEFITS

Reduced process variation
Short lead time to achieve rate
Increased yield
Reduced cost of poor quality
Better control of process changes
Standard PPAP package to demonstrate process control & capability

Working upstream to prevent issues later in production
PFMEA – IDENTIFY AND ELIMINATE RISKS

Focus on high risk operational steps to reduce risk of manufacturing error

- Conduct PFMEA Workshop and calculate Risk Score
- Identify Opportunities for Improvement from ongoing quality issues
- Develop and Implement Action Plans to reduce risks
- Update PFMEA and recalculate Risk Score

Drive PFMEA Using AS13004 - Process Failure Mode and Effects Analysis (PFMEA) and Control Plans
Better variation control & reduction

Enables fast response to process drift

Common standard aligned with AS9103, AS9145, AIAG “Blue Books” and AS13004 Process Risk Mitigation

Improved Quality Performance of Supplier selected KC’s and Customer KC’s

The benefits far outweigh the consequences of the current state
Customers expect a PERFECT EXPERIENCE

Quality must ENABLE and not inhibit

Focus on PROACTIVE tools. Not “check in the box”

Increase quality organization PROFICIENCY

Leverage AESQ Procedures and Standards

Our common objective should be to achieve PERFECT QUALITY
ENGINE CERTIFICATION
AIRWORTHINESS

SAFETY
is the main purpose of the airworthiness regulations

In official language, “safety” has a very precise meaning.

It concerns:
The SAFETY OF PERSONS TRANSPORTED.
The SAFETY OF PERSONS OVERFLOWN.
CERTIFICATION

CERTIFICATION covers the actions requested to the designer of an aeronautical product (aircraft, engine and propellers) that are used to demonstrate to the certifying authority (EASA*/FAA**) the safety level required for the product.

- This demonstration includes testing of the parts, components, systems or engines, along with analyses and descriptions.

Scope of the DESIGN CERTIFICATION, in order to establish and maintain the fleet's safety level.

- Certification of the definition (Type Design), including after-sales documentation.
- Modifications to the Certified Definition (Definition Modifications).
- Airworthiness monitoring in service.

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* European Aviation Safety Agency ** Federal Aviation Administration
Airworthiness: safety is non-negotiable

Absolute prerequisite for air transport.
Air transport activities will double in 30 years, and safety has to be maintained accordingly or improved when possible.
Society is increasingly sensitive to risks...creates more pressure around safety considerations.
An extremely robust airworthiness regulatory structure, coordinated with industry and enforced by official agencies.
SAFETY is the overriding goal of the certification requirements, with clearly defined levels to be respected.

CERTIFICATION deliverables are: approved Type Design definition and Continued Airworthiness documentation.

The approved Type Design definition must be controlled through a Configuration Control Management, which is also approved.

Arrangements must be set up between the Designer and the Manufacturers in order to issue Individual Airworthiness Certificates.
What are the implications for us?

PPAP ensures that each part is compliant with certificated part;

- Development
- Certification
- Mass production

Process control
PFMEA
Change management
Traceability
NC management
...
STANDARDS OVERVIEW
SAE ITC / SAE G-22 Structure

AESQ Strategy Group

Companies
- Strategy
- Training
- Deployment
- Promotion & Communication
- Customer, Regulator & IAQG Interface
- Administration

G-22 Technical Committee

Individuals
- Standards Writing

AESQ Strategy Group

Steering Committee
G22 AESQ Working Team

Workstream Teams
Existing and Future Workstreams
AS13000 Problem Solving

Original State

- 7-Step
- Apollo
- DIVE/Red-X®
- AESQ Principles
  - Standardise
  - Simplify
  - Adopts Existing Industry Standards
  - Prescriptive, Auditable
  - Common Language
  - Supported by 3rd Party Training & Consultancy

Current State

- 8D
- Expected Benefits
  - Reduced need for Customer training & support
  - Improved access to training & consultancy
  - Removal of complexity of reporting
  - Improved problem solving skills

