issue 02/2017

e-tech

news & views from the IEC

Active Assisted Living (AAL)

TECHNOLOGY FOCUS
Robots pick up the challenge of home care needs

Getting about made easier

INDUSTRY SPOTLIGHT
Relying on AAL for a better life

TECHNICAL COMMITTEES
Expanded scope for SyC AAL

IEC WORLD
IEC work on cyber security for energy infrastructure

Enabling silver economy

SyC AAL, IEC TCs & SCs

producing International Standards for Active Assisted Living (AAL)

Impaired hearing

IEC TC 29 Electroacoustics

Cyber security

ISO/IEC JTC 1/SC 27
IT Security techniques

Data privacy

IEC SC 62A/JWG 7 Safe, effective and secure software for medical equipment
ISO/IEC JTC 1/SC 27 IT security techniques

Impaired vision

IEC 100/TA 10
Multimedia e-publishing and e-book technologies

Smart homes

IEC TC 59 Performance of household and similar electrical appliances
IEC TC 61 Safety of household and similar electrical appliances
IEC TC 79 Alarm and electronic security systems

Assistive robots

IEC SC 47E Discrete semiconductor devices
IEC SC 62A/JWG 9 Medical electrical equipment and systems using robotic technology
IEC TC 100/TA 16 AAL accessibility and user interfaces
IEC TC 110 Electronic display devices

Medical wearables

IEC TC 21 Secondary cells and batteries | IEC TC 47 Semiconductor devices
IEC TC 62 Electrical equipment in medical practice | IEC SC 62A Common aspects of electrical equipment
IEC TC 113 Nanotechnology for electrotechnical products and systems
IEC TC 119 Printed Electronic | IEC TC 124 Wearable Electronic Devices and Technologies
ISO/IEC JTC 1/SC 6 Telecommunications and information exchange between systems

Independence means everything

Assistive technologies help tackle the challenges posed by ageing and disabilities

By Claire Marchand

Claire Marchand, Managing Editor e-tech

What immediately comes to mind when evoking active assisted living (AAL) is that it is essential in helping senior citizens keep as good a quality of life as possible. The focus is obviously on the elderly in industrialized countries where the population is ageing rapidly. But AAL represents more than that – it is meant for all people who suffer from illnesses or physical, mental and social disabilities. The general concept is to ensure that they live their life independently and comfortably in their own environment for as long as they can manage.

A wide array of technologies

Everyone can benefit from the use of smart devices and appliances, from new technological developments in healthcare, from new home designs that incorporate sensors in every corner of the house that allow people to control doors, windows, heating and much more through applications on their smartphone or tablet. For older or disabled people, these technologies may be life-changing. They can stay in their own home instead of having to go to specialized institutions; they can be independent while knowing that, in case of problems, help from family, caregivers or emergency services is available at the touch of a button.

Elderly or disabled people often feel isolated. AAL develops programmes and applications that help them remain socially active. They can chat online with their family on a regular basis; assistive robots allow them to interact with their caregivers or doctors via videoconference while the latter can remotely visit their patient's environment to ensure all is as it should be.

Ongoing developments

Not a day goes by without its lot of launches in smart technologies, in healthcare and medical equipment, in robotics and wearable devices. With the proportion of people aged 60+ expected to almost double from 12% to 20% between 2015 and 2050 and more than one billion living with some kind of disability (WHO), the necessity to devise new forms of assistance is essential. Assistive technology will most certainly play a major role in the future in contributing to the care and wellbeing of this part of the population.

With the help of assistive technology, people can overcome their disabilities and become better integrated into all aspects of community living (Photo: Specialised Assistive Technology Centre, Singapore)

06
A growing number of dedicated robots for the care sector aim to cover multiple tasks for caregivers and patients

10
Monitoring the network's physical layer, in other words, the connections, cables, and other hardware assets, provides improved security

12
The technology helping disabled athletes is becoming mainstream

FOCUS OF THE MONTH - **Active assisted living (AAL)** - Issue 02/2017

Active assisted living (AAL) is essential in helping senior citizens keep as good a quality of life as possible. The focus is obviously on the elderly in industrialized countries where the population is ageing rapidly. But AAL represents more than that – it is meant for all people who suffer from illnesses or physical, mental and social disabilities. The general concept is to ensure that they live their life independently and comfortably in their own environment for as long as they can manage.

16
Systems provide assistance to ageing population aspiring to stay longer independent in their own homes

30
The LVDC Conference on Sustainable Electricity Access will take place in Nairobi, Kenya, on 22-23 May 2017

39
Meet the IEC 2016 Young Professional Leaders and learn more about how YPs are becoming involved in the technical work of the IEC

EDITORIAL

Independence means everything..... 2

TECHNOLOGY FOCUS

Robots pick up the challenge of home care needs..... 6

Standardization enhances network security..... 10

Getting about made easier..... 12

INDUSTRY SPOTLIGHT

Relying on AAL for a better life..... 16

TECHNICAL COMMITTEE AFFAIRS

Expanded scope for SyC AAL..... 18

Raising awareness on IEC standardization work..... 21

CONFORMITY ASSESSMENT

Nailing safety..... 22

Dusty business..... 24

Smart home: a life-changing experience..... 27

IEC WORLD

IEC calls on disruptive technology for universal energy access..... 30

IEC work on cyber security for energy infrastructure..... 32

Upcoming global events (March-May 2017)..... 36

IEC FAMILY

The next generation of IEC leaders..... 39

Obituary – Alastair Ramsay..... 43

IN STORE

Safety Standards for sealed batteries for portable use..... 44

Robots pick up the challenge of home care needs

Growing number of dedicated robots for the care sector to cover multiple tasks for carers and patients

By Peter Feuilherade

The demands posed by a rapidly ageing global population are leading manufacturers of robots to develop technology for providing care and rehabilitation for elderly and impaired people in their own homes.

Ageing population drives demand for wide range of assistive robots

Advances in sensors have increased the ability of assistive robots to perform domestic handling and mobility assistance tasks as well as to analyze the environment and individuals around them so that they can carry out monitoring functions. About 4 700 elderly assistance robots were sold globally in 2015, according to the International Federation of Robotics in Frankfurt, which forecasts that sales will increase to 37 500 units between 2016 and 2019.

Robots assisting with healthcare delivery in the home not only increase their users' autonomy but also have the potential to relieve the burgeoning demands that elderly populations place on health and care services and informal caregivers.
Meanwhile, increasingly sophisticated "companion robots" are being developed to interact with users, make social connections with them and even provide companionship and emotional support, subject to personal choice.

