STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
107	**United Kingdom**	**Jan 18, 2021**

Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting or sent to the Central Office promptly after its contents have been agreed by the committee.

A. STATE TITLE AND SCOPE OF TC

Are there any new or emerging trends in technology that will impact the scope and work activities of the TC? Please describe briefly.

Do you need to update your scope to reflect new and emerging technologies? If yes, will these changes impact another TC's scope or work activities?

If yes, describe how these will impact another TC(s) and list the TC(s) it would impact

The title and scope of TC107 is:

Title: Process management for avionics

Scope: To develop process management standards for electronics used in Avionics systems and equipment for commercial, civil and defence aerospace applications.

There are no changes required at this time.

B. MANAGEMENT STRUCTURE OF THE TC

Describe the management structure of the TC (use of an organizational chart is acceptable) (should be integrated by CO automatically) and, if relevant (for example an unusual structure is used), provide the rationale as to why this structure is used.

Note: Check if the information on the IEC website is complete.

When was the last time the TC reviewed its management structure? Describe any changes made. When does the TC intend to review its current management structure? In the future, will the TC change the current structure, for example due to new and emerging technologies, product withdrawal, change in regulations etc. Please describe.

Make sure the overview includes:

- any joint working groups with other committees,
- any special groups like advisory groups, editing groups, etc.

The TC has no Sub-committees. It is managed by a Chairman and a Secretary. An Assistant-Secretary helps the Secretary, regarding the management of documents (schedule, templates, forms, ...).

The IEC provides a Technical Officer.

The TC has:

- 5 working groups (WG):
  - WG1, Aerospace and defence electronic systems containing lead-free solder
  - WG2, Aerospace qualified electronic component (AQEC)
  - WG3, Counterfeit electronic parts; avoidance, detection, mitigation, and disposition

in avionics applications

- WG4, Accommodation of atmospheric radiation effects via single event effects within avionics electronic equipment.
- WG5 management Plans

- 2 maintenance teams (MT):
  - MT2, Component capability – temperature uprating
  - MT3, process for avionics- Electronic components for aerospace, defence and high performance (ADHP) application-part1: General requirements for high reliability integrated circuits and discrete semiconductors
- 3 Ad Hoc Groups:
  - ahG3, Avionics reliability prediction
  - ahG4, New electronic technology qualification
  - ahG5, New general connector qualif ication.

TC107 needs relationships to other committees, in order to share common problems and to avoid developing duplicate documents created by other committees. The following liaisons have been established:

Component committees (TC107 role of customer)	IEC TC 47	Semiconductor devices
	IEC TC 91	Electronics assembly technology
	IEC TC111	Environmental standardization for electrical and electronic products and systems
	IEC TC 56	Dependability
	SAE APMC	American parts Management Committee
	SAE G19	Anti-counterfeit
System committees (TC107 role of supplier)	ISO TC 20	Aircraft and space vehicles
	ISO TC 20/SC1	Aerospace electrical requirements
	ISO TC 20/SC14	Space and operations
	IECQ	International Electrotechnical Commission Quality Assessment System for Electronic Components

The structure of the TC107 Working Groups and Ad Hoc Groups will be reviewed at the next 2021 TC107 Plenary meeting in October.

C. BUSINESS ENVIRONMENT

Provide the rationale for the market relevance of the future standards being produced in the TC.

If readily available, provide an indication of global or regional sales of products or services related to the TC/SC work and state the source of the data.

Specify if standards will be significantly effective for assessing regulatory compliance.

The aerospace industry is increasingly dependent on 'off the shelf' electronic components, equipment, and systems designed and manufactured mainly for other industries, over which the aerospace industry has less control. TC 107 develops standard processes for industry to use and manage components, equipment, and systems in aerospace applications, possibly in liaison with other industrial sectors also concerned.

The standards enable the Avionics Industries to comply with regulatory requirements for example:

- The Civil Avionics Industry FAR/EASA regulation 21 'Approval of Materials, Parts, Processes and Appliances' Subpart K, in particular section 303 paragraph (4); or
- AC20-152A/AMC20-152A which defines the acceptable means of compliance (AMC) for "Development Assurance of Airborne Electronic Hardware" (section related to COTS (Commercial Off the Shelf) electronic components) for complex electronic components such as microprocessors, FPGAs (field programmable gate arrays), ASICs (application specific integrated circuits) large semiconductor memories etc.
- AS/EN/JIQS 9100 quality management series for obsolescence and anti-counterfeit management.

D. MARKET DEMAND

Provide a list of likely customers of the standards (suppliers, specifiers, testing bodies, regulators, installers, other TC/SC's etc.). Do not specify company names, only categories of customers.

