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Process management for avionics — Counterfeit prevention

Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

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National foreword

This Published Document is the UK implementation of IEC/TS 62668-1:2016. It supersedes PD IEC/TS 62668-1:2014 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/107, Process management for avionics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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TECHNICAL SPECIFICATION

colour inside

Process management for avionics – Counterfeit prevention – Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 03.100.50; 31.020; 49.060

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PROCESS MANAGEMENT FOR AVIONICS – COUNTERFEIT PREVENTION –

Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62668-1, which is a technical specification, has been prepared by IEC technical committee 107: Process management for avionics.

This third edition cancels and replaces the second edition, published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) identified that the Chinese RECS scheme is no longer maintained (in 4.2 and where appropriate as agreed with CEPREI);
b) added a reference to AS/EN/JISQ 9100 which at the next revision (revision D) will contain an anti-counterfeit requirement which may be used to satisfy the requirements of 4.2;
c) added reference to the now published SAE AS6496 for franchised distributors, to USA DFARS rule 252.246.7007 and to UK Defence Standard 05-135;
d) added reference to more GAO, OECD and ICC reports in 4.5.1;
e) updated weblinks and other references.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
107/267/DTS	107/277/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 62668 series, published under the general title *Process management for avionics – Counterfeit prevention,* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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PROCESS MANAGEMENT FOR AVIONICS – COUNTERFEIT PREVENTION –

Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

1 Scope

This part of IEC 62668, which is a Technical Specification, defines requirements for avoiding the use of counterfeit, recycled and fraudulent components used in the aerospace, defence and high performance (ADHP) industries. It also defines requirements for ADHP industries to maintain their intellectual property (IP) for all of their products and services. The risks associated with purchasing components outside of franchised distributor networks are considered in IEC TS 62668-2. Although developed for the avionics industry, this specification may be applied by other high performance and high reliability industries at their discretion.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TS 62239-1, *Process management for avionics – Management plan – Part 1: Preparation and maintenance of an electronic components management plan*

IEC TS 62668-2, *Process management for avionics – Counterfeit prevention – Part 2: Managing electronic components from non-franchised sources*

ISO 9001, *Quality management systems – Requirements*

AS/EN/JISQ 9100, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations*

AS/EN/JISQ 9110:2015 *Quality Maintenance Systems – Aerospace – Requirements for Maintenance Organizations*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
aftermarket source
reseller which may or may not be under contract with the original component manufacturer (OCM), or is sometimes a component “re-manufacturer”, under contract with the OCM

Note 1 to entry: The reseller accumulates inventories of encapsulated or non-encapsulated (wafer) components whose end of life date has been published by the OCM. These components are then resold at a profit to fill a need within the market for components that have become obsolete.

3.1.2
broker
individual or corporate organization that serves as an intermediary between buyer and seller

Note 1 to entry: In the electronic component sector a broker specifically seeks to supply obsolete or hard to find components in order to turn a profit. To do so it may accumulate an inventory of components considered to be of strategic value or may rely on inventories accumulated by others. The broker operates within a worldwide component exchange network.

3.1.3
COTS product
commercial off-the-shelf product
one or more components, assembled and developed for multiple commercial consumers, whose design and/or configuration is controlled by the manufacturer's specification or industry standard

Note 1 to entry: COTS products can include electronic components, subassemblies or assemblies, or top level assemblies. Electronic COTS subassemblies or assemblies include circuit card assemblies, power supplies, hard drives, and memory modules. Top-level COTS assemblies include a fully integrated rack of equipment such as raid arrays, file servers to individual switches, routers, personal computers, or similar equipment.

3.1.4
counterfeit, verb
action of simulating, reproducing or modifying a material good or its packaging without authorization

Note 1 to entry: It is the practice of producing products which are imitations or are fake goods or services. This activity infringes the intellectual property rights of the original manufacturer and is an illegal act. Counterfeiting generally relates to wilful trademark infringement.

3.1.5
counterfeited component
material good imitating or copying an authentic material good which may be covered by the protection of one or more registered or confidential intellectual property rights

Note 1 to entry: A counterfeited component is one whose identity or pedigree has been altered or misrepresented by its supplier.

Identity = original manufacturer, part number, date code, lot number, testing, inspection, documentation or warranty etc.

Pedigree = origin, ownership history, storage, handling, physical condition, previous use, etc.

3.1.6
customer device specification
device specification written by a user and agreed by the supplier

3.1.7
customer
user
original equipment manufacturer (OEM) which purchases electronic components, including integrated circuits and/or semiconductor devices compliant with this technical specification, and uses them to design, produce, and maintain systems

3.1.8
data sheet
document prepared by the manufacturer that describes the electrical, mechanical, and environmental characteristics of the component

3.1.9
franchised distributor or agent
individual or corporate organisation that is legally independent from the franchiser (in this case the electronic component manufacturer or OCM) and agrees under contract to distribute products using the franchiser's name and sales network

Note 1 to entry: Distribution activities are carried out in accordance with standards set and controlled by the franchiser. Shipments against orders placed can be despatched either direct from the OCM or the franchised distributor or agent. In other words, the franchised distributor enters into contractual agreements with one or more electronic component manufacturers to distribute and sell the said components. Distribution agreements may be stipulated according to the following criteria: geographical area, type of clientele (avionics for example), maximum manufacturing lot size. Components sourced through this route are protected by the OCM's warranty and supplied with full traceability.

3.1.10
fraudulent component
electronic component produced or distributed either in violation of regional or local law or regulation, or with the intent to deceive the customer

Note 1 to entry: This includes but is not limited to the following which are examples of components which are fraudulently sold as new ones to a customer:

1) a stolen component;
2) a component scrapped by the original component manufacturer (OCM) or by any user;
3) a recycled component, that becomes a fraudulent recycled component when it is a disassembled component resold as a new component (see Figure 1), where typically there is evidence of prior use and rework (e.g. solder, re-plating or lead re-attachment activity) on the component package terminations;
4) a counterfeit component, a copy, an imitation, a full or partial substitute of brands;
5) fraudulent designs, models, patents, software or copyright sold as being new and authentic. For example: a component whose production and distribution are not controlled by the original manufacturer;
6) unlicensed copies of a design;
7) a disguised component (remarking of the original manufacturer's name, reference date/code or other identifiers etc.), which may be a counterfeit component (see Figure 1);
8) a component without an internal silicon die or with a substituted silicon die which is not the original manufacturer's silicon die.

3.1.11
microcircuit
component
device
electrical or electronic device that is not subject to disassembly without destruction or impairment of design use and is a small circuit having a high equivalent circuit element density which is considered as a single part composed of interconnected elements on or within a single substrate to perform an electronic circuit function

Note 1 to entry: This excludes printed wiring boards/printed circuit boards, circuit card assemblies and modules composed exclusively of discrete electronic components.

3.1.12
non-franchised distributor
company which does not fall under a franchised distributor or OCM

Note 1 to entry: These distributors may purchase components from component manufacturers, franchised distributors, or through other supply channels (open markets). These distributors cannot always provide the guarantees and support provided by the franchised distributor network; components sourced through this source are usually protected by the source's warranty only. However, some of them are able to purchase traceable components and/or to provide traceability paperwork and/or are able to return stock for investigation to the OCM.

3.1.13
OCM
original component manufacturer
company specifying and manufacturing the electronic component

3.1.14
OEM
original equipment manufacturer
manufacturer which defines the electronic subassembly that includes the electronic components or defines the components used in an assembly and/or test specification

3.1.15
piracy
willful copyright infringement

3.1.16
reseller
general supplier which offers a selection of electronic components to order from a catalog

3.1.17
recycled component
electrical component removed from its original product or assembly and available for reuse

Note 1 to entry: The component has authentic logos, trademarks and markings. However, it typically has no output to measure the useful life remaining for its reuse. A recycled component can fail earlier than a new one when re-assembled into another product or assembly. A recycled component may also be physically damaged or damaged through electro static discharge (ESD) during the removal process.

3.1.18
semiconductor
electronic component in which the characteristic distinguishing electronic conduction takes place within a semiconductor

Note 1 to entry: This includes semiconductor diodes which are semiconductor devices having two terminals and exhibiting a nonlinear voltage-current characteristic and transistors which are active semiconductor devices capable of providing power amplification and having three or more terminals.

3.1.19
subcontractor
manufacturer of electronic subassemblies or supplier manufacturing items in compliance with customer design data pack and drawings, and under the authority of the OEM

Note 1 to entry: This supplier can potentially procure all or part of the electronic components required to produce a subassembly and is often referred to as the contract electronic manufacturer (CEM) or electronics manufacturing services (EMS).

3.1.20
supplier
company which provides to another an electronic component which is identified by the logo or name marked on the device

Note 1 to entry: A supplier can be an OCM, a franchised distributor or agent, a non-franchised distributor, broker, reseller, OEM, CEM, and EMS, etc.

3.1.21
suspect component
electronic component which has lost supply chain traceability back to the original manufacturer and which may have been misrepresented by the supplier or manufacturer and may meet the definition of fraudulent or counterfeit component

Note 1 to entry: Suspect components may include but are not limited to:

1) counterfeit components;
2) recycled components coming from uncontrolled recycling operations carried outside of the OEM, franchised network and OEM business where typically it has been fraudulently sold to the OEM as being in a new unused condition.

3.1.22
traceability
ability to have for an electronic component its full trace back to the original component manufacturer

Note 1 to entry: This traceability means that every supplier in the supply chain is prepared to legally declare in writing that they know and can identify their source of supply, which goes back to the original manufacturer and can confirm that the electronic components are brand new and were handled with appropriate ESD and MSL handling precautions. This authenticates that the electronic components being supplied are unused, brand new components with no ESD, MSL or other damage. This ensures that the electronic components are protected by any manufacturer's warranties, have all of their useful life remaining and function according to the manufacturer's published data sheet, exhibiting the expected component life in the application for the OEM's reliability predictions and product warranty.

3.1.23
untraceable
property of electronic components which have lost their traceability (see 3.1.22)

3.2 Abbreviations

AAIPT	Alliance Against IP Theft
ACTA	Anti-Counterfeit Trade Agreement
ACTF	Semiconductor Industries Association Anti Counterfeit Task Force
ADHP	aerospace, defence and high performance
ASIC	application specific integrated circuit
ATP	acceptance test procedure
BEAMA	British Electrotechnical Allied Manufacturers' Association
BoM	bill of materials
CATA	China Anti-counterfeit Technology Association
CB	certifying body (third party)
COTS	commercial off-the-shelf
CEC	China Electronics Coporation
CECA	China Electronic Components Association
CEEI	China Electrical Equipment Assosication
CEM	contract electronic manufacturer
CESI	China Electronics Standardization Institute
CQAE	China Quality Management Association for Electronics Industry
CMOS	complementary metal oxide semiconductor
DFARS	Defense Federal Acquisition Regulation System
DOD	Department of Defence (US)
DMEA	Defense MicroElectronics Activity
DMSMS	diminishing manufacturing sources and material shortages
DNA	deoxyribonucleic acid
DSCC	Defence Supply Centre Columbus
DLA	Defense Logistics Agency (former DSCC)
EASA	European Aviation Safety Agency
ECIA	Electronic Components Industry Association
ECMP	electronic component management plan
ECSN	electronic component supplier network
EMS	electronic manufacturing services

ERAI	Electronic Reseller Association International (see web-page http://www.erai.com)
ESD	electrostatic discharge
EOS	electrical overstress
EU	European Union
FAA	Federal Aviation Administration
FAR	Federal Avionic Regulations
FFF	form, fit and function
FIT	failures in time
FPD	flat panel display
FPGA	field-programmable gate array
FSC	Federal Supply Class
G-19	SAE Counterfeit Electronic Parts Committee
GAMS	Government/Authorities meeting on Semiconductors
GIFAS	French Aerospace Association
HAST	highly accelerated stress test
HIS	hardware intrinsic security
HTOL	high temperature operating life
ICC	International Chamber of Commerce
ID	independent distributors
IDEA	Independent Distributors of Electronics Association
IAQG	International Aerospace Quality Group – SAE
iNEMI	International Electronics Manufacturing Initiative
IP	intellectual property
IPR	intellectual property rights
ISP	internet service provider
ITAR	International Traffic in Arms Regulations
IUID	Item Unique Identification
JIT	just in time
JPO	Japanese Patent Office
LED	light-emitting diode
LDC	lot data code
LTB	last time buy
MBTF	mean time between failures
MEMS	micro-electromechanical systems
MOD	Ministry of Defence, UK
MTTF	mean time to failure
MSL	moisture sensitivity level
NATO	North Atlantic Treaty Organization
NDAA	National Defense Acquisition Act
NEDA	National Electronics Distributors Association
NVRAM	non-volatile random access memory
OCM	original component manufacturer

OECD	Organisation for Ecomonic Co-operation and Development
OEM	original equipment manufacturer
OHIM	Office for Harmonisation in the Internal Market (EU)
PCB	printed circuit board
PCN	product change notice
PRC	People's Republic of China
PV	photovoltaic
RECS	Reliable Electronic Component Supplier
PUF	physical unclonable function
RFID	radio frequency identity detection
RAM	random access memory
ROM	read only memory
SEE	single event effect
SEU	single event upset
SER	soft error rate
SIA	Semiconductor Industry Association
SRAM	static random access memory
TAPO	Trusted Access Program Office
TSO	Trading Standards Officers
UK	United Kingdom
UKEA	UK Electronics Alliance
UNG	unique number generator
USA	United States of America
WIPO	World Intellectual Property Organization
WSC	World Semiconductor Council

4 Technical requirements

4.1 General

This technical specification minimises counterfeiting, recycling and fraudulent activities by maintaining intellectual property and allowing the purchasing of traceable components.

Minimum avionics OEM requirements are defined in 4.2.

Subclauses 4.3 to 4.14.6 provide supporting information to 4.2.

Informative annexes are provided at the end of this specification and their content is subject to change. Users of this specification are encouraged to review the latest data available whenever referencing the content of these annexes.

- Annex A provides further cross-reference information for all the institutions and organisations discussed in Clause 4;
- Annex B provides examples of aftermarket sources which shall be considered in obsolescence situations (see 4.12.9);
- Annex C provides an example of a typical Chinese RECS certificate (see 4.7.2);
- Annex D provides a flowchart of IEC TS 62668-1 requirements and their relationship to external standards.

The key elements to control and understand are:

a) the definition of intellectual property (see 4.3);

b) the limitations of the term counterfeit (see 4.4);

c) the better description of “fraudulent components” (see 4.4.3);

d) what recycling is and why the avionics industry minimises recycling to in-house activities only (see 4.6);

e) the use of original component manufacturers (OCMs) which protect their intellectual property (see 4.7);

f) the use of approved franchised distributors or sources (see 4.10);

g) the use of risk management and component test processes when buying suspect untraceable components from non-franchised distributors in accordance with IEC TS 62668-2 (see 4.12.6);

h) the protection of OEMs' intellectual property, throughout their product lifecycles including management of all spares;

i) the reporting of violations of intellectual property through local law enforcement (see 4.14, A.7.2, and Clause A.8 for useful contacts).

4.2 Minimum avionics OEM requirements

The avionics OEMs shall:

a) Protect their intellectual property rights (see 4.3, 4.4, 4.5, 4.12 and 4.13).

b) Select components from original component manufacturers (OCMs) which control their intellectual property rights (see 4.3, 4.7) and which include unique configuration controlled part numbers and physical part markings (see 4.7.6).

c) Have an anti-counterfeit, fraudulent and recycled component process, in compliance with the requirements herein, which may include an anti-counterfeit management plan in accordance with this specification and which can be based on plans such as SAE-AS5553A or others similar (see 4.12.13). The OEMs shall flow this requirement down to lower level suppliers (see 4.12.13.3).

NOTE The next revision of AS/EN/JISQ 9100, which will contain the requirement for an anti-counterfeit management plan for all types of electrical and mechanical components and materials, may allow also satisfy this need (see 4.7.3 and 4.12.1). Some documents such as IEC TS62239-2 and SAE AS6174 (see 4.12.13) may aid for anti-counterfeit management.

d) Have an AS/EN/JISQ 9100 process (see 4.12) to audit all sources of supply of components.

e) Have a process only allowing the purchase of traceable components (see 4.12.3), using the AS/EN/JISQ 9100 procedures, as follows:

   1) from the original component manufacturer (OCM) (see 4.7) with any appropriate traceability measures such as the use of Semiconductor Industries Association Anti Counterfeit Task Force (ACTF) measures (see 4.7.7) or physical unclonable function (PUF) features (see 4.7.10), as considered necessary;

   2) direct from the USA Trusted Foundry Program (see 4.7.8) and/or from the USA Trusted IC Supplier Accreditation Program (see 4.7.9) where required by customer contract or considered appropriate;

   3) in situations where the component is obsolete, by purchasing directly from the franchised aftermarket manufacturer (see 4.12.9 and Annex B);

   4) from franchised distributors (see 4.10)

      – which are preferably AS/EN/JISQ 9120 approved (see 4.9);

      – which are also ISO 9001 approved as a minimum requirement (see 4.8); or

      – which comply with SAE AS 6496 requirements(see Clause A.16);

   5) from non-franchised distributors (see 4.11) using IEC TS 62668-2.

f) Have an AS/EN/JISQ 9100 process which avoids the use of unapproved brokers (see 4.11.5).

g) In the rare event an avionics OEM considers it is necessary to purchase untraceable components:

   1) conduct and document an exhaustive search for traceable alternatives, including the review of possible design changes to accommodate traceable alternatives and aftermarket sources (see 4.12, in particular 4.12.9, 4.12.10, 4.12.11, and Annex B);

   2) use and document a risk management process to assess the additional requirements needed to determine that the components are not counterfeited, recycled or fraudulent components, using the requirements of IEC TS 62668-2. This risk management process will include conformity, quality, reliability and maintenance performances aspects.

h) Have a process for repair and rework operations (see 4.13.9) which shall include AS/EN/JISQ 9110 certification for all maintenance operation.

i) Report incidents of counterfeit and fraudulent activities in accordance with local law (see 4.14).

j) Establish an anti-counterfeit awareness training for relevant personnel based on Table 1 which is provided for guidance and which identifies the relevant personnel and training records. In the case of newly hired personnel, initiate immediate training for the specific discipline or department.