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AS13001 DPRV Training

Original State

- Standardise
- Simplify
- Adopts Existing Industry Standards*
- Prescriptive, Auditable
- Common Language
- Supported by 3rd Party Training & Consultancy

Current State

- One Common Training Requirement
- Industry wide DPRV database through SAE
- Delivered by SAE Globally
- Training every 3 years

AESQ Principles

Expected Benefits

- Reduced costs for the supplier
- Reduced training time for DQR
- Training provided in Supplier’s region
- Customer training limited to on-site

* Rev A is align with AS9117 - DPRV

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### AESQ Principles

- **Standardise**
- **Simplify**
- **Adopts Existing Industry Standards**
- **Prescriptive, Auditable**
- **Common Language**
- Supported by 3rd Party Training & Consultancy

### Expected Benefits

- **Standardised Process**
- **Improved compliance**
- **Improved Product Quality**

---

**AS13002 Inspection Frequency**

**Original State**

100% Inspection

REduced Sample

Error Proof AQL

**Current State**

- Common Method for Inspection Planning
- Guidance on commodity specific planning

**Inspection Level**

100%

**Capability**
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AS13003 Measurement System Analysis

Original State

Current State

AESQ Principles

- Standardise
- Simplify
- Adopts Existing Industry Standards
- Prescriptive, Auditable
- Common Language
- Supported by 3rd Party Training & Consultancy

Expected Benefits

- Improved knowledge of Measurement Capability
- Clarification of minimum acceptance standards
- Mandates replaces guidance
- Adopts Automotive Industry Action Group ‘Blue Book’ on MSA
- Improved Quality Performance
AS13004 PFMEA & CONTROL PLANS

AESQ Principles

- Standardise
- Simplify
- Adopts Existing Industry Standards
- Prescriptive, Auditable
- Common Language
- Supported by 3rd Party Training & Consultancy

Future State

In Scope: Risk Mitigation requirements with execution guidance & recommended timing, supporting AS9145

Out of Scope: DFMEA requirements, any duplication of related Aerospace Standards (e.g. AS9145)

Expected Benefits

- Standardised process
- Increased pace of adoption
- Improved compliance to a better standard
- Reduced quality risks
- Ultimately improved quality & delivery
AESQ Standards – Global Deployment

Vision

Deploy harmonically
Challenge each other
Common language for Quality
Easy adoption of standards
Simplify requirements

### AESQ Standards – Global Deployment Status

<table>
<thead>
<tr>
<th>AESQ Member</th>
<th>AS13000 Problem Solving</th>
<th>AS13001 DPRV Training</th>
<th>AS13002 Alternate Inspection Frequency Plans</th>
<th>AS13003 MSA</th>
<th>AS13004 PFMEA &amp; Control Plans</th>
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<td>GE</td>
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<td>Feb-16</td>
<td>Mar-17</td>
<td>Mar-16</td>
<td>Aug-17</td>
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<td>GKN</td>
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<td>PCC Structurals</td>
<td>Aug-15</td>
<td>Jan-16</td>
<td>4Q16</td>
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<tr>
<td>Pratt &amp; Whitney</td>
<td>Feb-15</td>
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<td>May-16</td>
<td>Jun-16</td>
<td>1Q 18</td>
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<td>Rolls-Royce</td>
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<td>Dec-14</td>
<td>Jan-15</td>
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<td>Aug-17</td>
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<tr>
<td>Safran</td>
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<td>Jan-15</td>
<td>Jan-15</td>
<td>Jan-15</td>
<td>Aug-17</td>
</tr>
</tbody>
</table>
AESQ is now well established and is gathering momentum

Supplier feedback is very positive & they want us to move faster

Broader supplier engagement is being sought to apply more resources

Stronger links with IAQG & PRI are being developed

Stakeholder engagement essential for progress & direction
SURVEY
Survey Overview

**Collaboration**
- Working together to drive quality performance

**Feedback**
- Provide input on developing standards

**Integrated Supply Chain**
- Drive efficiency, maximize resources, create synergies

**Training**
- Coordinated training efforts
Are you aware of the Published Standards?

We still have some work to do
Which Standards have you heard of?

