Counterfeit Avoidance: SAE International Standards-Current Status and Under Development

ANSI-HSSP Workshop
September 13, 2012
Washington, DC

Bruce Mahone
SAE International
www.sae.org
About SAE …

• Non-profit membership society

• 131,000 mobility engineering members in 97 countries

• 250 professional staff

• Global Offices:
  – World Headquarters – Warrendale PA, USA
  – Automotive Headquarters – Troy MI, USA
  – Aerospace Standards – Washington DC
  – Aerospace Standards Europe – London
  – Shanghai
US National Bureau of Standards and Industrial Preparedness Committee of the Naval Consulting Board

Agreed to address aeronautical standards & technology within SAE

SAE’s charter expanded to address aerospace in September 1916. American Society of Aeronautical Engineers merged into SAE
Total Aerospace Standards

6800+ standards

150+ committees, subcommittees, and task groups

8000+ global participants

Civil and Military applications addressed

Jan. 2005
Over 1500 Mil-Specs have been converted to SAE standards

The US DoD has adopted more documents SAE from than any other SDO

http://www.sae.org/standardsdev/military/
Key SAE Standards Activities

Materials

Environmental Standards

Counterfeit Parts Avoidance

Standard Parts

Deicing

Human Factors

Military Avionics

Integrated Vehicle Health Management & Reliability
SAE Aerospace G-19
Counterfeit Electronic Parts Committee

• Chartered in 2007 to address aspects of preventing, detecting, responding to and counteracting the threat of counterfeit electronic components. Participants included:
  – Government
  – Defense/Aerospace manufacturers
  – Industry Groups
  – Testing Laboratories
• April 2009 - SAE International released aerospace standard AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
• August 2009 – United States DoD adopted AS5553
SAE G-19 Members
from Government, Defense and Industry Sectors

**Government Members**
- Defense Logistics Agency (DLA)
- Defense Contract Management Agency (DCMA)
- DOE - National Nuclear Security Administration (NNSA)
- Federal Aviation Administration (FAA)
- Intelligence Advanced Research Projects Activity (IARPA)
- Ministry of Defence, UK
- National Aeronautics and Space Administration (NASA)
- USAF/NRO (The Aerospace Corporation)
- USAF Wright Patterson AFB
- US Army - AMCCC Business Operations HQAMC
- US Army Aviation & Missile Command
- US Army Redstone Arsenal
- US Missile Defense Agency (MDA)
- US Navy - Naval Air Warfare Center
- US Navy - Naval Surface Warfare Center (NSWC) Crane
- US Navy - NAVSEA Crane
- US Navy, Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity
- US Department of Transportation

*Note: Members function as individuals intending to represent the best interests of the industry, and not as agents or representatives of any organization with which they may be associated*
SAE G-19 Members From Industry Sectors

Participating Industry Associations …

- ACLASS Accreditation Services
- Aerospace Industries Association (AIA)
- ANSI-ASQ Accreditation Board (ANAB)
- Component Obsolescence Group (COG)
- The Electronic Components Supply Network
- EIA Standards and Technology Electronic Components
- ERAI, Inc.
- IEC/IECQ
- Independent Distributors of Electronics Association (IDEA)
- Performance Review Institute (PRI)
- UK Electronics Alliance (UKEA)
<table>
<thead>
<tr>
<th>Adaptive Management Solutions</th>
<th>GE Aviation</th>
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<tr>
<td>Aero Engine Controls</td>
<td>Goodrich Control Systems</td>
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<td>American Electronic Resource</td>
<td>Greenberg &amp; Bass</td>
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<td>Analytical Alternatives</td>
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<td>Hi-Reliability Microelectronics</td>
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<td>Hi-Rel Laboratories</td>
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<td>Arcadia Components</td>
<td>Honeywell Aerospace Electronic Systems</td>
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<td>Ares Corp</td>
<td>Honeywell Int'l</td>
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<td>Arrow Electronics</td>
<td>Honeywell Technology Solutions</td>
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<td>Astute Electronics</td>
<td>Infineon Technologies AG</td>
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<td>BAE Systems (Operations)</td>
<td>Integra Technologies</td>
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<td>BAE Systems</td>
<td>Jabil Circuits</td>
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<td>Ball Aerospace &amp; Technologies</td>
<td>Jacobs Engineering</td>
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<td>Boeing</td>
<td>Jet Propulsion Laboratory</td>
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<td>Boeing Advanced Systems</td>
<td>L-3 Communications - CSW</td>
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<td>Business Quality Process Management</td>
<td>Left Coast Technical Solutions</td>
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<td>Bechtel Plant Machinery</td>
<td>Lockheed Martin Aeronautics</td>
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<td>CALCE University Of Maryland</td>
<td>Lockheed Martin Missiles &amp; Fire Control</td>
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<td>Celestica Corp. Technology &amp; Engineering</td>
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<td>China Aero-Polytechnic Establishment</td>
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<td>Crestwood Technology Group</td>
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<td>Mouser Electronics</td>
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<td>Northrop Grumman Electronic Systems</td>
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<td>DPA Components International</td>
<td>N.F. Smith &amp; Associates</td>
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<td>Electronic Supply Chain Solutions</td>
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<td>Underwriters Laboratories, UL DQS</td>
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<td>Westland Helicopters</td>
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<td>White Horse Laboratories</td>
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<td>World Data Products</td>
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<td>World Micro</td>
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<td>Wyle Laboratories</td>
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G-19 Committee
AS5553