Table 1 – Anti-counterfeit awareness training guidelines

Discipline or department	Type of awareness training	Frequency	Comments
Sourcing, buying or procurement	Traceability in the supply chain, differences between brokers, the different types of distributor (franchised, non-franchised), the OCM etc. When to raise issues.	Every 2 years	Change frequency to annual if there is a new major change or development to be flowed down or if the department has a poor anti-counterfeit management record.
Subcontract procurement	How the subcontractors should control their supply chain for an avionics product, how changes are to be managed and approved by the OEM before implantation.	Every 2 years	
Hardware design	Why sourcing cannot be done directly off the internet; why approved suppliers are necessary; why franchised distributors are necessary, etc.	Every 2 years	
Program management	Why sourcing cannot be done directly off the internet, why approved suppliers are necessary, etc.	Every 2 years	
Component engineering	Type of testing which can be used to minimise the use of counterfeit components; how part numbers and non-conformances should be managed, etc.	Every 2 years	
Goods receiving. Goods inwards Stock room Kitting, material kitting department	Why visual inspection is necessary and why attention to detail regarding part numbers, labelling, certificates of conformance and paperwork is necessary. How to raise concerns.	Every 2 years	
Supplier quality	How to audit for anti-counterfeit. Checklists, etc. Whom to discuss issues with and how to manage corrective actions.	Every 2 years	
Production assembly department	General awareness; how to report any concerns if part marking looks suspicious, etc. Review production test failure trends and investigate low yields which may be caused by counterfeit or fraudulent components.	Every 2 years	
Test department	General awareness for consideration of counterfeit to be included in fault analyses or fault findings.	Every 2 years	

4.3 Intellectual property

4.3.1 General

Anti-counterfeit activities start with the definition and knowledge of what intellectual property (IP) is. Counterfeit occurs when the original manufacturer's IP is fraudulently infringed. Therefore anti-counterfeit activities are concerned about the maintenance of intellectual property.

The World Intellectual Property Organization (WIPO) is a specialized agency of the United Nations. It is dedicated to developing a balanced and accessible international IP system, which rewards creativity, stimulates innovation and contributes to economic development while safeguarding the public interest.

WIPO was established by the WIPO Convention in 1967 with a mandate from its Member States to promote the protection of IP throughout the world through cooperation among states and in collaboration with other international organizations. Its headquarters are in Geneva, Switzerland. For further information about WIPO see Clause A.1. The following are regional Intellectual Property offices:

a) USA: The United States Patent and Trademark Office (see A.8.1).

b) UK: The Intellectual Property Office (see A.6.1), which provides further information and details of the on-line IP Healthcheck diagnostic tool.

c) Europe: The Europa webpage contains summaries of EU legislation for intellectual property (see A.7.1).

d) China: the State Intellectual Property office of the P.R.C (see A.9.1).

The following are additional resources for intellectual property information:

1) WIPO webpage (see A.1.3) has links to the treaties administered by WIPO, with details of legislations from a wide range of countries and other related information (see A.1.4) and includes the present members of the Global Network on Intellectual Property (IP) Academies.

2) The International Intellectual Property Alliance is a private sector coalition, formed in 1984, of trade associations representing the US copyright based industries in bilateral and multilateral efforts working to improve international protection and enforcement of copyrighted materials and open up foreign markets closed by piracy and other market access barriers (see A.8.4).

3) The International Trade Administration, U.S. Department of Commerce Stopfakes webpage (see A.8.2) has links to Intellectual Property Toolkits for other countries.

4) The USA Embassy in China webpage (see A.8.3) has very useful data for IP control when importing goods into China.

4.3.2 Definition of intellectual property

4.3.2.1 General

Intellectual property (IP) refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. This is property created through intellectual or creative activity. It includes patents, trademarks, copyright and designs. It can be owned, rented out, licensed, sold or given away.

4.3.2.2 Patents

Patents are territorial rights. Therefore, they apply in one country, in the European Union (EU) or through the Patent Cooperation Treaty. A granted patent becomes property and can be sold or licensed out. A patent can last up to 20 years. For further information see:

a) WIPO (see A.1.3);

b) the European Patent Office (see A.7.3.);

c) the Chinese Patent and Trademark Office (see A.9.2); or

d) the Japanese Patent Office (see A.10.1).

4.3.2.3 Trademarks

These are signs, for example words, logos, pictures, or any combination thereof. Trademarks are territorial and must be filed in each country where protection is sought.

Trademarks should be registered at:

- WIPO for the Madrid System for the International Registration of Trademarks which offers a route to trademark protection in multiple countries by filing a single application (see A.1.3); or
- OHIM in Europe (see A.7.4) for a "Community Trade Mark" applicable to all EU member states; or
- the Chinese Patent and Trademark Office in China (see A.9.2); or
- the United States Patent and Trademark Office in the USA (see A.8.1 b)).

4.3.2.4 Copyright

This is an automatic right which can be licensed or sold. Use © after your name.

4.3.2.5 Design

A design relates to the physical appearance of an item or part of it. Designs should be registered in your country or with the EU at OHIM (see A.7.4) or with WIPO (see A.1.3).

4.4 Counterfeit consideration

4.4.1 General

There are various definitions of "counterfeit" being used in the avionics industry at present, which is essentially infringement of intellectual property rights. However counterfeit definitions need to use the legal definition to ensure law enforcement can proceed with managing counterfeit issues through the judiciary. The definition of counterfeit should not be confused with recycling (see 4.6).

4.4.2 Legal definition of counterfeit

See 3.1.4 for the definition of "counterfeit" and 3.1.5 for the definition of "counterfeited component". These definitions are based on ISO 16678.

Each country typically has a slightly differently worded legal definition but generally all are based on trademark infringement.

4.4.3 Fraudulent components

See 3.1.10 for the definition of "fraudulent component". Fraudulent components are considered to be a subset within the suspect components perimeter; see 3.1.21 for the definition of “suspect component” and Figure 1. Suspect components require further investigation to determine if they are fraudulent, fraudulent recycled or counterfeit components.

NOTE It is relatively easy for law enforcement to follow the trail of money derived from fraudulent activities through the banking system and therefore there are many more successful legal convictions for fraud than for counterfeit activities. Also, as the electronic component recycling market expands, there is a huge temptation for unscrupulous brokers to trade hard to find recycled components as being in a new ‘unused’ condition in order to realize a greater profit. The sale of fraudulent recycled components as being in a new ‘unused’ condition is therefore increasing as the electronics recycling industry expands.

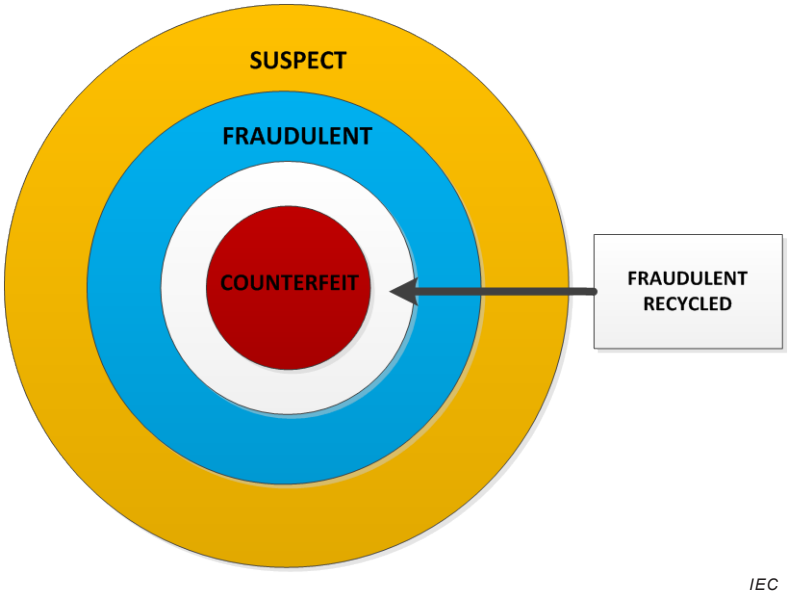

Figure 1 – Suspect components perimeter

4.4.4 How to establish traceability

See 3.1.22 for the definition of "traceability".

4.4.5 Reasons for the loss of component traceability

Many components lose their traceability (see 3.1.23 for the definition of "untraceable") back to the original manufacturer. This can be caused by:

a) Poor housekeeping and record retention either by distributors or OEMs. Many OEMs move stock from one location to another and in the process lose the traceability paperwork.

b) Often OEMs sell off surplus stock back into the supply chain, without the traceability paperwork and then attempt to buy it back in. Such components are then identified as ‘suspect’. As there is no traceability, this stock becomes known as possible ‘counterfeit’ stock.

c) Distributors not checking back through the supply chain as to whether the components have traceability back to the original manufacturer. Many non-franchised distributors will not be able to manage this traceability. The supply chain may be very long and after a certain point down the supply chain, information may not be obtainable. This lack of knowledge makes the components ‘suspect’ and hence considered as possible counterfeit stock.

d) Using inappropriate distributors, which are not AS/EN/JISQ 9120 certified. Although they may typically supply direct from manufacturers, they cannot prove that this is the case as their warehouse operations and traceability processes are not able to track individual lots of components and where they originate from.

e) Commercial grade components which are not supplied with full traceability back to the OEM.

4.5 Why is counterfeit a problem?

4.5.1 General

Recent reports, published by the US Government Accountability Office, detail the extent to which counterfeiting activity affects the US economy:

- GAO-10-423;
- GAO-12-375;

- GAO-12-213T;
- GAO-13-762T;
- GAO-03-713T.

The Japanese Patent Office also includes a 'FY2004 Survey Reports on Losses Caused by Counterfeiting' (see A.10.1).

The OECD (Organisation for Economic Co-operation and Development) published a report in 2007 concerning the impact of the counterfeit trade (see Clause A.18)

The International Chamber of Commerce (ICC) also tracks the impact of counterfeiting and piracy providing projections up to 2015 (see Clause A.19).

4.5.2 General worldwide activities combating counterfeit issues

4.5.2.1 General

There are currently several ongoing anti-counterfeit activities which will assist law enforcement activities, as follows.

4.5.2.2 Anti-Counterfeiting Trade Agreement (ACTA)

The Anti-Counterfeiting Trade Agreement (ACTA) is a multinational treaty for the purpose of establishing international standards for intellectual property rights enforcement. The agreement aims to establish an international legal framework for targeting counterfeit goods, generic medicines and copyright infringement on the Internet, and would create a new governing body outside existing forums, such as the World Trade Organization, the World Intellectual Property Organization, and the United Nations.

The agreement was initially signed in October 2011 by Australia, Canada, Japan, Morocco, New Zealand, Singapore, South Korea, and the United States. In 2012, Mexico, the European Union and 22 countries which are member states of the European Union signed it as well. One signatory (Japan) has ratified (formally approved) the agreement, which would come into force in countries that ratified it after ratification by six countries (see Clause A.2).

4.5.2.3 Government/Authorities Meetings on Semiconductors (GAMS)

GAMS, founded in 1999 by a multilateral Joint Statement on Semiconductors, aims to promote the fair and open global trade and growth of the global semiconductor market through improved mutual understanding between industries and governments. It now has members from the Semiconductor Industries Associations in China, Chinese Taipei, EU, Japan, USA and Korea. The Joint Statement is reviewed every five years. The Joint Statement provides for industry to make reports and recommendations to governments on policies that may affect the future outlook and competitive conditions within the global semiconductor industry through a CEO-level World Semiconductor Council (WSC) (see Clause A.3). Topics under discussion include counterfeit prevention issues. The 2009 meeting affirmed the members' agreement to undertake enforcement measures against semiconductor counterfeiting. The European Semiconductor Industry Association (ESIA) (see Clause A.3) is chair of the counterfeit committee. This committee has recently published a white paper on anti-counterfeit measures (see 4.7.7 and Clause A.3) and has excluded DNA fingerprint marking of components as a viable technique to mitigate against anti-counterfeiting (see 4.5.4.4). The October 2014 meeting was held in Fukuoka Japan and GAMS continues to work with the WSC to eliminate counterfeits from the supply chain.

4.5.3 Cultural differences

Many cultures are not familiar with the concept of intellectual property and fail to comply with the WTO intellectual property definitions (see 4.3). As worldwide trade increases it is essential that all worldwide organisations comply with intellectual property definitions. Failure

to comply can result in claims of counterfeiting when there is no intent to deceive. For example, it is common for components and materials to be locally sourced but these may not comply completely with the customers' requirements. A local substitute is often the only solution for a quick delivery. However, it is essential that any substitute components or materials are declared to the customer and that customer approval is obtained before shipping these alternatives. Failure to inform the customer can result in the customer declaring the components are 'suspect' and hence 'counterfeit'.

4.5.4 Counterfeiting activities and avionics equipment

4.5.4.1 General

Avionics component obsolescence issues may result in the following situations:

- the obsolete components are difficult to find and sourced from franchised distributors or the OCM, which may have ceased trading;
- long deliveries (for example higher than 26 weeks) may be quoted for special assembled lots from franchised aftermarket sources or the OCM;
- limited quantities may only be available.

These situations typically have a high value market where the component cost at this stage of the component lifecycle may be considerably more than the original component cost. In addition, the avionics OEM typically has a short term requirement and wishes to avoid costly redesigns. These situations are very attractive to fraudsters and counterfeiters wishing to exploit the avionics industry.

A market is therefore created where there is an urgent demand which can be filled by counterfeit and fraudulent components.

This is an ongoing problem particularly where the avionics OEM has a requirement to support past designed avionics equipment. In these situations the current production activity can address for example a repair activity with future obsolescence issues. The temptation for counterfeiters to continue to produce components for this avionics obsolescence market is very high and has become 'easy' money. Counterfeiting activities have become more sophisticated as knowledge of this activity increases and the avionics community procurement activities improve.

Today it is quite common for counterfeit and fraudulent electronic components to visually appear genuine, operate electrically at room temperature and somewhat over temperature extremes. Counterfeit detection methods today therefore have to be more sophisticated than just a visual inspection and knowledge of where the component was last purchased from.

However counterfeit activities can have a more malicious intent. As counterfeit sophistication increases, it will become more difficult in the future to distinguish between counterfeiting activities which are just commercial endeavours to make a profit and those which are genuinely intended as sabotage.

4.5.4.2 DOD counterfeit issues in the USA

The recent report GAO-10-389, published by US Government Accountability Office on 28 April 2010, highlights the risks of counterfeit parts to the USA DOD.

In addition, the January 2010 report "Defense Industrial Base Assessment: Counterfeit Electronics" published by the US Department of Commerce extensively reviews counterfeit activities and strongly recommends:

a) buying components directly from the original component manufacturer or the approved franchised distributor;

b) maintaining component traceability back to the original manufacturer, typically through the use of certificates of conformance or test certifications;

c) maintaining approved supplier lists and criteria of supplier approval;

d) ensuring supply chain anti-counterfeit procedures are established and are maintained;

e) using escrow accounts operated by ERAI when purchasing potentially suspect components;

f) using IDEA-STD-1010 type visual inspection regimes and test suspect components, for example X-ray, electrical test, as required;

g) using databases to track suspect or counterfeit components, using GIDEP;

h) that DOD entities should use Product Quality Deficiency Reports (PQDRs) to report non-working electronic components;

i) proposing that FAR regulations are changed for the procurement of components for mission critical applications;

j) that a centralised US federal reporting mechanism and database be set up for collecting counterfeit data with close ties to law enforcement. [10][1]

At the July 9th 2013 Oversight and Investigations subcommittee meeting on Intellectual Property (see GAO-13-762T), the Chief Economist reviewed insights gained from efforts to quantify the effects of counterfeit and pirated goods in the US economy. The conclusion is that IP theft is growing, heightened by the use of digital technologies.

4.5.4.3 Reliability impact and danger to general public

Counterfeit, suspect or untraceable components are a serious threat to the safety of avionics equipment as they do not have the expected reliability that the original authentic component has. Reliability is a result of good design controlled by the original manufacturer, with controlled manufacturing and handling. Reliability can never be screened into a component afterwards.

Traceable components perform as expected to the manufacturer's published data sheets, exhibiting the expected component life in the application for the OEM's reliability predictions and product warranty.

Untraceable or suspect components, which may or may not be counterfeit, have no information as to how the component has been stored or handled and whether it has been subjected to ESD latent damage, moisture damage, shock or vibration, etc. As a result of this lack of knowledge, it is impossible to attribute untraceable components with having the same reliability as traceable components.

4.5.4.4 Defense Logistics Agency (DLA)

The DLA sources various US Military specified component categories for various US defence programs.

The DLA has recently established the Qualified Testing Suppliers List (QTSL) to assist with the sourcing of near obsolete components using SAE AS6081 (see A.8.13); see A.8.13, also, when sourcing components from non-franchised sources.