AS13000 Problem Solving
AS13001 Supplier Self Release Training
AS13002 Inspection Frequency
AS13003 Measurement Systems Analysis
AS13004 PFMEA & Control Plans
AS13005 Internal & Supplier Audits
AS13006 Process Control
AS13007 Supplier Management
Which Standards are in YOUR Contracts?

![Bar chart showing percentage of standards in contracts]

- **AS13000**
- **AS13001**
- **AS13002**
- **AS13003**
MARKET PLACE #1
Market Place #1

15 minutes per table

For the published standards (5 Tables)

– 13000
– 13001
– 13002
– 13003
– 13004
Market Place #1 Questions

1. Has the Standard been flowed down by your Customer(s)?

2. Do you have any problems with or suggestions for the Standard?

3. Have you had problems flowing down the Standard to your suppliers?

4. Are there any commodity specific considerations?
LUNCH

BEGIN AGAIN AT 1:15PM
BENEFITS OF THE STANDARDS & SUPPLIER CONTRIBUTIONS TO AESQ
AS13000 – 8D
PROBLEM SOLVING
REQUIREMENTS FOR SUPPLIERS

HELEN DJAKNEGREN - GKN
AS13000 – 8D How is the Standard being used?

**PCC**
- Utilized for Root Cause Corrective Action
- Incorporated with Zero Defect Program for UTAS
- Assimilated with Innovator

**MTU**
- 8-D method existed for years
- Web-based IT tool in use
- Find and eliminate the “real” root cause

**GKN**
- Implemented in QMS and flowed to suppliers
- Utilized in internal and external Root Cause Corrective Action
AS13000 – 8D How is the Standard beneficial?

PCC
- Useful for addressing systemic issues
- Can be read-across for part families
- Increased effectiveness of problem-solving due to standardization

MTU
- Easy to convince suppliers
- Ease of training at suppliers leading to better quality
- Increased efficiency in close-looping RCCA

GKN
- Great problem solving method rather than just a reporting tool
- Prevented shortcuts
- Good training tool for personnel

Supplier Development Engineer Video
Videos\AS 13000 Problem Solving.m4v
AS13001
DPRV

BHU KENJALE - PCC
AS13001 – DPRV / DSQR How is the Standard being used?

**PCC**
- Standardized training for self-release of product
- Cross-functional teams can benefit from this training

**MTU**
- Implemented within MTU with high sense of urgency
- Suppliers requested implementation

**GKN**
- Implemented customer release agents at GKN sites
- Implemented at suppliers for release agents
AS13001 - How is the Standard beneficial?

PCC
- Eliminated duplication of training at various OEMs
- Cost avoidance due to less travel and lower labor hours
- Increased shipment efficiency

MTU
- Less travel and less training hours, for trainees and trainers. Less lost working hours for trainees
- Training done in supplier region, sometimes even in native language
- Reduced maintenance cost of different training systems for OEMs
- Standardization leads to better clarity in requirements

GKN
- Provided a good, general overview of quality requirements
- Reduced cost associated with travel, training material and time
- Annual reduction in training hours for agents, internally and externally

Sr. Supplier Quality Engineer Video
AS13002 & AS13003

MARTIN SCHAEFFNER - MTU
AS13002 & AS13003 – How are the Standards being used?

**PCC**
- For New Product Introduction
- Limited implementation

**MTU**
- 13002 has limited use due to existence of already-approved quality plans
- 13003 is implemented within MTU for PPAP parts

**GKN**
- 13002 has been implemented on GKN designs. This is a requirement at GKN sites, however still limited in use.
- 13003 Implementation on-going for new product introduction
AS13002 & AS13003 - How are the Standards beneficial?