G-19 CI
Continuous Improvement Subcommittee
(AS5553A: Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition)

G-19 D
Distributor Subcommittee
(AS6081: Counterfeit Electronic Parts; Avoidance Protocol, Distributors)

G-19 DR
Distributor Risk Characterization Subcommittee
(ARP6178: Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors)

G-19 A
Test Laboratory Standards Development Subcommittee
(AS6171: Test Methods Standard; Counterfeit Electronic Parts)

G-19 C
Standards Compliance Verification Subcommittee
AS6462 Verification Criteria

G-19 T
Terms and Definitions
AIR6273 Terms and Definitions - Fraudulent/Counterfeit Electronic Parts
Document Roadmap since AS5553

**DISTRIBUTOR**

- AS6081, Counterfeit Electronic Parts; Avoidance Protocol, Distributors
  *(Worksheet and User Guide in progress)*

**USER**

- AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

- AS6462 Compliance Standard or Guide (includes Audit Checklist)

**TEST PROVIDER**

- AS6171, Test Methods Standard; Counterfeit Electronic Parts

- ASXXXX Compliance Standard or Guide for AS6171 (includes Audit Checklist)
### Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Provide uniform requirements, practices and methods to mitigate the risks of purchasing and supplying counterfeit electronic parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Audience</td>
<td>Organization that purchase and/or manufacture products with electrical components</td>
</tr>
</tbody>
</table>
| Uses | • Requirements for developing a Counterfeit Parts Control Plan  
• Guidelines in the appendices for Counterfeit Mitigation industry best-practices  
• Certification standard under development |
| Status | • Issued April-2009  
• Adopted by NASA in November, 2008  
• Adopted by DoD in August, 2009  
• Under revision by G-19CI Committee  
  • Modify language to be more ‘international’  
  • Align with AS 6081 (for distributors) |
AS5553 - Counterfeit Electronic Parts; Avoidance, Detection, Mitigation and Disposition

"... created in response to a significant and increasing volume of counterfeit electronic parts entering the aerospace supply chain, posing significant performance, reliability, and safety risks."
SAE AS5553 – Aerospace Standard

Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

- Counterfeit Electronics Parts Control Plan
- Purchasing
  - Assessment of Suppliers
  - Supply Chain Traceability
- Verification of Purchased Product
- In-process Investigation
- Material Control
- Reporting
**SAE AS6081 – Aerospace Standard**

### Counterfeit Electronic Parts Avoidance – Distributors

| **Purpose** | standardizes practices to:  
| | a. procure parts from reliable sources,  
| | b. assess and mitigate risk of distributing counterfeit parts,  
| | c. control suspect or confirmed counterfeit parts,  
| | d. report suspect and confirmed counterfeit parts to other potential users and Authority Having Jurisdiction,  
| | e. and assess, mitigate, control, and report parts which have been used, refurbished, or reclaimed, but represented as new product.  