As of August 2012, a new clause in the Defense Logistics Acquisition Directive, DLAD 52.211-9074, related to the deoxyribonucleic acid (DNA) marking on high risk items, will be included in new solicitations and contracts for Federal Supply Class (FSC) 5962 electronic microcircuits when the microcircuit description states that the microcircuit requires DNA marking. The clause requires contractors to provide microcircuits that have been marked with

[1] Numbers in square brackets refer to the Bibliography.

botanically-generated DNA produced by Applied DNA Sciences Inc. or its authorized licensees if any; see A.8.13.

However this marking requirement is unpopular with the Semiconductor Industry Association (SIA) many of whose members are refusing to bid for working with the DLA. As a result the DLA has arranged a re-imbursement scheme for those Trusted Suppliers who use Applied DNA Science (see Clause A.20).

The recent 2013 appraisal of the US FY2013 National Defence Authorisation Act acknowledges this (see A.8.13).

4.5.4.5 USA DFARS 252.246.7007

The USA President signed the National Defence Acquisition Act (NDAA), which included section 818 on anti-counterfeit measures, on December 31st 2012. Section 818 addresses how to minimise counterfeit components in the US defence supply chain. Severe penal and financial penalties will be levied on organisations and individual personnel found to be involved in deliberately supplying counterfeit or fraudulent components to the US defence organisations. This applies to all parts of the supply chain including brokers, distributors and OEMs. This was converted into an Anti-counterfeit Prevention Policy, number DoDI 4140.67 and a new Defence Federal Acquisition Regulation System (DFARS) 252.246.7007 for use in contracts (see A.8.14). Note that there is on-going discussion about modifying this DFARS rule to remove reference to component microcode in 2015/2016. The DOD plans to endorse SAE AS5553 revision B (still in draft stage) as being a means of complying with DFARS 252.246.7007. All penalties are alleviated if the OEM or distributor publishes an anti-counterfeit management plan using for example SAE AS5553A or this specification.

The DoD will publish a white paper in 2015/2016 explaining how the SAE AS5553 revision B and the proposed future accompanying SAE ARP 6328 guidelines can be used to fulfil the DFARS 252.246.7007 requirements.

In addition, DoDI 7050.05 concerning remedies for fraud and corruption-related procurement activities is already published.

4.5.4.6 UK MOD anti-counterfeit guidance

The UK DOD has created an interactive webpage (see A.6.7), to provide guidance for their supply chain. It has also published their ‘Counterfeit Avoidance Maturity Model’ which includes the Defence Standard 05-135 document and associated auditing and assessment awareness guidelines which together provide high level counterfeit avoidance requirements for managing complex supply chains covering the procurement of missiles, munitions, ships, tanks, airplanes to bandages, food, clothing and medicines for the armed forces.

4.5.4.7 North Atlantic Treaty Organization (NATO)

NATO has now acknowledged the risk of counterfeit materiel in the supply chain and is working on an assessment of counterfeit issues for their next meeting.

4.5.5 Electronic components direct action groups

Several electronic components manufacturers take direct action working with local law enforcement to seize their counterfeited components and associated tooling. An example is the non-profit organisation BEAMA for the electro-technical industry in the UK and Europe, which represents over 300 manufacturing companies and conducts raids of suspected factories and distributors passing on counterfeited components (see A.7.7). In addition the anti-counterfeiting task force of the WSC (see Clause A.3) works with customs and law enforcement to eliminate counterfeits in the supply chain.

4.6 Recycled components

4.6.1 General

See 3.1.17 for the definition of “recycled component”.

This is a legal activity when the components are sold as being recycled. Many industries use this practice to recover expensive chipsets, for example the telecommunications industry where expensive ASIC components are recycled from returned mobile phone handsets. In itself recycling is not illegal if all parties in the transaction understand that the components are recycled.

NOTE The electronic recycling industry is increasing massively as the world uses more consumer products that are typically replaced by upgraded models every few years. The replaced discarded consumer products are sent to worldwide recycling centres, many of which recycle the components using uncontrolled processes, potentially causing component ESD and physical damage, making them unsuitable for future ADHP use.

4.6.2 Why does the avionics industry not use recycled components?

The avionics industry has to ensure that all flight equipment produced has a predicted product life in line with the predicted repair and service life to ensure the public is not endangered. Typically an OEM will calculate a mean time between failure (MTBF) and possibly a mean time to failure (MTTF) prediction in order to establish maintenance operations. These calculations assume that all components are new, or considered as “unused”, at the point of introduction into flight use and that no useful component life and/or any “unsafe” component conditions have been used.

Generally recycled components have no output for users to measure and determine how much useful life has already been used before being recycled and therefore the predicted remaining life cannot be accurately calculated for maintenance operations established by the OEM. Also the process of recycling itself, if carried out in an uncontrolled process, can introduce component damage such as inducing ESD or EOS latent damage which cannot be immediately detected but which is a long term failure mechanism and which could affect the remaining component reliability.

4.6.3 When do recycled components become suspect and potentially fraudulent?

ADHP OEMs typically purchase new unused components for their products and their purchase orders have terms and conditions excluding the delivery and acceptance of recycled components. Delivered components or products entering ADHP OEMs are therefore considered to be "suspect fraudulent recycled components” when evidence of prior use is observed on the component package or termination, for example where there is evidence of solder present on the terminations or the terminations have been re-plated or re-attached. Typically, in these situations, the supply chain traceability back to the OCM (see 3.1.22) has also been lost and the recycled components have been fraudulently sold into the ADHP supply chain as being "new" or "unused". For more information on fraudulent components see 4.4.3. Law enforcement agencies would typically consider this to be "fraudulent" activity rather than "counterfeit" activity, where the fraud is the selling of recycled components as being new or unused.

NOTE This practice is increasing particularly for hard-to-find expensive obsolete components as the electronic component recycling industry increases due to the turnover in consumer products for upgraded modules.

However, ADHP OEMs may use an internal recycling practice when repairing their assemblies in-house, using their internally controlled repair conditions, which include supply chain traceability back to the OCM, as defined in the IEC TS 62239-1 ECMP, which is approved by their customer.

4.7 Original component manufacturer (OCM) anti-counterfeit guidelines

4.7.1 General

It is important that all OCMs use anti-counterfeit measures when manufacturing, producing and selling their components. The following are typical measures which should be used on a worldwide basis unless the scheme is specific to a region or country as stated in the respective paragraph in some of the clauses 4.7.2 to 4.7.11.

4.7.2 Chinese Reliable Electronic Component Supplier (RECS) audit scheme

This auditing scheme operated in China and was promoted by GAMS 2009 and by the WSC. The RECS scheme announced the first thirteen qualified enterprises in January 2008. Unfortunately this audit scheme has not been maintained and is now considered to be of historical interest only.

The RECS system certified and authenticated electronic component manufacturers and authorized distributors which provide products from legal and reliable sources. RECS was established in response to a growing trend of counterfeit products in China and was designed to promote legitimate product sources and educate China electronic purchasers to buy from reliable sources of electronics components while ensuring the reliability and traceability of product sources. RECS was identified by the China Quality Management Association and the China Electronics Enterprises Association Procurement Branch, in support of the Ministry of Information Industry which jointly organized and implemented industry activities.

4.7.3 Original component manufacturer (OCM) ISO 9001 and AS/EN/JISQ 9100 Third Party Certification

When OCMs are third party audited by accredited registrars, this process also authenticates manufacturers and their manufacturing facilities and product lines, as all addresses listed on the certificates have to be physically visited and audited by the Third Party auditors. It is therefore highly recommended that all components are purchased from AS/EN/JISQ 9100 (see 4.2) or as a minimum from ISO 9001 Third Party Certified manufacturers. Note that ISO 9001 has no minimum benchmark workmanship standards and therefore does not guarantee component quality.

The IAQG online Oasis database (see A.8.15), can be used to verify AS/EN/JISQ 9100/9110/9120 certificates.

4.7.4 Original component manufacturer (OCM) trademarks

All OCMs shall protect their intellectual property and have a registered trademark or logo registered with WIPO, etc. The Semiconductor Association recommends that trademarks be registered within all countries within a trade free zone to ensure counterfeiters do not import their components through the member country where the trademark is not registered. In Europe trademarks can be registered with OHIM (see A.7.4) for a "Community Trade Mark" applicable to all EU member states. Component trademark infringement is the most common cause of counterfeiting.

4.7.5 Original component manufacturer (OCM) IP control

Manufacturer intellectual property control is typically by control of patents, control of design, use of trademarks and logos. A crucial part of the design control is the control of the final acceptance test program (ATP test software and test stations) and control of the published data sheets. ATP test software and test stations should be numbered and critically controlled. Data sheets (see 3.1.8) should be published in a locked format so that they cannot be edited and should also contain the manufacturer’s logo or trademark. For COTS parts, only the data published in the OCM data sheet is the OCM’s design information which is controlled by their intellectual property rights.

4.7.6 Original component manufacturer (OCM) physical part marking and packaging marking

OCMs secretly control their final part marking activities, typically through in house operations. However, it is essential that the OCM's trademark which is physically marked on the component is the same as the trademark registered with WIPO (see Clause A.1) and is as expected as per the OCM information. OCMs add additional physical markings to authenticate their products, using special font size, font spacing, letter and number positioning, special laser or ink marking, etc., with:

- trademarks;
- lot date codes;
- unique location codes;
- wafer lot date codes;
- special exterior package marking;
- other proprietary codes for traceability.

OCMs may assist OEMs with validating their part marking if required. However, there is a limit to the control that can be employed with this method alone. Most OCMs also use some proprietary die and packaging marking techniques (see 4.7.9, 4.7.10, 4.7.11). Note that:

- ISO 12931 has been issued to assist with the authentication methods required to combat counterfeit risks.
- ISO 16678 was developed for tracking and trace methods for shipment.
- ISO/IEC 15459-8 is issued to assist with specifying unique, non-significant string of characters for the unique identifier for grouping of transport units which may be represented in a bar code label or other media that make up the grouping to meet supply chain needs and regulatory needs.
- US defence components may be uniquely identified using DoDI 8320.04 Item Unique Identification (IUID) methods.

4.7.7 The Semiconductor Industries Association Anti Counterfeit Task Force (ACTF)

SEMI is a global industry association (see Clause A.4) and provides guidance on practical measures which can be used to avoid counterfeit issues.

Chip or die traceability is a new emerging activity for wafer foundries. The following new standards have been published focusing on IC chip counterfeiting:

- SEMI T20 – *Specification for authentication of semiconductors and related products*
- SEMI T20.1 – *Specification for object labelling to authenticate semiconductors and related products in an open market*
- SEMI T20.2 – *Guide for qualifications of authentication service bodies for detecting and preventing counterfeiting of semiconductors and related products*.

These new standards help trusted manufacturers of authentic goods and use strongly-encrypted batch numbers. Using a free authentication service, anyone considering the purchase of a batch of goods can use the encrypted batch number as the basis for a validation check. Secure serialization is a major deterrent to counterfeiters. Although secure serialization systems alone do not prevent the copying or theft of codes, they can be effective at detecting that such fraud has occurred. Thus, secure serialization serves as a deterrent and an early warning system. Developed for use with semiconductor circuits and devices, these procedures can also be extended to apply to other electronic parts and other types of products.

The SIA has published a white paper in August 2013 where they discuss their recent activities in the fight against counterfeit components (see Clause A.3). This white paper concludes that

the best strategy is to buy components from OCMs and their franchised distributors including franchised aftermarket distributors and to avoid buying on the open market or from non-franchised sources.

4.7.8 USA Trusted Foundry Program

The USA DOD in response to several counterfeit issues has set up new policies, including the Trusted Access Program Office (TAPO) (see A.8.6), which are responsible for finding and maintaining suppliers of trusted microelectronic parts per DoD DODI 5200.44.

Trusted suppliers are now managed by the Defence Micro Electronics Activity (DMEA) (see A.8.7) where a list of accredited suppliers is maintained.

This currently protects custom ASIC components used in critical US applications. Such items are typically designated ITAR controlled components. Users should check the ITAR status of any components used from ‘Trusted Foundry’ manufacturers.

4.7.9 USA Trusted IC Supplier Accreditation Program

USA trusted suppliers, in addition to those listed in 4.7.8 , which are now managed by DMEA (see A.8.7), also include Trusted Test Houses, brokers, post processing facilities, packaging/assembly/test facilities, etc. Accredited trusted suppliers are awarded Trusted Supplier certificates for a period of time (with an expiry date listed on the certificate) which can be found on the company’s website.

4.7.10 Physical unclonable function (PUF)

For a good definition of PUF, which is a cryptography term, see Clause A.11, where various silicon, SRAM, IC coating and magnetic PUF examples are described. This is a new emerging technology with immediate applications for preventing counterfeit activities, for example RFID tags and military applications.

However, new research is concerned that this technology can be tampered with and suggests this should be used with caution (see Clause A.11).

Organisations and products which can assist with this new technology include the Hardware Intrinsic Security (HIS) Initiative, launched in May 2010 (see Clause A.12). This technology exploits the unique ‘electronic fingerprint’ found on each semiconductor (see 3.1.18), the physical unclonable function (PUF). Semiconductor components are now in manufacture using PUF as part of their secure device manager system.

4.7.11 Original component manufacturer (OCM) best practice

OCMs should ensure that rigorous control is maintained over their subcontractors, including CEMs or EMSs to ensure that scrap, pilot runs and bad yield components are disposed of beyond use. This will ensure that these components are not sold onto the open market through non-franchised suppliers to OEMs. OCMs should also aid their distributors and OEMs by stating on their documentation when components have been legitimately re-marked. OCMs should also provide part marking verification processes, for example websites with look-up information for OEMs and other users to verify physical component markings and tamperproof labels or tags (see Clause A.13).

4.8 Distributor minimum accreditations

It is recommended that all distributors should have the following minimum third party accreditations:

- International Organization for Standardization (ISO) 9001: a quality management system standard;

- ISO 14001: an environmental management system;
- Standard Occupational Health and Safety Assessment Series (OHSAS) 18001: an occupational health and safety management system specification or equivalent procedure;
- American National Standards Institute/Electrostatic Discharge (ANSI/ESD) S20.20: an ESD control program standard or equivalent procedure.

4.9 Distributor AS/EN/JISQ 9120 Third Party Certification

AS/EN/JISQ 9120 is a subsection of ISO 9001 and is the complementary aerospace standard for stockists/distributors. It manages avionics distribution requirements and is in line with the OEM AS/EN/JISQ 9100 requirements. The purchase of traceable components, with traceability back to the original manufacturer is a key aspect of this AS/EN/JISQ 9120 certification process. The contract review section of the AS/EN/JISQ 9120 audit requires that all distributors in the scheme clearly define when quoting, whether the quote is for traceable components or untraceable components. The distributor will lose their AS/EN/JISQ 9120 certification if they supply untraceable components when the order is for traceable components.

Both franchised distributors and non-franchised distributors may acquire AS/EN/JISQ 9120 certification.

It is recommended that all distributors and in particular non-franchised distributors used by avionics OEMs are AS/EN/JISQ 9120 Third Party audited. The IAQG online Oasis database (see A.8.13), can be used to verify AS/EN/JISQ 9100/9110/9120 certificates.

4.10 Franchised distributor network

4.10.1 General

Manufacturers can sell their components directly through approved franchised distributor networks (see 3.1.9 for the definition of “franchised distributor”).

These franchised distributors are approved for a stated time-frame by the OCM, for example annually or every 2 years. Additionally, a distributor may only be franchised for one manufacturer and not for all the manufacturers on their line card. There appears to be no central database whereby all franchised distributors and their approval/disapproval dates are maintained historically over time. OEMs are advised to keep their own records of when a distributor is franchised for a given manufacturer and when this franchise ends.

Information about authorized franchised distributors of semiconductors is available as follows:

- The Electronic Authorized Directory (see Clause A.5), is organised by Rochester Electronics for the Semiconductor Industry Association (SIA) and has been established by the SIA as an anti-counterfeit measure.

However, the most up-to-date information should be checked on the OCM website page dedicated to: local sales, distribution offices, sales and distributors.

Franchised distributor associations are now becoming more stringent on standards for membership. These are evolving from networking clubs into standard bearers for best practices.

Examples of distributor associations are:

a) Electronics Components Industry Association (ECIA), a non-profit organisation in North America (see A.8.9) which produces guidelines including:
   - NIGP 113: *NEDA Guidelines for Product Returns*;
   - NIGP 109: *Guidelines for distributor assessment of manufacturer performance*;

- NIGP 107: *Guidelines for the format of Military Certificates of Conformance*;
- NIGP 115: *Guidelines for Certificates of Conformance for Commercial Electronic parts*;
- NGIP 116: *ECIA guidelines for Disposition of Excess Inventory*;
- a new authorised inventory search site that supports authorised distribution.

b) Electronic Component Supplier Network (ECSN), a non-profit UK trade association (see A.6.6), which publishes several guides and can act as an arbitrator for franchise agreements.

c) International Independent Distributors of Electronics Association (IDEA) (see A.8.8) which created the IDEA-STD-1010 visual inspection anti-counterfeit standard and operates the certified IDEA-ICE-3000 training courses. In addition, IDEA publishes white papers, operates suspect counterfeit parts lists and guidelines for independent non-franchised distributors.

4.10.2 SAE AS6496

A new franchised distributor specification has been published by the SAE G-19 committee, SAE AS6496 (see Clause A.16), to address how the franchised distribution supply chain mitigates the risk of counterfeit components.