Several IEC Technical Committees (TCs) and Subcommittees (SCs) cooperate on the development of International Standards for the broad range of electrotechnical systems, equipment and applications used in care robots, with an emphasis on safety and interoperability.

Care robots and other assistive robotic devices form part of the wider category of Active Assisted Living (AAL) technologies. All are designed to enhance the quality of life of users and enable them to lead independent lives through the use of Information and Communication Technology (ICT).
The IEC Systems Committee on AAL (SyC AAL), which started work in 2015, has the role of promoting safety, security, privacy and cross-vendor interoperability in the use of AAL systems and services, and of fostering standardization that enables their usability and accessibility.

Human-robot interaction

Assistive robots with sensory and monitoring functions have been in use in healthcare for over a decade.

In 2004, Japanese inventor Dr Takanori Shibata created a three-kilo robot called Paro. The robot is modelled on a baby seal and makes a similar plaintive crying sound. Paro, one of the most widely studied care robots, responds to touch and can make eye contact by detecting the direction from which voices come. It also has a degree of artificial intelligence, including the ability to "learn" behaviour that elicits a positive and empathetic response in the "user" (for instance, being stroked) rather than one that evokes anger, and then to repeat the behaviour that causes the positive response. Some 5 000 Paro robots have been used in more than 30 countries, in therapeutic settings ranging from dementia care to helping earthquake survivors.

Tasks include helping carers as well as patients

Today's assistive robots can navigate autonomously and carry out a wide range of tasks such as handling, providing assistance with mobility, lifting and bathing in order to reduce the workload of care providers. Their capabilities may include human-robot interaction skills such as face recognition, speech and gestures. These robots are equipped with multiple digital cameras for reading

The Hyundai Medical Exoskeleton (H-MEX), composed of a high-tech back/leg brace combination device and forearm crutches, is meant to help paraplegics walk again (Photo: Hyundai)

facial expressions and recording the near environment, and stereo microphones and speakers for monitoring and communicating with users. Some models have databases containing photo galleries, music and brain exercises for the elderly.
IEC TC 62: Electrical equipment in medical practice, and its SCs develop International Standards for the electrical equipment and systems and the software used in healthcare. Their work focuses on safety and performance, including data security and confidentiality. There is a joint working group concerned specifically with the safety of the surgical robots and assistive robots used in healthcare.

IEC TC 100: Audio, video and multimedia systems and equipment, has set up a Technical Area, TA 16: Active Assisted Living (AAL),

accessibility and user interfaces, to address AAL-specific issues related to audio, video and multimedia systems and equipment (see article *Improving access to multimedia content for those with disabilities* in *October 2016 e-tech*).

Sensors used in care robots include heart rate and blood pressure monitors; sensors to detect changes in motion, audio and scent which could indicate potentially dangerous scenarios for people living alone; range sensors for fall detection; force/torque sensors; light detection and ranging (Lidar) navigation sensors; and red, green and blue image plus depth (RGB-D) sensors for additional navigation data, enabling the robot to perceive objects and people with which it can interact. IEC SC 47E: Discrete semiconductor devices, prepares International Standards for the design, manufacture and use of sensors.

Other IEC TCs involved in standardization work for assistive robots include IEC TC 110: Electronic display devices, and IEC TC 21: Secondary cells and batteries.
As well as care robots, motorized wheelchair robots and exoskeletons offer autonomous motion assistance for the elderly and disabled. Some "robot walkers" are equipped with GPS and wireless Internet connectivity to summon help in an emergency – for instance, a fall – and to enable users' families to monitor them remotely.

Companion robots

Companion robots are emerging as a specific category. They are designed to act as interfaces that will make it easier for the elderly to enrich their social lives and connect with their families and friends. Typically, they are powered by small electric motors and equipped with high-definition cameras, voice and facial recognition capabilities, wireless internet connectivity, video-calling apps, music libraries, memory games and colour-changing LEDs to indicate a device's "mood".

An "advanced social companion robot" undergoing trials in California this year is designed to "convey emotion" through different speech tones, sounds, lights and body language. As well as reminding users to take their medication, this robot proactively suggests activities such as reading, going for a walk, playing games or phoning friends. The device uses machine learning to tailor these suggestions to individual preferences.
The European Union and the Japanese government are jointly funding an international research project that will run from 2017 to 2020 to develop "culturally aware robots" to assist with elderly care. Dr Chris Papadopoulos of the University

Paro, modelled on a baby seal, is a companion robot that responds to touch and can make eye contact (photo: UCI UC Irvine)

In addition to talking, understanding speech and navigating autonomously, the Kompaï care robot can keep track of shopping lists, plays music, and work as a videoconference system for users to talk with their doctors, for example (Photo: Robosoft)

of Bedfordshire in the UK says that elderly users are more likely to accept robots which can "autonomously reconfigure their interactions to match the culture, customs and etiquette of the person they're caring for". Designers of companion robots face issues related to privacy and care-giving ethics, as well as many technical challenges, not least that robots are currently unable to detect the subtleties of human interactions and therefore to assess people's moods and feelings.

Analysts see rapid adoption

Healthcare accounts for a substantial sector of the robotics market, primarily in the form of surgical robots. However, the availability of assistive robots for elderly care offering greater functionality and at cheaper prices will see this nascent market segment grow too, particularly in Japan, South Korea, Western Europe and North America.

The consultancy firm Frost & Sullivan predicted in December 2016 that the global market for care assistance and automation robots is expected to achieve rapid adoption, with a Compound Annual Growth Rate (CAGR) of 36% until 2021.

According to Japanese government data, the country's "care-bot" market is expected to increase 25-fold to USD 3,7 billion by 2035.

In the EU, the market for robots and devices assisting elderly people is estimated to reach EUR 13 billion by 2016, according to the Robohub website.

The high cost of assistive robots (currently thousands of dollars each) and the challenges of building safe and certified robotic devices are among the factors restraining market growth.

Access all areas

Japan, a world leader in "eldercare robotics", has pioneered the development of robots to lift and carry elderly patients and so alleviate the physical strain on care workers. At a February 2017 "hackathon" in Singapore on the social use of robotics for elderly healthcare, the winning team proposed an autonomous system using the Segway Robotics platform, Loomo, for transporting wheelchair-dependent elderly residents in nursing homes and extended-care facilities. The system uses facial recognition algorithms to identify patients, then connects with their wheelchair using a custom-designed electromagnetic coupling, allowing a robot to move patients to and from activities such as meals and medical appointments. This frees up manpower, enabling caregivers to focus on more critical care and medical tasks.

