

MULTIMEDIA & APPLIANCES

Ultra HD Experience

TECHNOLOGY FOCUS

CES 2014 trends

MEMS

The Internet of Things

IEC CONFORMITY ASSESSMENT

2014 IECEX

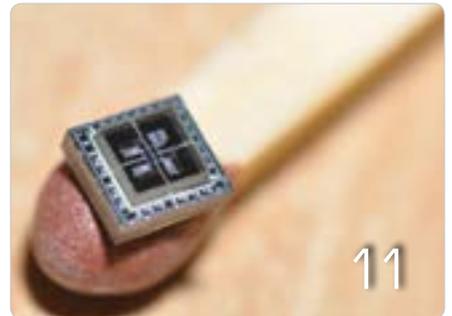
**International Conference
in Malaysia**



6



10



11



14



26



48

6 At CES, hundreds of companies presented connected devices that aim to give us more control over our bodies and the things that surround us **10** High-performance audio is making a significant comeback with connected and wireless devices **11** MEMS, tiny electromechanical systems, are now an indispensable component of any piece of electronic equipment **14** At CES, a group of experts shared some of the opportunities and hurdles facing the Internet of Things in the consumer space **26** Dr Alan Hodgson, Chair of IEC TC 119, provides an update on the set up of the TC structure **48** IEC announced the publication of the first globally relevant Technical Specification for a single external charger for a wide range of notebook computers and laptops

Multimedia and appliances

Issue 01/2014 of *e-tech* focuses on technological evolution in multimedia and appliances. The 2014 International CES showcased not only products that have just reached the marketplace, but also a wide range of technological innovations that may bring fundamental changes in our lives in the not so distant future.

EDITORIAL

Connected 24/7

TECHNOLOGY FOCUS

Tech trends 2014

CES 2014 megatrends

Advanced displays for better content

High-performance audio – Back with a vengeance!

Tiny MEMS – Huge impact on our digital future

The Internet of Things

Standards in the Cloud

More content down the same pipe

Food print

INDUSTRY SPOTLIGHT

Connecting homes, connecting things

TECHNICAL COMMITTEE AFFAIRS

TC 119 – Gearing up for standardization

Small or huge – displays are everywhere

CONFORMITY ASSESSMENT

IECEE – Nightmare of a child chewing on a cord

A CA perspective from Turkey

2014 IECEx International Conference in Malaysia

IECQ – Gifts that can be hazardous

World Electronics Forum

IEC FAMILY

Introducing the IEC 2013 Young Professional Leaders

Closer ties to build trade and share experience

A focus on industry and evolution

ACEA nominations

Obituary – Professor Takashi Tomita

IEC WORLD

International Standards for sustainable energy

Global Visions: Allow interoperability – Secure investment

IN STORE

Single charger for notebook computers

Protecting rights

Connected 24/7

Smarter and smaller devices help us monitor every aspect of our lives



Claire Marchand
Managing Editor e-tech

The 2014 International CES (Consumer Electronics Show), held on 7-10 January 2014 in Las Vegas, Nevada, United States, lived up to its reputation, showcasing not only products that have just reached the marketplace, but also a wide range of technological innovations that may bring fundamental changes in our lives in the not so distant future.

Connected wearables were trending big this year. Smart bands monitoring your sleep, steps or heart beats; a smart collar to check your dog's activity, rest and respiration rate; a designer bracelet letting you know when your skin has had enough exposure to the sun; a connected pillbox to help you take your medication at the right moment, are just a few of the innovative devices that were presented at CES.

Apart from wearables, this issue of *e-tech* focuses on recent developments in high-performance audio, UHDTV (ultra-high definition TV), the Internet of Things and home automation. It also includes the technology forecast of Shawn DuBravac, Chief Analyst and Director of Research of CEA (Consumer Electronics Association), which organizes the yearly International CES.

Also featured are MEMS, these tiny electromechanical systems that are now an indispensable component of any piece of electronic equipment, from smart phones, to tablets, to wearable devices, cars, aeronautics and much more.

The IEC, through several of its Technical Committees, has worked to prepare International Standards that lay out safety and performance requirements for those technologies.



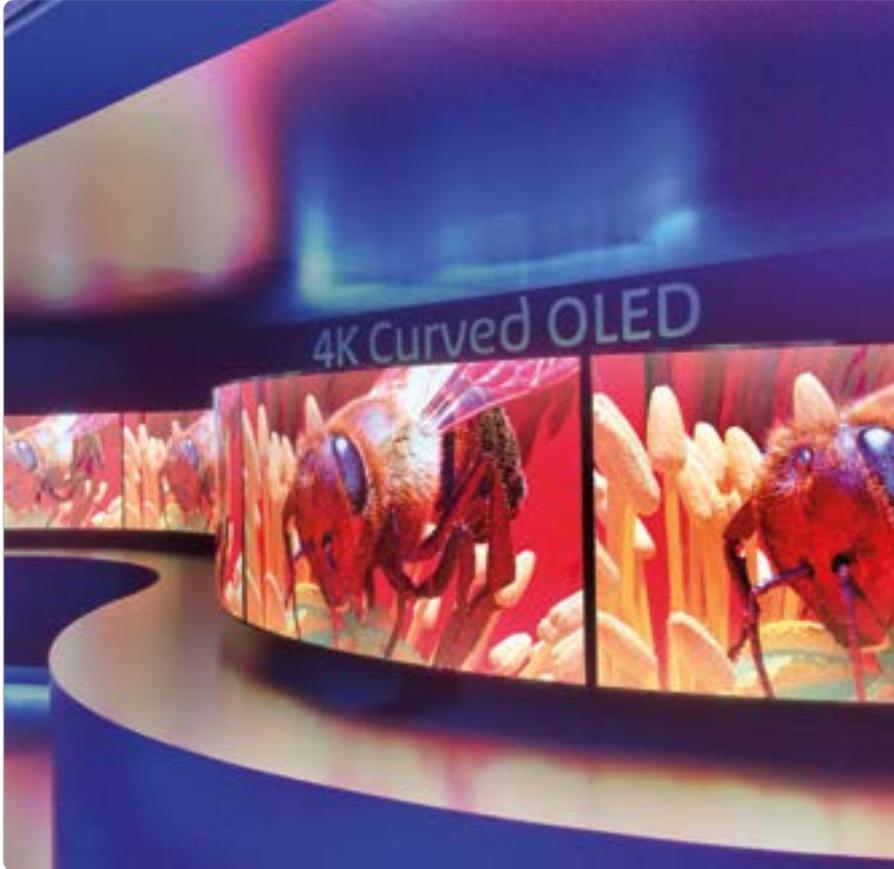
This smart watch keeps you connected to your phone via Bluetooth and via its touchscreen, acts as a wireless dialer, allowing users to handle calls directly from their wrist (Photo: My Kronoz)



The iHealth Blood Pressure Dock turns your iOS device into your own blood pressure monitor (Photo: iHealth)

Tech trends 2014

Presentation by Shawn DuBravac, International CES in Las Vegas



The expansion of multidimensional and curved screens, UHD TV are trending big in electronics

Gabriela Ehrlich

The electronics industry is one of the fastest innovating industries globally. In 2013 USD 6 billion worth of electronic products were sold in categories that didn't exist just a few years ago, including for example 3D printing, connected devices or tablets. IEC work covers a myriad of components, wires, sensors, LEDs, semiconductors, switches and protocols that allow modern electronics to function reliably and safely anywhere in the world. While this presentation focuses on CES trends in 2014, broad electronic trends don't play out over a single calendar year, they generally build up over several years.

The 3rd industrial revolution – mass customization

The first industrial revolution started around 1760 and lasted until approximately the 1830s. This was the time when small shops and enterprises combined into larger facilities and factories. It was a move from hand production, where everything was individually built to the use of machines and more standardized, exchangeable methods. This was the very beginning of mass production.

The second industrial revolution happened between 1860 and WW II when mass production capacity was fully reached. During that time span electricity and many different technologies were added. Different World Fairs in Paris

(1881) and St. Louis (1904) saw the introduction of numerous electrical innovations that fundamentally changed the daily lives of our grandparents. In 1906 the IEC was founded.

In 2013 the 3rd industrial revolution made a break-through ringing in an era of mass customization. Mass customization allows individuals to tailor make a mass produced product. Take for example a tennis shoe: with mass customization customers were given the opportunity to individually select and combine different colours, materials, soles and finishes to end up with a shoe that very likely would be unique in this combination. The same was true for stamps or credit cards and more recently electronics and services provided for certain devices.

3D printing

3D printing is a further expression of this trend towards mass customization. In 2010 the Makerbot, the first consumer accessible 3D printer was launched at CES with a price tag of under USD 2 000. Today, at CES 2014 more than 30 companies exhibited hardware, software and services for 3D printing, including the first 3D scanner for just over USD 500.

Evolution of the Internet

Today there are 2 billion desktop computers and 1,5 billion smart phones and tablets. In 2014 smart phones and tablets will for the first time surpass the number of installed desktops.

Until recently the Internet was a browser-driven experience. We are now moving from a desktop Internet experience to a mobile phone experience and then one that's driven by numerous connected devices. According to CISCO, the



3D printing is a perfect example of the trend towards mass customization

number of connected devices in the market will reach 50 billion in 2014.

All of this is also changing how we use the Internet. Initially, the Internet was a shared experience – access to a computer was shared by several people in the household. This made place to individual Internet access via mobile devices and tablets. In the near future we will experience customized niche Internet access via connected devices.

Such connected devices allow consumers to experience different activities such as keeping in touch and playing with their dog when they are travelling; checking the moisture level of their plants; monitoring their heart rate or insulin level, checking on the daily activity level of their kids, and much more.

Multidimensional screens

Another trend in electronics has been the expansion of multidimensional screens including a boost in resolution, size and colour. In 2009 there were no screens available beyond 135 cm (53 inches) and most Smart phone screens were around 7.5 cm (3 inches). Now TVs beyond 165 cm (65 inches) are becoming quite common and some of the bigger smart phones boast 14 cm (5,5 inches) screens.

Over 270 million tablets are expected to sell in 2014 up from 0 in 2009. Beyond phones and TVs a multitude of interactive screens are now found on

items such as household equipment, watches and other devices; many with screens that are smaller than 2,5 cm (1 inch).

Colour, resolution and shape

But size is only one dimension of what has changed in screens over the past 2 or 3 years. In 2013 a single Ultra HD Television was presented at CES; this year dozens of companies sell them. When the first Ultra HD TV was launched movie directors remarked that this was the first time they saw on a TV what they see when they film. In 2014 UHD TV shipments are expected to reach 485 000 up from 60 000 in 2013.

Flat screens are...flat. The latest fashion is for curved screens both for smart phones up to huge TVs.

Age of autonomy – Internet everywhere

In 2006 sensors were rarely found in electronics; they were generally reserved for cameras and most were used in airbags. In 2007 the iPhone was launched and its accelerometer allowed it to change screen direction depending on how it was held. Since then the cost for sensors has dramatically decreased from approx. USD 7/unit to USD 0.60/unit today. There is not a single technology where sensors today don't play a major role. They have literally invaded everything enabling measuring, data capture and constant feedback. Any smart phone today has multiple digital microphones to capture voice and to cancel environmental noises, one or more cameras, motion sensors and more. And this is not the end. Sensors and MEMS (micro-electromechanical systems) will continue to change electronics dramatically over the coming years.

Hybrid innovation

Six or seven years ago car manufacturers started to come for the

first time to CES. Now many present their new cars at CES. Where HP used to be the most exciting measurement for car performance in the past, today it is design and electronics that drive their sales.

Many accessories from cruise control to parking sensors are now standard equipment in modern cars. Short of offering driverless cars, this year at CES lane assist and automated parking systems have been added to the offer. Again, all of them make extensive use of sensors as well as front and rear cameras. The integration of different technologies with software and sensors leads to massive amounts of data that bring on fully autonomous solutions to complex problems.

Digital everything

Today everything is digitized: from life style and fitness level, to posture, eye movements, sleep patterns, door locks, etc. Basically everything that existed physically is now becoming digital. Everything that was difficult and cumbersome to measure is now measured on the go. Data was always available but it was never captured to this extent and in such an organized way. Many technologies help capture data, those include radio for every range, LTE 2G, 3G; Wi-Fi; Zigbee; ANT+; -wave; Bluetooth, and more.

Constant monitoring and measuring allows for constant adjustments. It used to be that store prices were fixed and only changed when new products were delivered because it involved the physical movement of an employee to the shelf and that added cost. Today prices change constantly according to supply and demand and they are remotely digitally controlled.

Curation & context

This constant feedback of data provides opportunities for many new

information services. Those can include recommendations for improved viewing or reading, or pre-settings in devices that take into account preferences such as temperature or volume settings. If we allow them to, in the future smart devices may sense if a person is depressed or stressed and propose an appropriate entertainment programme that takes into account overall genre preferences. It may also register food preferences and point to relevant menu items in a restaurant. The possibilities are near limitless.

Wearables and sensorization of consumer tech is the biggest trend in 2014.



The new Chevy MyLink display, with an icon for GM's AppShop (Photo: Sean Gallagher, Ars Technica)

2014 CES megatrends

Connected devices everywhere for everybody

Gabriela Ehrlich

From dog bracelets to pill boxes, to devices that measure our health and fitness levels, the Internet of Things has become the Internet of Everything. At CES, literally hundreds of companies presented connected devices that aim to give us more control over our bodies and the things that surround us. The combination of new hardware with software and data collection is bringing new functions to everyday things. IEC work including printed electronics, MEMS, semiconductors and innumerable other components largely facilitates the broad development and roll-out of these technologies.

A megatrend in 2014 are connected devices. They collect masses of data through all kinds of wearable sensors. But how this data will be used and by whom remains to be

seen. In the meantime the market is flooded with devices that offer niche functionalities to monitor our bodies, companions and our environment.

Promising better sleep

Feeling tired in the morning? One of the gadgets presented at CES was a Smart Sleep System. A typical combination of new hardware, data collection and a smart phone. A bedside device records the sleep environment (noise pollution, room temperature and light level), and delivers light and sound programmes that help stimulate better sleep. A soft sensor that is placed under the mattress monitors personal sleep patterns, sleep cycles, body movements, breathing and heart rate. The two are complemented by a mobile app that receives the collected data and lets the user visualize his or her sleep cycles to better understand when and why they wake up.



Smart wristbands track activity, sleep and food consumption to help their wearers make healthier choices (Photo: Jawbone)

Taking care of Fido

Several connected devices presented at CES were destined for dogs and their owners. One of the more interesting ones was a smart collar stuffed with sensors that allows to monitor a dog's activity and rest levels, calories, heart and respiratory



Voyce has developed a smart collar for dogs (Photo: Voyce)

rate. That data is collected over Wi-Fi. Information can be tracked over time and can be shared with the vet if needed. Increases in heart rate for example can indicate if a dog is in pain and provide an early warning system when it is time to go to the vet.

Beauty and the sun

Connected devices can be beautiful and useful too. The proof: a UV measuring bracelet presented at CES that was designed by the designer behind Louis Vuitton and Harry Winston jewellery brands. It monitors UV intensity and synced to an iOS device alerts users on the level of sunscreen to be applied and when the skin has had too much exposure to the sun. The bracelet tracks daily habits and advises women on how to better take care of their skin. The app calculates maximum sun exposure for a given skin type

and reveals details about how much impact it's had on the skin throughout the day.

Watching out for granny's health

A multitude of health related hardware and applications were presented at CES. Again the aim for many of them is to make things simpler for the patient while providing added information and relevant data to the practitioner. While previously heart rate values or blood pressure would be measured with cumbersome devices during a whole day or occasionally at the doctor's office, now real time information can be collected and later shared, leading to better diagnostics and treatment results.