Airframers, Original Equipment Manufacturers (OEM), equipment suppliers and their subcontractors are the main customers.

- Aerospace customers, regulatory agencies, and defence agencies demand assurance that avionics products will operate reliably during their required life. The market requires that the effects of electronic component obsolescence, counterfeit and recycled components are minimized.

- Advanced submicron electronic components and now deep submicron electronic components (lithography size lower than 100 nm) can lead to new failure mechanisms and degradation modes affecting potentially reliability and wear out of electronic components. On the other hand, they can suffer data corruption or malfunction even at sea level due to the effects of secondary atmospheric radiation neutrons produced in the interaction between the Atmosphere and Cosmic Rays that originate beyond Earth. At the cruising altitude of modern airliners the flux of secondary atmospheric radiation neutrons is about 300 times that which it is at sea level. The market demands that avionics electronics must be able to meet its application requirements at these altitudes. Also, semi-conductor wear-out effects require management to ensure long term reliability of Avionics products.

E. SUSTAINABILITY DEVELOPMENT GOALS

INDICATE THE SUSTAINABLE DEVELOPMENT GOALS (SDGS) THAT ARE ADDRESSED BY WORK WITHIN THE TC/SC. INDICATE EACH SDG INDICATOR AFFECTED (REFERENCE SPREADSHEET AVAILABLE AT https://www.iec.ch/SDG/, AND PROVIDE SPECIFIC INFORMATION ABOUT HOW THE TC/SC IS ADDRESSING THE SDG. CONSIDER BOTH DIRECT AND INDIRECT IMPACTS OF THE WORK OF THE TC/SC.

- ☐ **GOAL 1:** No Poverty
- ☐ **GOAL 2:** Zero Hunger
- ☐ **GOAL 3:** Good Health and Well-being
- ☐ **GOAL 4:** Quality Education
- ☐ **GOAL 5:** Gender Equality
- ☐ **GOAL 6:** Clean Water and Sanitation
- ☐ **GOAL 7:** Affordable and Clean Energy
- ☐ **GOAL 8:** Decent Work & Economic Growth
- ☒ **GOAL 9:** Industry, Innovation & Infrastructure
- ☐ **GOAL 10:** Reduced Inequality
- ☒ **GOAL 11:** Sustainable Cities and Communities
- ☐ **GOAL 12:** Responsible Consumption & Production
- ☐ **GOAL 13:** Climate Action
- ☐ **GOAL 14:** Life Below Water
- ☐ **GOAL 15:** Life on Land
- ☐ **GOAL 16:** Peace, Justice Strong Institutions
- ☒ **GOAL 17:** Partnerships to achieve the Goals

F. TRENDS IN TECHNOLOGY AND IN THE MARKET

If any, indicate the current or expected trends in the technology or in the market covered by the products of your TC/SC.

High-volume applications dominate the electronics industry such as computers and telecommunication products. There is relentless pressure to reduce component cost, improve their performance and increase their physical integration. This results in products that change rapidly and cause obsolescence and potential reliability and wear-out problems. The aerospace industry must respond to these trends whilst using COTS (commercial off the shelf) electronic components to meet its own cost, reliability, and performance requirements. Work is continuing meeting the impact of legislation on lead-free electronics and counterfeited prevention.

Regarding the market, the aeronautical industry faces an increasing upwards trend regarding obsolescence and counterfeiting.

- The obsolescence management of electronic components for the Avionics product lifetime of 40 years has to be managed in conjunction with sourcing components from the mass markets which are essentially pushed forwards by the automotive and telecom industries, which have much shorter availability lifetimes in the marketplace. Long term storage of electronic components and circuit card assemblies are also techniques used in obsolescence management.

- Counterfeiting prevention in a developing worldwide electronic component market is essential for avionics applications, with regards to reliability and safety requirements.

Atmospheric radiation SEE (single event effects) related to electronic components are far more prevalent today due to many microcircuit design geometries being less than 100 nm and the use of high voltages in aircraft designs. The IEC atmospheric radiation series is being re-structured to become more ‘user friendly’ with additional updates to assist industry in mitigating these effects in their electronic equipment.

The use of power components is also increasing to satisfy the demand for the ‘more electric’ aircraft operation where new wide-bandgap semiconductors are increasingly used (for example silicon carbide, aluminium nitride transistors and diodes and other emerging technologies, thanks to their higher operating temperature ranges and power switching capabilities).

Engineering analysis techniques are steadily improving, which assist the industry in managing their product’s reliability performance for example for facilitating reliability predictions, maintenance planning and atmospheric radiation effects mitigation.