The EU is funding various projects to design robots that can help with specific mobility-related tasks. They include an intelligent robotic walker that can help someone sit in a chair or assist them as they move around the house.

In the UK, a project known as CHIRON (Care at Home using Intelligent Robotic Omni-functional Nodes) is developing a system of modular robotic components located in multiple positions around the home which users can adapt to perform different assistive tasks. A key component is a flexible wall- or ceiling-mounted robotic arm-like structure that can provide varying degrees of assistive support, depending on particular needs. The hardware of the robotic arm forms part of an integrated system designed to be connected to other devices and sensors and capable of responding to voice, visual and touch inputs.

Personal care and other assistive robots are becoming increasingly viable ways to complement healthcare technology trends such as smart monitoring systems and mobile applications, thus easing the reliance on human caregivers. The role of the IEC in developing International Standards for the sensors, motors, cameras and other components used in these devices is vital to promote the safety of new products and stimulate market growth.

Standardization enhances network security

Monitoring the network's physical layer, in other words, the connections, cables, and other hardware assets, provides improved security

By Antoinette Price

As we transition into a smarter world, more buildings are becoming connected to improve overall efficiency. They incorporate new technologies, which manage everything from lighting, heating and energy, to security systems. Many functions, processes and systems of intelligent buildings are entirely dependent on network infrastructure, which must run smoothly and above all be secure.

Protecting information is a top priority for many organizations, businesses, government agencies, healthcare providers, data centres and manufacturing facilities, which increasingly rely on these complex networks.

Network systems contain diverse connectors and cables

Plenty of tools protect software from cyber attacks. However, physical interruptions may also have significant consequences. If someone disconnects a server, whether intentionally or not, a business which sells products or services online could quickly experience large financial losses, or serious data breaches.

A clear view of AIM systems

International Standard ISO/IEC 18598 for automated infrastructure management (AIM) systems, aims to deliver physical security for networks. The Standard was developed by the Joint Technical Committee (JTC) of the International Organization for Standardization (ISO), and IEC, ISO/IEC JTC 1/ Subcommittee (SC) 25, which focuses on the interconnection of information technology equipment.

Hans-Jürgen Niethammer is involved in standards committees at national (German), regional (European) and international levels (ISO/IEC), for telecommunication cabling in office buildings and data centres. Niethammer was Project Leader of ISO/IEC 18598 during its development and commented on some of its key points. "There are many advantages to this new Standard, but I see two main ones. First, users of ISO/IEC 18598 now have a defined requirement list of features and functions that AIM systems must have in order to conform to this International Standard. Prior to this, there were a lot of systems out there that did some of the things on the list, but not all. So users couldn't distinguish between their functions. This list gives end users who are thinking of adopting an AIM system a clear overview of what such a system has to offer," said Niethammer.

Providing continuity and flexibility

The Standard also defines a mandatory software interface for AIM systems, which allows the integration of AIM system functionality into already existing business software applications like data centre infrastructure management (DCIM) or other AIM systems.

"This is the second main point for me. Previously, if a vendor stopped developing its AIM products, end users would be stuck, because they would not be able to continue using the product. But the new definition of this standardized software interface allows another vendor to take over, using the existing software interface to

International Standard documents cabling infrastructure and records connectivity information

continue delivering the customer this service," Niethammer added.

Software functions monitor physical connectivity

AIM systems can provide automated, easily accessible, current documentation that can improve system availability and facilitate solving problems quickly.

ISO/IEC 18598 specifies the requirements and recommendations for the attributes of AIM systems, which it defines as an integrated hardware and software system. The hardware automatically detects the insertion or removal of cords using a combination of patch panels and controllers, and processes this as part of an automated infrastructure management system.

The software used includes either application programming interfaces or data exchange formats, which collect, store and allow the data from the AIM system to be shared with other systems. The Standard also includes documenting the cabling infrastructure, recording connectivity information and allowing data exchange with other platforms. Thanks to these software functions, the application of this Standard will allow IT managers to see all the physical connections in buildings, both locally and remotely. They will receive instant updates of changes, and reports on which devices are connected and where they are. By alerting managers to unscheduled changes, this extra layer of surveillance will allow them to quickly locate where the problem is and address it. IT managers will also be able to monitor and maintain network connectivity automatically and in real time.

Valid for diverse industries

This International Standard will benefit different industries in varied ways. Two examples of how the Standard impacts ICT providers and building management teams are noted below:

Example 1: ICT providers should make sure that their engineers get the clear list of requirements defined in this Standard, which must be put into their systems. So if a company offering an AIM system follows this list, then it will be, by definition, standard-compliant. Infrastructure network planners and designers, network operation managers, IT process managers, software integrators, suppliers of AIM solutions, and suppliers of management system software will improve their systems by incorporating requirements of the Standard at the initial development stage.

Example 2: In the case of DCIM, the software used in AIM systems can enhance and automate the management and operational functions in building and data centres, thanks to the real-time information gathered for the cabling infrastructure. This includes asset and connectivity management, change and availability management and capacity planning.

Interaction between building management systems and AIM systems may improve the overall efficiency and security of the building. By having an accurate, real-time overview of how buildings are used, it is possible to find savings in areas including energy management, lighting, access control for employee time and attendance systems, and security.

Getting about is made easier

The technology helping disabled athletes is becoming mainstream

By Catherine Bischofberger

The life of people with disabilities has improved drastically thanks to advances in technology. Their mobility outside of the home has increased in leaps and bounds, to the extent that the technology may be used to benefit the able-bodied as well.