4.10.3 Control stock through tracking schemes

Franchised distributors control manufacturers' stock through relevant tracking schemes and can accept back unused stock from the OEMs and resell to other customers with the required traceability (see 4.10.1 for the NIGP 113 NEDA Guidelines for Product Returns and 4.10.2 for SAE AS6496).

US defence components can be tracked using DoDI 8320.04 IUID tracking standards.

4.10.4 Control scrap

Franchised distributors also control OCM scrap and are legally allowed to scrap and destroy ‘suspect’ counterfeit or fraudulent stock on behalf of the OCM (see 4.10.2 for SAE AS6496).

4.10.5 RECS

All franchised distributors in the Far East were recommended to be RECS audited some years ago (see 4.7.2). However, this scheme is no longer maintained and RECS certificates are now considered out of date and not relevant for current supply chain management.

4.11 Non-franchised distributor anti-counterfeit guidelines

4.11.1 General

See 3.1.12 for the “non-franchised distributor” definition.

The supply chain for components purchased through non-franchised distributors can be very long. There is the possibility that several distributors and brokers will be involved. The non-franchised distributor will not always know the other sources in this long supply chain and at some stage in this supply chain the components may become ‘suspect’ components.

It is recommended that OEMs manage non-franchised distributors in accordance with 4.11.4.

Non-franchised distributors can also be AS/EN/JISQ 9120 Third Party Certified. The IAQG online Oasis database (see A.8.13), can be used to verify AS/EN/JISQ 9100/9110/9120 certificates.

Non-franchised distributors also need to establish a procedure for how to deal with suspect components as they cannot return them back again into the supply chain without being legally liable for handling counterfeit components and being accused of fraud.

SAE ARP 6178, which is an audit checklist, is a useful tool in assessing sources of supply (see Clause A.16), and when completed, could become part of the non-franchised distributor anti-counterfeit management plan.

For more information, see IEC TS 62668-2.

4.11.2 CCAP-101 certified program for independent distributor

The Components Technology Institute Inc. (CTI) in the USA has established the CCAP-101 certified program for independent distributors (see A.8.10), to define mandatory practices to detect and avoid the delivery of counterfeit electronic components to their customers.

4.11.3 SAE AS6081

SAE AS6081 is published for the non-franchised distributors which offer components for sale with some testing as detailed in SAE AS6081 to avoid counterfeit, fraudulent and recycled components in the supply chain. Such components may not have any traceability back to the original component manufacturer (OCM).

The IECQ has established an audit program for non-franchised distributors using SAE AS6081, see A.7.6.

The DLA has adopted SAE AS6081 on June 10th 2013 for use by the DOD. The DLA audits the distributor which tests components to SAE AS6081 and which becomes listed on the Qualified Testing Suppliers List (QTSL) when the audit is successful (see A.8.11).

However, an OEM needs to take precautions when using components tested to SAE AS6081 as there may be no traceability back to the OCM, testing can be customised in SAE AS6081, and the parts are not risk assessed for the application as the non-franchised distributor has no knowledge of the intended application. Avionics OEMs may prefer to take direct action themselves and manage the entire supply chain and select appropriate testing using IEC TS 62668-2 (see 4.11.4).

4.11.4 OEM managed non-franchised distributors

Most OEMs need to use some non-franchised distributors occasionally to source traceable components as it is impossible, with the vendor (OCM or franchised distributor) reduction programs in place today, to supply all the components needed from franchised distributors.

For more information, see IEC TS 62668-2.

4.11.5 Brokers

Use of brokers (see 3.1.2) for the purchase of avionics components is not recommended.

For more information, see IEC TS 62668-2.

4.12 Avionics OEM anti-counterfeit guidelines when procuring components

4.12.1 General

OEMs shall have anti-counterfeit management plans in place based on:

- AS/EN/JISQ 9100 procedures (see 4.2);

- IEC TS 62239-1 (ECMP) which includes obsolescence management.

4.12.2 Buy from approved sources

All components, which should be selected from approved manufacturers which use trademarks, logos and other intellectual property controls, should be bought from authorised sources with traceability back to the OCM, using the OEMs AS/EN/JISQ 9100 approved processes. All authorised sources should be either ISO 9001 or preferably AS/EN/JISQ 9100 or AS/EN/JISQ 9120 approved, and should be either the OCM or their authorised approved franchised distributor (see 4.10). The IAQG online Oasis database (see A.8.13), can be used to verify AS/EN/JISQ 9100/9110/9120 certificates.

SAE ARP 6178, which is an audit checklist, may be a useful tool in assessing sources of supply (see Clause A.16) and could become part of the OEM AS/EN/JISQ 9100 approved supplier process.

4.12.3 Traceable components

AS/EN/JISQ 9100 requires demonstration of conformity to product definition. For electronic components this can be shown by traceability back to the original manufacturer to validate they are genuine and conform to the stated specification/data sheets.

Most avionics OEMs therefore require that all components purchased are traceable back to the original manufacturer, as most OEMs operate common stock procedures for all their programs where the buyer at the point of ordering does not know where the component will be used and whether the application is flight critical or not. The OEM buyers shall ensure there is full traceability on all stock ordered and raise special non-conformance purchase queries when only non-traceable stock can be found. This shall apply to any procurement process including direct line feed (DFL) operations via a typical KANBAN replacement system and/or any traditional stockroom situation.

Components have full traceability when purchased from the original manufacturer, their franchised distributor or their franchised aftermarket supplier of packaged final product or die or wafers or their OEM managed non-franchised distributors (see 4.11.4). Traceable stock is also available through AS/EN/JISQ 9120 certified distributors which may be franchised or non-franchised distributors. A certificate of conformance can be requested confirming this traceability (see 3.1.22 and 4.12.4).

It may be necessary for the OEM to establish special contractual agreements with distributors to ensure that their orders are fully traceable back to the OCM prior to the placement of any orders. This contractual agreement should be part of the OEM AS/EN/JISQ 9100 distributor assessment and approval process (see 4.12.2).

All OEMs should order traceable stock as a first priority as safety is paramount.

Supply chain delivery tracking schemes can assist this process, for example DoDI 8320.04 Item Unique Identification (IUID) methods.

4.12.4 Certificate of conformance and packing slip

4.12.4.1 Certificate of conformance

A certificate of conformance is the traditional way of checking traceability back to the original component manufacturer. A certificate of conformance signed by the OCM not only shows traceability but also conformity to the product design. These OCM certificates of conformance are routinely used by avionics OEMs to underwrite their airworthiness certificates, as the certificates of conformance provide evidence that the components have been validated as conforming to their product design characteristics. It is typically a written statement signed by the quality manager of the distributor or company selling the component with a written

guarantee that the component supplied is new, unused and traceable back to the original manufacturer. This information may be held electronically in a database or in paper form.

In the USA, certificates of conformance for USA defence components follow JESD31 requirements.

Note that certificates of conformance may only be the supplier's certificate of conformance and not the OCM's certificate of conformance. These may also be counterfeited.

4.12.4.2 Packing slip

For non-defence components, traceability may be demonstrated by the distributor 'packing slips' which typically follow the ECIA publications (see A.8.9):

- NIGP 111, *Guidelines for the Format of Packing Slips*, which allows for the certificate of conformance to be either printed directly on the front of the packing slip or as a separate document included with the pack list;
- NIGP 115, *Certificates of Conformance for Commercial Electronic Parts*.

In this case, as there is an information transfer, the OEM needs to make sure with the distributor that the traceability towards the OCM is reliable.

4.12.5 Plan and buy sufficient quantities

OEMs often only buy components with a two-year forecast as that is the only order cover that they themselves have for the products they deliver to their customers, even though the product has a lifetime of 15 years plus maintenance time. Often the OEM also operates 'just in time' (JIT) ordering procedures. The result is that OEMs typically do not buy enough components or even miss last time buy (LTB) opportunities. It is essential that every OEM operates an obsolescence management process which may be in accordance with its IEC TS 62239-1 ECMP or its SAE STD-0016 DMSMS management plan and monitors component requirements throughout the lifecycle of its product.

OEMs JIT policies need to be rationalised with their obsolescence management policies. Risk could be better managed by arranging more 'one time buys' depending on the application or by ordering periodically to maintain the link with the OCM for components which are on the verge of obsolescence than waiting for the last time buy (LTB) announcement. In addition, LTB stock requires careful management and storage (see the guidelines of IEC PAS 62435).

4.12.6 Use of non- franchised distributors

The use of non-franchised distributors (see 4.11), should be minimised wherever possible as they require direct management. Their use has an inherent risk of possible counterfeit stock being procured. The OEM has to manage them carefully to know when they are shipping fully traceable components and when they are shipping untraceable components. It is highly recommended that all non-franchised distributors be AS/EN/JISQ 9120 certified as this distinction will be clearly identified on all quotations to the OEM. Also the OEM may consider the use of various tools which are now available to assess the risks when using non-franchised distributors, for example:

1) SAE ARP 6178 (see Clause A.16);
2) iNEMI anti-counterfeit risk assessment calculators (see Clause A.17);
3) SAE AS6171 whose next revision (currently in draft form) will probably propose a risk assessment calculator (see Clause A.16).

When non-franchised distributors are shipping untraceable components, the OEM shall follow the requirements of IEC TS 62668-2 for more information, which requires that all purchased components be analysed for risk, and risk mitigation tested prior to use. Prior approval by the customer, generally the OEM (see 3.1.14), is typically required.

4.12.7 Brokers

The use of unapproved brokers (see 3.1.2) for the purchase of avionics components is not recommended, especially brokers which operate off the internet (see IEC TS 62668-2 for more information).

4.12.8 Contact the original manufacturer

The OCM may organise a new production run of an obsolete product or infrequently manufactured product, if there is enough die left over in wafer storage. This may not be visible on the website and direct contact with the OCM is needed to determine if this is possible.

4.12.9 Obsolete components and franchised aftermarket sources

Obsolete components are often the greatest sources of counterfeit or recycled components in the supply chain. Obsolete components may be available in franchised distribution for considerable time after the last time buy (LTB) announcements. Care should be taken to monitor the lot date codes (LDCs) in the LTB announcements to ensure the parts offered for sale are genuine. The OCM may assist with this LDC verification. In addition various obsolescence and active counterfeit monitoring tools are now available to assist OEMs in monitoring LTBs, PCNs and counterfeit reports so that the LDCs can be quickly verified.

Obsolete components which are still available from franchised ‘sunset’ or manufacturer approved ‘aftermarket’ sources (see 3.1) shall be used before sourcing untraceable components. See Annex B for examples of aftermarket sources.

It may be necessary to verify the franchised agreement between the franchised ‘sunset’ or ‘aftermarket’ manufacturer and the original manufacturer, for example by asking for the franchised agreements, letters, searching for press releases, published statements, etc.

Where only franchised die is available, the die may be packaged up by third party custom packaging houses (see Clause B.3) and approved in accordance with the OEMs' IEC TS 62239-1 ECMP or SAE STD-0016.

Obsolete or soon to be obsolete components should be identified early using pro-active obsolescence procedures based on one or more of the following:

- IEC TS 62239-1;
- SAE STD-0016;
- IEC 62402;
- SD-22.

4.12.10 IEC TS 62239-1 approved alternatives

Where no traceable or aftermarket components can be found, the OEMs should consider using their IEC TS 62239-1 electronic component management plan (ECMP) process to find traceable IEC TS 62239-1 approved components which are form, fit and function alternatives suitable for the application.

4.12.11 Product redesign

Where there is no franchised aftermarket or IEC TS 62239-1 alternatives available, the OEM should consider a redesign so that traceable components can be used. The redesign could be limited to develop a small ‘electronic mezzanine’ or ‘daughter electronic board’ rather than redesigning the entire electronic board.

4.12.12 Non traceable components

Where all other sources of supply are exhausted and there is no opportunity for a product redesign, untraceable stock is often considered to be the only solution. However, procuring untraceable stock is a high risk process with no guarantee of success as it is highly likely that counterfeit or recycled components will be found. Also the legal implications of what to do if the components are proved to be counterfeit have to be considered as they cannot be mixed up with good traceable stock and cannot be returned into the supply chain. Returning such components back into the supply chain means that the returner is trading illegally and may be liable for prosecution. Components found to be counterfeited should be quarantined and retained for evidence and the matter should be reported to the relevant enforcement authority (see 4.14, A.7.2, and Clause A.8 for useful contacts). Non traceable stock should be managed within an OEM anti-counterfeit management plan (see 4.12.13).

4.12.13 OEM anti-counterfeit plans including SAE AS5553 and SAE AS6174

4.12.13.1 General

The OEM shall have an anti-counterfeit, fraudulent and recycling plan in accordance with this specification (see 4.2 and in particular 4.2 c)).

The OEMs which do not have an SAE AS5553A plan shall meet the requirements specified in 4.2 c).

The OEMs that have an SAE AS5553A anti-counterfeit plan for electronic components may include it in lieu of the requirements listed in Table 2 in their IEC TS 62668-1 anti-counterfeit plans.

SAE AS5553A is a very comprehensive document targeted at general industry and written for USA users (see Clause A.17 for further information) but only applies to electronic components coming into a business.

In addition to the management of electronic components coming into a business, IEC TS 62668-1 also includes the management of an OEM’s IP of all the products sold out of the business, including the management of spares (either sold as separate individual components or assemblies) and repairs.

Table 2 – IEC TS 62668-1 requirements waived if OEM has an approved SAE AS5553A plan

IEC TS 62668-1 requirement	Satisfied by SAE AS5553A requirement	Comments	Notes for avionics OEMs when writing an SAE AS5553A plan as a basis for an IEC TS 62668-1 plan
4.2 a)	No.		
4.2 b)	No.	SAE AS5553A has no minimum specific component selection rules, only rules for maximizing the availability of parts with an obsolescence management plan and rules for sourcing or buying components.	Refer to an IEC TS 62239-1 ECMP plan addressing obsolescence management and component selection and qualification rules for avionics OEMs.
4.2 c)	An SAE AS5553A plan only satisfies how components are purchased and brought into a business. The IEC TS 62668-1 plan also has to address all the 4.2 requirements including how plan owners manage their own IP, spares, repairs and sale of individual spares into the market place.		Issue a cross reference matrix based on Table 2 to show how the SAE AS5553A plan satisfies the IEC TS 62668-1 requirements.
4.2 d)	No – not unless AS/EN/JISQ 9100 is invoked.	SAE AS5553A is written for general industry and does not mandate the use of AS/EN/JISQ 9100.	Base your SAE AS5553A plan on your AS/EN/JISQ 9100 procedures.
4.2 e)	Yes.		Base your SAE AS5553A plan on traceability through the supply chain.
4.2 e) 1)	Yes.		Base your SAE AS5553A plan on traceability through the supply chain.
4.2e) 2)	Optional requirement depending on customer contract. No.	SAE AS5553A does not acknowledge this optional contract requirement using USA trusted sources.	Allow your SAE AS5553A plan to be customised using USA trusted suppliers where required by contract if you have USA customers.
4.2 e) 3)	Yes.		Base your SAE AS5553A plan on using franchised aftermarket sources when the part is obsolete.
4.2 e) 4)	Yes.		Base your SAE AS5553A plan on traceability through the supply chain.
4.2e) 5)	No.	SAE AS5553A does not refer to IEC TS 62668-2.	Base your anti-counterfeit plan on using IEC TS 62668-2 for managing non-franchised distributors.
4.2 f)	Partially.	SAE AS5553A is written for general industry and does not mandate the use of AS/EN/JISQ 9100.	Base your anti-counterfeit plan on your AS/EN/JISQ 9100 procedures.

IEC TS 62668-1 requirement	Satisfied by SAE AS5553A requirement	Comments	Notes for avionics OEMs when writing an SAE AS5553A plan as a basis for an IEC TS 62668-1 plan
4.2 g) 1)	Partially.	SAE AS5553A does not ask for the search to be exhaustive and that alternate solutions should be considered before going to an untraceable part sourced from a non-franchised source.	Base your anti-counterfeit plan on using IEC TS 62239-1 for assessing the risks and considering alternate solutions based on a traceable part before derogating and procuring an untraceable part outside the OCMs and franchised distributors network.
4.2 g) 2)	No.	SAE AS5553A minimum requirements do not refer to IEC TS 62668-2 and do not mandate the use of AS/EN/JISQ 9100 non-conformance procedures.	Base your anti-counterfeit plan on using IEC TS 62668-2 for managing non-franchised distributors.
4.2 h)	No.	SAE AS5553A does not apply to product or spares leaving the OEM.	
4.2 i)	Yes.		
4.2 j)	Yes.		

4.12.13.2 GIFAS guide for OEMs using non-franchised distributors

The GIFAS 5052 guide is published by the GIFAS French National Committee. It was adopted and modified to be published as IEC TS 62668-2.

4.12.13.3 Flow down to lower level subcontractors

The OEM shall flow down the requirements for an anti-counterfeit plan to the lower level subcontractors or shall manage them effectively.

4.12.13.4 Die extraction

Die extraction techniques are considered damaging and incapable of producing components of the necessary long term reliability required for avionics use and are therefore not addressed in this specification.

4.13 OEM anti-counterfeit guidelines for their products

4.13.1 IP control

The OEMs should control their design through a combination of patents, trade agreements, franchise agreements, control of design, trademarks and logos. The OEMs should also control their final ATP and test stations, bills of material (BOMs), drawings and specifications securely.

4.13.2 Tamper-proofing the OEM design

There are many ways of configuring an OEM design with tamper-proofing features either in hardware or software.