Taking medication can be complex and often important treatments are not taken in a timely manner, jeopardizing the final outcome. A connected pill box launched at CES can help elderly patients and their caregivers to ensure that pills are taken on time. The box can be filled by the pharmacy or the care giver. Light as well as sound alerts via SMS, email or voice notifications inform the patient that it is time to take their pills. The relevant

pill compartment lights up to inform the patient that it is the next one to be emptied. If programmed, the caregiver can be informed if and when the medication has been taken.

Don't lose your head

A new sensor cap for people who participate in impact sports may provide early warning when an impact to the head (with or without helmet) of the wearer threatens his or her health, getting them to the doctor in time. The cap has a gyroscope, accelerometers and a microprocessor all hooked up to flexible printed electronics. A warning light in the back of the cap blinks when an impact reaches a level that requires medical attention.

And while all these devices are now stand-alone, in the future their data and functionalities may well merge when and where useful. The only issues still standing in the way are standardized data sharing protocols and overcoming potential privacy concerns, and as one doctor put it: avoiding getting swamped by the masses of data, extracting only those that are useful and comparable.



This sensor cap by Reebok alerts its wearer when an impact reaches a level requiring medical attention (Photo: Reebok)

Advanced displays for better content

UHDTV displays becoming viable consumer option

Morand Fachot

New display technologies are driving up the sales of equipment worldwide. The rollout of 4K or UHDTV (ultra high definition TV), which offers four times the resolution of current 1080p HD, is forecast to bring about a spectacular growth in the sale of sets. Mobile devices also benefit from developments in display technologies, including flexible screen displays. A number of IEC TCs (Technical Committees) prepare International Standards that make these advances possible.

The display world is flat

Flat panel displays ousted CRT (cathode ray tube) screens relatively rapidly in IT equipment; by contrast they took a comparatively long time to replace them in the TV environment. CRT-based TV sets still made up 99% of the market in 2002, before their share dropped dramatically to less than 10% in 2011.

In recent years new display technologies and the availability of the right content have been the main drivers behind the introduction of new products in the consumer and professional markets.

Major equipment trade fairs, like the recent International CES (Consumer Electronics Show) that takes place every year in Las Vegas, USA, offer a good indication of technologies and products that are set to come onto the market in the near future.

One of these which attracted particular attention at CES was UHDTV. In the last couple of years UHDTV sets have



OLED displays offer better pictures than LED screens (Photo: Sony Corp.)

been present in shows around the world, but sold in small volumes owing to their extremely high prices. They are now becoming a viable consumer option as prices are dropping sharply and production levels are ramping up rapidly.

Only 63 000 UHDTV sets were sold in 2012; 1,9 million units were shipped in 2013 and sales are expected to exceed 12,5 million units in 2014, according to a December 2013 industry survey. One key factor in this dramatic growth is falling prices; these are expected to drop to under USD 1 000 in China and USD 2 000 in the US.

Content will be key

The adoption rate of new TV technology is highly dependent on standards for content. This was the case when HDTV was first introduced; consumers were faced with confusing signals as some sets labelled HD Ready were capable of receiving HD signals, but didn't have enough resolution to truly display HD content and had to downscale it to a lower resolution. This led to frustration on the part of many consumers who

bought equipment before sets with full HD capabilities described as 1080p (1080 horizontal lines of vertical resolution) were introduced. The availability of HD content was also a decisive factor in the adoption of the new technology.

The same issues are emerging with UHDTV but content producers and broadcasters are striving to offer more UHDTV programmes in the coming years. One transitional measure is the upscaling of HD content into UHDTV – a technology similar to that used in Blu-ray players which can convert standard definition DVDs into 1080p resolution.

Standards matter

One significant issue with the delivery of UHDTV content is the large bandwidth it requires. This would place significant strain on existing terrestrial or satellite distribution channels using current compression standards.

However, solutions are available now with the recent release of the latest video coding standard, known as HEVC (High Efficiency Video



Flexible displays will find use in mobile devices (Photo: LG)

Coding), which has been developed jointly by ISO/IEC MPEG (Moving Picture Experts Group) and ITU-T (International Telecommunication Union Telecommunication Standardization Sector). HEVC needs only half the bit rate of its AVC (Advanced Video Coding) predecessor to deliver the same content. AVC currently accounts for over 80% of all web video (see article on HEVC in this issue).

HEVC will allow the streaming and downloading of content using less bandwidth on all equipment from mobile devices to UHDTV sets, thus relieving pressure on global networks. UHDTV will also require more advanced connections, such as the HDMI (High-Definition Multimedia Interface) 2.0 specification.

TA (Technical Area) 1: Terminals for audio, video and data services and

contents, part of IEC TC (Technical Committee) 100: Audio, video and multimedia systems and equipment, includes HDMI in its specifications for DTT (Digital Terrestrial TV) and satellite and terrestrial receivers for ISDB (Integrated Services Digital Broadcasting).

Advanced displays

OLED (organic light-emitting diode) passive-matrix displays represent the fastest growing display market segment as they offer superior brightness and contrast and display pictures that appear crisper, more colourful and more vibrant than was possible before. OLED displays can operate at low voltages, often in the 5 to 20 V range. TV sets using OLED displays are being introduced on a wide scale by all major manufacturers. The range also includes the latest slightly curved screens currently being introduced.

AMOLED (active-matrix organic light-emitting diode) technology offers even better capabilities and features, better picture quality, response time and contrast. In addition, it offers lower power consumption, resulting in longer battery life, making it ideal for smartphones and other mobile devices.

IEC TC 110: Electronic display devices, prepares the IEC 62341 series of International Standards for OLED displays. It has also published IEC 62715-1-1, its first International Standard on flexible display devices.

Standardization work from a number of IEC TCs in the display and related domains cannot be underestimated as it underpins the entire global flat panel display industry, which is expected to reach USD 110 billion by 2017, according to a recent report.



Foldable phone concept using advanced screen technology

Back with a vengeance!

High-performance audio is making a remarkable comeback



High-performance audio equipment requires good connections (Photo: Yamaha)

Morand Fachot

In spite of the widely held view that high-performance audio was losing the prominent position it had in the entertainment sphere a few decades ago, it has been making a significant comeback in a different guise with connected and wireless devices. Many aspects of IEC standardization work underpin the current renewal of this significant segment of the consumer electronics industry.

High-quality audio everywhere is nothing new

Not so many years ago high-fidelity, or hi-fi, stereo sound systems, which first started appearing in homes in large numbers in the early 1970s, were considered the ultimate in home entertainment. They provided the best possible sound from sources as diverse as FM radio, LP (long play) vinyl records and tape or cassette recorders connected to amplifiers and other sound processing devices, and occupied pride of place in living rooms.

The introduction of better picture and HD (high-definition) TV caused consumers to increase their levels of TV viewing since it provided access to a greater choice of channels and

improved video experience. As a result, high-quality audio seemed to lose its aura in the home environment. This impression was confirmed by a diminishing selection of audio systems and the commensurately increasing range and availability of video equipment in specialized stores.

Audio on the move gained users with the widespread introduction of car audio systems, initially with AM then FM radio and later the addition of car tape and cassette players. Individual music listening on the move also gained momentum with the arrival of portable audio cassette players.

Back from the brink?

Contrary to the impression that might have been given by the disappearance of mass-market stores devoted to hi-fi gear, and diminishing dedicated shelf space in shops, high-quality audio never really disappeared – it just made a gradual comeback in a different guise. So-called home theatre systems and other equipment such as sound bars connected to TVs, and more recently to digital or Wi-Fi radio, the internet or home computers, have replaced old-fashioned stereo systems. They now form the backbone of high-performance audio.

Car audio systems are another manifestation of the trend. They may now be connected to digital or satellite radio in some regions, and are equipped with CD or digital audio players.

Portable audio systems have also gained in terms of listening quality and ease of use. Personal mobile digital music players and mobile phones are now in widespread use, replacing portable cassette players.

The recently held Las Vegas CES (Consumer Electronics Show) offers evidence that high-performance audio is a vibrant sector, even if it didn't make the same striking headlines as ultra HD TV, connected appliances or 3D printing. No less than 565 out of over 3 530 CES 2014 exhibitors classified themselves as "high-performance audio companies".

New possibilities, such as live streaming of concerts or music, open up further opportunities for the sector.

This renewal even concerns, on a more modest scale, what many thought was a disappearing and "old" analogue technology: LPs, which have found a second life of a sort with global sales growing nearly five-fold between 2006 and 2012, exceeding the volume sold in 1997.



SRS-X9 high-resolution wireless speaker system (Photo: Sony Corp.)



High-definition headphones (Photo: Philips)

Cutting the cord

One of the well-established issues in quality audio systems was – and still is – connectivity of certain cables. Reconnecting all the cables of the numerous components of stereo systems after a move used to represent a challenge. However that is receding, with the gradual adoption of wireless connectivity for high-performance audio.

The wireless audio device sector is a fast-growing market with one recent report expecting it to achieve a 24% CAGR (compound annual growth rate) over the 2013-2018 period to reach USD 13,75 billion. Although this report covers all sectors, including defence and automotive, it gives useful indications regarding the most significant and the fastest growing

segments, all of which are connected with high-performance audio.

Wireless headphones accounted for the largest market revenue at USD 1,25 billion in 2012, and the wireless sound bar market is expected to show the highest CAGR from 2013 to 2018.

Wireless audio technology represents a revolution in audio experience as it allows users to enjoy high-quality audio from a variety of sources – including small portable devices – and locations, even on the move, without the inconvenience of being tied to cables or confined to a fixed location. Industry experts consider that wireless technology in audio devices will contribute significantly to the growing audio industry.

IEC standardization support for high-quality audio

IEC standardization work for audio equipment predates the 1995 creation of TC 100: Audio, video and multimedia systems and equipment. TC 100 was formed from the merger of several existing TCs and SCs (Subcommittees).

Its contribution to audio standardization includes the IEC 60268 series on sound system equipment. This covers many audio components and applications, including amplifiers,

loudspeakers, headphones and earphones, automatic gain control devices and the application of connectors for the interconnection of sound system components and for broadcast and similar uses.

Countless other IEC Standards cover various characteristics of audio equipment.

IEC standardization concerns a wide variety of aspects that make high-performance audio and its plentiful availability possible with Standards that focus not only on equipment but also on the software that is required. These Standards include advanced digital compression coding/decoding standards for audio and video content (see article in this *e-tech* on the latest digital audio / video compression coding) and International Standards on DLNA (Digital Living Network Alliance) guidelines that allow the design of interoperable devices in the home environment (see article on the latest Standard on DNLA Guidelines in this *e-tech*).

What was foreseen by many as the impending demise of high-quality audio a few years ago appears now as a mere blip that heralded a remarkable renewal of this important segment of the entertainment industry. IEC International Standards will make a major contribution to this expansion.

Tiny MEMS

Huge impact on our digital future

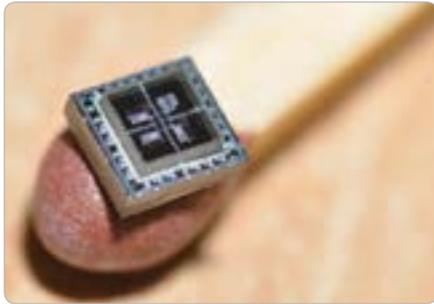
Gabriela Ehrlich

MEMS, tiny electromechanical systems, are now an indispensable component of any piece of electronic equipment, from smart phones, to tablets, to wearable devices, cars, aeronautics and much more (see also article on

CES trends in this e-tech). Often MEMS outperform their macro scale counterparts achieving feats much larger than their size. IEC work both in standardization and conformity assessment plays an important role in the further expansion of this technology.

What are MEMS

MEMS (Micro-Electro-Mechanical Systems) are miniaturized mechanical or electromechanical elements that vary in size from 1 to 100 microns, approximately the thickness of a human hair. They were invented in the 1980s and are now present in most modern electronics.



MEMS are tiny electromechanical systems that vary in size from 1 to 100 microns

MEMS all look different and can be anything from relatively simple devices without moving elements to extremely complex electromechanical systems with multiple moving elements under the control of integrated microelectronics.

The micro sensors and actuators in MEMS are also called “transducers” as they convert energy from one form to another. In the case of micro sensors, the device typically converts a measured mechanical signal into an electrical signal.

To make MEMS, generally thin layers of material are deposited onto a base and then selectively etched away, leaving a microscopic three-dimensional structure. The electrical elements process data while the mechanical elements act in response to that data. An integrated circuitry provides the thinking part of the system while the MEMS components complement the system with active perception and control functions.

Micro outperforms macro

Today MEMS are used for a large number of sensing modalities, including temperature, pressure, inertia, chemical, magnetic fields, radiation, etc. Remarkably, it seems that many of these micro machined sensors have demonstrated performances that sometimes exceed those of their macro scale counterparts. Memsnet.org, the information site for the MEMS and Nanotechnology industry puts forward

the example of a pressure sensor made to the most precise macro scale level machining technique that is outperformed by a micro scale pressure transducer.

High performance, small in size, cheap to produce

While the performance and size of MEMS are important arguments for the electronics industry, their production cost has been steadily decreasing. Today an average unit costs around USD 0,60, down from USD 7 in 2006.

All kinds of electronics

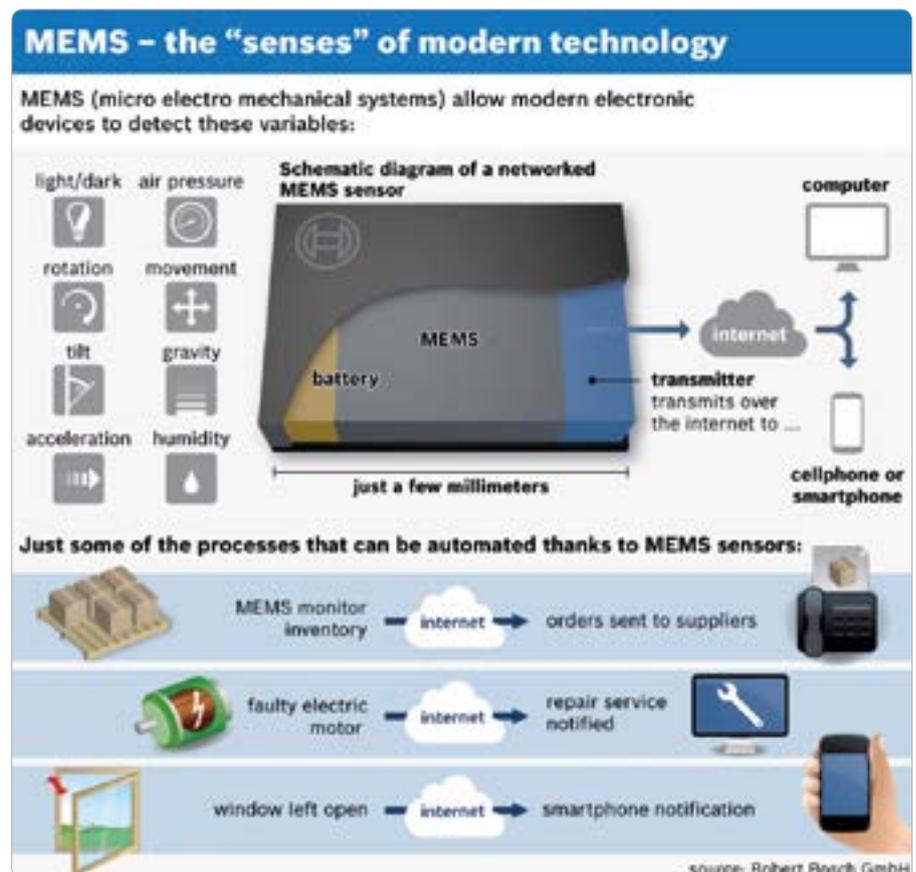
For all of the above mentioned reasons, MEMS are now found in an increasing number of devices, many of which are used every day by millions of people. But MEMS have also found their way into industrial applications such as for

example micro valves to control gas and liquid flows; optical switches and mirrors to redirect or modulate light beams; independently controlled micro mirror arrays for displays; micro pumps to increase the pressure of fluids; micro flaps to modulate airstreams on air foils, and many others.