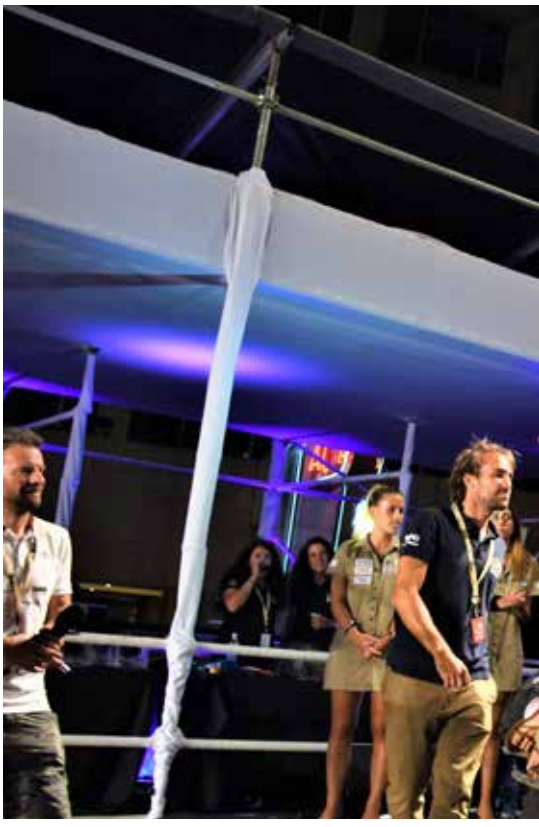
Sports, and especially extreme sports, have always pushed technology forward: in the audiovisual industry, it was coverage of the 2014 Football World Cup that convinced many broadcasters to make the shift to 4K resolution technology for capture and transmission. The IEC is heavily involved in those areas, primarily under the aegis of IEC Technical Committee (TC) 100: Audio, video and multimedia systems and equipment. Likewise, in the area of wearables and tracking devices, specific individual performances can lead to the testing of new technology powered by sensors. The IEC is equally very active in pushing standards for sensor technology, most notably through IEC TC 47: Semiconductor devices, which produces International Standards for the design, use and reuse of sensors as well as measuring and testing equipment. The rapidly increasing area of wearables comes under the remit of TC 124: Wearable electronic devices and technologies.

Philippe Croizon, a mould breaker

An important push is also taking place in the world of sport for the disabled, where accessibility and ease of use are some of the key drivers. Philippe Croizon's recent sporting feats have pushed the envelope for athletes with disabilities, most notably his performance in the Paris-Dakar race at the beginning of the year: the quadriplegic athlete used a specially-designed car adapted by a French automotive company renowned for its cutting edge technology, tailoring every-day and racing cars to disabled requirements. Among the features of the specially-designed buggy are an automatic gearbox and hydraulic power steering. Thanks to the technology, coupled with Croizon's extraordinary resilience, mental strength and state of physical fitness, the athlete reached the finish line of this incredibly gruelling race, a feat many able-bodied drivers did not achieve. "Automatic gearboxes for buggies used on the Paris-Dakar did not exist. But we asked Freddy Valade from Off Road Technology based in the Vendée region of France to create one and he did in a period of four months. He was one of our key mechanics on the Dakar race," Croizon explains.

According to Croizon, performances like his are becoming the norm, as technology evolves. "There were three paraplegic athletes on the Dakar, in addition to me. One was driving a truck. Technology is moving so fast, most notably in the area of limb replacements and exoskeletons. I predict that in 10 to 15 years from now, trauma-based handicap will no longer exist!"

In his everyday life he uses an electronically-controlled car, equipped



Philippe Croizon celebrates finishing the race with his team

with technology developed by a Swiss company, which includes for instance the Abi Loader automatic wheelchair loading system. At the flick of a switch, Abi Loader opens the rear hatch of the car and delivers the wheelchair directly to the car door. A second press of the switch folds the Abi Loader back into the car while the user transfers to the wheelchair. The loader even closes the rear hatch behind itself.

The use of programmable electronic circuits, for instance the remote controlled devices employed by the Abi Loader, comes under the remit of TC 61 which oversees standardization about the safety of household and virtually every other electrical appliance. TC 72: Automatic electronic controls is also active in this area.

More people with disabilities

Without being perhaps quite as optimistic as Philippe Croizon, it is obvious that life is changing rapidly for people with disabilities as well as more widely for elderly people with mobility problems. According to the World Health Organization (WHO), by 2050, the world's population of those aged 60 and above is expected to total two billion, up from 900 million in 2015.

While people are definitely getting older in high-income countries, the trend is bound to expand and affect less well-off areas of the world. The WHO predicts that in 2050, 80% of older people will be living in low- and middle-income countries.

The number of people with disabilities is also growing throughout the world. It is partly a consequence of the population ageing: – older people have a higher risk of disability. According to the WHO, there are one billion people in the world living with some form of disability.

The IEC Systems Committee on Active Assisted Living (SyC AAL) is leading the way in these areas, by adopting a systems-based approach and making sure that standards pertaining to the technologies helping the old and those with disabilities are interoperable.

Electric cars are adapting too

Electric cars are another area where technology advances are making huge strides as environmental concerns skyrocket, including electric vehicles (EVs) for people with disabilities. A US company has manufactured a small car that measures 7x 5 feet and has no seats. The driver can just roll his or her wheelchair into the car from a pop-up back door. Designed for use on local roads, the vehicle can travel up to 25 miles per hour and costs around $ 25 000. IEC TC 69: Electric road vehicles and industrial trucks and its subcommittees (SCs) work hard preparing international standards for electric vehicles powered by self-contained batteries. For instance, the Joint Working Group (JWG) IEC TC 69/TC 21/SC21A has published the 62660 family of Standards on lithium battery cells.

3D printing, a revolution

Wheelchair technology is also evolving fast in the wake of the two most recent Paralympics, first in London, then in Rio. According to the WHO, 70 million people in the world require a wheelchair for moving inside and outside their homes but many in the developing world cannot access them because they are too expensive. The organization estimates that only 5 to 15% of the world's population has access to a wheelchair. When they do get one, in most cases it is not adapted to them at all in terms of weight, size or disability, partly to do with the costs involved in tailoring chairs to each person's specific requirements. London-based charity Hack-on-wheels is creating an online library of tried and tested open source designs, following the example of the well-publicized open source prosthetic arm and hand championed

(Photo: @Dakarpress)

by volunteer network e-Nable. People will be able to search the archive to find what they require and then get it printed in 3D, making the chair easy to customize.

A Vienna-based lab has created a basic carbon frame braced with 3D-printed joints, making it easily customizable and cheap. The same lab has produced a concept for a child's wheelchair with parametric joints that can actually grow with the child. It includes a backrest made of foam based on a 3D body scan, which fits each individual perfectly and makes the chair much more comfortable.

The thread linking all these stories together is 3D printing and scanning. Without it, no cheap customizable devices can or will be created. The IEC is involved in this area through the Joint TC of the International Organizations of Standardization (ISO) and the IEC, ISO/IEC JTC 1/SC 28: Office equipment, which works on the standardization of some of the features and the testing of 3D scanners and printers.

Exoskeletons may be the future for us all (Photo: John B. Carnett)

Exoskeletons and prosthetic limbs

A lot of electronics are involved in creating the latest cutting-edge prosthetic limbs. One leading French company in that area has created the ALLUX knee – a smart remote-controlled limb. If the user stumbles, electronics take over control of the knee thanks to dedicated sensors which detect unsafe situations. Microprocessors immediately increase the hydraulic resistance so as to prevent the knee from suddenly buckling. An inbuilt lithium ion battery provides power for 2 to 4 days.