There are many specialised external subcontractors which offer a full tamper-proof service for a complete design (see Clause A.13 for examples).

Alternatively custom ASICs and FPGAs can be designed using physical unclonable function (PUF) technology (see 4.7.10) or similar technologies.

Recent tamper-proof articles include:

- Adam Waksman, Simha Sethumadhavan, ‘Tamper Evident Microprocessors’, Department of Computer Science, Columbia University, NY. [11]

4.13.3 Tamper-proof labels

Tamper-proof labels are available in different styles and can be applied throughout the assembly to indicate when unauthorised disassembly or repair has been carried out. Units can be sealed externally with tamper-proof hardware or labels (see Clause A.13).

4.13.4 Use of ASICS and FPGAs with IP protection features

4.13.4.1 General

ASICS and FPGAs are complex microcircuits containing OEM proprietary software code, which is typically the OEM’s intellectual property. This code requires IP protection.

4.13.4.2 FPGA and peripheral microcircuit packaging

Some FPGA solutions (RAM based FPGA) have been manufactured as a single microcircuit, assembled onto a PCB with PCB traces between it and adjacent separately packaged and assembled semiconductor memories. These PCB traces can be intercepted by counterfeiters, who can read the signals coming through the PCB traces. Anti-fused FPGA solutions or FPGA with on board semiconductor memory in one stacked microcircuit package, are better IP solutions as no external memory is required. FPGA manufacturers are now also including additional peripheral microcircuits with the FPGA into one highly complex microcircuit thereby providing a one-microcircuit package solution for assembly onto the PCB.

4.13.4.3 FPGA die serialization

FPGA confidential randomly generated single die serialization is now available from some manufacturers (see Clause A.14 for examples).

4.13.4.4 NVRAM

Some NVRAMs contain an internal microprocessor, which can be factory programmed to destroy the internal code (see Clause A.15).

4.13.5 Control the final OEM product marking

The OEM shall ensure that the equipment supplied shall be marked in accordance with the regulatory requirements and provide full traceability. Note that radio frequency ID tags are becoming common in the automotive world in order to distinguish genuine components from counterfeit ones (see Clause A.12).

The user can note the following:

- ISO 12931 has been issued to assist with the authentication methods required to combat counterfeit risks;
- ISO 16678 is being developed for tracking and trace methods for shipment;
- ISO/IEC 15459-8 has been issued to assist with specifying unique, non-significant string of characters for the unique identifier for grouping of transport units which may be represented in a bar code label or other media that make up the grouping to meet supply chain needs and regulatory needs;
- MIL-STD-130 specifies the identification marking of US defence property;
- MIL-STD-129 defines the US defence marking practices for shipment and storage.

4.13.6 Control OEM scrap

All internal rejects should be physically destroyed to ensure potential counterfeiters cannot reconstruct rejects and sell them fraudulently as original components or units. US defence equipment should be disposed of using DoD 4160.21-M.

4.13.7 OEM trademarks and logos

All trademarks should be registered (see A.1.3). The OEMs should take as many precautions as possible to protect their products with the use of special serial numbers, lot date code markings, exterior markings, package markings and product shipping processes.

4.13.8 Control delivery of OEM products and spares and their useful life

The OEM should consider the use of special tracking schemes for mission critical components such as engines, which are FAA Class I products.

For further information on the FAA and its product classifications, see A.8.5.

The FAA has webpages for engine identification and registration marking requirements (see A.8.5.2).

The FAA recently published an advisory circular AC 00-56B about their “voluntary industry distributor accreditation program” for accrediting civil aircraft electronic components distributors based on voluntary oversight.

Also, see DI-MISC-81356 for certificates of compliance when delivering equipment to US defence customers.

4.13.9 Repairs to OEM products

Most civil OEMs repair their equipment internally, in their own approved repair centres, to ensure authentic components are used and repairs are carried out in a controlled manner. The OEMs also issue component maintenance manuals (CMMs) for their products which detail the design and the replacement component information. Often the replacement component can only be purchased from the OEM and this again is an anti-counterfeit measure.

However, military customers typically use their approved military repair centres and order replacement components for repairs. This ordering activity is beyond the control of the OEM which supplied the equipment and the OEM cannot be held responsible for this procurement activity.

It is recommended that all maintenance organizations be Third Party Certified to AS/EN/JISQ 9110 quality management system to ensure full traceability of all components and repaired units. In addition, AS/EN/JISQ 9110:2015 has a specific clause in 7.4.1 g, requiring that appropriate measures be taken to prevent purchase of counterfeit/unapproved products.

Civil air framers also carry out repairs and use FAA approved facilities as follows:

- FAR Part 43 describes the rules for any aircraft having a US air-worthiness certificate;
- FAA advisory circular 20-62E, dated December 23rd 2010, defines the quality, eligibility and traceability of aeronautical parts and materials intended for installation on US type certified products;
- FAR Part 145 describes the certification, training, facility requirements and operating rules for aeronautics and space repair stations.

EASA, the European Aviation Safety Agency (see A.7.5), certifies civil aircraft in Europe and repair facilities:

- EASA Part M establishes common technical requirements and administrative procedures for ensuring continuing airworthiness of aircraft;
- EASA Part 145 deals with approved maintenance organisations.

Some aircraft engine manufacturers operate real time tracking schemes for engine health management which provide full traceability through satellite tracking schemes on their engines throughout the engine operational life. Processes using this concept are highly recommended.

4.14 Counterfeit, fraud and component recycling reporting

4.14.1 General

It is recommended that evidence of counterfeiting, fraudulent and electronic component recycling activities be forwarded on to the relevant local law enforcement agencies in a timely manner, preferably before the suspect component crosses the border control.

4.14.2 USA FAA suspected unapproved parts (SUP) program

Suspected counterfeit component issues can be e-mailed to the Aviation Safety Hotline office (see A.8.5.3).

4.14.3 EASA

EASA issue Safety Information Bulletins (SIBs) on potential hazards which may include reporting of counterfeit or fraudulent components (see A.7.5).

4.14.4 UK counterfeit reporting

The UK Revenue and Customs webpage (see A.6.4) has a reporting facility for suspected counterfeit components. In addition the local Trading Standards office (see A.6.3) has a facility for reporting counterfeit goods.

4.14.5 EU counterfeit reporting

Counterfeit reporting within the EU should be reported locally. The Europa webpage (see A.7.1 b)) contains forms and details of how to process national and EU wide applications for IP action by customs authorities.

4.14.6 UKEA anti-counterfeiting forum

See A.6.5 which is managed by the UK Electronic Alliance (UKEA).

Their website contains awareness information and links for industry in their fight to beat counterfeit components from entering their supply chains. It contains an on-line directory of relevant free-to-access information including articles, best practice, events, presentations, reliable component sources, reports and solution providers. Visitors may register free of charge to contribute to and search a database of suspect counterfeit components.

Annex A
(informative)

Useful contacts[2]

A.1 World Intellectual Property Organization (WIPO)

A.1.1 General

WIPO has its headquarters in Geneva: 34 Chemin des Colombettes, 1211 Geneva 20, Switzerland, tel: (+41-22) 338 9111 and its regional offices are as follows:

- WIPO Brazil Office, Rua Farme de Amoedo, 56-7th Floor, Ipanema-CEP22420020, Rio de Janeiro-RJ, Brazil, tel: (+5521) 2103-4625, see webpage: http://www.wipo.int/contact/en/area.jsp?area=wbo
- WIPO China Office, No.2 Dongkoudai Hutong, Xicheng District, Beijing 100009, China, tel: + 86 10 83 22 02 38 /+ 86 10 83 22 08 33, **Fax:** + 86 10 83 22 03 23 see webpage http://www.wipo.int/about-wipo/en/offices/china/
- WIPO Japan Office UNU Building, 6F 5-53-70 Jingumae, Shibuya-Ku, Tokyo 150-0001, Japan, tel: (+81) 3 5467 1216
- WIPO Mocscow Office, 24, Berezhkovskaya naberezhnaya, 123995, Moscow, Russian Federation, Tel: +7 499 940 04 82, Fax: +7 499 940 04 83, see webpage http://www.wipo.int/about-wipo/en/offices/russia/
- WIPO New York Office, WIPO Coordination Office, 2 UN Plaza, Suite 2525, New York, NY 10017, tel:(+1) 212-963-6813
- WIPO Singapore Office, 29 Heng Mui King Terrace, #06-16, Singapore, 119620, Singapore, tel:(+65) 6774 7712

The WIPO webpage is http://www.wipo.int/portal/index.html.en. It contains the following information.

A.1.2 What is WIPO?

The World Intellectual Property Organization (WIPO) is a specialized agency of the United Nations. It is dedicated to developing a balanced and accessible international intellectual property (IP) system, which rewards creativity, stimulates innovation and contributes to economic development while safeguarding the public interest.

WIPO was established by the WIPO Convention in 1967 with a mandate from its Member States to promote the protection of IP throughout the world through cooperation among states and in collaboration with other international organizations. Its headquarters are in Geneva, Switzerland.

A.1.3 WIPO Intellectual Property Services

a) International patent protection – Patent Cooperation Treaty (PCT) System

The PCT System (see webpage http://www.wipo.int/pct/en/) allows inventors and applicants to seek patent protection in 148 countries by filing a single international application with a single patent office. Filing and processing patent applications through the PCT:

- brings the world within reach;

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2 The information contained in Annex A is given for the convenience of the users of this document and does not constitute an endorsement by the IEC of the organizations or softwares named.

- postpones the major costs associated with international patent protection;
- provides valuable information about potential patentability of the invention;
- is safe and easy with WIPO's electronic filing software.

b) International trademark registration (Madrid System)

The Madrid System (see webpage http://www.wipo.int/madrid/en/ or http://www.wipo.int/trademarks/en/) offers trademark owners the possibility to protect a trademark in multiple countries by filing a single application with a national or regional trademark office. Trademarks are distinctive signs, used to differentiate between identical or similar goods and services offered by different producers or services providers. Trademarks are a type of industrial property, protected by intellectual property rights.

WIPO is not in a position to offer legal advice to individuals or businesses on specific questions. You may wish to consult your national IP office, an IP agent, or the relevant national or regional legislation (WIPO Lex).

International trademark registration through the Madrid System offers the following advantages:

- avoids having to file multiple applications at different offices;
- covers 95 countries from around the world;
- facilitates management of the mark, as changes or renewals can be recorded through a single procedural step;
- trademark owners simply need to fill in, from their national office, one form, in one language, pay one set of fees, in one currency, to obtain and modify an international registration;
- trademark owners benefit from online tools to search existing marks, browse the WIPO gazette, estimate filing costs, make e-payments and renewals and check registration status;
- this unique service offered by the Madrid System eases the registration and management of a mark or a large portfolio: it empowers businesses and helps expand their market abroad;
- WIPO works with Member States to develop international laws and standards for trademarks. See Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications (SCT);
- to search international trademark registrations, see the ROMARIN (**R**ead-**O**nly-**M**emory of **M**adrid **A**ctive **R**egistry Information) database at webpage http://www.wipo.int/madrid/en/romarin/

c) International design registration (Hague System)

The Hague System (see webpage http://www.wipo.int/hague/en/) allows applicants to register an industrial design in up to 64 countries with a minimum of formalities and expense. Choosing the Hague System to protect industrial designs internationally:

- avoids having to file multiple registrations at different offices;
- enables applicants to register up to 100 industrial designs with a single form;
- facilitates management of registered designs, as changes or renewals can be recorded through a single procedural step.

d) International registration of appellations of origin (Lisbon System)

The Lisbon System (see webpage http://www.wipo.int/lisbon/en/) facilitates the international protection of appellations of origin through one single registration procedure. The Lisbon System:

- avoids having to file multiple registrations at different offices;
- covers over two dozen countries in Africa, Asia, Europe, and Latin America.

e) Alternative dispute resolution

The WIPO Arbitration and Mediation Center (see webpage http://www.wipo.int/amc/en/) is the leading resource in the resolution of IP disputes outside the courts. It offers specialized procedures including arbitration, mediation and expert determination for the resolution of international commercial disputes between private parties. The Center's procedures are designed as efficient and inexpensive alternatives to court proceedings and may take place in any country, in any language and under any law.

f) Domain name dispute resolution

The WIPO Arbitration and Mediation Center (see webpage http://www.wipo.int/amc/en/) is internationally recognized as the leading dispute resolution service provider for challenges related to abusive registration and use of Internet domain names, a practice commonly known as "cybersquatting." Applicable to all international domains and a growing number of country code domains, the resolution procedure is conducted in electronic format and results in enforceable decisions within two months.

g) International classifications

Applicants for national or international IP protection are required to determine whether their creation is new or is owned or claimed by someone else. To determine this, huge amounts of information must be searched. International classification systems (see webpage http://www.wipo.int/classifications/en/) facilitate such searches by organizing information concerning inventions, trademarks and industrial designs into indexed, manageable structures for easy retrieval.

h) Protection of State emblems (Article 6ter of the Paris Convention)

The protection of State emblems, and names, abbreviations and emblems of international intergovernmental organizations is governed by Article 6*ter* (see webpage http://www.wipo.int/article6ter/en/) of the Paris Convention, administered by WIPO.

A.1.4 WIPO global network on Intellectual Property (IP) Academies

See webpages http://www.wipo.int/academy/en/ and http://www.wipo.int/academy/en/about/startup_academies/, which contains the following information:

This web page has been launched in order to support the work and sharing of resources, including training programs, of the Global Network of IP Academies and to provide an effective forum for exchanging of views and experiences among the members of the network.

Contact the WIPO Academy using the webpage
http://www.wipo.int/contact/en/area.jsp?area=academy

A.2 Anti-Counterfeiting Trade Agreement (ACTA)

A.2.1 ACTA

For more information, see the information on the Office of the US Trade Representatives (see webpage https://ustr.gov/acta) where the final text of the agreement can be found at http://www.mofa.go.jp/policy/economy/i_property/pdfs/acta1105_en.pdf.

The Europa webpage (A.7.1.c)) contains a copy of the final ACTA agreement with further information.

The ACTA treaty was signed on February 4th 2013 by 31 states (USA, Australia, Canada, Japan, Morocco, New Zealand, Singapore, South Korea, as well as the EU). See webpage https://en.wikipedia.org/wiki/Anti-Counterfeiting_Trade_Agreement#Signatures_and_ratifications for more information.

A.2.2 Global Anti-Counterfeiting Network (GACG)

The GACG is an informal network of national and regional IP protection and enforcement organizations which have a strong international dimension to their activities. There are currently 21 members covering 40 countries plus direct informal contacts with many other national and industry associations. The objectives are to exchange and share best practices and information and to participate in appropriate joint activities to solve IPR enforcement challenges (see webpage http://www.gacg.org/Home/About).

A.3 World Semiconductor Council (WSC)

The webpage is http://www.semiconductorcouncil.org/wsc/ where the following information is available:

"The purpose (of the World Semiconductor Council) is to promote cooperative semiconductor industry activities, to expand international cooperation in the semiconductor sector in order to facilitate the healthy growth of the industry from a long-term, global perspective.

WSC activities shall be undertaken on a voluntary basis and shall be guided by principles of fairness, respect for market principles, and consistency with WTO rules and with laws of the respective countries or regions of each Member. The WSC recognizes that it is important to ensure that markets will be open without discrimination. The competitiveness of companies and their products should be the principal determinant of industrial success and international trade.".

Reference: "Agreement Establishing a New world Semiconductor Council", June 10, 1999; Brussels, Belgium.

WSC meets annually and at the May 2015 Hangzhou China meeting recognised the importance of trade secret protection. Members have agreed a set of ‘core’ elements in model trade secret legislation and are calling for government authorities including GAMS to support the core elements.

The WSC anti-counterfeit task force (ACTF) is working to eliminate counterfeits from the semiconductor market and has published a white paper "Winning the battle against counterfeit semiconductor products".

The webpage provides links to the Semiconductor Industry Associations from China, Chinese Taipei, Europe, Japan, Korea and the USA which are all members of the World Semiconductor Council.

The Semiconductor Industry Association USA webpage for viewing their statements on anti-counterfeit is: http://www.semiconductors.org/issues/anticounterfeiting/anti_counterfeiting/

The European Semiconductor Industry Association webpage is chair of the counterfeit committee (see webpage http://www.eeca.eu/esia/). Their counterfeit webpage is http://www.eeca.eu/esia/public-policy/anti-counterfeiting which contains details of how to file for action for trademark infringement.

A.4 SEMI

SEMI global headquarters are located at 3081 Zanker Road, San Jose, CA 95134, USA (tel: +1 408 943 6900), see webpage http://www.semi.org/About/ContactUs. SEMI is a global industry association serving the manufacturing supply chain for the micro and nano-electronics industries with worldwide offices, see webpage http://www.semi.org/en/About/ where the following information is found:

"SEMI is the global industry association serving the manufacturing supply chain for the micro- and nano-electronics industries, including:

- Semiconductors;
- Photovoltaics (PV);
- LED;
- Flat Panel Display (FPD);
- Micro-electromechanical systems (MEMS);
- Printed and flexible electronics;
- Related micro- and nano-electronics.

The industries, companies, and people SEMI represents are the architects of the electronics revolution. SEMI members are responsible for the innovations and technologies that enable smarter, faster, more powerful, and more affordable electronic products and devices that bring the power of the digital age to more people every day.

