STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
29	**Denmark**	**2020-05-15**

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

Title
Electroacoustics.

Scope
Standardization of electroacoustic instruments and systems for acoustic and audiometric measurements. This includes performance requirements, and calibration and test methods for: acoustic measurement systems including; microphones, sound calibrators, sound level meters, filters, and equipment used for measurement of aircraft noise, audiometric measurement systems and related instruments and equipment, including; audiometric equipment and transducers (earphones and bone vibrators), ear simulators, hearing aids and induction loop systems.

Excluded are:

a) standards for equipment in the field of audio and audio- visual engineering and recording as dealt with by TC 100;
b) standards and terminology for ultrasonic techniques dealt with by TC 87.

NOTE - Close co-operation is, however, maintained with TC 87 in the fields of common interest.

B. MANAGEMENT STRUCTURE OF THE TC

MT 4: Sound level meters
WG 5: Measurement microphones
WG 10: Audiometric equipment
WG 13: Hearing aids
MT 17: Sound calibrators
MT 18: EMC requirements and updates of relevant IEC/TC 29 standards
WG 21: Head and ear simulators
WG 22: Hearing loop systems and equipment
MT 23: Revision of IEC 61265, Instruments for aircraft noise certification
WG 24: Modular instrumentation for acoustic measurement
MT 25: Graphical presentation of electroacoustical characteristics
AHG 26: Alignment of standards for measurement microphones, sound level meters and sound calibrators

C. BUSINESS ENVIRONMENT

TC 29's technical work plays a vital role in underpinning large areas of social, environmental, medical diagnostic and rehabilitation applications, where the accurate production and/or measurement of sound is needed. Electroacoustical instrumentation and devices are therefore required by a very diverse range of users.

The declaration and verification of noise emission values for all kinds of machinery, consumer and domestic products, as presently required by many national or regional regulations,

presupposes the use of uniformly specified and sophisticated sound measuring instrumentation with well-defined tolerances.

Telephone retailing, banking and information provision creates a demand for the use and development of TC 29 standards in determining the acoustic environment in which these businesses operate, and in particular the noise to which operators are exposed in the course of their work.

For the control of noise emission there is a growing need for instrumentation for the measurement and analysis of noise exposure in the work place as well as in residential areas, and within the music and entertainment sectors. The available instruments and measuring methods still represent a high degree of simplification compared to the human perception of noise and to the effect on our hearing. However, current instrumentation provides a consistent means of measurement, which allows preventative action to be taken where appropriate based on the best available data.

Regulation and law on acoustical instrumentation differs widely from country to country. For example, in some countries pattern evaluation of new models of instrument against the international standard is required before the device can be sold, and regular testing of individual specimens is also required by law. In other countries this is not the case and it is up to the user to follow good measurement practice. Hence the aim of TC 29 is also to encourage testing in countries where it is not mandated by use of the same agreed international specified test methods within all countries, ensuring consistency and cost-effective testing across world markets.

In terms of worldwide market this varies considerably for the different instruments within the scope of the Committee's remit, and as the number of key manufacturers in some areas is quite small, data on sales is often not available for commercial reasons. However, as examples some 8 million hearing aids are manufactured worldwide each year, and it is known that in some countries lost productivity due to noise can equate to up to approximately 2% of GDP.

D. MARKET DEMAND

The demand for electroacoustic devices and measurement is worldwide, with many applications and stakeholders, and in many countries the control and measurement of noise is covered by law or legislative directives.

The range of users of the standards will include governments, local authorities, planners, the medical profession, health and safety professionals and agencies, environmental noise consultants and agencies, manufacturers of instrumentation and equipment, as well as the many laboratories and test houses around the world.

Users of TC 29 standards include international and national standards organizations, and in many countries the international standards are directly adopted with no change as equivalent national standards, with the number of adopting countries increasing.

As an example, noise is the second largest form of environmental pollution (after air quality) and has been identified by the World Health Organisation as the second largest health risk in Western Europe. Up to 170 million citizens in the EU alone are said to be living in areas where the noise levels were such as to cause serious annoyance during daytime. Also, reports from some countries found that some 30% of the population are highly disturbed by road traffic noise. Measures to be taken to reduce the noise are normally very expensive and must be based on proven facts. Similarly, ability to make reliable measurement of aircraft noise is vital to the aircraft and airline industries, airport operators and regulators, central government and the general population.