Often these tiny devices can perform mechanical feats far larger than their size would imply. For example, researchers have placed small micro actuators on the far edge of air foils of an aircraft and have been able to steer the aircraft using only these micro miniaturized devices.

A fast growing market

With the proliferation of smart consumer devices and especially smart phones, the MEMS market is increasing by double digit CAGR (compound annual growth rate) and it



MEMS sensors, embedded in a variety of objects, can send their readings over the internet to a user’s smartphone (Photo: Bosch)

More on MEMS

Processing motion

MEMS motion sensors detect the orientation of any device, where it is heading and its absolute location in three-dimensional space. By fusing the data streams from different MEMS (accelerometers, altimeters, inclinometers, etc.) they are for example used to control the hardware of game consoles or inform software such as security protocols or location-based services.

Sharper images in millions of shades

The MEMS micro mirror chip (DMD) is frequently used in consumer electronics and particularly in video projectors and televisions. This chip uses microscopic moving mirrors to improve the image quality and reliability of these products. The mirrors are mounted on tiny hinges that allow them to tilt either towards the light source to reflect the light or away from it to block the light. The length of time the mirror faces the light determines the brightness of each dot. They are able to produce over 16 million shades of colour and an image quality that enables them now to replace film projectors in movie theatres.

More storage and better sound

MEMS are revolutionizing mass data storage in the computer industry by miniaturizing components for disk drives, servers and peripherals.

Acoustic MEMS chips are changing the way sound reaches the human ear. They provide less distortion and higher clarity and quality of sound. For this reason they are built into cell phones, music devices but also hearing aids.

Increasing safety

In the automotive industry MEMS accelerometers are a key element of modern airbag systems. These MEMS contain a central mass that moves in response to the vehicle's acceleration. The mass is mounted on a hinge that allows it to move during driving, returning it to its original position when the car stops. Sensitive electronic circuitry read the mass's movement and relates its data to a connected micro-processor. When the mass's movement changes at an unsafe speed, the airbags are deployed protecting passengers from impact.

Opening the way for new applications

In medical applications, in addition to improving speed and reliability,

MEMS open the way for novel innovations: MEMS chips inserted under the skin of patients are able to release an exact amount of drug over time; built into a scalpel they measure the length and depth of incisions during delicate operations. Environmental sensors (for temperature, humidity and air quality), medical sensors (such as in blood-pressure monitors, glucose meters, weight scales and pulse oximeters) and wearable sensors that can invoke a personal emergency response system, all use MEMS often connected wirelessly to the Internet.

Sensing danger

MEMS low-power nano sensors are also used to detect gas leaks or saturation levels. They are so small that they can be sewn into clothing to be worn by soldiers in the field or by the elderly at home. Increasingly these MEMS sensors are placed along pipelines, around factory perimeters and in workspaces where they help increase safety and enable early warning systems.

This text includes extracts of technical explanations courtesy of www.memsnets.org

is estimated to reach USD 19.5 billion by 2016 from next to nothing in 2000, when MEMS had just begun being used in the PlayStation game console. This market acceleration in turn drives prices further down. The fastest developing MEMS categories include pressure sensors and gyroscopes.

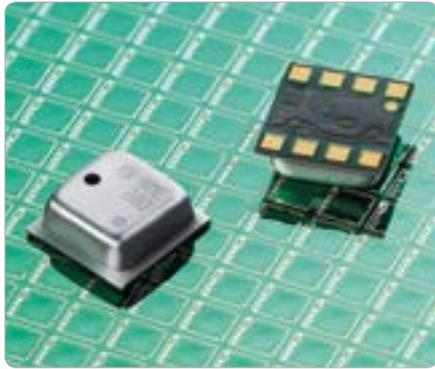
The MEMS phone

At CES a group of industry experts discussed the advancement of

the MEMS market in consumer electronics. They agreed that smart phones, while already highly dependent on MEMS will be adding a multitude of additional functions in the future with the help of further MEMS. They already incorporate accelerometers, altimeters, magnetometers (compasses), inclinometers, gyroscopes, and pressure sensors, which in combination with apps and/or

hardware drive a multitude of health and well-being functionalities.

In the future altimeters, pressure and humidity sensors will allow the development of fully localized and tailored weather forecasts or personalized GPS. Smartphones will soon know not only where we are horizontally at street-level but also what floor of a building we are on.



Some MEMS sensors, such as this one by Bosch, combine pressure, humidity and temperature measurement (Photo: Bosch)

Biochemical or radiation sensors will allow people to test food, water and their environment on the go. A gas or biosensor may be able identify alcohol levels or even certain lung diseases by identifying the breath of the person who speaks into the phone. A UV sensor may provide alerts when sun screen needs to be reapplied.

Challenges

MEMS come in many different shapes and specifications, which makes comparison increasingly difficult. The

experts at CES all agreed that going forward standardized parameters for MEMS are needed. Additionally, if algorithms are not optimized for multiple sensors then it will be difficult to achieve integrated data collection. There is a clear need for harmonization to further promote the growth of this industry.

IEC work for MEMS

IEC TC (Technical Committee) 47: Semiconductor devices and SC (Subcommittee) 47F: Micro-electromechanical systems prepare a multitude of International Standards that enable manufacturers to build better, more resistant, efficient and reliable sensors and MEMS. They cover terms and mechanical properties, basic characteristics, essential and optimal operating ratings, as well as a multitude of testing methods for materials such as bonding strengths in composites, resistance to stress, bending or thermal expansion. Together they facilitate the design, manufacture and use and reuse of micro electromechanical systems.

IECQ (IEC Quality Assessment System for Electronic Components) allows electronic component manufacturers to test and measure the safety, reliability of MEMS and ensure that they meet set requirements. Huge and growing market

The market for MEMS will grow from about USD 12 billion in 2012 to over USD 22 billion by 2018, according to market analysis published at the 12th annual meeting of the MIG (MEMS Industry Group), held in November 2013.

Laurent Robin, activity leader for Inertial MEMS Devices and Technologies at Yole Development in France, told the meeting that the MEMS sector could grow at a 13% CAGR (compound annual growth rate) for the next five years. He claimed that MEMS for mobile devices was the driver for future growth, noting that smartphones have as many as 12 MEMS chips today, growing to as many as 20 in the near future, including 9-axis sensors. IEC SC 47F standardization work will be central to that expansion.

The Internet of Things

How sensors change the sharing of information

Gabriela Ehrlich

At CES (Consumer Electronics Show) a group of experts met and shared some of the opportunities and hurdles facing the Internet of Things in the consumer space. This is a short summary of their discussion.

Information pathways are changing

Until recently information was harvested from public sources, the Internet or purchased from information suppliers.

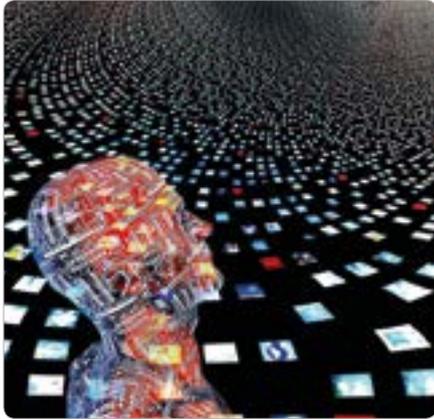


Physical objects, such as this glucose monitoring device, make use of sensors and actuators to link with each other through wireless networks (Photo: iHealth)

But the predictable pathways of how information is gathered, stored and shared are changing. The physical world itself is becoming an information system.

In what is called the Internet of Things, sensors and actuators embedded in physical objects from streets to blood pressure monitors are linked through wireless networks. These networks produce huge amounts of data.

Connected devices that are able to sense their environment and share



One of the biggest challenges facing the Internet of Things is obtaining permission to access and use data

on the Management and Internet of Things. The aim is to identify market requirements and standardization gaps.

However, even though not everything is yet standardized in this space, the experts at CES felt that even if a manufacturer bet on the wrong horse, since often solutions and analytics stay the same, they can switch at a later point. They also mentioned that

many appliances are already smart and connected and that such connectivity is only getting cheaper.

In reality the innovation cycle is never finished. Manufacturers will always need to try to open new revenue streams through innovative data analysis. Consumers will increasingly contribute to the creation of services and devices by providing feedback on the next functionally they want.

The total benefit will only be achieved once everything is connected and that takes stamina and long-term investment. Only those will survive who best translate consumer needs and wants.

Standards developers will need to be responsive to the market and they also need to develop solutions that will be stable in the long run.

Protecting against cyberthreats

As regards privacy and security, one expert, Marc Rogers, principal

research analyst at mobile security firm Lookout, said that dealing with these “aspects of the Internet of Things is going to be one of the biggest challenges we have faced in security for a long time.”

The security risks were highlighted when it was revealed that more than 750 000 malicious emails had been sent from over 100 000 smart devices, including a refrigerator, over the holiday period, according to Proofpoint Security, a Silicon Valley-based cybersecurity company.

IDC, a research firm, predicts that more than 200 billion items will be connected to the Internet by 2020. With so many connected devices the potential for cyber-attacks is huge.

Companies that produce smart devices will have to ensure these provide a good degree of protection from cybercrime for consumers. The latter will also need to take security seriously, as computer users should do.

Standards in the Cloud

Interview with Don Deutsch, Chairman of ISO/IEC JTC 1/SC 38, Distributed Application Platforms and Services

Don Deutsch, chairman of ISO/IEC JTC 1/SC 38, Distributed Application Platforms and Services, shares his thoughts on the importance of standards for the paradigm-shifting field of cloud computing within the information technology sector and the role of SC (Subcommittee) 38. Also discussed are ISO/IEC JTC (Joint Technical Committee) 1: Information technology, various consortia in the development of cloud computing standards, and what may be expected for

the future of cloud computing standardization.

Standards for clarity and interoperability

e-tech: Why are standards important for cloud computing?

Standards are important in the IT (Information Technology) sector because they enable products to interoperate. That is to say, information technology products from multiple vendors can work together when they incorporate standard interfaces. IT



Don Deutsch, Chairman of ISO/IEC JTC 1/SC 38: Information technology/ Distributed application platforms and services



In today's interconnected world, standards are absolutely essential

products rarely operate in isolation or solely with other products from the same vendor. Consequently, in today's interconnected world, standards are absolutely essential.

As an emerging vehicle for providing information technology services, cloud computing can benefit from standards. When people talk about cloud computing they mean various things. To provide clarity and a basis for developing future cloud computing standards, SC 38 is developing a definition of cloud computing. Currently under development by SC 38, ISO/IEC 17788, *Cloud Computing - Overview and Vocabulary*, includes a concise definition of cloud computing. Since the standards process is a process of gaining consensus among various different constituencies, this is a consensus definition. According to this document that is being proposed as an International Standard cloud computing is described as: "a paradigm for enabling network access to a scalable and elastic pool of shareable, physical or virtual resources with self-service provisioning and administration on-demand".

At the bare minimum, cloud computing is a form of information technology involving the use of resources that are not owned, controlled or maintained by a single user. Rather, the resources are accessed over a network and are shared among a community of users. With cloud computing those resources can be dynamically provisioned – if users need more computing power, more storage or more processing capabilities, then these resources can be provided. Cloud computing services may be provided by more than a single computer or even a single computing centre; users may actually be sharing resources across various facilities that may not even be co-located.

Standards to guide the Cloud transition

It is important to note the word "paradigm" in the definition of cloud computing outlined in the ISO/IEC 17788 draft standard. Cloud computing is a shift in the paradigm for providing IT capabilities to users, and a great deal of future IT activity is likely to take place within the context of cloud computing. Because cloud computing has the potential to disrupt the IT products and

services marketplace, there are strong demands for near-term cloud computing standards, especially from governments.

The information technology industry has undergone significant changes throughout its history, such as the transition from the mainframe (centralized computing) era to the distributed computing era and personal computing. With cloud computing, we may be experiencing another important transition; the standards developed by SC 38 promise to be an essential part of getting that transition right.

e-tech: What is ISO/IEC JTC1's role in cloud computing standards? What part is SC 38 playing?

ISO/IEC JTC 1 recognized the emerging field of cloud computing (and the desire to develop cloud computing standards) when in 2009 it established SC 38: Distributed Application Platforms and Services. At the time, there were three different converging demands that were brought to the JTC 1 plenary. After six years of studying standardization requirements for web services – a technology for providing capabilities across the network through the World Wide Web – JTC 1 was considering whether to begin developing web services standards. At the same time, China proposed that JTC 1 work in the area of SOA (Service Oriented Architecture), another underlying technology closely related to web services. The third converging initiative came from Korea, with a proposal that JTC 1 look into the new area of cloud computing. Recognizing the strong relationships among these technologies, JTC 1 established SC 38 with the title of DAPS (Distributed Application Platforms and Services) so as to address these three areas: web services, service oriented architecture, and cloud computing.

Ongoing focus on cloud standardization

As the work of SC 38 has evolved over the last four years, I have found that

the overwhelming focus of SC 38 today is on cloud computing. The work on web services is nearly finished and there is no new development of web services standards. The work on SOA in SC 38 is still ongoing, but winding down. However, there is a tremendous amount of interest and effort in the area of cloud computing.

To date, SC 38 has focused on preparing two important documents for cloud computing in collaboration with ITU-T (International Telecommunication Union Telecommunication Standardization Sector): ISO/IEC 17788, *Cloud Computing - Overview and Vocabulary* and ISO/IEC 17789, *Cloud Computing - Reference Architecture*. In addition to preparing these documents, SC 38 has initiated work on the definition of a standard SLA (Service-Level Agreement) for cloud computing.

Adapting to meet changing needs

Recognizing the heavy shift in focus of SC 38 towards cloud computing, at the SC 38 Plenary in Kobe, Japan, in September 2013, I initiated a study group on future work in the area of cloud computing and related technologies. My anticipation is that the work of this study group will result in new projects being proposed, and that there may be new structures within SC 38 to develop these projects. The current working groups – one each for web services, SOA, and cloud computing – do not properly reflect the interest and level of effort that we have in the cloud computing area; new structures might better deploy our resources to carry out what is likely to be a more robust programme of work in the area of cloud computing.

e-tech: What is ahead for SC 38 in the next couple of years?

The first step in the standardization process is for the provider community and standards-setting organizations to come to a consensus as to which standards are required, beyond

those standards that already exist or are currently being developed. Because cloud computing is still in the rapid innovation stage, this idea of consensus on required standards is extremely important to its success.

Future cloud standardization

Heading up the study group on future work in cloud computing mentioned above is someone from NIST (National Institute of Standards and Technology), the US federal technology agency. NIST is one of the big demand-pull organizations and represents a major market for most of the US providers; in addition, NIST is looked to in much of the rest of the world as a trusted player in defining requirements for users, especially for governments – many of which are represented by major players in JTC 1.

This study group should help SC 38 decide where to go beyond vocabulary and reference architectures. Over the next couple of years SC 38 will determine which standards are required for cloud computing and will play a significant role in providing those standards.

I do not expect SC 38 to define all of the standards that are required for cloud computing, but it should be in a position where it is able to recognize what standards are required. It can then become a consolidator of the standards that are produced from a wide and diverse community of standards-setting organizations and can develop the additional required standards not being developed elsewhere.

Coordination and leadership

SC 38 is uniquely positioned to serve as a consolidator of cloud computing standards because of the JTC 1 PAS (Publicly Available Specification) process. This allows specifications developed through consensus processes outside the formal structure to be transposed into JTC 1 and

recognized as International Standards. To date, most of the international technical standards in the area of cloud computing have come as PAS submissions from consortia addressing the lower levels of the cloud computing technology stack; that is, those focusing on standards for infrastructure as a service.