For more than 40 years, SEMI has served its members and the industries it represents through programmes, initiatives, and actions designed to advance business and market growth worldwide. SEMI supports its members through a global network of offices, activities, and events in every major electronics manufacturing region around the world.

Our purpose:

The industries that comprise the microelectronics supply chain are increasingly complex, capital intensive, and interdependent. Delivering cutting-edge electronics to the marketplace requires:

- Construction of new manufacturing (fabrication) facilities;
- Development of new processes, tools, materials, and manufacturing standards;
- Advocacy and action on policies and regulations that encourage business growth;
- Investment in organizational and financial resources;
- Integration across all segments of the industry around the world;
- Addressing these needs and challenges requires organized and collective action on a global scale.

SEMI facilitates the development and growth of our industries and manufacturing regions by organizing regional trade events (expositions), trade missions, and conferences; by engaging local and national governments and policy makers; through fostering collaboration; by conducting industry research and reporting market data; and by supporting other initiatives that encourage investment, trade, and technology innovation.

In addition to supporting access to regional markets, SEMI helps its members explore diversified business opportunities and contributes to the growth and advance of emerging and adjacent technology markets."

The SEMI Intellectual Property webpage
http://www.semi.org/en/Issues/IntellectualProperty/ provides further information.

Also see webpage http://ams.semi.org/ebusiness/standards/semistandard.aspx?volumeid=17 for a list of published specifications.

A.5 Electronics Authorized Directory

The Electronics Authorized Directory has a website www.authorizeddirectory.com which has the following information and search capabilities:

"Welcome to the only comprehensive worldwide directory for AUTHORIZED distributors of semiconductors. With our quick, up to date search tool, you can search by semiconductor manufacturer, by country to find authorized distributors worldwide. If you are not purchasing your semiconductors from the original manufacturer, Authorized Directory is your #1 trusted source for AUTHORIZED semiconductor distributors.

Having difficulty finding a genuine semiconductor device?

Don't compromise; buy from an authorized semiconductor distributor or manufacturer:

- find the semiconductor manufacturer;
- search for manufacturer headquarters and sales offices;
- find the authorized semiconductor distributor;
- check worldwide inventory of authorized devices".

A.6 UK

A.6.1 The UK intellectual property office

The interactive webpage is http://www.ipo.gov.uk/

This website contains information to decide what type of IP protection is required:

a) Patents (see webpage https://www.gov.uk/intellectual-property/patents) which are discussed with details about how to apply for a patent and manage them. Details are also provided for using other people's patents and patent infringement.

b) Trademarks (see webpage https://www.gov.uk/intellectual-property/trade-marks) which are discussed with details of how to apply and manage these. Details are also provided for other people's trademarks and trademark infringement.

c) Designs (see webpage https://www.gov.uk/intellectual-property/designs) which are discussed with details of how to apply to register a design.

d) Copyright (see webpage https://www.gov.uk/intellectual-property/copyright) which is discussed with details of ownership and how to legally apply to use other people's copyright works.

Also see the in-line tool at webpage www.ipo.gov.uk/iphealthcheck. This tool provides information related to how to use intellectual property for protecting the business and answers to typical IP questions.

The UK Information Centre will also be able to assist, tel: 0300 300 2000 within the UK or 44 (0)1633 814000 outside of the UK or e-mail enquiries@ipo.gov.uk

A.6.2 Alliance for IP

The Alliance for Intellectual Property is located at 2nd Floor, Riverside Building, County Hall, Westminster Bridge Road, London, SE1 7JA, phone +44 020 7803 1319, see webpage http://www.allianceforip.co.uk/ where the following information is found:

"Established in 1998, the Alliance Against Intellectual Property (IP) Theft is a UK-based coalition of 23 associations and enforcement organisations with an interest in ensuring intellectual property rights receive the protection they need and deserve. With a combined

turnover of over £250 billion, our members include representatives of the audio-visual, music, video games and business software, and sports industries, branded manufactured goods, publishers, authors, retailers and designers."

A.6.3 UK Chartered Trading Standards Institute

The Chartered Trading Standards Institute (see webpage http://www.tradingstandards.uk/) has the following information:

"Trading standards professionals act on behalf of consumers and business. They advise on and enforce laws that govern the way we buy, sell, rent and hire goods and services.

Trading standards officers (TSOs) work for local councils advising on consumer law, investigating complaints and, if all else fails, prosecuting traders which break the law.

These laws cover a wide area, which includes:

- counterfeit goods, product labelling, weights and measures, under-age sales, animal welfare;
- checking that food labelling is correct and advertising is not misleading;
- advising consumers and businesses about the law;
- investigating suspected offences, which could include undercover or surveillance work;
- preparing evidence and prosecuting cases in court;
- inevitably, writing reports and keeping records."

NOTE There is concern about the viability of the current structure of 200 local authority services in the future as budgets are cut and Members of Parliament are calling for action to restructure these services.

A.6.4 UK HM Revenue and Customs

HM Revenue and Customs has a webpage: www.hmrc.gov.uk. For IP rights see webpage http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageLibrary_ShowContent&id=HMCE_CL_000244&propertyType=document and webpage https://www.gov.uk/fraud-and-international-trade.

The UK customs hotline for reporting counterfeit items is: 0800 59 5000 or use webpage customs.hotline@hmrc.gsi.gov.uk

A.6.5 ESCO Anti-counterfeiting Forum (formerly UKEA Anti-Counterfeiting Forum)

The ESCO Anti-Counterfeiting Forum, see webpage http://www.anticounterfeitingforum.org.uk/counterfeiting.aspx, is now part of the Electronic Systems Community (ESCO, see website http://www.esco.org.uk/) and provides guidance on how to avoid counterfeit components.

Reports of suspect counterfeit items can be reported on this webpage and accessed by members. This webpage provides the UK customs hotline for reporting counterfeit items as: 0800 59 5000.

A.6.6 Electronic Component Supplier Network (ESCN)

The Electronic Component Supplier Network (see webpage http://www.ecsn-uk.org/) is a member managed, not-for-profit trade association based in the UK which supports counterfeit avoidance measures.

A.6.7 UK Ministry of Defence

Guidance for MOD delivery teams on the avoidance of fraudulent and counterfeit material is provided on the interactive webpage:
https://www.aof.mod.uk/aofcontent/tactical/quality/content/counterfeitavoid/counterfeit.htm?zoom_highlight=Counterfeit.

NOTE Registration (as a "civilian" to the "AOF (Acquisition Operating Framework)") is necessary to access the website.

Reporting should be directed at the Defence Irregularity Reporting Cell (DIRC) using e-mail: DIRCellMailbox@mdpga.mod.uk

A.7 Europe

A.7.1 Europa Summaries of EU Legislation

a) The Intellectual Property interactive webpage is

   http://eur-lex.europa.eu/summary/chapter/fight_against_fraud.html?root_default=SUM_1_CODED%3D22,SUM_2_CODED%3D2203&obsolete=false

b) The Europa webpage for the EU Taxations and Customs Union entitled 'How can right holders protect themselves from counterfeiting and piracy' provides details and forms for reporting counterfeit activities, see webpage

   http://ec.europa.eu/taxation_customs/customs/customs_controls/counterfeit_piracy/right_holders/index_en.htm

c) See the following Europa webpage for the published ACTA http://trade.ec.europa.eu/doclib/docs/2011/may/tradoc_147937.pdf

A.7.2 Europol, the European Law Enforcement Agency

See webpage https://www.europol.europa.eu/content/page/about-us

Europol is the European Union's law enforcement agency whose main goal is to help achieve a safer Europe for the benefit of all EU citizens. Europol does this by assisting the European Union's Member States in their fight against serious international crime and terrorism.

A.7.3 European Patent Office

See the interactive webpage www.epo.org/ (phone +0049 89 2399 4636), where a search or application can be made.

A.7.4 Europe at OHIM

See webpage https://oami.europa.eu/ohimportal/en/ to access the trademark webpage for information regarding the 'Community Trade Mark' applicable to all EU member states.

Trademarks are discussed at webpage https://oami.europa.eu/ohimportal/en/trade-mark-definition which contains the following information:

"A trade mark may consist of any signs capable of being represented graphically, particularly words, including personal names, designs, letters, numerals, the shape of goods or of their packaging, provided that such signs are capable of distinguishing the goods or services of one undertaking from those of other undertakings.".

"Why register your trade mark?

A trade mark has three essential functions:

- it identifies the origin of goods and services;
- it guarantees consistent quality by showing an organization's commitment to its users and consumers;
- it is a form of communication, a basis for publicity and advertising.

A trade mark can become one of the most important assets of a company.

Trade mark registration is one of the strongest ways to defend a brand; a way to ensure that no one else uses it. If you do not register your trade mark, others may do so and acquire your rights to distinguish their goods and services.

Trade marks influence consumer decisions every day. A strong trade mark creates an identity, builds trust, distinguishes you from the competition, and makes communication between seller and buyer simpler. Because so much money and time is often invested in a trade mark, it is worth paying something to protect it from misuse.

What is a good or a service?
In law, a good is any kind of item which may be traded. A service is the provision of activities in accordance with human demands.

What is the difference between a trade mark and other industrial property rights such as patents and designs?
All industrial property rights are intended to protect the creativity of businesses and individuals. However, they do not cover the same aspects.

A trade mark identifies the origin of goods and services of one undertaking so as to differentiate them from those of its competitors.

A design covers the appearance of a product. A design cannot protect the function of a product.

A patent covers the function, operation or construction of an invention. To be patentable, a function must be innovative, have an industrial application and be described in such a way as to permit reproduction of the process."

A.7.5 European Aviation Safety Agency (EASA)

The European Aviation Safety Agency is located at Ottoplatz 1, D-50679 Koeln, Germany, tel +49 221 8999 000, info@easa.europa.eu and has a webpage http://easa.europa.eu/home.php. EASA controls Design Organisation Approvals (DOA), Production Organisations Approvals (POA) and Maintenance Organisations Approvals (MOA).

EASA publishes Safety Information Bulletins on webpage http://ad.easa.europa.eu/sib-docs/page-1.

A.7.6 IECQ audit schemes

The IECQ is the assessment side of the IEC (see IECQ WG06 Counterfeit avoidance webpage http://www.iecq.org/workgroups/wg06/).

IECQ Working Group 6 (WG6) is establishing audit rules of procedure and auditor training requirements for Certifying Bodies such as BSI, DNV, etc., to operate Third Party SAE and IEC anti-counterfeit schemes which include:

1) SAE AS6081 auditing for non-franchised distributors which offer components with some testing to their customers which include the DLA;
2) SAE AS5553 auditing;

3) IEC TS 62668-1 for avionics OEMs in the near future.

A.7.7 BEAMA

BEAMA is the independent expert knowledge base and forum for the electro-technical industry for the UK and across Europe. Representing over 300 manufacturing companies in the electro-technical sector, the organisation has significant influence over UK and international political, standardisation and commercial policy (see webpage http://www.beama.org.uk/ and webpage http://www.beama.org.uk/en/what-we-do/services/anti-counterfeiting/index.cfm for anti-counterfeit activities).

Also see webpage http://www.counterfeit-kills.co.uk/uk/index.php which has access to an excellent on-line video at webpage http://www.youtube.com/embed/11SAAiiGX08?rel=0

A.8 USA

A.8.1 United States Patent and Trademark Office

The United States patent and Trademark office (USPTP) is headquartered at: Madison Buildings (East and West), 600 Dulany Street, Alexandria, VA 22314, USA, phone: 1-800-786-9199. The USPTO has many customer support centres which can be found on their webpage.

The USPTP website is http://www.uspto.gov/ which contains the following information:

a) “What is a patent?

A patent is an intellectual property right granted by the Government of the United States of America to an inventor to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States for a limited time in exchange for public disclosure of the invention when the patent is granted.”

“This right was established over 200 years ago in Article 1, Section 8 of the United States Constitution: “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”

“General Information Concerning Patents

There are three types of patents

- Utility patents may be granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof. The webpage has a Process for Obtaining a Utility Patent;
- Design patents may be granted to anyone who invents a new, original, and ornamental design for an article of manufacture; and
- Plant patents may be granted to anyone who invents or discovers and asexually reproduces any distinct and new variety of plant.".

b) Trademarks Home, see Trademarks Home at webpage: http://www.uspto.gov/trademarks/index.jsp

A.8.2 The International Trade Administration, US Department of Commerce

The International Trade Administration, U.S. Department of Commerce Stopfakes.gov has a webpage http://www.stopfakes.gov/sf_how.asp which contains very useful information for protecting IP.

A.8.3 US Embassy in China information

The US Embassy in China webpage (see webpage http://beijing.usembassy-china.org.cn/ipr.html) has extremely useful information for protecting IP and provides hyperlinks to the following and frequently asked questions.

Some general websites are:

State Intellectual Property Rights Office: http://english.sipo.gov.cn/

Judicial Protection of IPR in China http://www.chinaipr.gov.cn/

“Frequently Asked Questions

Q: What must a foreign trademark holder do to become eligible for trademark protection in China?

A: The registration system is voluntary. However, protection is not offered to a company that claims "first use" in China. China has a "first to file" system that grants trademark rights based on the time of trademark registration. Trademark applications must be filed at the SAIC's Trademark Office. See above for more details on registration and mandatory use of certified trademark registration agents by some types of foreign companies.

Q: What is the duration of trademark protection in China?

A: A registered trademark is valid for a period of ten years, calculated from the time on which the registration is approved.

Q: Where should a trademark owner file a complaint alleging trademark infringement?

A: File the complaint with the local AIC Trademark Division, usually in the place where trademark infringement occurred.

Q: If a trademark owner selects the administrative channel, can the owner obtain compensatory damages?

A: No. A registered trademark holder may only seek compensatory damages through civil litigation.

Q: What administrative corrective measures may be imposed against the infringer by the local AIC trademark division?

A: The Trademark Division may issue a cease and desist order, confiscate and destroy goods to which are attached illegal representations, confiscate materials, tools and equipment used to produce counterfeit goods, impose fines up to the maximum of three times the illegal gain or in cases where it is difficult to determine the illegal gain, administrative authorities may impose a maximum fine of RMB100 000 (US$12 000). A complainant is entitled to a written decision regarding the corrective measure taken.

Q: What is the criterion for criminal prosecution?

A: In practice, it appears to be RMB50 000 (US$6 000) in illegal gain. However, the "Provisions on Standards for Prosecution of Economic Crimes," issued by the Supreme People's Court in l993, provide for lower thresholds.

Q: What are the minimum and maximum criminal punishments?

A: If the circumstances are "serious" or if the amount of illegal gain is "huge," the defendant may be sentenced to imprisonment a minimum of three years, maximum seven years, and may also be fined.

Q: Is it possible to prevent the defendant from destroying evidence?

A: Yes. A trademark holder may seek a preliminary injunction from the court. The rights holder is required to post a bond.”

A.8.4 International Intellectual Property Alliance

See webpage http://www.iipa.com/aboutiipa.html where the following information is provided:

"The International Intellectual Property Alliance (IIPA) is a private sector coalition, formed in 1984, of trade associations representing U.S. copyright-based industries in bilateral and multilateral efforts working to improve international protection and enforcement of copyrighted materials and open up foreign markets closed by piracy and other market access barriers.

IIPA's seven member associations are: the Association of American Publishers (AAP), the Business Software Alliance (BSA), the Entertainment Software Association (ESA), the Independent Film & Television Alliance (IFTA), the Motion Picture Association of America (MPAA), the National Music Publishers' Association (NMPA) and the Recording Industry Association of America (RIAA). IIPA's seven member associations represent over 1,900 U.S. companies producing and distributing materials protected by copyright laws throughout the world—all types of computer software, including business applications software and entertainment software (such as videogame discs and cartridges, personal computer CD-ROMs, and multimedia products); theatrical films, television programs, DVDs and home video and digital representations of audio-visual works; music, records, CDs, and audiocassettes; and textbooks, trade books, reference and professional publications and journals (in both electronic and print media).

The U.S. copyright-based industries are one of the fastest-growing and most dynamic sectors of the U.S. economy. Inexpensive and accessible reproduction and transmission technologies, however, make it easy for copyrighted materials to be pirated in other countries. IIPA and its member associations, working with U.S. government, each foreign government, and local rights holder representatives, analyse copyright laws and enforcement regimes in over 80 countries and seek improvements that will foster technological and cultural development in these countries, deter piracy, and improve market access, all of which encourages local investment, creativity, innovation and employment. As technology rapidly changes, IIPA is working to ensure that high levels of copyright protection and effective enforcement become a central component in the legal framework for the growth of global electronic commerce. Strong protection and enforcement, both in-law and in-practice, against the theft of intellectual property are essential for achieving the full economic and social potential of global e-commerce."

A.8.5 The Federal Aviation Administration (FAA)

A.8.5.1 General

The FAA is located at 800 Independence Avenue, SW Washington, DC 20591, and has an interactive website, see webpage http://www.faa.gov/.

A.8.5.2 FAA engines consideration

The FAA identification and registration marking requirements webpage for engines is http://www.faa.gov/aircraft/air_cert/design_approvals/engine_prop/engine_approvals/

A.8.5.3 FAA aviation safety hotline office

See webpage http://www.faa.gov/contact/safety_hotline/

A.8.6 Trusted Access Program Office (TAPO)

The Trusted Access Program Office (TAPO) webpage is https://www.tapoffice.org/ where the following information is found:

"US Government acquisition programs must actively manage their IC supply chains, anticipate potential threats posed by outsourcing practices, formally assess their system's vulnerabilities and employ trusted suppliers and/or pursue other means of risk mitigation. Trust is defined as "the confidence in one's ability to secure national security systems by assessing the integrity of the people and processes used to design, generate, manufacture and distribute national security critical components."