Noise induced hearing impairment is one of the most frequent occupational hazards resulting in large social expense. Equipment for the measurement and analysis of noise as covered by TC 29, is in high demand and allows facts to be gathered based on accurate and reproducible measurements. Worldwide research in psychoacoustics is aiming at a better understanding of human reactions to noise exposure that certainly will call for further development of measuring techniques and instrumentation. Hearing assessment is now carried out routinely at all stages of life from birth to old age. High quality data yielded by well-specified audiometric equipment can lead to early detection and greater success in reducing further risk or in remedial treatment with hearing aids.

Hearing aid performance, specification and measurement is the subject of a series of standards produced by TC 29. The associated standardization of ear simulators and head and torso simulators for measuring performance has allowed a better understanding to be found of the relationship between subjective and objective measurements. The effect of these standards and the standards for induction loop systems, has been to improve the means by which the vast majority of hard of hearing people communicate, and so improve their quality of life.

The ability to accurately measure the threshold of hearing is crucial to hearing conservation programmes, the early detection of hearing loss in children and the diagnosis of hearing loss. TC 29 works in conjunction with ISO/TC 43 to ensure that standards for thresholds of hearing and other techniques for audiometry are integrated. The same close cooperation also takes place on the integration of measurement methods and the necessary instrumentation for determination of acoustic power emission from machinery, total noise exposure of workers during a work day, etc.

E. TRENDS IN TECHNOLOGY AND IN THE MARKET

Technology trends

Rapid development in digital measurement, wireless technologies such as Wi-Fi and Bluetooth, manufacturing techniques, miniaturisation and wearable technologies, offer increased capabilities and more sophistication in general sound measuring instrumentation, and in audiometry and hearing aids. The advent of automated methods of testing and calibration also have a key role to play, and newer digital designs may mean that in practice reduced test procedures are possible without detriment to quality assurance. Hence the international standards require continuous revision and updating to ensure specifications and test procedures remain appropriate and fit-for-purpose.

New technologies are continually evolving, for example Bluetooth LE is driving new standardisation requirements for hearing aids and the emergence of MEMS microphone-base measurement systems create a set of new considerations for conformance testing. The Committee needs to ensure that as these technologies start to become mainstream, standardisation keeps pace with introduction of new products and systems, and their usage.

A current growth area, made possible by advances in technology, is the use of modular measuring systems. These are often multi-channel and PC based. Development of new and existing standards is required to ensure that fit-for-purpose specifications and appropriate testing regimes are provided for these systems.

Market trends

Market trends are broadly in line with the technology trends mentioned above, which are often enabling greater flexibility, more customisation and enhanced functionality of devices, whilst maintaining a static cost base. Similarly miniaturisation in hearing aids and other areas has progressed considerably over recent years, and although some further change may occur the usability of devices will continue to be a key factor.

In 2015 the United Nations established their 2030 Agenda for Sustainable Development comprising 17 Strategic Development Goals (SDGs) covering such global challenges as the

eradication of poverty and hunger, climate change, health, education and economic growth. TC 29 has the potential to contribute to many of these goals (see Annex B), that would see the emergence of new markets and new requirements for standardisation on electroacoustic.

TC 29 has liaisons with relevant TCs. As new markets and applications emerge, the range of other TCs with which TC 29 has liaison should be kept under review, so that TC 29 remains the central point of responsibility for any specification and performance aspects of electroacoustic devices and systems.

F. SYSTEMS APPROACH ASPECTS (REFERENCE - AC/33/2013)

TC 29 will actively continue to promote the ongoing liaisons to other committees and to system committees and to seek new liaisons, where relevant.

Systems committees (TC 29 as a supplier of standards)	TC 62	Electrical equipment in medical practice
	TC 87	Ultrasonics
	TC 100*	Audio, video and multimedia systems and equipment
	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology
	TC 124	Wearable electronic devices and technologies
	ISO/TC 43	Acoustics
	ISO/TC 43/SC 1	Noise
	ISO/TC 108	Mechanical vibration, shock and condition monitoring
Systems committees (TC 29 as a customer of standards)	TC 25	Quantities and units
	SC 77B	High frequency phenomena
	TC 87	Ultrasonics
	TC 100*	Audio, video and multimedia systems and equipment
	TC 106	Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure
	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology
	TC 124	Wearable electronic devices and technologies
	ISO/TC 12	Quantities and units

***** in particular, IEC/TC 100/TA 20 "Analogue and digital audio"

Cooperation established:

- Through liaison with the following international organisations:
    - ITU-T "International Telecommunication Union – Telecommunication Standardization Sector"
    - OIML "International Organization Of Legal Metrology"
    - ICAO "International Civil Aviation Organization"
    - Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV)
- Through experts working on other TCs or with other bodies e.g. TC 106, ISO/TC 43, OIML, ICAO
- Previous experience of joint WG with ISO/TC 43.
- New liaisons to be sought:
    - IEC/TC 88 "Wind energy generation systems"

NOTE - Formal action for liaison to wait until ICAO wants to include information on the ground plane microphone in a TC 29 standard

- European Telecommunications Standards Institute (ETSI)

G. CONFORMITY ASSESSMENT

TC 29 standards include where necessary, performance specifications, reproducible test requirements and test methods.

With regard to uncertainties and conformance assessment TC 29 has prepared a basic document on policy on measurement uncertainty and conformance assessment for use in documents prepared by IEC/TC 29, Electroacoustics, given in doc. 29/810/INF.

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

Objectives

1. To keep TC 29 standards up-to-date to reflect new/changing technologies and user requirements both in the marketplace and via customer IEC and ISO Technical Committees.

2. Respond to requests for development of new standards to meet new marketplace and business needs and environmental noise protection concerns following IEC guidelines in a timely manner.

3. Ensure consistency within TC 29 standards on common aspects e.g. uncertainties of measurement and ensure the standards are written in such a way that requirements are clear to end-users.

4. Promote the work of the committee and increase the awareness of TC 29 publications.

5. Encourage new membership of the Committee.

Strategies

1. Continue regular reviews of the Stability Dates for each standard and ensure a comprehensive review of the options available for each.

2. Raise early awareness of new technologies or market requirements, likely to have an impact on existing standards or likely to trigger NWIPs, by using WG and MT members expert knowledge to identify.

3. Operate a Chair Advisory Group (CAG) to address cross-TC issues, TC 29 scope, and requirements for TC 29 policy on specific matters arising.

4. Discuss with IEC Central Office marketing staff effective methods to increase awareness of the work of TC 29 and of its publications. Encourage experts to perform a similar task at National Committee level.

Action plan

1. Maintain current record of Stability Dates, including a list in WG/MT order to ease identification of those due for review in the immediate future. In advance of plenary meetings, Convenors/Project Leaders to review and add relevant documents to their WG/MT Agendas to ensure members have an opportunity to consider requirement for revision prior to WG/MT meeting. *Initiate RR forms as appropriate*.

2. Agendas to include an item for discussion on new technologies or market requirements likely to impact the work of the Committee. *Convenors/Project Leaders to document discussions in WG-meeting reports/minutes, and initiate RR or NP as appropriate*.

3. Convene a Chair Advisory Group meeting (via Zoom) consisting of the WG/MT/AHG conveners and other invited participants as needs demand, at least once between TC 29 plenary meetings.

4. Raise awareness of new and revised standards, and the work of TC 29, through internationally and nationally available channels such as professional bodies, conferences and journal papers. *All Members. Ongoing from 2014*. (References registered as per November 2015 are given in Annex A).

Useful links to IEC website

The TC home page gives access to membership, TC/SC Officers, scope, liaisons, WG/MT/PT structure, publications issued and work and maintenance programmes and similar information for SCs, if any.

STRATEGIC OBJECTIVES 3-5 YEARS	ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES	TARGET DATE(S) TO COMPLETE THE ACTIONS
Maintain current record of stability dates	All stability dates reviewed and updated during the meeting	None
Agendas of WGs and MTs to include discussion of new technologies and market requirements likely to impact the work	Discussed by all WGs and MTs	None
Consideration of need for additional guidance documents	Discussed	None
Raise awareness of new and revised standards of TC 29	References collected and compiled	None
Note: The progress on the actions should be reported in the RSMB.		

ANNEX A

REFERENCES TO THE WORK OF IEC/TC 29

Stig Arlinger, former member of WG 10

- A list of international standards relevant for people within audiology on the web-page of the International Society of Audiology on http://www.isa-audiology.org/standards.asp *(maybe not completely up to date).*

Susan Dowson, convenor of MT 17 and AHG 26, and member of MT 4

- "Acoustical instruments – Specifications and use"; S P Dowson and R G Tyler, Proceedings of the Institute of Acoustics, Vol 36 Pt3 2014, pp 236-243.
- "Acoustical Instruments – Specification standards update"; S P Dowson, Acoustics Bulletin, Vol 40 No 6 pp 23-24.
- Sound calibrators – new revised edition of IEC 60942' by Susan Dowson, Institute of Acoustics Bulletin, Vol 43 No. 2, March/April 2018, pp 6 – 7.
- Simplifying the use of sound calibrators – New revised edition of IEC 60942' by Catherine Bischofberger, IEC e-Tech Issue 02/2018.