PCC
- Standardized approach

MTU
- MSA at MTU

GKN
- Ease in training
Experiences from using the Measurement System Analysis method at MTU

Martin Schäffner

10/03/2017
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# General Approach

## What is the intent?

The goal is to make sure that every measurement system (gage + outside influences) used is suitable for the intended task → representing “real” part quality!

The AS13003 method summarizes different tools and delivers a standardized approach. Mainly used in: PPAP; approval of new measurement technology; stabilizing production processes.

## Guiding Questions

<table>
<thead>
<tr>
<th>“Method 1”</th>
<th>“Method 2”</th>
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<tbody>
<tr>
<td><em>Is the gage precise and accurate enough to rely on it?</em></td>
<td><em>What happens in real production line conditions?</em></td>
</tr>
<tr>
<td>How big is the variance of my measurement?</td>
<td>What happens if the same inspector measures the same part without knowing the results from his last measurements?</td>
</tr>
<tr>
<td>Calculation of the value cg &gt;1,33</td>
<td>Calculation of the value cgk &gt;1,33</td>
</tr>
<tr>
<td>Is there a systematic error in the measurement?</td>
<td>What happens when a different inspector measures the same part without knowing the results from his coworker?</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Total Variance</th>
<th>% GR&amp;R</th>
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<tbody>
<tr>
<td>Calculation of the value cgk &gt;1,33</td>
<td>Calculation of the value cg &gt;1,33</td>
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</table>
Hands-on Example

**Background**

- Thin-walled part with tight tolerances
- The measurement results were suspected to be unstable due to issues with the fixture and clamps.

→ MSA performed according to AS13003

**Approach**

- Definition of Key characteristics by manufacturing engineers, metrologists, and designers
- Independent reference measurement (new program)
- 20 CMM measurements under production line conditions
- Evaluation of systematic errors and variances.
- Optimization of the measurement process to eliminate errors which were found until values can be accepted.
- R&R Study to evaluate influences from different inspectors
Actions defined due to results from the MSA

Case, Turbine

- Characteristics showed problems with accuracy and repeatability
  → a test on a more accurate CMM showed a huge improvement

- Form tolerances problems with repeatability even though the machine was changed
  → The case was found in changing the measuring fixture

- The parallelism tolerance between the upper and lower flange was still not in
  → Together with engineering the reference plane was changed

Standard CMM for this part family  New CMM  Rework of the measuring fixture  Change made to the drawing
Lessons Learned up to now

• By using the MSA method you get a reliable and understandable statement if you can rely on your results or not
  → don’t touch your production processes before you are sure about your measurement

• Cg & Cgk database is a great support to discuss drawing requirements with the design organization

• An MSA helps to eliminate influences coming from different measurement strategies

• A CMM measurement is not always reliable – accuracy and inspector variance matters

• High quality of existing measurement programs as in most cases only a few characteristics show a significant variance

• A comparison to an independent reference measurement gives a valuable insight into the production line measurement;
  → not easy to achieve due to the small tolerances and the expectation to be more precise

• For tighter tolerances the method is very challenging and even a difference of 1/10 µm between reference & production results can be the reason for an incapable system ->
Rules for these special cases are necessary
SUPPLIER CONTRIBUTIONS TO AESQ WORK
Supplier Contributions

How can suppliers contribute to the work of AESQ?