The Trusted Access Program Office (TAPO) has been chartered by the U. S. Government to find and maintain suppliers of trusted microelectronic parts. TAPO has successfully developed a reliable source of parts that gives the Intelligence Community needed access to state of the art commercial processes, fabrication tools and fabrication services. In so doing, TAPO has effective cost-avoidance advantages by not having to upgrade or replace government owned wafer fabrication tools. TAPO has made it possible for the Intelligence Community to design and obtain advanced mission critical systems via commercial, state of the art manufacturing processes. Finally, TAPO's long term contract assures long term access to the latest and most capable commercial IC technologies in the world.

TAPO has established a contractual relationship with IBM to produce advanced microelectronics parts in a trusted environment. IBM maintains domestic facilities, providing capabilities to the government with yearly options through fiscal year 2013. Other facilities are currently under review including sources for design, packaging, test and fabrication. TAPO is entering its fourth year of operation, in support of the US Government. TAPO brokers cost-effective access to trusted suppliers of customized leading edge microelectronic technologies in order to improve the security of mission-critical U.S. Government information and operations.

TAPO resources are made available for government use only and therefore access requests require a valid government sponsor.”

TAPO has ASIC trusted foundry contracts. Accredited suppliers are listed on the DMEA webpage, see A.8.7.

A.8.7 Defense Microelectronics Activity (DMEA)

The DMEA Trusted IC Supplier Accreditation Program webpage is: http://www.dmea.osd.mil/ where the Trusted IC webpage is found at webpage http://www.dmea.osd.mil/trustedic.html where the following information is found:

"The Office of Secretary of Defense (OSD) issued the Defense Trusted Integrated Circuits Strategy (DTICS) that established "Trust" as a minimum need for DOD in October 2003. Interim Guidance from the Office of Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD/AT&L, dated 27 January 2004) initiated development of policy that requires all Mission Assurance Category I systems (DoDI 8500.2) to "employ only trusted foundry service(s) to fabricate their custom designed ICs". As a result, the new vendor criteria issued to DOD Program Managers has increased the need for trusted parts and the subsequent expansion of the Trusted Foundry Program. The OUSD/AT&L, through TAPO and DMEA, has implemented an accreditation plan for design, aggregator/broker, mask and wafer fabrication, packaging and test services across a broad technology range for specialized governmental applications both classified and unclassified. The Defense MicroElectronics Activity (DMEA) has been designated by the Department of Defense through the Trusted Access Program Office (TAPO) as the accrediting authority for this program."

For a current list of accredited suppliers, download the following PDF file at the following webpage: http://www.dmea.osd.mil/otherdocs/AccreditedSuppliers.pdf:

The Defense Microelectronics Activity (DMEA) has been designated by the Department of Defense as the accrediting authority for this program. Send questions or comments to TrustedIC@dmea.osd.mil or call (916) 231-1514 for more information on trusted electronic components suppliers.

A.8.8 Independent Distributors of Electronics Association (IDEA)

The Independent Distributors of Electronics Association (IDEA) organisation is located at 6312 Darlington Avenue, Buena Park, CA 90621, USA, phone: 714-670-0200. See webpage http://www.idofea.org/ where the following information is available:

“The Independent Distributors of Electronics Association (IDEA) is a global trade association comprised of organizations dedicated to quality initiatives that provide Responsible Procurement Solutions™ to the supply chain.

IDEA seeks to fulfil this mission through sustained leadership in the implementation of quality standards, certifications, best practices, and counterfeit detection methods as well as the cooperation and education of all stakeholders through the development and dissemination of relevant standards, training, and certification programs that promote industry quality, knowledge, and integrity.”

IDEA hosts a series of IDEA-STD-1010 USA based training courses.

A.8.9 ECIA formerly National Electronic Distributors Association (NEDA)

The Electronic Component Industry Association in North America is located at 111 Alderman Dr., Suite 400, Alpharetta, GA 30005, USA, phone: 678-393-9990. See webpage http://www.ecianow.org/. which contains the following information:

“ECIA provides resources and opportunities for members to improve their business performance while enhancing the industry’s overall capacity for growth and profitability. From driving critical conversations and process optimization to product authentication and industry advocacy, ECIA is your trusted source for support, insight and action.

Bringing together the talent and experience of broad array of industry leaders and professionals representing all facets of the electronics components supply chain, ECIA is uniquely positioned to enable individual connection as well as industry-wide collaboration. As the supply chain becomes increasingly more complex, ECIA serves as a vital nexus for refinement and progress.

Expansion and uncertainty seem to be the only true constants in the electronics industry today. In this dynamically shifting environment, reliable market intelligence is at a premium. Because ECIA’s members are the marketplace, we provide a level of visibility into the supply chain otherwise unavailable. From individual anecdotes gleaned from conversations at an ECIA event, to our exclusive market reports, we help keep you in the know.

As an organization made up of the leading electronic component manufacturers, their manufacturer representatives and authorized distributors, ECIA members share a common goal of promoting and improving the business environment for the authorized sale of electronic components to the end customer. In doing so, we contribute to making the Americas region more competitive in the design and production of electronic goods.”

Documents such as NIGP best practices and guidelines can be downloaded from their webpage http://www.ecianow.org/standards-practices/general-best-practices-guidelines/. Visit http://www.eciaauthorized.com/ the only US industry’s website that fully supports authorized distribution with an easy-to-use tool to find available inventory from authorized sources. The search results are random, unbiased and not influenced by advertising.

Advocacy efforts:

The ECIA supported SAE AS6496 and has a created dedicated webpage for this, see http://www.ecianow.org/industry-issues/sae-as6496-anti-counterfeiting-standard-3/

The industry advocacy effort delivers the message that electronic component users and buyers can’t go wrong dealing with supplier authorized distributors. The campaign features a significant online presence every month to grab the attention of prospective customers.

A.8.10 Components Technology Institute Inc. (CTI)

CTI is a multi-discipline company providing engineering and consulting services, training courses, and component conferences, see webpage http://www.cti-us.com/CCAP.htm. Its counterfeit components avoidance program (CCAP) has developed the CCAP-101 certified program for use by independent distributors to detect and avoid the delivery of counterfeit electronic components to their customers.

CCAP-101 certified independent distributors are listed on webpage http://www.cti-us.com/CCAPCertifiedDist.htm The CTI contact address is:

2608 Artie St., Suite 4
Huntsville, AL 35805
Tel: 256-536-1304
Fax: 256-536-1308

A.8.11 Defense Logistics Agency (DLA)

The DLA audits non-franchised distributors to SAE AS6081 which combine accepted counterfeit mitigation practices with quality assurance processes for selected Federal Stock Class (FSC) 5961 and 5962 electronic microcircuits and, if successful, lists the distributor on the Qualified Testing Suppliers List (QTSL), see webpage http://www.landandmaritime.dla.mil/offices/sourcing_and_qualification/QTSL.aspx, where approximately 16 USA based distributors are listed.

The DLA also operates the Qualified Suppliers List of Distributors (QSLD) program for 5961 and 5962 electronic microcircuits, see webpage http://www.landandmaritime.dla.mil/offices/sourcing_and_qualification/offices.aspx?Section=QSL

The DLA is now applying the deoxyribonucleic acid (DNA) marking themselves, see http://mil-embedded.com/articles/dna-marking-ics-causing-discontent/.

The Appraisal of Select Provisions of US FY 2013 National Defense Authorization Act, “Section 807: Item-Unique Identification requirements”, that discusses the new DLA DNA marking scheme for 5962 microcircuits, can be viewed on webpage http://www.rjo.com/PDF/FederalContractsReport-01082013.pdf.

The DLA hotline number for reporting suspected fraud, waste, abuse or mismanagement is 0001 800 411-9127.

A.8.12 DFARS

DFARS 252.246.7007, Contractor Counterfeit Electronic Part Detection and Avoidance System, can be found on webpage: http://www.acq.osd.mil/dpap/dars/dfars/html/current/252246.htm#252.246-7007

See webpage http://www.acq.osd.mil/dpap/dars/case_status.html for DFARS case status. There is an on-going DFARS case number 2015-D020 entitled ”DoD Use of Trusted Suppliers for Electronic Parts” which is a further implementation of NDAA section 818 for FY2012 where a status report is due 6/24/2015.

A.8.13 IAQG

The IAQG (see webpage http://www.sae.org/iaqg/), is affiliated to the SAE and provides a forum for collaboration within the aviation, space and defence companies. There are several initiatives including:

- the online OASIS database for looking up the latest AS/EN/JISQ 9100/9110/9120 certificates;
- an interactive Supply Chain Management Handbook (SCMH) which is being expanded to include a new section on anti-counterfeit guidance.

A.9 China

A.9.1 State Intellectual Property office of the P.R.C.

See the interactive website http://english.sipo.gov.cn/ and http://www.chinaipr.gov.cn/

A.9.2 Chinese Patent and Trademark Office

See the webpage http://www.chinatrademarkoffice.com/ where further information can be found.

A.9.3 China Electronics Associations:

Select search engines that translate Chinese into English:

- The China Electronics Corporation (CEC) is located at: No.27 Wanshou Road,Haidian District, Beijing TEL:(010)68218529 Fax: (010)68213745. The CEC webpage is http://www.cec.com.cn/template_en/index.aspx;
- China Electronic Components Association (CECA) is located at Beijing Shijingshan Road in ZhongChuDaSha the 23rd 311 Postal Code: 100049, phone: 010-68638939 / 68638969;
- China Electrical Equipment Industry Association (CEEI), is located at Fengtai District, 188 South Fourth Ring Road No. 12 District, Beijing, Building 30 Zip code: 100070;
- China Electronics Standardization Institute (CESI), see webpage http://www.cesi.ac.cn/cesi/englishversion/2010/0316/8355.html,

A.9.4 China Electronics Quality Management Association (CQAE)

CQAE is located at 1 Andingmen E St Dongcheng, Beijing, see webpage cqae.com

A.9.5 Chinalawinfo.Co Ltd., for Law info China

See webpage http://www.lawinfochina.com/ which is a hi-tech legal company, established by Peking University, to develop Chinese laws in electronic database format also available in English.

For other information, see webpage http://www.chinatrademarkoffice.com/index.php/tdreg/

A.10 Japan – Japanese Patent Office (JPO)

The Japanese Patent Office (JPO) is located at 3-4-3- Kasumigaseki, Chiyoda-ku Tokyo, 100-8915, Japan. The e-mail address for industrial property system questions is PA0842@jpo.go.jp.

The JPO interactive webpage is http://www.jpo.go.jp/ where patents, trademarks and designs can be registered.

A.11 Physical unclonable function

See webpage http://en.wikipedia.org/wiki/Physical_unclonable_function where the following is extracted:

"A physical unclonable function (PUF, sometimes also called “physically unclonable function”) is a function that is embodied in a physical structure and is easy to evaluate but hard to predict. Further, an individual PUF device must be easy to make but practically impossible to duplicate, even given the exact manufacturing process that produced it. In this respect it is the hardware analog of a one-way function. Despite being named "physical unclonable", a research team from Berlin Institute of Technology was able to clone an SRAM PUF within 20 hours using tools readily available in university failure analysis labs. [2]

From 2010 onwards till 2013, PUF gained attention in the smartcard market as a promising way to provide “silicon fingerprints”, creating cryptographic keys that are unique to individual smartcards. [3] [4]

However, university research has shown that PUF is vulnerable to side channel attacks [5] [6] and improper implementation of PUF could introduce "backdoors" to an otherwise secure system. [7] [8] In June 2012, Dominik Merli, a scientist at Fraunhofer Research Institution for Applied and Integrated Security (AISEC) further claimed that PUF introduces more entry points for hacking into a cryptographic system and that further investigation into the vulnerabilities of PUFs is required before PUFs can be used in practical security-related applications.” [9]

A.12 The Hardware Intrinsic Security (HIS) initiative

See the website https://www.intrinsic-id.com/about/ where the following information is available:

“Hardware Intrinsic Security (HIS)

HIS Initiative Goals:

- Establish HIS credibility
  Engage thought leaders in the industry;
- Educate the industry on HIS;
  Joint papers, panels, seminars;
- Reduce barriers to HIS adoption ;
  Proof points on reliability and security.

Members include: NXP, TSMC, GSA, SiVenture, Irdeto, Microsemi, Renesas, ARM, Coherent Logic.

HIS advisory meetings are held for embedded defence component anti-tamper and security features.”

Also semiconductor manufacturers are now embedding PUF features in their new designs, for example Altera Stratix 10 with Intrinsic ID’S PUF technology.

Examples of tag providers are:

a) The company Verayo, which is located at 1054 S. De Anza Blvd, Suite 201, San Jose, CA 95129, USA, tel 408-996-0352 and has a webpage http://www.verayo.com/ where the following information is found:

   “Counterfeiting is a global problem with negative impact on consumers, brands and retailers. Relying on our PUF technology to extract silicon biometrics, we make unclonable RFID chips and use them to uniquely identify products.

   With a simple tap of an NFC phone, consumers can verify authenticity of the product at any time. We have also built a robust platform to enable consumer engagement and back-

end big data analysis on top of authentication for a variety of applications: pharmaceuticals, liquor, cigarettes, luxury goods, electronic devices, access cards... and much more.

- Low-cost
- Unclonable
- Consumer Focused”

b) The company Prooftag, which is located at 1100, Avenue de l’Europe, F-82 000 Mountauban, France, tel: +33 (0)5 63 21 10 50 and has a webpage http://www.prooftag.net/solutions-2/, develops security solutions to guarantee product and document authenticity and traceability based on one of the most reliable authentication systems in the world, the Bubble Tag™, now complemented by the Fiber Tag™ which is an intrinsic authentication solution for printed labels and documents.

Prooftag has been deploying solutions since 2004 to protect brands (wines, spirits, watches, jewelry, cosmetics, electronic goods, etc.), to guarantee document authenticity (diplomas and customs, financial, voting, identity documents, etc.) and fiscal stamps (cigarettes, spirits, beers).

The high level of security conferred by the Bubble Tag™ has further strengthened Prooftag's legitimacy worldwide. For instance, Prooftag has been approved by the Chinese authorities (CATA – China Anti-Counterfeiting Technology Association) for its anti-counterfeiting technology.

A.13 Examples of tamper-proof design companies

– See Microsemi webpage http://www.microsemi.com/applications/security and others.

A.14 Examples of FPGA die serialization

– Xilinx device DNA security feature, see webpage

http://www.xilinx.com/products/technology/design-security.html

A.15 Examples of NVRAM manufacturers

– Cypress semiconductor NVRAMs, see webpage

http://www.cypress.com/?id=65&source=products.

A.16 SAE G-19

SAE International (see webpage http://www.sae.org/), is a global organisation of more than 128 000 engineers and related technical experts in the aerospace, automotive and commercial-vehicles industries.

The SAE G-19 Counterfeit Electronic Parts committee (see webpage http://www.sae.org/servlets/works/committeeHome.do?comtID=TEAG19) is currently working to publish the following documents:

- **SAE AS5553A**[3], Counterfeit Electronic Parts; Avoidance, Detection, Mitigation and Disposition

  Its scope is as follows:

  This document is intended for use in aviation, space, defense, and other high performance/reliability electronic equipment applications. This standard is recommended for use by all contracting organizations that procure electronic parts, whether such parts

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are procured directly or integrated into electronic assemblies or equipment. The requirements of this standard are generic and intended to be applied / flowed down to all organizations that procure electronic parts, regardless of type, size, and product provided.

- **SAE AS6081**[4], Counterfeit Electronic Parts: Avoidance Protocol

  The scope of the document is as follows:

  This proposed project is to develop a standard similar to AS5553, but will prescribe counterfeit parts avoidance requirements directly applicable to distributors. The intent of the document is to describe a program to establish and maintain certified distributors of electronic components whose regular use of anti-counterfeit process controls and requirements (in their purchasing and supplying operations) is designed to ensure delivery of authentic products that meet original component manufacturer specifications. It is intended that independent verification of conformance to this standard will be by third-party certification bodies (CBs). Accreditation of the CB will be through a recognized and respected accreditation body to ensure the impartiality and competence of the CB. The G-19 committee's choice to establish third-party CBs to audit and certify the distributor will hopefully foster confidence and acceptance of the CB's certifications by end users in the public and private sectors.

  SAE AS6081 will reference SAE AS6171 which will define test methods.

- **SAE AS6171**[5], Test Methods Standard: Counterfeit Electronic Parts

  The scope and rationale are as follows:

  Scope: This document standardizes practices to detect suspect counterfeit electronic parts, to maximise the use of authentic parts and to ensure consistency across the supply-chain for test techniques and requirements.

  Rationale: There is currently no standard that addresses this need within the industry.

- **SAE ARP 6178**[6], Counterfeit Electronic Parts: Tool for Risk Assessment of Distributors

  The scope and rationale are as follows:

  Scope: This SAE Aerospace Recommended Practice is applicable for all organizations that procure electronic components from sources other than the original component manufacturer. It is especially applicable for assessing distributors that sell electronic components without contractual authorization from the original component manufacturer.

  Rationale: This recommended practice was created due to a significant and increasing volume of counterfeit electronic parts entering the aerospace supply chain, posing significant performance, reliability, and safety risks. This recommended practice was created to provide organizations with a tool to assess a supplier's capability to prevent, detect, contain, and report suspect or confirmed counterfeit electronic components.