Last year, Nathan Copeland, a 28-year-old paraplegic American man was fitted with a prosthetic hand with two-way feedback. This not only enables him to control it but also feel when it is being touched. As Philippe Croizon stated, exoskeletons are no longer in the realm of science fiction.

As mentioned by Philippe Croizon, exoskeletons are no longer in the realm of science fiction.

As many will remember, the start of the 2014 Football World Cup was, literally, kicked off by Juliano Pinto, a 29-year-old disabled athlete from Brazil wearing an exoskeleton developed by scientists from the Walk Again Project, a non-profit collaborative undertaking involving US, Swiss, Brazilian and German scientists. The free project aims to allow people with disabilities to walk again by employing the latest technology, including virtual reality. The World Cup exoskeleton was powered by the athlete's brain. He was wearing a cap which picked up brain signals and transmitted them to a computer in the exoskeleton's back pack. Here they were decoded and sent to the exoskeleton's legs. According to the scientists involved, this was the first time an exoskeleton has been controlled by brain activity and offered feedback to the athlete.

Things have already moved on since then as some exoskeletons have become commercially viable. One of them is a US device called ReWalk.

Much of this pioneering work has been reliant on Standards developed by IEC TC 47: Semiconductor devices, as it relates to the sensors which are used in virtual and augmented reality applications, more specifically in eye-tracking and speech-recognition technologies.

Benefits for the able bodied

The advances in technology for athletes with disabilities are also finding their way into the mainstream, as able bodied athletes reflect on how to use them. Philippe Croizon comments: "The human body has its limits and there is a stage when it will no longer be able to beat any records. That's where technology comes in. In the not so distant future, able-bodied runners will probably perform with electronically-enhanced limbs as well, as it will improve their performance immeasurably."

Some visionaries like Tesla founder Elon Musk believe that in the near future we will probably all have to become cyborgs, increasing our capabilities in a world where robots will be the norm.

In a somewhat more likely scenario, the use of exoskeletons could also become widespread in the area of disaster relief, for instance in situations where heavy weights need lifting after an earthquake.

Whatever the future holds, technology currently helping people with disabilities is leading the way for us all to benefit in the long run.

Quadriplegic athlete Philippe Croizon on the Paris Dakar q1race (Photo: @Dakarpress)

Relying on AAL for a better life

Systems provide assistance to ageing population aspiring to stay longer independent in their own homes

By Morand Fachot

Keeping individuals in need of certain levels of assistance active and living at home as independently and as long as possible is emerging as a major issue in many countries. This drives a significant growth in many alarm, access and remote alert systems. Standardization work from a number of IEC Technical Committees (TCs) and their Subcommittees (SCs) makes possible the development and widespread introduction of such systems.

Protecting different users for different needs on different levels

Individuals of any age, who use and/or benefit from Active Assisted Living (AAL) devices, systems or services rely more and more on alarm, access and alert systems of different kinds to protect or grant them access to homes or other premises, to monitor their health remotely or to alert different services in case of emergency. These needs coincide to a great extent with applications increasingly used in smart home environments.

Security products for AAL environments and smart homes include cameras, motion sensors, door and window sensors and alarms, electronic locks and panic buttons.

Alarm and access control

IEC TC 79: Alarm and electronic security systems, prepares International Standards for a wide range of applications and systems including electronic access control, alarm transmission, video surveillance, fire detection and fire alarm systems, and remote receiving and/or surveillance centres. Its work also covers interoperability between different services.

Advances in electronic components allow a wider range of applications that includes social alarm systems, which form part of the TC remit.

It is worth noting that access control systems, alarm transmission systems, video surveillance systems and remote receiving and/or surveillance centres all have applications in AAL environments.

Protecting vulnerable people, which may be the case of AAL users, from unwanted intrusion in their homes is important. At the same time allowing them easier access is no less important.

Another important aspect is the possibility of alerting someone in case of difficulties resulting, for instance, from a fall or urgent health problem.

Monitoring AAL users in their home environments

Elderly people represent an ever-growing proportion of the population. By 2025, there will be 820 million people aged 65 and older globally. The shift in demographics towards an ageing population will make it impossible to keep everyone who needs care in hospital. Fortunately, elderly people are on the whole in better health and more independent

Some access control systems allow remote monitoring (Photo: Access Security Corp.)

than in the past and may stay in their own homes or in care facilities longer.

This is made easier over time by the gradual addition of sensors, tele-monitoring and, more recently, of contextual awareness to social alarm systems.

Advanced bio-monitoring systems and remote monitoring technologies make it easier for elderly people to retain their independence and live at home for longer.

They include fall detectors and wireless sensors to track activity levels, sleeping patterns and medication schedules. People with dementia can have their homes fitted with automated sensors that check whether cookers have been left on or taps have been left to overflow, and if necessary alert caregivers via smartphones or tablets.

IEC TC 47: Semiconductor devices, includes sensors in a number of its publications. IEC SC 47E: Discrete semiconductor devices, prepares International Standards for components used in a variety of sensors.

Assessing the global financial value of alarm and monitoring systems for AAL users and other individuals in need of some form of assistance is very difficult, owing to the fact that many of these systems are not specifically targeted at such users, but are installed for a variety of other purposes. This is rendered even more complicated by the fact that a number of medical devices are being used in the home environment for health and wellness monitoring (see *e-tech* article Robots pick up the challenge of home care needs in this issue).

Wearables and two-way systems playing a growing role

More recent categories of AAL-relevant systems include two-path alarm systems and wearable devices. These allow healthcare workers to monitor patients remotely and/or to alert carers, emergency services of issues affecting individuals or their direct environment. This requires two-path processes for alarm transmission systems (ATS).

The Simband wearable has six sensors to track daily steps, blood pressure, heart rate, sweat and skin temperature (Photo: Samsung)

To address this issue, IEC TC 79 published IEC 60839-5-2:2016, *Alarm and electronic security systems - Part 5-2: Alarm transmission systems - Requirements for supervised premises transceiver (SPT*), and IEC 60839-5-3:2016, *Alarm and electronic security systems - Part 5-3: Alarm transmission systems - Requirements for receiving centre transceiver (RCT).* A transceiver (transmitter/receiver) can both transmit and receive communications.