• Attend AESQ supplier forums
• Provide feedback on current and future standards through the website
• If you see a valuable need to standardize between AESQ members, please communicate
• Share experiences/case studies of best practices and impact of standards
• Claim your rights and privileges from the AS1300X standards vis-à-vis your customer. AESQ members are committed to deploy
OVERVIEW OF DRAFT STANDARDS
### Product Life Cycle & Document Interaction

**AS9145 (APQP/PPAP) & AESQ Standards**

<table>
<thead>
<tr>
<th>AS9145 (PDP)</th>
<th>Kick Off</th>
<th>End of Concept (PDR)</th>
<th>Design Release (CDR)</th>
<th>Initial Prod. Approval</th>
<th>Production Launch</th>
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</thead>
<tbody>
<tr>
<td><strong>1. Planning</strong></td>
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<tr>
<td><strong>2. Product Design &amp; Development</strong></td>
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<td><strong>3. Process Design &amp; Development</strong></td>
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<td><strong>4. Product &amp; Process Validation</strong></td>
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<td><strong>5. Ongoing Production, use and Post Delivery Service</strong></td>
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#### AS9145 APQP Phases

1. Planning
2. Product Design & Development
3. Process Design & Development
4. Product & Process Validation
5. Ongoing Production, use and Post Delivery Service

#### AS9145 Key PPAP Events

- Kick Off
- End of Concept (PDR)
- Design Release (CDR)
- Initial Prod. Approval
- Production Launch

#### AS9145 PPAP Element Timing

- Design Records & DRA
- Process Flow Diagram
- PFMEA
- Control Plan
- Packaging, Preservation & Labelling
- MSA
- ICS
- FAI

#### AESQ 2nd Level Documents

- AS13004 - Process Flow, PFMEA and Control Plans
- AS13003 - Measurement Systems Analysis
- AS13006 - Process Control Methods
- AS13002 - Qualifying Alternate Inspection Plans

#### AESQ Systems Documents

- AS13000 - Problem Solving Requirements for Suppliers - 8D
- AS13001 - Delegated Product Release Verification Training Requirements
- AS13005 - Internal Audit Requirements for Suppliers
- AS13007 – Supplier Management

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AESQ – Aerospace Engine Supplier Quality Strategy Group

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**AS13006 Process Control**

**Original State**
- Varying standards & approaches

- PC requirements not clearly defined/understood
- Inconsistent application/flowdown to sub-tiers
- Lack of commitment/belief in benefits
- Belief low volume environments not applicable

**AESQ Principles**
- Standardise
- Simplify
- Adopts Existing Industry Standards
- Prescriptive, Auditable
- Common Language
- Supported by 3rd Party Training & Consultancy

**Future State**
- Common standard & approach
  Aligned with AS13002, 13003, 13004, AS9103, AS9145 & AIAG “Blue Books”

**In scope:** Process Control for all characteristics
**Out of scope:** Foundational requirements

**Expected Benefits**
- Improved variation control & reduction techniques, broad-based belief in benefits
- Common prescriptive standard fully aligned with AESQ, AS9103 & AIAG Blue Book Stds
- Focus on accurate data analysis and prevention
- Improved Quality Performance, reduced risk
- Help will be on the website and not in the standard
AS13006 Process Control – Valuable Content

AS13004
- Process Flow Diagram
- Product Key Characteristics

AS13006
- Process control method selection
- Process analysis, investigation and improvement
- Process Monitoring & Control

Process Flow Diagram → PFMEA → Control Plan

Experience/learning fed back into risk mitigation (updates to PFMEA and Control Plan)

Product and Process Key Characteristics

Foundational activities
AS13007 Supplier Management

- Lots of sub-tier surprises?
- Is the variation and risk understood?
- Is the risk owned?
- Is it managed?
- Why and how will you improve it?
**AS13007 Supplier Management**

**Original State**

- **Industry Standard for Supplier/Tier Management**
- **Varied Customer-Specific Requirements**

**Future State**

- **Single AESQ Standard**
- **Fewer Customer-Specific Requirements**

**In scope:** Raw material & finished hardware

**Out of scope:** Distributors & MRO suppliers

**AESQ Principles**

- ✓ Standardise
- ✓ Simplify
- ✓ Adopts Existing Industry Standards
- ✓ Prescriptive, Auditable
- ✓ Common Language
- ✓ Supported by 3rd Party Training & Consultancy