| **Target Audience** | Distributors of Electronic Components  

| **Uses** | • Requirements for a Counterfeit Mitigation program  
| | • **Intended to be used for certification of Distributors**  

| **Status** | • Balloted – Disposition of comments underway  

SAE AS6081 – Aerospace Standard
Counterfeit Electronic Parts;
Avoidance Protocol, Distributors
– Quality Management System
  • Counterfeit Mitigation Policy
– Counterfeit Electronics Parts Control Plan
  • Customer Related Contract Review, Agreement, & Execution
  • Purchasing
  • Purchase Order Requirements
  • Supply Chain Traceability
  • Verification of Purchased Product
  • Material Control
  • Reporting
  • Personnel Training and Certification
AS6081 - Counterfeit Electronic Parts; Avoidance Protocol, Distributors

- OEMs can specify their suppliers comply with AS6081 to meet selected flow-down requirements of AS5553
- AS6081 requirements are intended to be applied/flowed down to distributor’s suppliers
- Independent, third-party certification bodies (CBs) verify of compliance to AS6081
- Accreditation of CBs will be through ANAB, a recognized and respected accreditation body (AB) to ensure the impartiality and competence of each Certification Body
## Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Tool for the evaluation of a distributor’s processes for the prevention, detection, containment, and reporting of counterfeit electronic components</th>
</tr>
</thead>
</table>
| Target Audience                   | Distributors of Electronic Components (self assessment)  
                                  | Customers of Distributors (for assessment and the calculation of a risk score)                                                   |
| Uses                              | • Develop Risk Assessment score for the Counterfeit Mitigation program                                                        |
| Status                            | • Published December 2011                                                                                                      |
Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors
- Justification for Assessment
- Pre-visit Assessment Survey
- Site Assessment Survey
- Supplier Selection
- Assessment Spreadsheet
  - Survey
  - Tabulates score
Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors -

– Survey

• General Company Information
• Pre-Assessment Information
• Industry Membership and Reporting
• Quality System and Processes
• Warranty and Insurance
• Supplier Qualification and Purchasing Process
• Handling and Facilities
• Training and Certification
• Inspection and Test
• Non-Conforming Material Control
• Additional Test and Inspection (In-house or Third-Party)
ARP6178 – Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

- Intended for use by organizations that procure electronic components from suppliers other than the original component manufacturer (OCM)
- Provides organizations with a tool to assess a supplier’s capability to prevent, detect, contain and report suspect or confirmed counterfeit electronic components
- Not intended to replace certification compliance criteria
## AS 6171

- Test Methods Standard; Counterfeit Electronic Parts

### Test Methods Standard; Counterfeit Electronic Parts

<table>
<thead>
<tr>
<th>Purpose</th>
<th>• Standardize practices to detect suspect counterfeit electronic parts and to ensure consistency of test techniques and requirements across the supply-chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Audience</td>
<td>• Independent Testing Facilities Distributors (in-house testing capability)</td>
</tr>
<tr>
<td>Uses</td>
<td>• Definition of Test Methods for counterfeit detection</td>
</tr>
<tr>
<td></td>
<td>• Accreditation</td>
</tr>
<tr>
<td></td>
<td>• Intended to be used for accreditation of Independent Test Laboratories or Distributors (ILAC, through ACLASS, A2LA, etc.)</td>
</tr>
<tr>
<td>Status</td>
<td>• In Draft</td>
</tr>
</tbody>
</table>
AS 6171-
Test Methods Standard; Counterfeit Electronic Parts

• Test Methods
  – External visual inspection
  – Radiological inspection,
  – X-ray fluorescence,
  – Remarking and resurfacing,
  – De-lid/ Decapsulation or destructive physical analysis,
  – Electrical tests,
  – Acoustic microscopy,
  – Optical/SEM inspection,
  – FTIR/DSC/TMA testing and miscellaneous testing

• Risk Criteria and sampling plans
• Personnel Certification requirements
AS6171 –
Test Methods Standard; Counterfeit Electronic Parts

Each Test Method section will include:

– Processes and a description of procedures
– Apparatus needed for the test technique
– Required qualification and certification of processes and personnel
– Guidelines and requirements for reporting
Standardize practices to detect suspect counterfeit electronic parts and to ensure consistency of test techniques and requirements across the supply-chain.