The use of ‘enhanced’ performance electronic components following IEC 62564-1 are also more commonly used today in order to avoid the complications of uprating electronic components per IEC 62240-1. Revisions to IEC 62564-1 are being discussed to further enhance the technical requirements to manage for example Cyber Physical Security requirements etc.

Standard requirements for Avionics microcircuits, diodes, transistors, passive components and connectors are also either published (see IEC 62686-1 and -2) or are in development to assist the Avionics industry in maintaining their product's quality and reliability.

Cyber physical security is now a concern for complex systems. The IEC TC107 contribution for fighting against this threat is through the use of electronic components which will be investigated, and a guidance document will be created if needed to assist the industry.

G. SYSTEMS APPROACH ASPECTS (SEE DIRECTIVES PART 1 ANNEX SP)

Does your TC/SC have a need for a systems approach?

If so:

- Will the Systems work be in a single TC or in multiple TCs?
- Will a Standardization Evaluation Group (SEG), Systems Committee (SyC), or Systems Resource Group be required?
- Is your TC/SC work of relevance to ISO?
- Is or are there fora or consortia working in parallel to IEC? Is there a chance to integrate this work in your TC/SC?

This should not only be restricted to the customer/supplier relationships with other TC/SCs indicating types of co-operation (e.g. liaisons, joint working groups) but be of a more generic nature.

TC107 has produced the following standards which are systems based:

- IEC 62239-1 "Electronic components management plan (ECMP)" and IEC TS 62239-2 "COTS assembly management plan" are already 'systems based' standard as they are applied horizontally across an Avionics business from the product bid process through to design, manufacturing and field support.

- The anti-counterfeit standards IEC 62668-1 "Avoiding the use of counterfeit, fraudulent and recycled electronic components" and IEC 62668-2 "Managing electronic components from non-franchised sources" are also 'systems based' as they apply to the Avionics business operations from the approval of the purchasing sources, the purchasing of electronic components with appropriate anti-counterfeit mitigation testing as considered necessary depending on the risk of the supply chain, through to storage, assembly and field support.

IEC TC107 already has formal liaisons with:

(a) ISO/TC20/SC14 for Space work, where IEC 62239-1 could be applied and modified (for space level radiation instead of atmospheric SEE radiation, addition of outgassing requirements, limiting certain materials etc.) for the space industry.

(b) ISO/TC20 for UAVs (unmanned aerial vehicle) where IEC 62239-1 should be considered 'best practice' for the UAV market.

IEC TC107 also has informal discussions with the additional industries below but has not established formal IEC liaisons.

(c) The Nuclear energy industry where members of IEC TC 45 are aware of the IEC 62239-1 standard via work in IECQ, which they may modify for their specific industry.

(d) The Railway industry IEC TC 9.

At the present time a Technical Advisory committee is not required.

H. CONFORMITY ASSESSMENT

With reference to Clause 33 of Part 2 of the ISO/IEC directives, are all you publications in line with the requirements related to conformity assessment aspects?

Will the TC/SC publications be used for IEC Conformity Assessment Systems (IECEE, IECEx, IECQ, IECRE)?

Will any of your standards include test specifications, reproducible test requirements, and test methods?

Are there likely to be special conformity assessment requirements generated by any standards projects? If yes, list which projects.

The standard can also be used for IECQ conformity assessment:

(a) "IECQ ADHP" scheme OD 03-4 defines the IECQ OD3405 conformity assessment scheme for IEC 62239-1 ECMP assessments.

(b) "IECQ AP-CAP" scheme OD 03-7 defines the IECQ OD 706-3 conformity assessment scheme for IEC 62668-1 anti-counterfeit assessments.

I. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

STRATEGIC OBJECTIVES 3-5 YEARS	ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES	TARGET DATE(S) TO COMPLETE THE ACTIONS
Maintaining and updating existing documents as necessary.	Review by WGs and MT	cf. Pow
Developing documents regarding atmospheric radiation problematic.	Market surveys and development of replacement draft standards for a new series	cf. PoW
Developing a document dealing with the long-term storage of circuit card assemblies	Market survey and development of a new guidance document	2021-11
Conducting technical analysis and potentially developing documents dealing with the scope of the proposed guide for reliability prediction techniques, implementing Liaison with IEC TC56..	Market survey	cf. PoW
Conducting technical analysis and potentially developing documents dealing with power component qualification, implementing Liaison with TC47 WG5	Market survey	cf. PoW
Conducting technical analysis and potentially developing documents on *General Requirements for Electrical Connectors*, implementing Liaisons with IEC SC48B and TC46.	Market survey	cf. PoW

Investigating and potentially developing documents dealing with the impact on existing standards due to Cyber Security.	Market survey	cf. PoW
Note: The progress on the actions should be reported in the RSMB.		