**Expected Benefits**

- Simplify language for organizations to manage suppliers
- Ability to use the standard throughout all tiers of the supply chain
- Standard will simplify and reduce the number of methods the suppliers must use to meet Customer requirements (i.e. simplify/make common the “how to”)
- Better quality from sub-tiers
### AS13007 Supplier Management - Requirements

| 4.3 Quality System Requirements |
| 4.5 Supplier Evaluation |
| 4.6 Supplier Selection and Approval |
| 4.7 Purchasing Requirements |
| 4.8 Verification of Purchased Product |
| 4.9 Control Of Suppliers |
| 4.10 Supplier Performance Monitoring |
| 4.11 Supplier Surveillance |
| 4.13 Corrective and Preventive Action |
| 4.14 Management of Nonconformance |
| 4.15 Records |
AS13005 Internal & Supplier Surveillance Quality Audit Requirements

Original State

- Internal audit requirements in many documents
  - S-1000
  - SABRe
  - ISO19011
  - EASA
  - FAA
  - TC
  - ASQR
  - AES

Future State

- Every Customer...
- ...audits...
- ...every Supplier

 Customers use standard audit process to...

- Audit types & checklists
  - System
  - Production process
  - Product
  - Special process
- Auditor qualification, KPI’s
- Supplier Surveillance Audit
  - Selecting suppliers
  - Selecting scope, approach
- Audit outcome

Aerospace Standard AS13005

Expected Benefits

- Lean & effective internal audit process provides confidence in state of compliance throughout Aero-Engine supply chain
- Improved rigor of audit approach
- Suppliers chosen for audit based on performance and risk
- Reduced and/or eliminated unnecessary and/or duplicate audits => Cost reduction / resources liberated by customer and supplier.
- Reduced supplier audits for performing suppliers (low risk) that demonstrate compliance to internal audit requirements
- Recognizes existing 3rd party certification

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Product Life Cycle & Document Interaction
AS9145 (APQP/PPAP) & AESQ Standards

1. Planning
   - Kick Off
   - End of Concept (PDR)

2. Product Design & Development
   - Design
   - Records & DRA
   - Process Flow Diagram
   - PFMEA
   - Control Plan

3. Process Design & Development
   - Packaging, Preservation & Labelling
   - MSA
   - ICS
   - FAI

4. Product & Process Validation
   - FAIR
   - Production Process Run
   - PPAP Approval

5. Ongoing Production, use and Post Delivery Service

AS9145 Key PPAP Events

AS9145 PPAP Element Timing

AESQ 2nd Level Documents

- AS13004 – Process Flow, PFMEA and Control Plans
- AS13003 – Measurement Systems Analysis
- AS13006 – Process Control Methods
- AS13002 – Qualifying Alternate Inspection Plans

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MARKET PLACE #2
Market Place #2

15 minutes per table

For the Work In Progress standards (4 Tables)

– 13005
– 13006
– 13007
– Future
Market Place Questions

Are there any additional questions, concerns, or feedback?
QUIZ ANSWERS

1. What does AESQ stand for?
   a.) Aeronautical Engine Source Quality
   b.) Aerospace Engineering Supplier Quality
   c.) **Aerospace Engine Supplier Quality**
   d.) Aeronautical Engineering Source Quality
   e.) Aerospace Equipment Standards for Quality

2. Airworthiness regulations require safety be maintained for:
   a.) The crew and passengers of manned aircraft
   b.) Persons being overflown
   c.) Property on the ground
   d.) **All of the above**
   e.) a.) and b.) only

3. How can an organization request approval for an alternate inspection frequency plan as per AS13002?
   a.) Request your quality contact to allow its use.
   b.) **Utilize the example form available at aesq.saeitc.org to provide proof of capability and control.**
   c.) Just change and see if the customer catches you.
   d.) Perform capability studies and develop a strategy to reduce.
   e.) None of the above
4. In general, what are the AS13000 requirements for timely problem solving response to customers?
   a.) D0 completed and returned to the customer within 2 days of problem identification.
   b.) D5 completed and communicated to the customer within 30 days of problem identification.
   c.) D8 closed and documentation sent to the customer within 60 days of problem identification.
   d.) All of the above  
ed.) a.) and c.) only