Foundation standards

The standards that have been worked on directly by SC 38 are the vocabulary and reference architecture standards, ISO/IEC 17788 and ISO/IEC 17789. Over the next year, I expect SC 38 to complete these foundation standards and to identify the requirements for additional cloud computing standards. Only then can SC 38 embark on developing these standards and/or fulfilling the need with standards brought in from elsewhere.

e-tech: Many standards organizations are developing cloud computing standards. Are they competing with SC 38?

I do think that we are in a new era, in that technology convergence is real. The mechanisms that we set up for international standards 50 or more years ago divided technological standardization into three fields, with ITU covering telephones and telecommunications, IEC taking on power generation and power distribution and ISO attending to areas not covered by the other two. When the need for IT standards was first recognized, ISO and IEC both claimed to have a stake in the sector. In order to avoid competition in this field, both organizations agreed to set up their first joint technical committee, known as JTC 1.

JTC 1's global role

JTC 1 is the recognized source for global information technology standards. Its voluntary, non-regulatory, nature has allowed the IT industry to thrive over the years. The

broadcasting limitations in terms of services and quality, compression standards that could be used in digital broadcasting and other applications were developed.

MPEG (Moving Picture Experts Group), a working group of experts, was formed by the IEC and ISO (International Organization for Standardization) in 1988 to prepare these types of Standards jointly with ITU-T (International Telecommunication Union Telecommunication Standardization Sector) Study Group 16, Multimedia, also known as VCEG (Video Coding Experts Group).

ISO/IEC 11172-1, the first of the Group's five-part series, also known as MPEG-1, was published in 1993 by ISO/IEC JTC (Joint Technical Committee) 1/SC (Subcommittee) 29: Coding of audio, picture, multimedia and hypermedia information.

MPEG-1 covers the coding of moving pictures and associated audio for

digital storage media at up to 1,5 Mbit/s or so.

The first of the ten-part ISO/IEC 13818 series, or MPEG-2, also known as ITU-T (Recommendation) H.262, which provides additional features such as support for interlaced video, was published in 1996. It is the most widely used format for digital television signals broadcast over-the-air (DTT, or digital terrestrial TV), cable and DTH (direct to home) satellite transmission, as well as for other applications such as DVDs.

Digital compression offered a significant advantage as demand for more services increased rapidly. For instance, a single 30-36 MHz satellite transponder used for DTH could carry just one analogue channel, but up to 16 digital channels encoded in MPEG-2, making satellite broadcasting much more cost effective and also resulting in more efficient use of the terrestrial frequency spectrum.

Improving efficiency

ISO/IEC 14496, the series of Standards known as MPEG-4, further improved on MPEG-2, in particular as regards digital video coding. MPEG-4 Part 10, advanced video coding, or AVC, also known as ITU-T H.264 or MPEG-4/H.264 AVC, reportedly provides the same quality as MPEG-2 with less than half the bitrate.

AVC is used in Blu-ray Disc and stereoscopic 3D video content.

Another digital multimedia format, MPEG-4 Part 14, better known as MP4, is also widely used to store video, audio and associated data, such as subtitles. In addition it allows streaming over the Internet.

The latest digital compression coding/decoding standard of the same family, ISO/IEC 23008-2, *High efficiency video coding (HEVC)*, or ITU-T H.265, was published in December 2013. It will allow the storage and distribution of UHDTV (ultra high definition TV) content. The term UHDTV covers both so-called 4K (offering twice the horizontal and vertical resolution of the 1080p HDTV format and four times as many pixels), which is currently being rolled out, and future 8K (four times the horizontal and vertical resolution of 1080p and 16 times as many pixels).

4K was the most popular innovation trend presented at this year's CES (Consumer Electronics Show) in Las Vegas, according to an analysis of the Twittersphere, an indication of growing interest from both industry and consumers.

MPEG-2 still Standard of choice

MPEG-2 is still widely used, in particular for SD (standard definition) content. According to a study by the satellite industry Market Research and Consulting company NSR (Northern Sky Research), 73% of



Viewers can access more higher-quality content thanks to digital compression (Photo: Sony Corp.)



This SES-5 satellite under construction can beam hundreds of channels thanks to digital compression (Photo: SES – www.ses.com)

the 23 182 SD channels it attributed to the global satellite market as of the end of 2012 were still broadcast in MPEG-2 or another similar format.

However, NSR notes that no less than 86% of the 3 836 HD/3D channels carried globally at the end of 2012 were broadcast using MPEG-4 encoding. To a large extent this trend was

also observed for similar channels broadcast via DTT or cable.

As is often the case, the first regions/countries to adopt a technology are likely to be the heaviest users years after newer technologies are introduced. Some 80% of SD channels in North America and 90% in Western Europe use MPEG-2 encoding compared to regions like Sub-Saharan Africa or South Asia where about half of the current SD channels are being carried in MPEG-4.

This tends to show that new technologies do not always displace older ones, but operate alongside them whilst also opening up new opportunities. MPEG-2 made possible the introduction of more channels in better definition compared to analogue broadcasts; MPEG-4/AVC allowed more HDTV channels and 3D content; HEVC is now paving the way to UHDTV, but MPEG-2 is still widely deployed.

International recognition

The economic impact of the digital compression coding/decoding Standards prepared jointly by ISO/IEC MPEG and ITU-T SG 16 cannot be overemphasized. A highly significant and growing share of the global broadcast media industry market, which is expected to reach nearly USD 600 billion in 2017, relies entirely on these Standards.

This contribution to the industry has been recognized by the US National Academy of Television Arts and Sciences (NATAS) which gave MPEG an engineering Emmy Award for its work on “International Standardization of JPEG, MPEG-1 and MPEG-2” in 1996, and two additional Emmys in 2008 and 2009 covering, respectively, MPEG-1 and MPEG-2 coding associated with video, CD and MP3, digital TV, set top boxes and DVD, and MPEG-4 AVC.



MP3 players like this Sansa Clip+ make for better audio on the move experience

Food print

3D food printer aims to help promote home cooking



The Foodini 3D printer (Photo: Natural Machines)

Claire Marchand

“Darling, what should I print for dinner tonight?” Not cook, not bake, but print. This question, which, six months ago would have seemed odd, may be one frequently asked in households later this year. The 3D printer – where anything from a prosthetic foot for a duck to a toy car or a handgun can be created in a matter of hours – is now set to revolutionize the way food is prepared.

Customizing your kitchen preps

Foodini, as it is called, is a 3D printer that can produce a range of foodstuffs,

from chocolate cake, to cheeseburger, ravioli or pizza and more, providing the ingredients fed into the machine are soft, moist and malleable. The device can print food items in a variety of shapes and also be used for the finishing touch, such as decorating plates, squirting on a pattern of icing or applying a layer of melted cheese. Food lovers can use their imagination and creativity to come up with customized, visually appealing dishes.

Like a regular printer

Foodini works as any other 3D printer, squeezing liquid materials onto a printing bed. It can hold five capsules, each potentially containing a different ingredient, in much the same way a normal printer has cartridges containing different coloured ink. As and when each ingredient is required, the computer automatically switches from one capsule to another and then pumps their contents, at different rates of pressure and temperature, through the extruder. The machine has a heater built in to keep the food warm during the printing process.

The capsules can be home-filled but for those who want to make it as easy



Four stages in the preparation of a pizza (Photo: Natural Machines)

as possible, pre-filled, ready-to-use capsules will also be available.

Promoting home cooking

Interestingly enough, the Foodini 3D printer encourages something that many of us gave up on years ago: home cooking. Preparing a pizza or a quiche from A to Z, instead of takeaways or the frozen stuff bought from supermarkets, can become a fun thing to do.

A recipe for success?

Unveiled by Barcelona-based Natural Machines last December, the Foodini is expected to be on the market mid-2014. The launch drew a lot of media attention, but while journalists focused extensively on the technical features of the 3D printer, none commented on how the Foodini preparations tasted. The guess is their taste and flavour will depend on the quality of the ingredients used.

Several other companies are working on 3D food printers. Will they become a fixture in our kitchens, the way microwave ovens have? Only time – the next 12 months or so – will tell...



Spinach dinosaurs being printed (Photo: Natural Machines)

Connecting homes, connecting things

Internet of Things to bring major changes in connected homes

Morand Fachot

Commercial and residential buildings are widely expected to become increasingly automated and better connected, allowing them to meet the need to cut energy use as well as to provide better security and improved working and living conditions. This trend presents many opportunities, but also challenges, which manufacturers and governments are addressing. They are supported in their efforts by IEC standardization work.

Building automation essential for the future

Although it is impossible to give a uniform breakdown, owing to the existence of wide-ranging economic, climatic and other conditions, commercial buildings are reported to account for 20%-40% of primary energy consumption in industrialized countries.

Residential buildings are similarly large consumers of primary energy.

Automating buildings is seen as an attractive solution to cutting energy use in commercial and residential buildings and as an essential step in the future introduction of Smart Grids. In addition to providing better energy efficiency through automated control and the regulation of utilities (electricity, gas or water), automating buildings provides solutions for:

- enhancing security through presence simulation, alarm systems (against intrusion, fire, smoke or other hazards), remote information and intervention
- improving health care with support for the elderly through AAL (ambient assisted living)

- ameliorating living conditions and increasing comfort in terms of ambience, through the means of lighting, interconnection of existing devices and connected appliances

IEC standardization work covers all these areas.

Commercial sector leading the automation drive

Automation is more advanced in commercial than in residential buildings as the former are usually refurbished and modernised more regularly, allowing for replacement or overhaul of energy-hungry installations.

Automation in commercial buildings includes the installation of programmable thermostats, timers and sensors that switch heating off or on, ventilation, lights, escalators and other equipment such as security systems as required.

IEC SC (Subcommittee) 61D: Appliances for air-conditioning for household and similar purposes, prepares International Standards for electrical heat pumps, air conditioners and dehumidifiers. For its part, TC (Technical Committee) 47: Semiconductor devices, prepares International Standards for integrated circuits and sensors, among a wide range of other devices and systems.

Technical challenges

Automation in residential housing is more complex than in the commercial sector, notably because significant technical challenges have to be overcome to bring older stock up to modern standards.

For owners and tenants, retrofit of buildings, in particular through the installation of automated systems, is often not a priority. Retrofitting mainly concerns critical systems and often only occurs when forced to, when a system such as a boiler breaks down



Control screen in security monitoring centre (Photo: Honeywell International Inc.)

and needs replacing. Furthermore, there is always a cost/benefit analysis between landlords and tenants that rarely favours expensive retrofits, automation in particular.

Automating new houses is easier and less costly as the infrastructure needed for automation (networking, cabling, etc.) can be installed at relatively low cost as soon as construction work starts.

Widening range

Home automation combines a widening range of domains, applications and products such as home energy management and data networking, home appliances, integrated home systems, security systems and access control.

Connected home appliances, which are coming onto the market, are also set to play a growing role in home automation.

International home automation systems and standards

Work done by ISO/IEC JTC (Joint Technical Committee) 1 /SC (Subcommittee) 25/WG (Working Group) 1: Interconnection of information technology equipment - Home electronic systems, paved the way towards energy management systems with its home automation/home networking standards. These allow consumers to take control of their energy use and programme their devices to a much greater extent than ever before.

This work was followed by initiatives in several regions of the world.

In Europe, CENELEC, the European Committee for Electrotechnical Standardization, presented its draft recommendations for its SHR (SmartHouse Roadmap) Project in 2010. The goal was to project a European vision, approach and suggested way forward for smart homes. In Asia, PASC (Pacific Area Standards Congress) included HEMS (home energy



Smart washing machines like this one are entering the home environment (Photo: Samsung)

management systems) at its 2012 meeting. The approaches to energy-efficient homes in the region's most industrialized economies, Japan, China and the Republic of Korea, present certain similarities.

In Japan the Echonet (Energy Conservation and Homecare NETWORK) consortium developed a standard of the same name for communication between appliances and networks to control white goods via embedded microprocessors through wireless or wired connections.

China, through its IGRS (Intelligent Grouping and Resource Sharing) developed a similar solution. Control of the appliances that meet this standard relies mainly on wireless control. Both Echonet and IGRS were accepted as International Standards by IEC TC 100: Audio, video and multimedia systems and equipment.

Korea, through the Korea Home Network Industries Association, makes great efforts to realize smart home applications able to control power consumption of each appliance remotely, either centrally or in a distributed manner, according to the architecture employed.

Security at the forefront

Besides energy management, which is considered a leading incentive, provision of security through the installation of

various alarm and surveillance systems is another major factor in the drive towards home automation.

IEC TC 79: Alarm and electronic security systems, prepares International Standards for systems for "the protection of buildings, persons, areas and properties against fraudulent actions". Its work does not cover the production of standards for fire detection and fire alarm systems in general, but does include the following:

- Access control systems
- Video surveillance systems
- Social alarm systems
- Alarm transmission systems
- Combined and/or integrated systems, even those that include fire alarm systems
- Intruder and robbery alarm systems
- Remote receiving and/or surveillance centres

Alarm systems have been used for decades as deterrents against theft and robbery and for fire detection and evacuation warning purposes. In more recent years, other domains have seen a steady growth. They include social alarm systems and services, which allow, for instance, elderly or disabled residents in specially equipped accommodation and dwellings to activate an alarm and call for assistance in the event of an emergency.

There are 36 TC 79 International Standards for home alarm systems;



Tele-health will play an important role in ambient assisted living (Photo: BT)

21 of these are recent, having been published since 2010. TC 79 standardization work underpins a huge global market, which is projected to reach USD 62,5 billion by 2018.

Assisted living

Improving health care with support for the elderly, disabled and others through AAL (ambient assisted living) represents another major reason to expand home automation. AAL systems “encompass products, services, environments and facilities used to support those whose independence, safety, wellbeing and autonomy are compromised by their physical or mental status”.

In 2011, IEC SMB (Standardization Management Board) established SG (Strategy Group) 5 “to manage and coordinate AAL standardization work in IEC TCs, to establish and achieve interoperability and interconnectivity of AAL systems, and accessible design of their user interface”.

Writing standards is not within the scope of SG5, but more than a dozen IEC TCs, including TC 79 mentioned earlier, do standardization work that is relevant to AAL.

Improving comfort and living conditions

Home IT and multimedia systems are increasingly interconnected. This interconnection facilitates wider and improved home automation. It has been used for entertainment for a

number of years, allowing users to connect compatible devices to a home network to access and share content using, for instance DLNA (Digital Living Network Alliance) standards (see article in this *e-tech* on DLNA).

Increased IT networking and connectivity in homes allow the automated or remote operation and control of many functions such as switching on or off heating, lights, alarms and, increasingly, appliances.

Large connected appliances, such as refrigerators, cookers, washing machines or robotic vacuum cleaners that can help with chores have been demonstrated at various trade events in recent years.

International Standards for household appliances are prepared by TC 59: Performance of household and similar electrical appliances, and TC 61: Safety of household and similar electrical appliances, and their SCs.

Judging by the range of connected products unveiled at the 2014 Las Vegas CES (Consumer Electronics Show), and the functions they now offer, the signs are that these devices will be entering the home environment as major constituents of the future Internet of Things. One issue that will need addressing is the interoperability of devices and appliances of different makes. Another issue that emerged was that of privacy and security.

Information security issues

As connected appliances and devices will communicate with each other and with users via networks, often wirelessly, they can be affected by security issues and “hijacked” by ill-intentioned individuals or organizations.

The problem is compounded by the lack of awareness on the part of sellers and installers of security risks inherent to connected appliances.

The BBC reported an analyst at a security firm telling 2014 CES participants that “dealing with the privacy and security aspects of the Internet of Things is going to be one of the biggest challenges we have faced in security for a long time”.