Anton Gebert, member of WG 13 and WG 21

- POTENTIAL ERRORS OF REAL-EAR-TO-COUPLER-DIFFERENCE METHOD APPLIED FOR A PREDICTION OF HEARING AID PERFORMANCE IN AN INDIVIDUAL EAR, Oleg Saltykov and Anton Gebert, *AES 47th International Conference, Chicago, USA, 2012 June 20–22*

Ryuzo Horiuchi, member of WG 5

- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in Paris", Masaharu Ohya, Makoto Tateno, You-ichi Fujisaka and Ryuzo Horiuchi, Journal of Acoustical Society of Japan, Vol. 72, No. 5 (2016).
- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in Pretoria", Ryuzo Horiuchi, Makoto Tateno, Masaharu Ohya and You-ichi Fujisaka, Journal of Acoustical Society of Japan, Vol. 70, No. 10 (2014).
- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in London", Ryuzo Horiuchi and Makoto Tateno, Journal of Acoustical S"Report on the meetings of IEC/TC 29 "Electroacoustics" held in Milan", Ryuzo Horiuchi, Masaharu Ohya, Yoh-ichi Fujisaka and Makoto Tateno, Journal of Acoustical Society of Japan, Vol. 74, No. 2 (2018).ociety of Japan, Vol. 67, No. 10 (2011).
- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in Ottawa", Ryuzo Horiuchi, Masaharu Ohya, Yoh-ichi Fujisaka, Shin-ichi Masunari and Makoto Tateno, Journal of Acoustical Society of Japan, Vol. 75, No. 11 (2019).

  (These reports are in Japanese)

Erling Sandermann Olsen, member of MT 4, WG 5, MT 17, MT 25 and AHG 26

- Sandermann Olsen, Erling. Heat conduction correction in reciprocity calibration of laboratory standard microphones, presented at Inter-noise 2012, New York, USA, 2012.
- Sandermann Olsen, Erling; Frederiksen, Erling. Microphone acoustic impedance in reciprocity calibration of laboratory standard microphones, presented at Inter-noise 2013, Innsbruck, Østrig, 2013.
- Sandermann Olsen, Erling; Carlsen, Henrik. Influence of ground-shield configuration in reciprocity calibration of laboratory standard microphones, presented at Inter-noise 2014, Melbourne, Australien, 2014.
- Jackett, Richard; Avison, Janine. Realizing the primary standard for sound pressure: The trouble with IEC 61094-2, presented at Inter-noise 2015, San Fransisco, California, USA, 2015.

- Jackett, Richard. The effect of heat conduction on the realization of the primary standard for sound pressure, Metrologia 51, 2014 pp. 423-430.
- Sandermann Olsen, Erling. MP.EXE, DFM Microphone Pressure Sensitivity Calibration Calculation Program version 4.00. Part s800.002. Dansk Fundamental Metrologi A/S, 2010, 69 pp.
- Erling Sandermann Olsen and Richard Barham presentation on calibration of microphones at extreme frequencies at BIPM CCAUV meeting 2015-11-25/27