- **SAE AS6174**[7], Counterfeit Material: Detection, Mitigation and Disposition

  The scope is as follows:

  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. 1.2 Application This document is intended for use in high performance/reliability or safety of life applications. This standard is recommended for use by all contracting organizations that procure materiel, whether such materiel is procured directly or integrated into assemblies or equipment. The requirements of this standard are generic and intended to be

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applied/flowed down to all organizations that procure materiel, regardless of type, size, and product provided.

- **SAE AS6496**[8], Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Authorized/Franchised Distribution

  The scope is as follows:

  This publication identifies the requirements for mitigating counterfeit products in the authorized distribution supply chain by the Authorized Distributor.

- **SAE AIR6273**[9] **(draft)**, Terms and Definitions – Fraudulent/Counterfeit Electronic Parts

  The scope is as follows:

  This document is to be used and cited as a standard reference by other SAE G-19 Committee documents that address the mitigation of Fraudulent/Counterfeit Electronic Parts.

- **SAE AS6301**[10], Compliance Verification Criterion Standard for SAE AS6081, Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors

  The scope is as follows:

  The criteria in this document is to be used by accredited Certification Bodies (CBs) to determine compliance and grant certification to AS6081, Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors.

- **SAE ARP6328**[11] , Guideline for Development of Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition Systems

  The scope is as follows:

  This document contains guidance for implementing a counterfeit mitigation program in adherence with AS5553B.

- **SAE AS6462**[12], Fraudulent/Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition Verification Criteria

  This set of criteria is to be utilized by accredited Certification Bodies (CBs) to establish compliance, and grant certification to AS5553, Aerospace Standard; Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition.

A.17 iNEMI

iNEMI has created a webpage on counterfeit components assessment methodology and metric development containing three counterfeit calculators (see webpage http://www.inemi.org/content.asp?contentid=97) which are based on Excel:

1) risk of counterfeit use;
2) risk of untrusted sources;
3) counterfeit loss and total cost estimations.

These tools are free to download and use. Feedback is appreciated.

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A.18 OECD

The Organisation for Economic Co-operation and Development (OECD) promotes policies that improve the economic and social well-being of people around the world (see http://www.oecd.org/about/). OECD has published various reports on the impact of counterfeits, see webpage http://www.oecd.org/general/searchresults/?q=counterfeit&cx=012432601748511391518:xzeadub0b0a&cof=FORID:11&ie=UTF-8.

A.19 ICC

The International Chamber of Commerce (ICC) produces statistics and reports concerning the economic and social impacts of counterfeiting and piracy, see webpage http://www.iccwbo.org/Advocacy-Codes-and-Rules/BASCAP/BASCAP-Research/Economic-impact/Global-Impacts-Study/.

A.20 Applied DNA Sciences

Applied DNA Sciences (see webpage http://www.adnas.com/company/about-applied-dna), uses biotechnology as a forensic foundation to create unique security solutions for modern commerce situations. Applied DNA Sciences's electronic product labelling/tracking scheme is explained on webpage http://www.adnas.com/electronics. This technology can be expensive to implement and industry has complained about the cost of the licence fees. As a result, the DLA has agreed to reimburse trusted suppliers who provide them with DNA labelled 5962-XXXXX components and is expanding the scheme through the Rapid Innovation Fund (RIF) to develop a single authentication platform for six types of commodity.

Annex B
(informative)

Examples of aftermarket sources[13]

B.1 Examples of franchised aftermarket sources

a) Rochester Electronics, see webpage http://www.rocelec.com/

b) QP Semiconductor (now E2V), see webpage http://www.qpsemi.com/, and E2V, see webpage http://www.e2v.com/products-and-services/Hi-Rel-Semiconductor-Solutions/

c) Lansdale, see webpage http://www.lansdale.com/

d) Chip Supply (now Micross), see webpage http://www.micross.com/

e) Micross Components, see webpage http://www.micross.com

f) Minco Technology Labs LLC, is now Micross see webpage http://www.micross.com/

g) Sensitron Semiconductor, see webpage http://www.sensitron.com

h) Defence Logistics Agency, Columbus Ohio, see webpage http://www.dscc.dla.mil/

i) Arrow/Zeus Electronics, Melville, NY, North America, see webpage http://www.arrow.com/

j) Eltek Semiconductors as a franchised aftermarket source for Linear Technology products, which is now part of Micross see webpage http://www.eltek-semi.com/

k) Xtreme Semiconductor for Analog to Digital converters, see webpage http://www.xtremesemi.com/products.htm

B.2 Examples of sources of franchised die which can be packaged

a) Micross formerly Chip Supply, see webpage http://www.micross.com/ (over 20 franchised manufacturers)

b) Eltek Semiconductors, now part of Micross see webpage http://www.eltek-semi.com/ for Linear Technology

c) Semidice, see webpage

http://www.semidice.com/Default.aspx

d) Micross Components, see webpage http://www.micross.com

B.3 Examples of third party custom packaging houses which provide aftermarket solutions

a) Force Technologies, see webpage http://www.forcetechnologies.co.uk/

b) Technograph Microcircuits, see webpage http://www.technographmicro.com/

c) Micross, formerly Eltek Semiconductors, see webpage http://www.eltek-semi.com/

d) Sac-Tec Labs Inc., see webpage http://www.sactec.com/index.htm

e) IDMOS, see webpage http://www.id-mos.com part of Serma Technologies

f) Microsemi, formerly T.S.I Microelectronics, see webpage http://www.microsemi.com/design-support/module-hybrid-design.

g) E2V, see webpage http://www.e2v.com/products-and-services/Hi-Rel-Semiconductor-Solutions/

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13 The information contained in Annex B is given for the convenience of the users of this document and does not constitute an endorsement by the IEC of the organizations named.

h) GE Aviation Systems Ltd., 351 Exning Road, Newmarket, Suffolk CB8 0AU UK, http://www.geaviation.com/commercial/systems/electrical-power/docs/microelectronic-solutions.pdf

i) Pantronix Corporation, see webpage http://www.pantronix.com/

B.4 Examples of emulated aftermarket providers

Through the “Advanced Microcircuit Emulation” (AME) and the “Generalized Emulation of Microcircuits (GEM)" programs, the Defense Logistics Agency (DLA) and SRI International (SRI) with its Sarnoff Corporation Division developed an emulation process (see webpages http://www.gemes.com and http://www.gemes.com/about_us/emulation_process/) offering an emulated replacement solution to obsolescence of an electronic component.

This approach allows electronic components that were originally manufactured in diverse technologies to be reproduced from a managed inventory of standardized base wafers.

Annex C
(informative)

Typical example of a RECS certificate[14]

NOTE The RECS scheme is no longer in use and this is included for historical reference purposes only.

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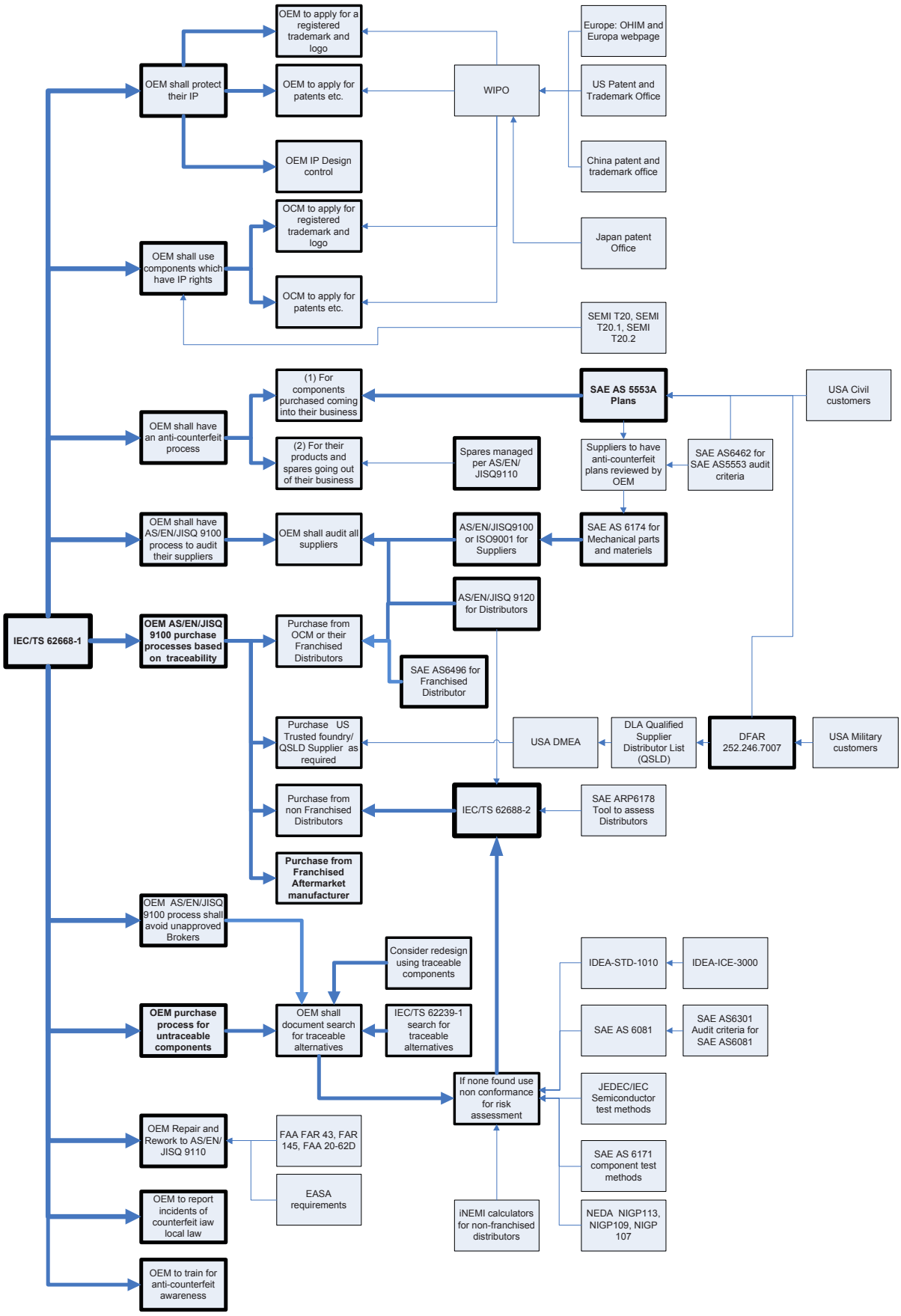
Annex D
(informative)

Flowchart of IEC TS 62668-1 requirements


IEC/TS 62668-1
OEM shall protect their IP
OEM to apply for a registered trademark and logo
OEM to apply for patents etc.
OEM IP Design control
WIPO
Europe: OHIM and Europa webpage
US Patent and Trademark Office
China patent and trademark office
Japan patent Office
OEM shall use components which have IP rights
OCM to apply for registered trademark and logo
OCM to apply for patents etc.
SEMI T20, SEMI T20.1, SEMI T20.2
OEM shall have an anti-counterfeit process
(1) For components purchased coming into their business
(2) For their products and spares going out of their business
SAE AS 5553A Plans
USA Civil customers
Spares managed per AS/EN/ JISQ9110
Suppliers to have anti-counterfeit plans reviewed by OEM
SAE AS6462 for SAE AS5553 audit criteria
OEM shall have AS/EN/JISQ 9100 process to audit their suppliers
OEM shall audit all suppliers
AS/EN/JISQ9100 or ISO9001 for Suppliers
SAE AS 6174 for Mechanical parts and materiels
AS/EN/JISQ 9120 for Distributors
OEM AS/EN/JISQ 9100 purchase processes based on traceability
Purchase from OCM or their Franchised Distributors
SAE AS6496 for Franchised Distributor
Purchase US Trusted foundry/ QSLD Supplier as required
USA DMEA
DLA Qualified Supplier Distributor List (QSLD)
DFAR 252.246.7007
USA Military customers
Purchase from non Franchised Distributors
IEC/TS 62688-2
SAE ARP6178 Tool to assess Distributors
Purchase from Franchised Aftermarket manufacturer
OEM AS/EN/JISQ 9100 process shall avoid unapproved Brokers
Consider redesign using traceable components
IDEA-STD-1010
IDEA-ICE-3000
OEM purchase process for untraceable components
OEM shall document search for traceable alternatives
IEC/TS 62239-1 search for traceable alternatives
SAE AS 6081
SAE AS6301 Audit criteria for SAE AS6081
If none found use non conformance for risk assessment
JEDEC/IEC Semiconductor test methods
OEM Repair and Rework to AS/EN/ JISQ 9110
FAA FAR 43, FAR 145, FAA 20-62D
EASA requirements
SAE AS 6171 component test methods
OEM to report incidents of counterfeit iaw local law
iNEMI calculators for non-franchised distributors
NEDA NIGP113, NIGP109, NIGP 107
OEM to train for anti-counterfeit awareness

IEC

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ISO 12931*, Performance criteria for authentication solutions used to combat counterfeiting of material goods*

ISO 14001, *Environmental management systems – Requirements with guidance for use*

ISO/IEC 15459-8, *Information technology – Unique identifiers – Part 8: Grouping of transport units*

ISO 16678, *Guidelines for interoperable object identification and related authentication systems to deter counterfeiting and illicit trade*

AC 00-56B, *Voluntary Industry Distributor Accreditation Program*

ANSI/ESD S20.20*, Protection of Electrical and Electronic parts, Assemblies and Equipment* (excluding electrically initiated explosive device)

AS/EN/JISQ 9120, *Quality Management Systems – Requirements for Aviation, Space and Defense Distributors*

Defence Standard 05-135, *Avoidance of Counterfeit Materiel*

DFARS 252.246.7007, *Contractor Counterfeit Electronic Part Detection and Avoidance System*

DI-MISC-81356, *Certificate of Compliance*

DLAD 52.211-9074, *Solicitation Provisions and Contract clauses – Deoxyribonucleic Acid (DNA) Marking-Federal Supply Class (FSC) 5962 Electronic Microcircuits*

DoD 4160.21-M, *DoD Disposition Manual*

DoDI 4140.67, *DoD Counterfeit Prevention Policy*

DoDI 7050.05, *Coordination of Remedies for Fraud and Corruption Related to Procurement Activities*

DoDI 8320.04 DoD, *Instruction 8320.04, Item Unique Identification (IUID) Standards for Tangible Personal Property*

DoDI 5200.44, *Protection of Mission Critical Functions to Achieve Trusted Systems and Networks (TSN)*

EASA Part M, *Continuing Airworthiness Requirements*

EASA Part 145, *Maintenance Organisation Approvals*

FAR Part 43, *Maintenance, Preventive Maintenance, Rebuilding and Alterations*

FAR Part 145, *Repair Stations*

FAA advisory circular 20-62E, *Eligibility, quality and Identification of Aeronautical Replacement parts*

GAO-10-389, *DOD should leverage on-going initiatives in developing its program to mitigate risk of counterfeit parts*

GAO-10-423, *Observations on Efforts to Quantify the Economic effects of Counterfeit and Pirated Goods*

GAO-12-213T*, DoD Supply Chain: Preliminary observations indicate that counterfeit electronic parts can be found on internet purchasing platforms*

GAO-12-375*, DoD Supply chain: Suspect Counterfeit Electronic Parts can be found on internet purchasing platforms.*

GAO-03-713T*, Counterfeit documents used to enter the US from certain western hemisphere countries not detected.*

GAO-13-762T, *Intellectual property: Insight gained from Efforts to Quantify the Effects of counterfeit and Pirated Goods in the US Economy*

GIFAS 5052, *Guide for managing electronic component sourcing through non-franchised distributors, preventing fraud and counterfeiting*

IDEA-STD-1010, *Acceptability of electronic components distributed in the open market*

IDEA-ICE-3000, *Professional Inspector Certification Exam*

JESD31*, General Requirements for Distributors of Commercial and Military Semiconductor Devices*

MIL-HDBK-103, *Department of Defense Handbook: List of Standard Microcircuit Drawings*

MIL-STD-129, *Military marking for Shipment and Storage*

MIL-STD-130, *Identification Marking of U.S. Military Property*

NIGP 107, *Guidelines for the format of Military Certificates of Conformance*

NIGP 109, *Guidelines for Distributor Assessment of Manufacturer Performance*

NIGP 111: *Guidelines for the format of Packing Slips*

NIGP 113, *NEDA Guidelines for Product Returns*

NIGP 115, *Certificates of Conformance for Commercial Electronic Parts*

NIGP 116, *ECIA Guidelines for Disposition of Excess Inventory*

OHSAS 18001, *Occupational health and safety*

SAE AIR6273[15], Terms and Definitions – Fraudulent/Counterfeit Electronic Parts

SAE ARP 6178[16], *Fraudulent/Counterfeit Electronic Parts: Tool for Risk Assessment of Distributors*

SAE ARP 6328[17], *Guideline for Development of Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition Systems*

SAE AS5553A[18], Fraudulent/*Counterfeit Electronic Parts; Avoidance, Detection, Mitigation and Disposition*

SAE AS6081[19], *Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation and Disposition – Distributors Counterfeit Electronic parts; Avoidance Protocol, Distributors*

SAE AS6171[20], *Test Methods Standard: Counterfeit Electronic Parts*

SAE AS6174[21], *Counterfeit Material: Detection, Mitigation and Disposition*

SAE AS6301[22], Compliance Verification Criterion Standard for SAE AS6081, Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors

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SEMI T20.2, *Guide for qualifications of authentication service bodies for detecting and preventing counterfeiting of semiconductors and related products*

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