This concern was vindicated when researchers at Proofpoint Security, a Silicon Valley-based cybersecurity company, announced in mid-January 2014 that more than 750 000 malicious emails had been sent from over 100 000 so-called smart devices, including a “smart” fridge, over the holiday period.

The IEC is involved with ISO (International Organization for Standardization) in standardization work aimed at ensuring IT security through ISO/IEC JTC 1/SC 27: IT security techniques.

Huge market with a bright prospect

The overall size of the global connected home market is difficult to assess with any precision. However, some figures indicate that it is huge and growing very fast.

In addition to the global market for electronic security systems, projected to reach USD 62,5 billion by 2018, the market for home automation and controls – lighting control, security control, access control, HVAC (heating ventilation air conditioning) control, entertainment control, outdoor control, communication protocols, standards and data distribution – is forecast to exceed USD 48 billion by the same date. Pike Research, a market intelligence company in clean technology products and services, estimates that the worldwide sales of smart appliances will total nearly USD 35 billion by 2020.

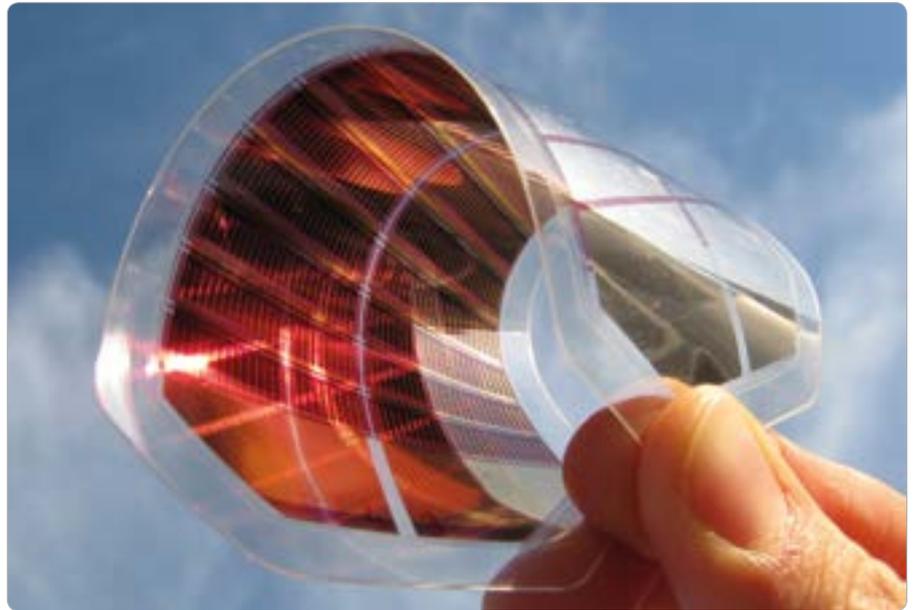
This vast market and the entire ecosystem on which connected homes and appliances are based rely on IEC standardization work.

Gearing up for standardization

IEC TC 119 Working Groups dealing with standardization on printed electronics

Dr Alan Hodgson, Chair IEC TC 119

Printed electronics is set to revolutionize the electronics industry and many other domains. It will prove a disruptive, yet creative process that will allow the production of new low-cost electronic devices. Equipment, substrates and printing processes are already widely available. IEC TC 119 was set up in 2011 to prepare International Standards in the field of printed electronics. Its Chairman, Dr Alan Hodgson, provides an update on the set up of the TC structure.



Flexible organic photovoltaic cell (Photo:Fraunhofer ISE)

Working groups set up and active

“The work of IEC TC 119 is progressing well and the Committee is starting to establish some formal structure,” says Dr Alan Hodgson, Chair for IEC TC 119: Printed Electronics. TC 119, dealing with

standardization of terminology, materials, processes, equipment, products and health/safety/environment in the field of printed

electronics, now has four working groups with three other groups that could yet achieve that status. These working groups are now active and

About printed electronics

Printed electronics is fast emerging and set to revolutionize many industrial applications. It consists in the creation of electronic devices and components using various printing methods, equipment and material.

This technology makes it possible to produce a wide variety of products that can be used in countless applications. It has other advantages, such as much lower production costs than for conventional electronics and it can be applied to flexible or rigid supports (or substrates).

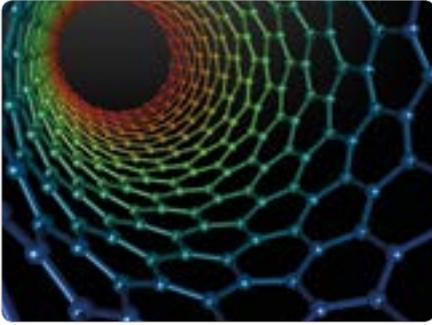
Printed electronics transforms the way electronic devices are made and employed. Using materials (inks and substrates) that have conducting, semiconducting, non-conducting, electroluminescent, PV (photovoltaic) or other properties, and different printing methods (e.g. lithography, inkjet, or screen printing,) allows great design flexibility and possibilities.

Both inorganic and organic materials are used for printed electronics. Organic materials can be found in products such as OLED (organic light-emitting diodes) displays used in television sets, computer

monitors or mobile phones, and OPVC (organic PV cells).

Innovative materials such as carbon nanotubes allow new or enhanced applications for batteries, new types of solar cells, ultracapacitors and electrical circuits.

Engineers throughout the world use printed electronics to design a variety of components and products, such as TFT (thin film transistor), flexible displays that can be unfolded to make up a large television, PV (photovoltaic) cells that fit windows or the roofs of cars or innovative and energy-efficient lighting solutions.



Carbon nanotubes are used to make printed electronic products

conducting meetings separate to the plenary sessions. As an example WG 3: Equipment, and WG 4: Printability, have arranged a meeting together at a common location in Tokyo, Japan.

There are two working groups that should be of particular interest to the OE-A (Organic and Printed Electronics Association) community, Hodgson

says. WG 2: Materials, is currently working in two major areas, he goes on to explain further. The first is standards for printed electronics substrates with the focus currently being on glass and polymer media. "I would urge readers with interest in other substrates such as paper and inkjet media to look into this work and consider involvement."

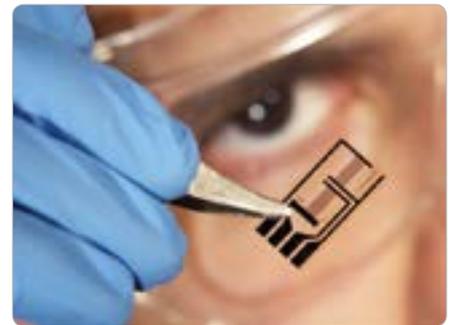
WG 3: Equipment, is setting standards for both contact and non-contact fabrication. Current work includes dimensions of printing plates and the patterns thereon and performance metrics for inkjet heads in Printed Electronics applications.

Membership and meetings

Involvement in International Standards activity is organized by country. TC 119 currently has 12 nations actively

participating with one more currently seeking association. There are also seven countries observing this work.

The next full meeting of TC 119 will take place in Cambridge, United Kingdom, on 17-19 March 2014. It will be followed by a meeting "Manufacturing for Printed Electronics" on 20 March and visits to local institutions on 21 March.



Printed electronic component

Small or huge – displays are everywhere

Supporting our thirst for multimedia content electronic displays are part of our lives



High-definition "Cloud" TV (Photo: Philips)

Morand Fachot

The top categories of products presented at this year's Las Vegas

Consumer Electronics Show and due to come onto the market in 2014 include electronic displays

that offer different characteristics and functionalities. Ultra wide monitors and TV sets, portable computing devices and wearable devices attracted most attention. All these, and any other equipment that uses electronic displays, rely on standardization work from IEC TC (Technical Committee) 110: Electronic display devices.

Ubiquitous displays

Electronic display devices dominate the multimedia and ICT (Information and Communications Technology) markets and can be found in an increasingly wide range of other domains.

The TV and IT industries have always relied on electronic displays



High-definition Kindle Fire e-reader (Photo: Amazon)

to transmit information to users. Initially this was achieved by using CRT (cathode ray tube) displays. CRT displays, first monochrome, then colour, were the only option for TV sets, computers and other systems for nearly 60 years before being phased out by FPDs (flat panel displays). The transition was rapid in the IT industry, but much slower in the TV domain. PDP (plasma display devices) and then LCD (Liquid Crystal Diode) screens came first, and now other newer technologies are gradually replacing CRTs.

Limitless range of applications

Beyond the traditional TV and IT areas, FPDs can be found in a multitude of other devices and systems such as cash dispensers and information boards. They are used in many domains, such as medical, retail,

automotive, aeronautics and avionics and transportation, all of which rely on FPDs to operate smoothly and effectively.

Electronic displays have enabled the spectacular expansion of mobile computing and telephony. They have also allowed the emergence of entirely new devices such as tablet computers and e-readers which use EPD (electronic paper display), a technology designed to mimic the appearance of ordinary ink on paper. New FPD technologies are constantly being developed, opening up additional possibilities for existing devices and paving the way for new ones.

LED (light-emitting diode) backlighting, resulting in a better image contrast and lower consumption, has been gradually introduced into LCD displays. Different

technologies using LEDs, such as OLED (organic light emitting diode display) and AMOLED (active-matrix organic light-emitting diode), have been developed to produce new types of FPDs for mobile phones and now for TV sets

TC work central to FPD expansion

The FPD market, driven by high demand in emerging economies and an expanding range of possible applications, is expected to reach USD 110 billion by 2017.

LCD continues to be the largest product segment in the FPD market while the more recent OLED technology, driven by applications in mobile phones and television, represents the fastest growing sector.

TC 110 prepares International Standards in the field of electronic display devices (excluding CRTs) and specific relevant components. It works on terms and definitions, letter symbols, essential ratings and characteristics, measuring methods, specifications for quality assurance and related test methods and reliability.

It was initially established as SC (Subcommittee) 47C in 1998 under TC 47: Semiconductor devices, focusing on standards development in the area of flat panel display. It was transformed into a full TC in June 2003 when it began to encompass standardization work in OLED, 3DDD (3 dimensional display devices for 3D TV), EPD or non-volatile display devices, FDD (flexible display devices) and other emerging technologies.

To cover all devices, TC 110 established eight WGs (Working Groups), each one dealing with a specific area: LCD, PDP, OLED, 3DDD, EPD, FDD, touch and interactive displays – which are now to be found in many devices and systems – and LDD (laser display devices).



Lorry radio, navigation and telephone system with touch screen (Photo: Bosch)

Close relationships

TC 110 works closely with a number of other IEC TCs, in particular TC 100: Audio, video and multimedia systems and equipment. As regulations in most countries now require reducing waste material and energy use through recycling, reuse of components and more energy-efficient appliances, it also works directly with TC 111: Environmental standardization for electrical and electronic products and systems.

The global significance and impact of TC 110 activities are illustrated by its relationship with many important international bodies. It works with subcommittees of the CISPR (International special committee on radio interference). CISPR is an organization within the IEC that was established to consider the protection of radio reception from interference. Its members include CIGRE (International Conference on Large Electric Systems), the EBU (European Broadcasting Union), ETSI (European Telecommunication Standards Institute), IARU (International Amateur Radio Union) and ITU-R

(International Telecommunication Union, Radio Sector).

TC 110 also collaborates with the CIE (International Commission on Illumination) and ISO (International Organization for Standardization) TC 159/SC4: General ergonomics principles – Ergonomics of human-system interaction.

Improving existing technologies, creating new ones

TC 110 works constantly to improve FPD performance, in particular as regards resolution, and in rolling out new technologies.

Resolution is continually being improved. One of the technologies that attracted most attention at CES 2014 was UHD TV (ultra high definition TV), which offers 16 times the number of pixels of HDTV and has been demonstrated at various professional shows since 2006.

The initial intention was to introduce UHD TV in homes between 2016 and

2020. This timescale has contracted as large-scale sales of UHD TV-capable devices started in 2013. The second track of TC 110 work concerns technologies. The objective is to improve existing technologies such as HDTV, 3DTV and touch screens, and to develop new ones. Examples of the latter include OLED, with AMOLED, in particular, offering significant prospects for better TV and mobile device displays, as well as flexible, bendable and even foldable displays.

TC 110 has published a series of International Standards for OLED. The first Standard for flexible display devices was released in December 2013 and the TC has now started work on Standards for LDDs and for touch and interactive displays.

With the growing global appetite for higher quality and new functions in multimedia devices, the range of applications and demand for FPDs keep expanding. To support this expansion, TC 110, which has so far published over 35 International Standards, can expect a significant workload over coming years.

Nightmare of a child chewing on a cord

IECEE Certification means safety

Aliyah Esmail

It happens to every parent at some point. Your child is playing with her toys in the living room. You step out of the room for a minute, knowing that the room has been baby proofed, feeling confident that nothing could happen. Then you come back and see that your curious little one is chewing on the television cord. A raft of nightmare scenarios pass before your eyes as you imagine what could have happened while you were gone. Then you shake yourself and remove the cord from your child's grasp. You are able to do this because IECEE, the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components, tests and certifies the safety of audio/video equipment.

Printer, computers, televisions, oh my

Audiovisual and information and communication technology equipment can be found in almost every home and



A child being hurt is any parent's nightmare

work environment. The widespread use of electrically powered devices means they have to be safe to install, operate and maintain.

IEC TC (Technical Committee) 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology, prepares International Standards to make sure that these pieces of equipment are safe to use and have around.

IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*, is the safety standard for AV (audiovisual) products and ITE (information technology equipment). This Standard is applicable

to the safety of electrical and electronic equipment within the field of audio, video, information and communication technology, and business and office machines with a rated voltage not exceeding 600 V.

Tested and certified

Having these pieces of equipment designed and manufactured according to IEC International Standards is just the first step. Manufacturers then need to prove that their products conform to the standards. Again, the IEC offers the solution, through IECEE.

The IECEE CB (Certification Body) Scheme, through its registered CBTLs (Certification Body Testing Laboratories)



Conformity Assessment certification helps to support safe devices

and NCBs (National Certification Bodies), can test and certify AV and ITE equipment manufactured according to IEC International Standards.

When testing AV and ITE equipment, IECEE focuses on multiple aspects. These include protection against access to live parts, input and current, endurance, abnormal operation, mechanical hazards and strength, switches, internal wiring, supply connection and external flexible cords, provisions for earthing and resistance to heat and fire.

The IECEE CB Scheme provides the assurance that tested and certified products meet the strictest levels of safety, reliability and performance as per the requirements of the relevant IEC standards. It helps reduce costs and time to market, eliminates duplicate or multiple testing and offers a high level of confidence for manufacturers, retailers and consumers alike.

This means that your audio/video and information technology equipment can cope with curious fingers, so long as they're playing gently, but you might



IECEE CBs can test and certify AV and ITE equipment to ensure safety

still want to keep a watchful eye open. Who knows what other kinds of trouble your child could get into?

A CA perspective from Turkey

Interview with İhsaner Alkim, Executive Committee Member, Vestel

Janice Blondeau

One of Turkey's leading companies and leading consumer electrical equipment manufacturer, Vestel has been part of IEC Conformity Assessment System IECEE for the last ten years. e-tech spoke to İhsaner Alkim, Vestel Executive Committee Member, about what this brings to Vestel and his advice to other companies, big and small.

Customer confidence in products

e-tech: How is Vestel involved in IEC conformity assessment work?

You know that the term "Conformity Assessment" means to determine whether a product fulfils the related requirements under certain standards or not. Conformity Assessment is needed mainly because the consumers want to trust the product they purchase and the governments want to have only "no-risk" products available to their people.

IECEE, the IEC System of Conformity Testing and Certification for Electrotechnical Equipment and Components, which is 3rd Party

Conformity Assessment, is highly regarded. Under these circumstances, Vestel applies for 3rd Party Conformity Assessment which is performed by independent CBs (Certification Bodies) in order to provide the highest level of confidence. This process ends up with fully trusted certifications. Our own laboratories located in our factories are authorized to be MTLs (Manufacturer Testing Laboratories) under this scheme (please see IECEE OD-2019) and we use SMTL (Supervised Manufacturer Testing Laboratory) procedure where possible.