Level of testing is risk-based and includes sampling plans.

Accreditation of the Test Laboratory will be through ILAC (AClass, A2LA or other laboratory accreditation bodies) to ensure the impartiality and competence of the Test Lab.
AS6171 - Test Methods Standard; Counterfeit Electronic Parts

• AS6171 will include guidance for:
  – Evaluating risk and recommended tier level of testing based on:
    • Risk of the supplier,
    • Risk of the part,
    • Risk of application, and
    • Other risk factors.
  – Recommended sampling plans for the tests based on tier level of accepted risk, level of confidence required, and acceptable reject criteria.
## AS 6174 – Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel

### Counterfeit Materiel Other than Electronic Parts

<table>
<thead>
<tr>
<th>Purpose and Uses</th>
<th>• This SAE Standard standardizes practices to: a. maximize availability of authentic materiel (made from the proper materials using the proper processes with required testing,) b. procure materiel from reliable sources, c. assure authenticity and conformance of procured materiel d. control materiel identified as counterfeit, and e. report counterfeit materiel to other potential users and government investigative authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Audience</td>
<td>• Organization that purchase and/or manufacture products other than electrical components</td>
</tr>
<tr>
<td>Rationale</td>
<td>• Created in response to a significant and increasing volume of counterfeit material entering the supply chain</td>
</tr>
<tr>
<td>Status</td>
<td>• Published May 2012</td>
</tr>
</tbody>
</table>
Committee G-21
Counterfeit Materiel

- April 20, 2010 – DoD PSMC (Part Standardization and Management Committee) requested SAE to address counterfeit NON-electronic parts
- May 14, 2010 – First telecon of new group
- October 4, 2010 – AS6174 based on major rewrite of AS5553 to address all materiel, nearly complete
- Jan-May 2011 – revised to consider Office of the Secretary of Defense (OSD) and WH Intellectual Property Enforcement Coordinator (IPEC) PEC input
- Published May 2012
AS6174 - Counterfeit Materiel

• For all applications
  – Preference for purchase from original manufacturer or licensed/franchised dist.
  – Extra documentation/testing for other distributors/brokers

• Tracks closely with draft OSD and White House policy for avoiding counterfeits with all materiel, including medicine, tourniquets, etc.
# Summary of SAE G-19 Aerospace Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE AS5553 (G19)</td>
<td>Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition</td>
<td>Issued and available at <a href="http://www.sae.org">www.sae.org</a></td>
</tr>
<tr>
<td>SAE AS5553A (G19-CI)</td>
<td>Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition</td>
<td>Under revision publication expected 4Q 2012. Incorporates non-US requirements into the standard</td>
</tr>
<tr>
<td>SAE AS6171 (G19-A)</td>
<td>Test Methods Standard; Counterfeit Electronic Parts</td>
<td>In draft; balloting expected in 3Q-2012</td>
</tr>
<tr>
<td>SAE AS6462 (G19-C)</td>
<td>Verification Criteria for Certification against AS5553</td>
<td>Ballot 4Q-2011; publication likely 4Q-2012. Negotiations underway with ANAB for certification programs</td>
</tr>
<tr>
<td>AIR6273 (G19-T)</td>
<td>Terms and Definitions:</td>
<td>In draft expected late 2012</td>
</tr>
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## Summary of SAE G-19/G-21 Aerospace Standards continued

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Status</th>
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<tbody>
<tr>
<td>SAE AS6081</td>
<td>Counterfeit Electronic Parts Avoidance – Distributors</td>
<td>Publication expected 4Q 2012</td>
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<tr>
<td>(G19-D)</td>
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<tr>
<td>SAE AS6301</td>
<td>Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors Verification Criteria</td>
<td></td>
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<tr>
<td>(G19D)</td>
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<tr>
<td>SAE ARP6178</td>
<td>Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors</td>
<td>Ballots complete; released for publication in Dec 2011</td>
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<tr>
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<tr>
<td>SAE AS6174</td>
<td>Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel</td>
<td>Published May 2012</td>
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Thank you for your time and attention!

Are there any questions?

Bruce Mahone
SAE International
(202) 434-8943
bmahone@sae.org