AAL users are set to benefit from additional services as more and more homes will become “Smart Homes”, thanks to new-built housing and to nationwide schemes to upgrade existing housing stocks to make them more energy-efficient and AAL-friendly in many countries.

In the Netherlands, funding schemes exist to provide a trans-sectoral approach to invest EUR 30 000 to make each house more energy-efficient and AAL ready.
AAL funding covers three areas:

- Remote care, with screen-to-screen care for the elderly; four hours of paid-for care per month (only as substitute for four hours of care in physical presence)
- Telemonitoring (of vital signs), with special arrangement between hospital and health insurers
- Screen-to-screen consultation with doctor, this is accepted and reimbursed as normal visit, but only the doctor can call in.
- If many of these systems (with the exception of wearables) have to be fitted in existing housing stock, they will most certainly be installed in new building from the onset, like systems previously considered as expensive extras in the automotive sector are now standard equipment (such as air conditioning, automatic lights and wipers, airbags, ABS, etc.)

Alarm, access and remote alert systems are set to be installed in most houses in the future for the greater benefits of all residents who will, at some point in their lives, need certain levels of assistance to remain active or simply help them in their daily lives.

Expanded scope for SyC AAL

IEC work to help people remain active longer

By Morand Fachot

The Tecla portable assistive device allows people with disabilities to access personal electronic devices and computers (Photo: Komodo OpenLab)

To deal with Active Assisted Living (AAL) issues, the IEC has established a Systems Committee, IEC SyC AAL. This SyC has the role of promoting safety, security, privacy and cross-vendor interoperability in the use of AAL systems and services, and of fostering standardization which boosts their usability and accessibility. Its role and scope are constantly being expanded.

The IEC Systems Committee (SyC) concept covers different domains rather than a single one. The SyC AAL, for instance, brings together a multitude of technology experts from different areas, such as medical devices, consumer electronics, Internet of Things, computer systems and networks. These experts, who may come from a number of IEC Technical Committees (TCs), from other standards development organizations (SDOs) and from industry consortia such as Continua and other organizations like AALiance 2, work to address transversal standardization and broader system-wide issues.

Users come first!

IEC SyC AAL has been established to address concepts, products, services and systems combining technologies and social environment with the aim of improving the quality of AAL users' lives. The AAL user is any person, of any age, who uses and/or benefits from AAL devices, systems or services.

The multiplicity of AAL technologies that the industry is developing, the large number of standards on the market today and the currently fragmented standardization landscape are challenges for the IEC in developing international and interoperable standards from which the AAL user can benefit.

The objective is that AAL users should, to the greatest extent possible, live a meaningful, active and independent life, be fit and in good health and be socially connected.

The SyC AAL work is represented through four levels of assistance and five use case categories.

Levels of assistance and AAL use case categories

AAL user domains cover four different levels of assistance:

- Level 0: Able to live independently with minimal assistance
- Level 1: Able to live independently, but some assistance is needed occasionally
- Level 2: Permanent assistance is needed with Instrumental Activities of Daily Living (IADL), which include, for example, the use of transportation, answering the telephone, shopping, cooking, housekeeping, cleaning, medication management, monetary management, etc.
- Level 3: permanent assistance is needed with Activities of Daily Living (ADL), which include the most basic human activities such as walking and moving around, going up a few steps of stairs, bathing, eating, clothing, continence, grooming, etc.

AAL use cases include a number of categories to deal with the required levels of assistance, for which there is a certain degree of overlap, i.e. categories may be relevant to several different levels of assistance and not limited to one. The categories identified so far are for:

- Prevention and management of chronic long-term conditions, e.g. prevention, early detection and efficient management of chronic long-term conditions; provision of AAL solutions for persons with identified risk factors or chronic conditions or both; enabling the wellbeing of people with chronic conditions and their communities, etc.
- Social interaction: enabling people of all ages to be active and socially connected in the society, from both a societal and personal perspective, effectively contributing to their health, overall quality of life and to social inclusion; including all systems for social connection and networking as well as the possibility for knowledge transfer
- Mobility: enabling mobility in terms of moving in the home and domestic environments; orientation and navigation, transportation and travel activities, etc.
- Health and wellness: effective management of health and wellness; prevention of functional decline and frailty; inclusion of all technical support, for example for fall detection and prevention, ambient sensors or actuators, alarm systems and location tracking; supporting sustainable care models
- (Self-)management of daily life activities at home: living independently for longer, with as little (professional) help as possible and with the choice and control over decisions, equipment and assistance affecting them; living actively in the sense of remaining in charge of their own lives and participating in society, etc.

All-embracing structure

The standards development work conducted by a SyC begins at the systems level rather than at the level of individual products, so supporting the investigation of more complex issues related to devices, services, systems, infrastructure and interoperability.
As with a TC, a SyC can publish International Standards and other IEC deliverables such as Technical Reports and Technical Specifications but only to fill any gaps that may exist with other standards.
The SyC AAL currently consists of five Working Groups (WGs), one Project Team (PT) and two Chairman's Advisory Groups (CAGs):

- WG 1: User Focus, covers all user-related issues of AAL products, systems and services; defines use cases that take into account the need of users (end users and organizations relevant to the SyC AAL); develop user requirements based on use cases; create risk management and contingency planning for these use cases; recommend product, systems, services and technologies needed for standardization.
- WG 2: Architecture and Interoperability, aims at coming up with a definition for an AAL reference architecture based on user needs, which allows interoperability at different levels by taking into account security and privacy issues
- WG 3: Quality and Conformity Assessment, focuses on quality criteria, developing testing cases, tools and Standards, working with IEC Conformity Assessment Board (CAB) to develop relevant schemes, and organize interoperability testing events (e.g. plugfests)
- WG 4: Regulatory Affairs, looks at AAL initiatives on national and regional levels with details on R&D projects and trials, at regulatory requirements on national and regional levels with details on AAL policies and at the relevant AAL organizations on national and regional levels such as those for the elderly and those with disabilities
- WG 5: AAL in the connected home environment, including the totality of appliances (e.g. household technology, home network, furnishings). Identifies standardization needs and new areas of standardization specific to the use of AAL systems, devices, services and technologies in the connected home environment; identify requirements for the integration of AAL assistant systems in connected homes (both new and existing homes)
- PT 60050-871: International Electrotechnical Vocabulary, was set up to develop the IEV part that

deals with AAL terminology. The IEC TCs involved in AAL as well as the external stakeholders engaged in SyC AAL are involved in this PT.
- CAG 1: Coordination, is responsible for organizing and coordinating the work of the SyC AAL
- CAG 2: Strategy, develops the vision and long-term strategy of the SyC AAL by taking into account the emerging market trends and user needs