İhsaner Alkim, Executive Committee Member, Vestel (Photo: Vestel)

e-tech: For how long has the company been involved in IEC work?

Vestel has been designing its products according to IEC International Standards for around 25 years. Our own laboratories located in our factories have been working as Manufacturer Testing Laboratories under IECEE system for 10 years.

CB certificate is a good passport

e-tech: What benefits does it bring to your company?

Vestel, as one of the biggest consumer electronics and home appliances manufacturer in Europe, is using IEC Standards and the IEC Conformity Assessment System in order to achieve the highest benefits while producing around 15 million products per year and transfer them to around 150 different countries worldwide. This reduces the trade barriers caused by different certification requirements in different countries. Having a CB certificate which is a strong passport for customs and enables a worldwide trade is really the biggest benefit for all manufacturers. Having our products



Vestel has MTL located in their factories (Photo: Vestel)

certified by an IEC CA system makes us feel the strength of this reputable organization behind us and feel the confidence that we have official and trusted approval of our products. One other benefit is that we can be so fast with IEC CA certification when entering to a market and we can reduce the costs by not performing multiple tests and approvals. The key is, "one test, one certificate, all markets" and we can do this with the IEC Conformity Assessment System.

e-tech: Approximately how many people from your company are involved in the IECEE Conformity Assessment Schemes?

Approximately 75 people are involved in the IECEE Conformity Assessment Schemes. They are experts for different IEC Standards depending on the product group and they are working with CB Test Laboratories to have CB test reports and finally CB test certificates.

Certification under IECEE Schemes

e-tech: What are the particular areas of IEC CA that Vestel is involved in?

The IEC Conformity Assessment System for Vestel is IECEE. Our products are tested according to related IEC Standards and we have

our CB test certificates together with CB test reports. This is a 3rd Party Conformity Assessment and we cooperate with our partner CB Test Laboratories and their NCBs (national certification bodies). All of our products, such as televisions, satellite receivers, monitors, tablets PCs, refrigerators, washing machines, dishwashers, air conditioners, cookers and LED lighting appliances, are certified under the IECEE Schemes.

e-tech: Do you also participate in standardization work at a national level? Could you please give some details?

We are joining the Mirror Committees of our NC (National Committee) and sharing our experience on that national platform. We will soon be joining the standardization work at an international level.

Facilitates global trade

e-tech: What advice would you give to CTOs who aren't convinced that participating in IEC work brings advantages to the company?

Trade is becoming more global day-by-day and recognition of safety, performance and other important characteristics of products is becoming more important. This makes trading

more critical than it was some decades ago. So, each manager should think about using IEC in order to have official and trusted passports for their products which then can help reach many markets worldwide. We believe that having this trusted IEC recognition on the products is a very important advantage to each company. Worldwide trade with trusted products is possible with IEC Conformity Assessment Systems.

IEC YPP growing the next generation of experts

e-tech: Can you also explain about your support of the IEC Young Professionals Programme?

Due to the importance of being involved in IEC work, we encourage our young experts to know IEC better and to play some roles in IEC where possible. We see IEC YP (Young Professionals) programme as a very well prepared programme during which the young experts get to know about IEC in detail. Each year, we apply for this programme and up to now we have joined twice; Melbourne in 2011 and New Delhi in 2013.

e-tech: Do you help to build awareness of the importance of international standardization and conformity assessment at Vestel and in the marketplace?

The awareness of the importance of international standardization and conformity assessment is now already at a mature level in Vestel. We are trying to maintain this level all the time. We are periodically performing internal and external seminars and trainings to keep this awareness level, not only internally within Vestel, but also for the marketplace. We are providing valuable information to our customers in different markets about the importance of standardization and conformity assessment, and trying to help build awareness by putting IEC approved products in around 150 countries.



IEC Conformity Assessment is bringing the vision of "one test, one certificate, all markets" closer (Photo: Vestel)

Working with IEC brings benefits to companies of all sizes

e-tech: Is there anything else that you'd like to share?

I would like to thank you for giving me such an opportunity to explain why IEC is a trusted roof for companies and how my company works within related IEC CA Systems. I suggest all companies to take advantage of IEC by means of conformity assessment and standardization work. Being involved in IEC work will provide every company many advantages regardless of their size or the markets they are

making business with. Use the key "one test, one certificate, all markets."

About the Vestel Group of Companies

Operating in electronics, white goods and IT fields and consisting of a total 25 companies, which 17 of them are abroad, Vestel Group of Companies is the flagship of Zorlu Group. Vestel is one of the strongest actors and one of the biggest manufacturers in its sector in the Turkish and international markets. It offers a wide range of products in consumer electronics, white goods, IT and digital fields with its technology and design development competency.

Vestel carries out its manufacturing operations at Manisa and Alexandrov, Russia. With a total area of 1,1 million m² in Manisa, Vestel City is the biggest industrial complex of Europe carrying out manufacturing at a single location. Vestel has raised its rank from 210 to 193 in "250 largest consumer products companies in the world" category in

Deloitte's "Global Powers of Consumer Products Industry 2012" report. Vestel realizes 2% of Turkey's total export as of 2012 and is the export champion of Turkey in electronics sector for 15 years.

Vestel received a total of 92 design awards in 2012 from prestigious international design contests including Plus X Award, A Design Award, Red Dot Design Award, IF Product Design Award and Good Design Award.

İhsaner Alkim, Vestel TV Products group, Executive Committee Member

İhsaner Alkim graduated from Istanbul Technical University, Electronics and Communications Engineering Department, in 1977. After assuming various posts in the communications and electronics sectors, he joined the Vestel family in 1988. Alkim has served in various R&D related positions in Vestel. Appointed in 2005 as Executive Committee Member Alkim continues to hold this position.

Failure can lead to disaster

IECEX International Conference in Malaysia



Through IECEX safety in high-risk areas has become an attainable goal

Aliyah Esmail

In explosive areas, seemingly small failures can have disastrous effects. To meet the world's ever increasing demand for energy, the oil and gas industries have built larger and more complex

installations for extraction, processing and distribution, requiring increasing levels of capital investment. To protect these investments and the people working in the installations, compliance with International Standards is paramount.

IECEX in Asia

Most Asian countries are involved in the oil, gas or mining industries in some way. This means that a great number of people are employed by oil, gas or mining companies, either directly on the production and processing side of the business or in repairing and

maintaining the equipment used in these industries.

The conference

To help introduce the benefits of IECEX (IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres) to the Asian economy, the Department of Standards Malaysia and MOSTI (Ministry of Science, Technology and Innovation) have volunteered to host and help organize this special two-day IECEX International Conference in Kuala Lumpur, Malaysia.

The 2014 IECEX International Conference is also organized by the



The 2014 IECEx International Conference will take place in Malaysia on 19-20 February 2014

IEC and IECEx in conjunction with the UNECE (United Nations Economic Commission for Europe). The major sponsor of the event is PETRONAS.

This two day event, taking place on 19 and 20 February 2014, will provide a unique opportunity for industries in the region to better understand IEC International Standards and Conformity Assessment Systems. The Conference will show them how they can benefit from the IECEx services that cover Ex equipment and systems.

World experts share experience and knowledge

The conference will bring together experts from all over the world who are involved in the international standardization, equipment manufacture, inspection, repair and overhaul of Ex equipment and systems, and the assessment and certification of personnel competence. Issues concerning Asia Pacific industry needs will also be covered.

Through their presentations and direct contact with participants, the experts will be able to share their experience and detailed knowledge of all matters pertaining to the Ex field, such as plant design, principles and practical

applications of area classification, installation and repair in compliance with IEC International Standards. They will answer questions, provide advice and give valuable information to anyone involved in the Ex sector.

IECEx not only provides services that verify that devices are able to function safely in explosive areas, it also enables the Ex industry to ensure that design, installation, maintenance, repair and inspection services for equipment are undertaken by personnel competent to execute them in accordance with the relevant IEC International Standards.

“This IECEx event is the first in Asia. It is a powerful tool that can provide professionals in any Ex sector with the ability to bring safety to the forefront and help their business protect lives and jobs,” said Chris Agius, Executive Secretary of IECEx.

Who should attend?

The event is for experts, senior staff and professionals from any Ex industry sector who are involved in the standardization, manufacture, inspection, repair, exploitation, maintenance and overhaul of equipment as well as systems

evaluation and certification of personnel competence.

Safety is the first priority

IECEx has set out to prove that safety in high risk areas is an attainable goal. The United Nations, via the UNECE, endorsed IECEx as the internationally recognized certification system for promoting the safety of equipment, services and personnel associated with explosive areas.

Benefit by attending

If you would like to benefit from the experience of the experts who can help your business to be safer, please send your details to info@iecex.com. For more information on IECEx, please visit www.iecex.com and for the complete programme, go to the dedicated conference section on the IECEx website: <http://www.iecex.com/malaysia/programme.html>

About IECEx

IECEx (IEC System for Certification to Standards relating to Equipment for use in Explosive Atmospheres) provides certification for areas where there is a risk of fire and/or explosion due to flammable gases, liquids and dusts (Ex areas).

Ex areas are a part of almost every industry, from transport, food production and textiles to petroleum and mining.



The oil and gas industries have come to rely on IECEx certification for equipment and personnel

IECEX covers the broad spectrum of devices, systems and services used in explosive environments and verifies their conformity to International Standards. The System addresses inspection

(location and other), installation, maintenance and repair of equipment and systems, and assesses the competence of personnel working in this highly specialized area.

IECEX has been endorsed by the UN via the UNECE as the certification system for the assessment of conformity in Ex areas: www.iecex.com

Gifts that can be hazardous

IECQ promotes safety in electronic components

Aliyah Esmail

Children born in the 1990s probably can't remember what it was like without internet access, when making a mixed tape was cool or when the newest game from Sega was the Christmas gift that everyone yearned for. Since that time kids' toys and children's own technological understanding have advanced. But how safe is that robotic dog that you want to buy for your child?



Though toys with electric components are cool to have, parents need to be careful that these components have been tested and certified

Parents have to pick electronic toys carefully

There are more toys in the world than can be packed in any one store and thousands of new devices come into the market every year. Now there are toys that are so technologically advanced that parents need text books to figure out how to help their child assemble them. Quite apart from the cool factor of having toys that include electronic components, parents need to be careful that the objects that they are giving their children have been tested and certified.

Threats to a child's safety

One of the issues associated with electronic components is that some of them may contain hazardous substances such as lead, cadmium or mercury. In toys this could be a disaster if a child dismantles the object and puts the components in its mouth.

Once the toy is no longer wanted, there could be problems with handing the toy on, as it could be unsafe for the next child that uses it or it could harm the environment. Manufacturers everywhere are trying to restrict the use of hazardous substances in electronic products and components.

IECQ supports safety

IECQ (IEC Quality Assessment System for Electronic Components) has the perfect solution for toy manufacturers who want to create safe and certified electronic toys that have hazardous substance-free electronic components.

IECQ HSPM (Hazardous Substance Process Management) is a technically-based management systems approach to implementing and maintaining hazardous substance-free products

and production processes. IECQ HSPM was developed in response to the need for component manufacturers to enable suppliers to demonstrate, through third-party assessment, that their electrical and electronic components and assemblies meet specific hazardous substance-free local, national and international requirements.

IECQ HSPM Certification provides confidence on a worldwide scale that companies operate systems that comply with the IECQ Specification, QC 080000. This specification details the management and technical requirements that IECQ HSPM certified companies need to undertake to provide the market with full confidence concerning the control of hazardous substances.

This means that toys using electronic components from suppliers that are certified under HSPM are manufactured with hazardous substance-free electronic components. However, it



Eliminating hazardous substances from toys also helps deal with recycling and electronic waste

CONFORMITY ASSESSMENT

does not provide parents with the guarantee that their kids won't tear apart their new cool toy while they're not looking, resulting in the destruction of their house.

About IECQ

As a worldwide approval and certification system covering the supply of electronic components, assemblies and associated materials and processes, IECQ allows manufacturers and suppliers to provide independent verification that the specifications (including IEC International Standards) are met. This gives end manufacturers the reassurance of knowing that suppliers holding IECQ certification do not need stringent second party assessment or monitoring.



The old game consoles would not be considered cool by kids today

The plethora of electronic components and processes covered by IECQ are used in all kinds of technologies, from the smallest device to the most complex piece of equipment. IECQ's

contribution to a safer and more reliable world can only increase with the development of new technologies and state-of-the-art electronic devices.

World Electronics Forum

Discovering new facets of IEC work

Gabriela Ehrlich

During CES (Consumer Electronics Show), which takes place every year in January in Las Vegas, the WEF (World Electronics Forum) holds its bi-annual meeting, bringing together CEOs, Presidents and high level decision makers of industry and electronics manufacturer associations. As an official observer, the IEC participates in both the bi-annual and the annual event, which this year will take place in Lagos, Nigeria during the Digital Africa summit. Participation in the Forum offers an excellent opportunity to network with leaders of the high-tech industry, learn about new developments in this industry, and to share IEC work in International Standardization and Conformity Assessment.

This year's bi-annual WEF meeting in Las Vegas brought together representatives from 15 countries. The IEC presented its efforts to combat counterfeit electronics. This is a major issue for the electronics industry and delegates of WEF were surprised to discover that the IEC offers real-life industry solutions in this area through IECQ and IECEE.

Counterfeit components affect the whole supply chain

Counterfeit goods are an increasing problem everywhere. It's not just high value parts that are being counterfeited; piracy in components is increasing exponentially. This has become a significant problem that affects the whole electronics supply chain, down to the end product.



The World Electronics Forum held its bi-annual meeting during CES in January of this year

Increased liability and cost

Counterfeit electrical and electronic products and components can be dangerous because they often use cheap raw material. They are often also poorly assembled, and generally are not tested or certified.

Electronic components from discarded electrical devices (e-waste) are equally dangerous because they generally don't retain their original specifications

and are presented to the market as a new product.

The use of such recycled or pirated electronic components can result in the deterioration of whole products and systems.

More than a nuisance

While counterfeit electrical and electronic products can be a nuisance when they result in the destruction of a household appliance or a home entertainment system, they can be a significant safety hazard, causing injuries and death in addition to substantial losses in property. They can have catastrophic consequences in aerospace where loss of performance or reliability is then generally fatal.

The aerospace industry is closely working with the IEC to fight the piracy of electronic components.

An important tool

WEF members were interested to learn that third-party certification can be an important deterrent against counterfeit electronics. It provides independent verification of a product or component and helps reduce liability in case of incidents. While some of the people in the room knew about IECQ, they were generally not aware of the IECQ Counterfeit Avoidance Programme for electronic components and assemblies. They learned with interest that IECQ provides immediate online verification that helps spot fake merchandise. Additionally the programme includes certification for component suppliers as well as supply chain management and control mechanisms that support the quality assurance of electronic components.

The IEC presentation gave WEF members a new insight into IEC work beyond standardization.



The IECQ Counterfeit Avoidance Programme leads the way in avoiding counterfeit and recycled electronic components



IECEE and IECQ offer real-life industry solutions by providing approval and certification amongst other services

Introducing the IEC 2013 Young Professional Leaders

Growing the next generation of electrotechnology standardization experts

Janice Blondeau

Upcoming expert engineers, technicians and managers from throughout the world, who aspire to become more involved in the IEC and help shape the future of international standardization and conformity assessment in the field of electrotechnology are brought together in the IEC Young Professionals programme. For this month's magazine, e-tech profiles the three 2013 Leaders of the IEC Young Professionals programme who were elected by their peers in New Delhi. Please give them your support!