5. In which following situation(s) should an MSA be performed/reevaluated when applying AS13003?
   a.) New/Changed Production Process.
   b.) Product requirements are changed to be more restrictive or tightened.
   c.) To verify a measurement system is adequate before SPC.
   d.) Following a product escape related to (or suspected to be) from the Measurement System
   e.) All of the above.

6. AS13004 should be applied to:
   a.) All New Product Introduction parts only
   b.) Products and/or services currently in production only.
   c.) New Product Introduction and products currently in production when manufacturing processes are
       changed, transferred to a new location, or addressed for improvement.
   d.) Only when a customer makes a request.
   e.) None of the above

7. If AS13001 is a customer requirement, where can DPRV personnel apply for training?
   a.) AESQ Website
   b.) SAE Website
   c.) Probitas Authentication Website
   d.) Through their customer
   e.) All of the above
## Marketplace Summary Session 1

<table>
<thead>
<tr>
<th>Standard</th>
<th>Key Feedback</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Will suppliers really see unique requirement elimination or will these standards drive additional work? How is AESQ applying this standard to tooling “non-product” supplier/products</td>
<td></td>
</tr>
<tr>
<td>AS13000</td>
<td>Recommend consistent 8D training</td>
<td>Olivier Castets</td>
</tr>
<tr>
<td>AS13001</td>
<td>Inconsistency of customer expectations</td>
<td>Earl Capozzi</td>
</tr>
<tr>
<td></td>
<td>Missing commodities, engines and non flying parts</td>
<td></td>
</tr>
<tr>
<td>AS13002</td>
<td>Partner with AS9100 Auditors Execute training deployment</td>
<td>Dave Goldberg</td>
</tr>
<tr>
<td>AS13003</td>
<td>Flow down as a reference in some cases, not clearly listed. Customers sometimes request MSA on all gauges, not practical, should be NPI KC or KC-M.</td>
<td>Dele Awofala Martin Schaeffner</td>
</tr>
<tr>
<td>AS13004</td>
<td>Still new</td>
<td>John Calder</td>
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<tr>
<td>Standard</td>
<td>Key Feedback</td>
<td>Facilitators</td>
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<td>-----------</td>
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<td>----------------------------------</td>
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<tr>
<td>AS13005</td>
<td>Like to see a common audit approach</td>
<td>Jeremy Johnson Helen Djaknegren</td>
</tr>
<tr>
<td>AS13006</td>
<td>What is the clear business case to conduct it?</td>
<td>Peter Amsden</td>
</tr>
<tr>
<td>AS13007</td>
<td>Similarity to AS9100 – more definition Applicability to all components</td>
<td>Robert Czanik Thomas Schmitt</td>
</tr>
<tr>
<td>Future</td>
<td>First Article Integration Change Management Standardize concession Can AESQ website provide notifications upon new AESQ standards?</td>
<td>Catherine Catarina-Graca Bhu Kenjale</td>
</tr>
</tbody>
</table>
CLOSING REMARKS
AESQ Vision

“To establish and maintain a common set of Quality Requirements that enable the Global Aero Engine Supply Chain to be truly competitive through lean, capable processes and a culture of Continuous Improvement.”

In detail:

• create common standards within the engine manufacturers (OEM’s) in regard to quality
• deploy together the written standards throughout our supply chain
• establish capable quality processes and a culture of continuous improvement

Main Targets:

• to improve quality within the supply chain
• improve on time delivery and minimize costs through a reliable quality performance
• Gain efficiency by standardized processes
AESQ will drive progress

Spread the word

We mean it!