Wide network of liaisons

IEC SyC AAL is working closely with the following IEC TCs, Systems Committees, Advisory Committees and a Standardization Management Board (SMB) *ad hoc* Group, as well as with ISO/IEC JTC 1: Information Technology, the Joint Technical Committee set up by the International Organization for Standardization (ISO) and the IEC:

- IEC TC 59: Performance of household and similar electrical appliances
- IEC TC 61: Safety of household and similar electrical appliances
- IEC TC 62: Electrical equipment in medical practice
- IEC TC 79: Alarm and electronic security systems
- IEC TC 100: Audio, video and multimedia systems and equipment. TC 100 has set up a Technical Area, TA 16: Active Assisted Living (AAL), accessibility and user interfaces, to address AAL-specific issues related to audio, video and multimedia systems and equipment.
- IEC TC 124: Wearable Electronic Devices and Technologies, a newly-created TC
- ACART: Advisory Committee on Applications of Robot Technology
- ACSEC: Advisory Committee on Information security and data privacy
- SMB ahG 66: Smart Home/Office Building Systems
- ISO/IEC JTC 1: Information Technology, including WG 10: Internet of Things and Subcommittee (SC) 35: User interfaces

IEC SyC AAL also works with the following TCs, the Strategic Advisory Group (SAG) from ISO and the International Telecommunication Union Telecommunication Standardization Sector (ITU-T), and other organizations.

- ISO/TC 159: Ergonomics
- ISO/TC 173: Assistive products for persons with disability
- ISO/TC 215: Health informatics
- ISO SAG on Ageing societies
- Continua Alliance and PCHA
- AALIANCE 2
- ITU-T/JCA-AHF: Joint Coordination Activity on Accessibility and Human Factors

This wide network may extend in the future as further needs become apparent.

Set to deal with emerging trends

The systems approach is being used to address AAL issues because they cut across many fields of technology.

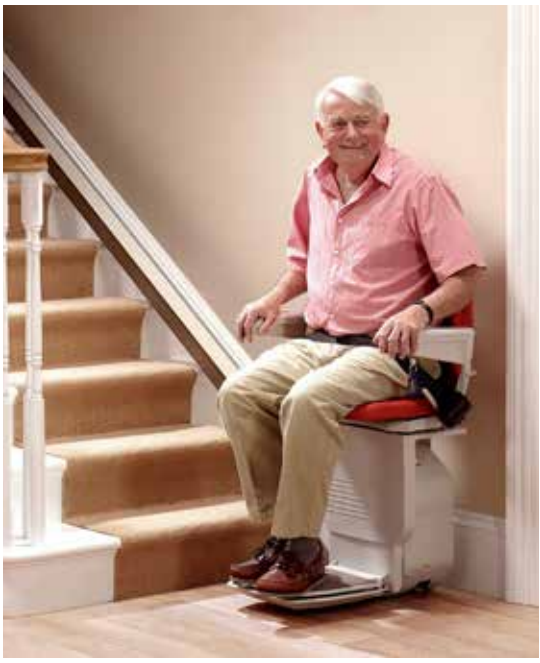
To do this, IEC SyC AAL has set itself the task of monitoring closely the following emerging trends:
- accessibility, user needs and user interface technologies
- Internet of Things and of People
- daily life autonomy and health support
- health informatics
- wearable smart devices
- disruptive technologies
- service robotics
- 5th generation Internet
- smart cities, including intelligent (smart) homes and smart office buildings
- security and personal data privacy
- Big Data and data analytics

Fast-growing AAL needs mean expanding role for SyC AAL

Increasingly, people of all ages are seeking wider and better access to technologies that allow them to live a more active and fulfilling life. These individuals may be elderly people who want to live independently and remain active longer, or those of any age who need to use or benefit from AAL devices, systems or services.

The proportion of elderly people in all societies is growing fast. In 2010, an estimated 524 million people were aged 65 or older, according to the US National Institute on Aging. By 2050, this number is expected to nearly triple, to about 1,5 billion.

Meanwhile, more and more individuals from other demographic groups are also seeking improved access to AAL products and services. The multitude of AAL technologies, products and services that can be used in the home and other environments, and the need to develop international and interoperable standards for these point to a very active agenda for the IEC SyC AAL in the future.



Stairway Lifts help individuals suffering from mobility issues to travel effortlessly from floor to floor (Photo: Home Elevator of Texas)

Raising awareness on IEC standardization work

IEC TC 40 public website paves the way for outreach from other IEC TCs

By Jan-Henrik Tiedemann

Recently several IEC Technical Committees (TCs) expressed the wish to have their own website to present specific TC activities that may be of interest to the general public.

Pilot project with TC 40

On the IEC website, every TC and Subcommittee (SC) already has a dashboard which shows all technical information on standardization projects together with contact details and meeting information.

While this is essential information for persons already involved in standardization projects, we understand that, to reach out to the general public, the information presented should have a few different options and be edited by the Technical Committee directly.

In a pilot project with IEC TC 40: Capacitors and resistors for electronic equipment, we have created a template for a new IEC TC website. TC 40 is the first TC using it publicly.

The concept of this pilot project is to evaluate giving IEC TCs a low maintenance tool to promote their work to the general public.

Creating, publishing and updating made easy

Since the Technical Committee is responsible for regularly updating the content, it is very important to have a team or person within the committee responsible for these regular updates.

Built on WordPress, an open-source platform used by millions around the world, the TC website template is very user-friendly.

In addition, for those experts in charge of creating, publishing, maintaining and updating the TC website, a guide has been prepared that explains, step by step, how to add text and links to existing pages; how to upload a blog post; how to add images or embed videos in pages and posts; and, for administrators, how to add new users. The guide also contains an FAQ section as well as guidelines providing best practice and recommendations for those who wish to use social media networks to communicate on their TC.

Axial electrolytic capacitors

What do you think about this approach?

If your Technical Committee is interested in creating and maintaining a website, please send a mail to IEC Community Manager Jan-Henrik Tiedemann: jti@iec.ch.

IEC TC 40 is the first Technical Committee to use a public website to promote its standardization work

Nailing safety

Products tested to international standards instil confidence

By Antoinette Price

Power tools are lighter, perform better and last longer, thanks to improved cordless battery technology, benefiting professionals in manufacturing, aerospace, automotive and construction, and amateurs alike. This booming global industry is expected to post revenues of more than USD 34 billion by 2020, according to market research by Technavio.