Introducing Ethan Biery, of the United States of America



Ethan Biery, representing the IEC National Committee of the US

Ethan Biery holds a Bachelors and Masters of Science from Lehigh University, Bethlehem, PA, USA. Biery works at Lutron Electronics where he gained initial exposure on the impact that international standards can have on the product development process through his experience with product design. Over time, Biery has become

familiar with LED lighting technology, with involvement in related standards development projects through Zhaga (an international consortium of lighting manufacturers) and NEMA (the US-based National Electrical Manufacturers Association). Biery is a US National Committee expert for IEC SC (Subcommittee) 23B: Plugs, socket-outlets and switches, where he is helping ensure that globally-developed lighting controls and LED light sources meet customer safety, reliability and performance requirements.

On the IEC Young Professionals workshop

Speaking about the IEC Young Professionals workshop in New Delhi, Biery had this to say, "Participating in these Young Professional meetings has really helped me to understand how the standard gets created, the work that goes into it, and really the rationale and the decision making process that goes into developing a complex standard... But I learned that team work, communication, and networking with others... are really the most important skills to have."

Introducing Adam Hamilton, of South Africa

Adam Hamilton holds Honours in a Bachelor of Science in Engineering, Mechanical Engineering, from the University of Cape Town, South Africa. While at university, Hamilton received a bursary from Eskom Holdings Limited for his last two years of study and he subsequently gained experience in the manufacturing industry, with Praga Technical, where he spent time developing understanding of the



Young Professional Leader Adam Hamilton, of South Africa

engineering principles used in this industry. During this time Hamilton had an opportunity to train at a power station which led to his enjoyment and passion for energy.

Over the last two years Hamilton has worked for Eskom Holdings, as a Turbine System engineer at a power station. He was part of the Power Station Enhancement Programme team, focused on improving station performance, building the strategy and completing an implementation plan to roll-out enhancement initiatives. In 2013, Hamilton completed a 12-month externship development programme with McKinsey & Company producing strategy, completing lean optimisation studies and supporting a site management team to build a 800 MW unit.

Impressions of Delhi workshop

"New Delhi gave me global perspectives on standardization. I worked with and formed networks with extraordinary young professionals from all walks of life. Each YP help broaden my knowledge horizon and

help me realise the power of the global community within the IEC.”

The benefits of participating in the workshop were:

- Networking with young professionals from around the world
- Understanding how standardization shapes industry economics
- Understanding the details of making a standard

Introducing Dimitrios Ladas, of France

Dimitrios Ladas has a Masters of Science in Electrical Engineering and Control from the National Engineering School in Electrotechnology, Electronics, Computer Sciences, Hydraulics and Telecommunications of Toulouse (ENSEEIH) in 2004. He also holds a Ph. D. from Polytechnic National Institute of Grenoble (INPG) in 2008. Ladas began his career at Schneider Electric in 2008 as technical leader on R&D projects aimed at



Dimitrios Ladas, representing the French National Committee of the IEC

improving the electrical durability of contactors. Since 2010, he has been the project leader of the EV (Electric Vehicle) Inductive Charging project and as an expert in electromagnetism and electrotechnologies, he is responsible for the design of the air-core transformer.

Since 2011, Ladas has been a member of IEC TC (Technical Committee) 69: Electric road vehicles and electric

industrial trucks in the project team which develops the standard for Wireless Power Transfer for EV charging.

In his own words...

On participating in the IEC Young Professionals - 2013 workshop, Ladas said, “I think it’s a really great opportunity to meet other standardization delegates, also other Young Professionals, because we were 55 from many different countries...The benefits are clearly that through these kinds of programmes young engineers could have an influence on future standards.”

Calling Young Professionals!

Information about the IEC Young Professionals - 2014 workshop is available from National Committees and on the IEC website. Registration will open from mid-May until the end of June. Contact your National Committee for details of the selection process in your country.

Closer ties to build trade and share expertise

Statement of Cooperation signed between the IEC, RusAccreditation and Rosstandart



L to R: Grigory Elkin, Pierre De Ruvo and Savva Shipov signing the Statement of Cooperation

Janice Blondeau

In a move that will bring benefits to both Russian companies

operating in international markets and international companies working in the Russian market, the IEC and Russian Federal standardization and conformity assessment agencies have signed a Statement of Cooperation.

IEC, Rosstandart and RusAccreditation cooperation

The 23 December 2013 Statement of Cooperation was agreed between the IEC, Rosstandart (Federal Agency on

Technical Regulation and Metrology, the national standardization body of the Russian Federation) and RusAccreditation (Russian Federal Accreditation Service).

The IEC was represented by former IECEE Executive Secretary & COO Pierre de Ruvo, while the Head of Rosstandart Grigory Elkin and the Head of RusAccreditation Savva Shipov represented the Russian agencies.



Russian and international companies will benefit by recognition of certificates issued by IECEE scheme members

Moving closer to one test, one certificate, all markets

The Statement of Cooperation represents a significant step in enabling increased trade with Russia. It aims to eliminate excessive regulation in the trade of electrotechnical products, facilitating, for example, the acceptance of certificates issued by IECEE (IEC System for Conformity Assessment of Electrotechnical Equipment and Components). Put simply, this Statement of Cooperation means that the “one test, one certificate, all markets” vision is moving

one step closer to becoming a reality. Elkin, the head of Rosstandart, noted that the Statement of Cooperation will promote a close cooperation with the IEC. He also emphasised the importance of establishing unified procedures for the recognition of the certificates issued by members of IECEE conformity testing and certification schemes.

Opportunities for Russian technical experts

Savva Shipov, the Head of RusAccreditation, stated that as well as expanding opportunities for international cooperation, this new agreement allows specialists from Russia, who are recognized by IECEE as technical experts, to take part in the accreditation processes. The IEC Conformity Assessment Systems such as IECEE help to reduce technical barriers to trade. They also help to reduce evaluation time for products, the cost of testing and time to market.

De Ruvo thanked all who participated in the preparation of the document on

the Russian side, especially the experts of Rosstandart, RusAccreditation and the public corporation VNIIS (Russian Research Institute for Certification JSC).

Since 1995, the active participation of Russia in the IECEE has seen the implementation of procedures for recognizing foreign conformity assessment certificates, lowering the cost of electrical products for consumers. It has also simplified the administration of conformity assessment certificates that are accepted in 52 industrialized countries without adding costs for re-testing electrotechnical conformity.



The vision of “one test, one certificate, all markets” moves a step closer

A focus on industry and evolution

Michel Brénon looks back at his time in Conformity Assessment

Aliyah Esmail

With a lifelong passion for standardization and conformity assessment work, Michel Brénon has focused on industry needs and has helped each of the IEC CA (Conformity Assessment) Systems evolve. Now that he has stepped down from his latest positions as a Member of the IEC CAB (Conformity Assessment Board) as well as IECQ (IEC Quality Assessment System for Electronic Components) Vice-Chairman and Secretary of the IECEx (IEC System for Certification to Standards

Relating to Equipment for Use in Explosive Atmospheres) Technical Committee, ExTAG, he looks back at the evolution of the CA Systems.

Brénon's past revisited

Brénon has been using standards for much of his career, which started in the 1970s. The IEC Standards, about which he talks enthusiastically, have been a part of his working life from the time that he joined LCIE Bureau Veritas. In 1994 Brénon started as the Head of the HAZLOC Department (Testing and Certification). Since

then he held a number of positions at LCIE, most recently that of Director of Certification before he retired at the end of 2013.

Brénon has been a highly active expert over a number of years, serving IEC in the areas of both Standards and Conformity Assessment.

At IECQ he held the position of Vice-Chairman for two terms starting in January 2010. He was already participating in IECEx before it officially became a System, and he helped with the transition. He was nominated as

Michel Brénon

Michel Brénon's professional career included a Master of Science



Michel Brénon

degree in Physical Chemistry and a graduate engineering degree in Organic Chemistry Specializing in Industrial Chemistry.

Michel has held numerous professional appointments including:

- Member of the French National Committee and the French Ministry of Industry continuously since 1994
- The French National representative to IECEE, IECEx, IECQ and to European Schemes

- Expert member to the ATEX Notified Bodies group (ExNB) including serving as ExNB Chairman

He was a university teacher from 1975-1978 then moved to industry, taking up a position as Development Engineer with Goodyear in 1978 and progressing to Development Manager there before moving to LCIE Bureau Veritas in 1994.

the Secretary of the IECEx Testing and Assessment Group in 1997 and held the position until the end of 2013. Brénon has been involved in several IECEE (IEC System for Conformity Assessment of Electrotechnical Equipment and Components) Certification Management Committee Working Groups and has been Convenor of Working Group 3, Manufacturers' Testing Laboratories/ Customer Testing Facilities. He was a member of CAB WG 10, WG 12 and other Working Groups.

"Since beginning with this, one of the changes that I've seen is that there is more interest by industry in Standards than ever before," said Brénon. "Now you have working groups and development groups that are interested in the technical aspects but also in the continuity of the Standards. The needs that industry tells us about are being met."

Importance of Conformity Assessment

Certification looks at both safety and performance and both aspects are very important to Brénon. He mentioned that products that are certified gain the acceptance of

governments, experts and the market. The country experts who work with the Systems can change the specifications to the certification so that there is less of a hurdle to overcome when entering a country.

If electronic components, for example, were not being certified, reliability of equipment communications may well be compromised. If household electrical items were not certified then houses could burn down. If the equipment in an explosive environment was not properly installed and maintained, it might mean big cities being evacuated because of the danger.

"Each of the CA Systems is focusing on safety, performance and accessibility to markets," he said.

CA in developing countries

Substandard electrical and electronic goods are dumped in the marketplaces of many developing countries. Having a guarantee that only safe equipment reaches the local market becomes ever more important.

Developing countries are beginning to use IEC Conformity Assessment Systems to ensure that imported

electrical and electronic goods are built according to IEC International Standards for safety and efficiency.

The IECEE has begun to train developing countries on things like electrical safety for refrigerators and luminaires as well as of audio and video electronic equipment. The System administers third-party conformity testing and certification procedures that address the safety, quality, efficiency and overall performance of components and goods used in the home or office or in health facilities.

By helping developing countries the CA Systems are promoting worldwide safety. Brénon says that he hopes that this will continue. In the future, when he has more time, he is hoping to help organizations like AFSEC (African Electrotechnical Standardization Commission) promote this sort of training and bring it to more people.

"Developing countries unfortunately receive products that would not be accepted in Europe, the US, Russia, or China (to name a few). These countries are now asking for proof of safety and performance from the products that are imported and used



L to R: Chris Agius, IECQ and IECEx Executive Secretary, Michel Brénon, Dave W. Smith, former Chairman of the IECQ Management Committee, and Pierre de Ruvo, former IECCE Secretary and Chief Operating Officer

by their populations and this is a step in the right direction,” said Brénon.

Brénon and IECEx

Brénon has been working with IECEx since 1996 and he attended its first meeting – held before it officially even had a name, he mentions, laughing.

Unless you drive an electric car, you are bound to enter a potentially hazardous area each time you need to put fuel in your vehicle. The most prevalent risks associated with fuel station environment hazards are fires and explosions.

“IECEx covers fewer standards but is very important. You would not want the gas line to blow up when you went to get gas,” said Brénon.

One of the advances that has particularly pleased Brénon has been that the UNECE (United Nations Economic Commission for Europe) has specified a regulatory platform endorsing IECEx certification and IECEx certified products as the standard for all explosive atmospheres.

The most important role of the United Nations is to protect people. In joining

forces with the United Nations, through UNECE, the IEC and IECEx aim to act as catalysts for a broad coalition that will help ensure safety for industries where flammable or combustible materials are used, stored or transported.

Future challenges

“The work that has been done has been quite successful, but the Systems are still evolving and must continue to evolve,” said Brénon.

He added that these evolutions will go into areas that may not have been foreseen. This will allow the IEC to incorporate new industries and bring a greater depth to the work of the IEC and the CA Systems.



No car owner thinks that they will be hurt when refuelling their car because of IECEx

ACEA nominations

Two new members join the IEC Advisory Committee on Environmental Aspects

Zoé Smart

ACEA (Advisory Committee on Environmental Aspects) is made up of a total of 16 members, nominated by NCs (National Committees) and appointed by the SMB (Standardization Management Board) following a vote. As of 1 January 2014, ACEA welcomes two new members, Tsuyoshi Naruoka, TC 100 representative and Lucio Azzola, SC 17B representative.

Providing expert environmental guidance

ACEA was set up to advise and guide the SMB on all environmental issues that could arise from the impact of products or systems using electrical technology, including electronics and telecommunications. It plays an important role in ensuring that IEC Standards developers take environmental protection concerns into account in their standardization

work and to that end has developed IEC Guide 109, *Environmental aspects - Inclusion in electrotechnical product standards*.

About Tsuyoshi Naruoka

Tsuyoshi Naruoka has a keen interest in environmental and international standardization activities and has held the position of Technical Secretary of IEC TC (Technical Committee) 100/TA



Tsuyoshi Naruoka is a new member and TC 100 representative to ACEA

(Technical Area) 13: Environment for AV and multimedia equipment since 2011. He is Director of the Green Solution Promotion Department at Fujitsu where he participates in innovative work in the fields of ecologically-conscious product design and related technologies.

Since 2008, Naruoka has been an active member of JEITA (Japan Electronics and Information Technology Industries Association), joining the PC Energy Saving Committee, and the AV & IT Standardization Committee in 2010.

Having led a number of discussions on eco-friendly product design and provided recommendations on the drafts of European energy-saving regulations, he brings with him a wealth of knowledge and expertise to contribute to the work of ACEA.

About Lucio Azzola

As Global BU Technology Manager Low Voltage Breakers & Switches at ABB, Lucio Azzola is responsible for driving technology development in line with technology trends, market requirements and standard and environmental requirements. He also manages feasibility and technology scouting studies, while cooperating with University and Research Centres.

An Electrical Engineer, Azzola is convenor of WG 10: Constructional requirements and environmental aspects of IEC SC (Subcommittee) 17B: Low-voltage switchgear and controlgear. His expertise and knowledge of the field will be a welcome addition to ACEA.



Lucio Azzola is joining ACEA as SC 17B representative



ACEA plays an important role in ensuring IEC standards developers take environmental concerns into account when developing new standards

Obituary

Professor Takashi Tomita



Professor Takashi Tomita (Photo: Takako Ushigome, Smart Solar International Inc)

Claire Marchand

The IEC was saddened by the death of Professor Takashi Tomita, who passed away on 20 January 2014, at the age of 63.

In recent years, Takashi Tomita was Chief Executive officer of Smart Solar International Inc., a spin-off from the University of Tokyo's RCAST (Research Center for Advanced Science and Technology); Tomita also played an important role in the IEC, as a member of the MSB (Market Strategy Board) until 2011.

Significant contributions to technological advances

A specialist in semiconductor physics, solid state electronics, optical processes, and microwave electronics, Professor Tomita's work contributed significantly to the development of new technologies in the field of crystalline silicon cell/modules, amorphous/micro-crystalline silicon thin film processes, and 3-5 compound semiconductor cells/concentrators.

Huge success in the solar energy field

Professor Tomita graduated from Kyoto University in 1974 and the same year



Professor Tomita displays an innovative solar power panel using moving mirrors that follow the sun throughout the day. (Photo: PhysOrg)

joined Sharp, a company where he spent most of his professional career. He served as General Manager of the Energy Conversion Laboratories, Corporate Research and Development Group and in 1997 became General Manager of the Photovoltaics Division, Electronic Components Group. In 2003 he was appointed Group Deputy General Manager of the Solar Systems Group and Group General Manager of the Solar Systems Division. In that position, he was instrumental in leading the company to become the largest solar supplier in the world for seven consecutive years (2000-2006), achieving a total solar business volume of USD 1,5 billion in 2006, and establishing Sharp – the company launched its first solar product in 1962 – as the top residential solar supplier in the world.