Gert Ravn, convenor of WG 13

- Robert Burcard, Ph.D., "Standards and calibration. Part 1: Standards process, Physical Principles, Pure tone and speech audiometry", Theme, Seminars in Hearing, vol. 35, number 4, November 2014:
  - National and International Standards: Standardization and Calibration, *Laura Wilber, Ph.D., Einar Laukli, Ph.D., and Robert Burkard, Ph.D.*
  - Physics of Sound and Electroacoustics, *John D. Durrant, Ph.D. and Lawrence L. Feth, Ph.D.*
  - Sound Level Calibration: Microphones, Ear Simulators, Couplers, and Sound Level Meters, *Dr-Ing. Thomas Fedtke and Lee Grason.*
  - Audiometric Calibration: Air Conduction, *Craig A. Champlin, Ph.D. and Tomasz Letowski, Ph.D.*
  - Bone-Conduction Calibration, *Robert H. Margolis, Ph.D. and Gerald R. Popelka, Ph.D.*
- Audiometric Calibration: Speech Signals, *Graham Frost, M.Sc. and Harry Levitt, Ph.D.* Robert Burcard, Ph.D., "Standardization and calibration. Part 2: Brief Stimuli,. Immitance, Amplification, and Vestibular Assessment, Thieme, Seminars in Hearing, vol. 36, number 1, February 2015:
  - Calibration/Standardization of Short-Duration Stimuli, *Einar Laukli, Ph.D. and Robert Burkard, Ph.D.*
  - Acoustic Immittance, Absorbance, and Reflectance in the Human Ear Canal, *John J. Rosowski, Ph.D. and Laura Ann Wilber, Ph.D.*
  - Hearing-Aid-Related Standards and Test Systems, *Gert Ravn, B.Sc. and David Preves, Ph.D.*
  - Vestibular Function Measurement Devices, *Richard D. Miles, Ph.D. and David A. Zapala, Ph.D.*
- Hearing Aid-Related Standards and Test Systems, Gert Ravn and David Preves, *Seminars in Hearing*, Volume 36, Number 1, 2015.
- In connection with the publication of IEC 60118-13:2019 “Electroacoustics – Hearing aids – Part 13: Requirements and methods of measurement for electromagnetic immunity to mobile digital wireless devices”, IEC has published a blog article: https://blog.iec.ch/2019/11/hearing-loud-and-clear/.

Christopher J. Struck, convenor of MT 25 and member of WG 5, WG 13, WG 21 and WG 24

- C. J. Struck, “An Overview of the ANSI/ASA Standards Program”, InterNoise 2015 – San Francisco, CA (2015 August 9-12). Reprinted in Sound & Vibration – 2015 December.
- C. J. Struck, “Opportunities for International Liaison: Acoustical Noise Standards for the New Millennium”, InterNoise 2016 – Hamburg, Germany (2016 August 21-24).
- Special Session: “Standards: Practical Applications in Acoustics”, C. J. Struck - Chair, to take place at the ASA 174th Meeting, New Orleans, LA, 4-8 December 2017.
- JASA Standards News, published bi-monthly: http://asa.scitation.org/action/doSearch?content=articlesChapters&countTerms=true&sortBy=Ppub&target=default&field1=Title&text1=%22standards+news%22&field2=AllField&text2=&publication%5B%5D=jas&Ppub=&Ppub=&AfterYear=&BeforeYear=

John Woodgate, convenor of WG 22

- Hearing loops; the preferred assistive listening technology, Thomas Kaufmann, Sterkens J, Woodgate J M, Journal of the Audio Engineering Society, vol.63 no. 4 298-302 (2015 April).
- A hearing loop system that worked!, J M Woodgate, Institute of Sound and Communications Engineers Magazine, Autumn 2015.
- 'Don't dismiss old technology that works', J M Woodgate, The Hearing Review vol. 24.2 February 2017.
- Mapp, P. (2018) Performance and Installation Criteria for Assistive Listening Systems, Convention Paper, Presented at the 145th Convention, 2018 October 17–20, New York, NY, USA

- THE EFFECT ON STI RESULTS OF CHANGES TO THE MALE TEST-SIGNAL SPECTRUM, Proceedings of the Institute of Acoustics Vol. 38. Pt. 2. 2016, Leembruggen et al
- Mapp, P. (2014) Simulating Talker, Directivity for Speech Intelligibility, Measurements. Convention Paper Presented at the 137th Convention 2014 October 9–12, Los Angeles, USA
- Mapp, P. (2014) Optimising microphone placement and formats for Assistive Listening System sound pick-up, Convention Paper, Presented at the 136th Convention, 2014 April 26–29 Berlin, Germany

IEC/TC 29 AND THE SUSTAINABLE DEVELOPMENT GOALS OF THE UNITED NATIONS

The United Nations has established their 2030 Agenda for Sustainable Development comprising 17 Strategic Development Goals (SDGs) covering such global challenges as the eradication of poverty and hunger, climate change, health, education and economic growth for action by all countries. It is recognised that international bodies such as the IEC also have a key role. Consequently, IEC has published its own response to the UN initiative indicating synergies between the SDGs and IEC work programmes. IEC/TC 29 contributes to many of the SDGs directly and indirectly, but here we focus on those goals where the potential contribution is strongest.