From business to academia

In 2008 Tomita was asked to join the University of Tokyo's Research Center for Advanced Science and Technology, where he was involved in a number of renewable energy projects ranging from generation and storage to grid distribution. He was a leading member of the university's Solar Quest project and played a key role in guiding standardization activities in this field both in and outside campus.

In parallel with Solar Quest, Tomita launched his think tank, GENNAI (Global Energy Navigating and Nature Apprehension Interdisciplinary: an international research association pursuing the harmony of global energy and environmental issues) to conduct research on strategic planning and assessment for the development of renewable or green technologies, by integrating the expertise of world-class researchers, key industry people and policymakers.

New venture

In 2009, Tomita established a venture company, Smart Solar International Inc., aiming to develop innovative CPV (concentrated photovoltaic) systems. A factory was built in the Sendai area in Northern Japan. In 2011 the region was struck by an 8.9-magnitude earthquake that set off a devastating tsunami. The factory had just opened but Tomita continued its operation, recruited victims, and started installing solar systems in the region.

Important IEC role

Takashi Tomita became a member of the MSB soon after the management body's inception. As such, in 2010 he was tasked with setting up a special

working group, Technology and Market Watch, and played a key role in recruiting the professional technology watch team members. The objective of the special working group was to provide the IEC with a mechanism to gather technical and market trend information and identify those technology areas requiring the Commission's immediate attention.

Through research and analysis, the group rapidly pinpointed one area the IEC should focus on: very large-scale power storage and recommended the development of a specific roadmap. The IEC White Paper Grid integration of large-capacity Renewable Energy sources and use of large-capacity Electrical Energy Storage, published in 2012, is a direct result of the group's work.

In October 2011, Tomita left the MSB. After the earthquake, he had started to be involved in several national projects in the solar energy field, and it became impossible for him to continue to serve as an MSB member.

An ardent defender of the solar industry

As a Committee Member of the Renewable Energy Portfolio Standard of METI (Ministry of Economy, Trade and Industry), an Advisory Board Member of the Nara Institute of Science and Technology, and a visiting professor at Tohoku University, he showed unswerving support for the solar industry throughout the years.



The IEC White Paper Grid integration of large-capacity Renewable Energy sources and use of large-capacity Electrical Energy Storage is a direct result of the work done by the special working group Technology and Market Watch

International Standards for sustainable energy

IEA, IEC and ISO joint workshop 13 March 2014, Paris

Janice Blondeau

Forging closer links between policy makers, renewable energy and energy efficiency stakeholders and standards developers is the focus of a workshop to be held in Paris next month.

Bringing key players together

IEC, who is co-hosting the workshop, along with IEA (International Energy Agency) and ISO (International Organization for Standardization), welcomes this opportunity to improve the engagement of those active in international standardization and to ensure that international standards support the transition towards more sustainable energy systems.

The workshop aims to bring together policy makers, representatives from international standardization organisations and other key stakeholders who work to promote energy efficiency and renewable energy.

Responding to the global energy challenge

Strengthening the positive contribution of international standards to respond to the global energy challenge is another objective of the workshop. This is particularly in relation to:

- The climate change due to the impact of the use of fossil energies on greenhouse gas emissions
- The physical, economic and environmental constraints on the availability of energy
- The need to enable a broader access to sustainable energy in support of economic and social development.



The workshop aims to ensure that international standards...

A key topic to be explored during the workshop is how to facilitate the development and use of systemic approaches both within policy making and standardization.

Linking policy and standardization

Discussions are planned on how to improve the collaboration between the key players so as to better communicate and assess available standards, and identify gaps and opportunities for the development



...support the transition towards more sustainable energy systems

of international standards. How to ensure sustained dialogue between standardization and policy making, and developing international standards and policies that jointly support energy efficiency and renewable energy will also be discussed at the workshop.

A few places still available

Attendance at this workshop is by invitation only. However if you are interested in one of the limited places that is still available please contact the IEC.



International standards are a tool to respond to the global energy challenge

Allow interoperability/Secure investment

Them bani Bukula, Regulator Member, NERSA (National Energy Regulator of South Africa)



Claire Marchand

IEC Global Visions interviewed Them bani Bukula, Regulator Member at NERSA (National Energy Regulator of South Africa). In this interview, he explains why the use of IEC International Standards and participation in IEC work allow countries to ensure that investment in national electrical infrastructure is secure, reliable, safe and affordable.

Standards: A working tool for regulators

Bukula says that standards play a very important role in his work – he is responsible for electricity regulation in South Africa – as they provide a body of knowledge that is crucial for the design, installation and maintenance of infrastructure. They allow regulators

to reduce the cost of electricity supply, making it more reliable, safe and affordable.

IEC brings many benefits

Bukula, who is a member of the IEC Council Board, further explains that being part of the IEC has many benefits, including easy access to the pool of knowledge and experience of engineers across the whole world. Participating in standardization work and using International Standards is also an asset when they plan investments because they are no longer limited to investors and suppliers from their own country. In his own word, they have the world to choose from and, as a result, by getting the most competitive prices, they end up with relatively affordable products or services.

On the importance of using International Standards rather than national ones, Bukula answers with some real-life examples where government agencies or companies ended up losing money because they had opted for the cheapest product and compliance with International Standards had gone unheeded.

Learning the hard way

Bukula remembers one instance where the South African government decided to install solar water heaters in low-income housing as part of an effort to improve the residents' quality of life. With a view to cutting costs, the cheapest products available were selected but the government soon realized they were mistaken. Cheap, untested, non-standardized water heaters were difficult to install



Thembani Bukula, Regulator Member, NERSA

because they didn't easily connect, didn't perform as promised by the vendor and some of them even fell off the roofs because of installation flaws. Learning from this experience, the government required that all solar heaters be tested and certified to IEC International Standards.

Be competitive, use International Standards

Bukula says they try to explain to small and medium companies who want to export that they are better off using international standards. To prove his case, Bukula cites companies that obtained important contracts, exported their goods and then just didn't get the certification in the destination country. They not only had to pay for the products to be shipped there...and back but also for other costs, not to mention the loss of reputation they suffered.

In effect, when companies dispense with buying standardized components and certifying their products to keep costs at a minimum, the consequences may involve much more than they bargained for.

This is why, Bukula says, in South Africa regulations specify that when purchasing products or services, those must meet IEC International Standards.

Challenges in improving the infrastructure

Asked about the challenges he is facing in his line of work, Bukula explains that the electrical infrastructure in most countries, South Africa included, is more than 50 years old and, in some cases, close to the end of its useful life as far as design specifications are concerned.

The first challenge is how to maintain and improve it. The second comes from the fact that, in the past, the technologies they invested in were not necessarily the most energy-efficient ones. The need is now to move to an economy that is much more energy-conscious and efficient.

Bukula adds that it is also essential to include more renewable energies and increase the ability to capture power generated from many different sources. As an example, he mentions

electric vehicles: they will need to be charged but can also become a power source when they are parked. Overall there is a convergence of many different technologies that will necessitate an electrical system that is smart, safe and capable of meeting all these many requirements.

Bukula confirms that regulators play a big role in what ultimately gets used or selected as the appropriate technology in the country. They are implementers of policy but they also influence the formulation of that policy. Additionally, once the policy is in place, they are the ones who look at a strategy for introducing renewables.

World Bank investment

For South Africa, as for many other countries, another incentive to use International Standards comes from the World Bank. The projects they support and fund must meet IEC International Standards.

Bukula cites the case of the South African utility Eskom, which recently received a USD 3,75 billion loan from the World Bank. Project specifications required Eskom to build power stations that meet a number of IEC International Standards.

Bukula adds that the World Bank will enforce this clause even if the beneficiary knows nothing about the standards. Their goal is to build something that is well designed, safe and durable that will at the same time allow them to recoup their investment.



Single charger for notebook computers

Major step to help reduce e-waste

Janice Blondeau

Each year billions of external chargers are shipped globally. Power supplies for notebooks weigh typically around 300 but sometimes up to 600 grams, and aren't generally usable from one computer to the next. Sometimes they get lost or break, which can mean that computers which still work perfectly well are thrown away. A new IEC Technical Specification provides another option...one single charger for notebook computers and laptops.

One power supply for many notebooks

IEC has announced the publication of the first globally relevant Technical Specification for a single external charger for a wide range of notebook computers and laptops, IEC TS 62700, *DC power supply for notebook computers*. This new IEC Technical Specification opens the way to a significant and very real reduction of e-waste related to power supplies. It will allow consumers to use a single external charger with a wide range of notebook computers.

It covers critical aspects of external chargers for notebook computers, their connector and plug, as well as safety, interoperability, performance and environmental considerations. This TS will also make it much easier for external chargers to be reused or replaced when needed. IEC work ensures that the charger is reliable and safe to use, and that it provides the required level of performance.

IEC efforts to reduce e-waste

Commenting on this new Technical Specification, IEC General Secretary



A single charger for notebook computers and laptops is provided for by IEC 62700

and CEO Frans Vreeswijk said, "The IEC International Standards for the universal charger for mobile phones has been widely adopted by the mobile phone industry and is already starting to help reduce e-waste. A single power supply covering a wide range of notebook computers is the next step in lowering e-waste and its impact on our planet. I am proud that the IEC has yet again managed to make the best possible technical solution available."

IEC TS 62700, *DC power supply for notebook computers*, comprises the

input of experts from many countries around the world and has been accepted by the National Committees participating in IEC TC (Technical Committee) 100: Audio, video and multimedia systems and equipment.

Real solution for a real issue

Even though some organizations are discussing and examining the merits of a universal power adapter covering numerous ICT (Information and Communications Technology) devices, due to the technical realities, this is likely still a long way from being achievable. Therefore, rather than chasing a dream that remains out of reach today, the IEC has leveraged its global technical expertise to bring concrete solutions to the market place. It is estimated that the total e-waste related to all kinds of chargers of ICT devices exceeds half a million tons each year; basically the equivalent of 500 000 cars.



A significant and real reduction of e-waste related to power supplies is now possible...

In the footsteps of universal charger for mobile phones

In 2011, the IEC published the first globally relevant Standard for a universal charger for data enabled mobile phones. This work was accomplished in the IEC with relevant input by CENELEC and ITU-T, with which the IEC has a long-standing cooperation agreement. With a single power supply covering a wide range of notebook computers, the IEC has achieved another important milestone in the reduction of e-waste.

Now it's over to industry to make use of IEC TS 62700 and help reduce e-waste.



....through the single power supply for PCs and the universal charger for mobile phones

Protecting rights

Ensuring consumer satisfaction

Morand Fachot

Consumers are producing, viewing, listening to and managing an increasing volume of digital content on devices in the consumer electronics, mobile and PC domains. They want to enjoy and share this content across different devices and locations in their home environment. The DLNA (Digital Living Network Alliance) has developed guidelines that allow the design of interoperable devices and also protect the commercial interests of content providers.



DLNA-enabled devices can share digital content over a network and protect it from illegitimate use access

Framework for interoperable devices

The DLNA, which brings together more than 250 of the world's most important digital brands, has developed a framework to allow the design of interoperable devices. To achieve this it has prepared DLNA Home Networked Device Interoperability Guidelines that are published as IEC International Standards.

DLNA-enabled devices may include the following: audio/video systems; digital cameras, recorders, and camcorders; DVD and Blu-ray; game consoles; gateway/routers; PCs; electronic photo frames; network attached storage; mobile devices; printers; set-top boxes; projectors; tablets; TV sets and other appliances.

Multilayered interoperability

DLNA Interoperability Guidelines identify a family of protocols and standards that allow a wide selection of devices to easily find, recognize

each other and connect to share digital content.

To allow this, DLNA narrowed down a plethora of protocols and standards to a small set that enables digital devices to connect easily. This set includes, among others: DTCP-IP (Digital Transmission Content Protection over Internet Protocol) for link protection to shield commercial content on home networks; MPEG-2, MPEG-4, JPEG, MP3 and other digital media coding formats; HTTP quality of service to transfer media content; UPnP (Universal Plug and Play) for media management, device discovery and control and IP networking, as well as various connectivity standards such as Ethernet, Wi-Fi 802-11 or Wi-Fi Direct.

Allowing sharing of content across devices

A key condition for the media industry to allow sharing of its digital content is to ensure that it is protected from piracy and illegitimate redistribution.



This device acts as a DLNA-enabled bridge between SD or USB storage media and router (Photo: Planex)

DRM (digital rights management) solutions have been developed that guarantee this.

Using DTCP-IP DLNA has designed methods that enable the secure transfer and use of protected commercial content among different implementations on network media devices.

DLNA Guidelines for DIS (DRM Interoperability Solutions) that allow the sharing of content that may be protected by different DRM technologies will be published in the coming weeks as International Standard IEC 62481-4, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 4: DRM interoperability solutions*.

Complex issues

Consumers acquire commercial digital content from different sources (Internet, cable or satellite TV), with different usage rights and price points (e.g. films streamed on a pay-per-view basis or bought from an Internet video download service). At the same time they expect to be able to store, transport and enjoy that content at any location and on any device on their wired or wireless home network using consumer-friendly solutions.

To allow this IEC 62481-4 provides a comprehensive framework that includes details and examples of DLNA home networking architecture and DLNA device models as well as guidelines. The Standard specifies DRM interoperability technology guidelines and references additional Standards in the IEC 62481 series and other Standards. It also gives examples of download/upload copy/move sequences.

IEC 62481-4 gives manufacturers and developers the information they need to build interoperable networked platforms and devices for the digital home for the benefit of users and ensuring that the commercial interests of content providers are duly protected too. The ever growing choice and acceptance of DLNA-enabled devices validate the technology's benefits.



Many tablets and mobile phones are DNLA-compatible (Photo: Samsung)



Transportation

Issue 02/2014 of *e-tech* will focus on transportation, from the role of the IEC in the automotive industry to new modes of urban transportation and maglev (magnetic levitation) high-speed trains. Smart transport and traffic management will also be covered. And last but not least, light and heavy-duty industrial vehicles, an important segment of the automotive industry that is undergoing many developments with the emergence of electric vehicles.

Motor vehicles, whether they are EVs (electric vehicles), hybrids or powered by internal combustion engines, contain an ever growing number of electric and electronic parts. Consequently the role played by the IEC becomes more important as well. Through its standardization and conformity assessment work, the Commission ensures that electrical equipment and electronic components used in these vehicles are of the highest quality and reliability and help make cars safer and ever more energy-efficient.

Other types of EVs will be featured in this issue: the first Formula E (electric racing cars) championship will make its debut in September 2014. Away from the glamour of Grand Prix racing but indispensable nonetheless on factory floors or warehouses, the trend in industrial vehicles is increasingly to go all electric.

With a view to reduce pollution and become more energy-efficient, many cities around the world are developing new public transit networks, such as electric pods or cable cars depending on the terrain, and are encouraging emission-free individual means of transport.





e-tech

News & views from the IEC

This is a special printout of IEC *e-tech* our electronic publication. You can find a link to *e-tech* on the IEC homepage, or you can access it at www.iec.ch/etech

If you would like to receive our monthly email notice telling you when the latest edition of *e-tech* is available, you can subscribe via the *e-tech* homepage. Click the button "Subscribe" or sign up for an RSS feed.

Articles may be reproduced in whole or in part provided that the source "IEC *e-tech*" is mentioned in full.

- Managing Editor *e-tech*: Claire Marchand
- Editor in chief: Gabriela Ehrlich

Articles published in *e-tech* represent the opinion of their author and the IEC cannot be held responsible for content matter or content.

IEC *e-tech* is published 10 times a year in English by the International Electrotechnical Commission.

Copyright © IEC, Geneva, Switzerland. 2014.

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

3 rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

T 41 22 919 02 11

Contact: iecetech@iec.ch
For more information visit: www.iec.ch