SDG 3 – Good health and wellbeing
Hearing is one of our most vital senses and impairment can lead to severe degradation in quality of life. IEC/TC29 provides the standards to support national health programmes to carry out reliable hearing tests using fit-for-purpose diagnostic equipment at all stages of life from birth to old age. Where hearing loss is identified, standards on hearing aid performance testing ensure that devices to restore hearing function can be effectively matched to individuals for maximum benefit.

Aside from disease and inherent disability, hearing is most commonly put at risk from excessive noise exposure. Indeed, noise induced hearing loss is one of the most prevalent occupational diseases. However, noise does not only present a risk of hearing damage. It is widely recognised that habitual exposure to lower levels of noise can result in a range of other severe health impacts such as cardio-vascular diseases, decline in mental health, and obesity. It can also impact physical and cognitive developments in childhood.

Environmental and occupational noise measurement is therefore vital to combat these risks and IEC/TC 29 provides standards for noise measurement instrumentation so that they can be reliably assessed and ultimately, controlled.

SDG 8 – Economic growth
While no specific case can be made for the direct role of acoustic measurement in economic growth goal, this is clearly a function of many of the other SGDs including those discussed here. Safe working conditions, a healthy, well-educated and mobile workforce, a climate of innovation, and due consideration of environmental impact, are all ingredients for high-quality jobs and economic growth.

SDG 9 – Industry, innovation and infrastructure
Investments in infrastructure including transport, energy, communication and IT are crucial to achieving sustainable development and empowering communities in many countries. Fulfilment of wider SDGs such as growth in productivity and incomes, and improvements in health and education outcomes are strongly linked to investment in infrastructure.

As will be discussed in a little more detail below (see SDG 11), noise is often an unwanted (and innovation-limiting) by-product of infrastructure developments. However, the integration of noise measurement as part of the infrastructure can lead to efficiency and sustainability benefits that are normally not economically viable with conventional instrumentation. However, this type of innovation requires TC 29 to develop new types of specification standards that allow for flexibility in the configuration and calibration of the noise measurement system, without compromising the quality of the yielded data. Indeed, such developments have already been initiated with the work on modular instrumentation.

SDG 10 – Inequalities
It is a sad fact that some health conditions, including hearing loss, that are diagnosed and treated simply and quickly in developed areas, are left undiagnosed and untreated in less developed area. This is especially unfortunate in that enormous benefits can result from relatively modest investment in health resources.

TC 29 has been successful in its obligation to avoid over-burdening specifications for audiometric equipment and provide affordable options to facilitate hearing assessment, including hugely beneficial neonatal hearing screening programmes, in developing areas.

SDG 11 – Sustainable cities and communities

Urbanisation is closely linked to economic growth and it is a fact that the global population is migrating to cities. The rapid increase in the size and population density in cities places strain on the complex social, economic and environmental ecosystem that maintain the viability of a city as a desirable place to live and work. Factors such as sustainability (in all its dimensions), environmental management, transportation operations and infrastructure, buildings and civil engineering, social responsibility, safety, health and wellbeing including occupational health and resource management (energy, water etc.) are all vital features of modern cities, and information technology is vital for effective integration of the management systems. However, technological development nearly always has unwanted consequences, and noise is often significant amongst them. Examples are easy to identify: Road traffic noise is the single most prevalent source of noise related health effects. Renewable energy sources, especially wind turbines but also heat pumps result in long-running contention over noise issues. Noise is the second most significant environmental pollution concern after air quality. Noise-induced hearing loss from workplace noise exposure remains one of the most significant occupational health issues.

It is clear that addressing the multitude of noise-related issues already relies heavily of noise measurement and hearing assessment capabilities supported by TC 29. It is also clear that noise measurement could be used more pervasively in many future city applications. Permanent and widely distributed monitoring can benefit; transportation system management, improve the environmental quality inside buildings, provide individualised noise exposure assessment, improve studies correlating noise and health and be part of an integrated smart system for environmental management. Indeed, possibilities are seemingly endless. However, noise measurement instrumentation (and practices) need to evolve from the type of systems currently considered in TC 29 publications.

SDG 13 – Climate action

As noted above the greater reliance on renewable sources of energy as an alternative to carbon-based fuels is not without unwanted consequences, with low frequency noise being amongst them.

However, there is also a positive role for acoustic measurement in climate studies. Research is showing that measurements of infrasound are important in understanding the physical characteristics of the stratosphere. This understanding can be used to enhance weather forecasting and climate change models.

TC 29 is currently active in developing standards for calibration methods at infrasound frequencies, to improve the quality of data obtained from microphones and other acoustic sensors in atmospheric acoustics applications.