Doing it yourself

In an age of DIY TV shows and step-by-step explanatory Internet videos, more people are having a go, whether hanging a painting, building a shed, or carrying out basic car maintenance. This is possible thanks to affordable, relatively easy to operate power tools. There's a tool for just about every job, ranging from mains-operated, electric-powered and robotic battery-powered lawn mowers, garden blowers, to hand-held motor-operated or magnetically-driven electric tools. These include drills, screwdrivers, impact wrenches, grinders, planers and disk-type sanders, hammers, spray guns for non-flammable liquids, shears and an array of saws.

One tool many parts

Electric tools and gardening appliances are comprised of a wide range of components and parts. A multitude of IEC International Standards prepared by technical committees (TCs) and subcommittees (SCs) are used for their design, manufacturing, as well as to ensure their safe use.

IEC TC 116: Safety of motor-operated electric tools, produces International Standards for the safety of hand-held motor-operated electric tools, transportable motor-operated electric tools, and garden appliances.

Cordless power tools are lighter, perform better and last longer (Photo: Makita)

Testing the equipment

While users in the home and workplace must follow safety procedures and work sensibly with power tools, manufacturers must do their part to ensure that their products have been designed with built-in safety mechanisms.

IECEE is the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components. It operates the CB Scheme, through its registered National Certification Bodies (NCBs) and Certification Body Testing Laboratories (CBTLs), which can test and certify all electrical hand-held tools manufactured against the IEC 62841 series of International Standards on electric motor-operated hand-held tools, transportable tools and lawn and garden machinery, developed by IEC TC 116.

Tests cover 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 earthings and resistance to heat, fire and rust.

Everyone wins

Everyone stands to benefit from the IECEE CB Scheme, whose members agree to the mutual acceptance of test reports and certificates dealing with the safety of electrical and electronic components, equipment and products.

Manufacturers, suppliers and consumers can be confident that power tools, which have undergone testing and certification, have done so to the highest safety, reliability and performance requirements contained in the IEC International Standards. Additionally, manufacturers can get their products to market faster, saving time and cost, by avoiding the need for multiple tests.

Robot mowers can be programmed to cut specific lengths at certain times (Photo: Holger Casselmann/Wikimedia Commons)

Dusty business

IECEx-certified equipment key in mitigating explosion risks

By Claire Marchand

Some industry sectors are automatically associated with explosive (Ex) atmospheres – oil and gas, petrochemical plants, mining and in particular coal mining. Many others won't necessarily come to mind although the risk of fire and explosion exists and needs to be heeded. Food processing, sugar refineries, grain handling and storage, printing, paper and textile industries, sawmills, woodworking areas or waste treatment operations are all potential hazardous areas. Not to mention gas stations or aircraft refuelling and hangars.

Focus on dust

What is the common denominator between all these sectors? They all utilize flammable or combustible substances in quantities capable of resulting in concentrations that are potentially explosive, whether on a constant basis, as a by-product of normal operation or due to the occurrence of an abnormal situation.

One of the substances found in huge quantities in many Ex industry sectors is dust.

Dust is often the by-product of a production process and treated as waste, but it can also be an important element in the manufacturing of products such as food products, pharmaceuticals or pigments. Coal, wood, grain, sugar starch, certain metals, dyes and plastics all generate dust.

Potential risks

The large majority of industrial dusts are combustible, and dust explosions can occur in any enclosed area. Dust explosions are a frequent occurrence in underground coal mines, but they can nevertheless happen in any location where powdered combustible material is present.

A publication by German-based company Stahl explains the mechanisms of a dust explosion: "If a draft of air swirls up a layer of dust in a small area, the dust, along with oxygen, forms a combustible dust/air mix. If this mix is ignited by an ignition source, an explosion is triggered. The force of the resulting explosion swirls up more dust, which is in turn ignited. This process continues, and under some conditions, chain reactions such as these sweep through entire buildings or facilities, destroying them."

Even an extremely thin dust layer in a closed room is sufficient to trigger an explosion when the dust is swirled up and ignited.

Ignition sources for dusts include sparks from electrical or mechanical processes, arcs, open flames, electrostatic discharge (ESD), and electromagnetic waves among others.

Safe manufacturing processes

Because of the hazards associated with the presence of dusts, all electrical and non-electrical equipment – electric, hydraulic and pneumatic motors, cables, enclosures, isolators and vents, lamps and switches, control systems, pumps, gearboxes, brakes, and many, many more – used in manufacturing processes should have the relevant level of dust explosion protection. Failure to do so can result in major industrial accidents and have fatal consequences.

Through its standardization and conformity assessment work, the IEC has a solution for all sectors of industry that are operating in those hazardous environments. The Commission has been at the forefront of Ex standardization for many years, preparing International Standards and establishing a Conformity Assessment (CA) System that provides testing and certification for all types of Ex equipment and related services as well as personnel competence.

Dust explosions are a frequent occurrence in underground coal mines

Specific requirements for Ex equipment

IEC Technical Committee (TC) 31: Equipment for explosive atmospheres, has a complete series of International Standards, IEC 60079, that cover all specific requirements for electrical Ex equipment and systems, from general requirements to protection levels for apparatus used by all sectors that operate in hazardous environments, such as pharmaceuticals, food processing, sugar refineries, flour mills, grain silos as well as the paper and textile sectors.

Several International Standards focus on dust:

- IEC 60079-10-2:2015, *Explosive atmospheres – Part 10-2: Classification of areas – Explosive dust atmospheres*
- IEC 60079-31:2013, *Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"*
- ISO/IEC 80079-20-2:2016, *Explosive atmospheres - Part 20-2: Material characteristics - Combustible dusts test methods*

Dust explosions are a frequent occurrence also in food processing plant

One of IEC TC 31 Subcommittees, SC 31M, recently published two International Standards – ISO 80079-36:2016, *Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements,* and ISO 80079-37:2016, *Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non electrical type of protection constructional safety "c", control of ignition source "b", liquid immersion "k"*, dealing with non-electrical equipment and protective systems for explosive atmospheres.

Testing and certifying to IEC Standard

Manufacturing Ex equipment in compliance with IEC International Standards is one thing. To make sure that the equipment they purchase meets the very strict requirements specified in the IEC 60079 series of International Standards, as well as those put in place by national or regional regulations and legislation, the Ex industry can rely on IECEx, the IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres for testing and certification.

An IECEx certificate provides clear proof of compliance with International Standards, an important assurance for anyone responsible for the safety of those working in such areas.

It is worth noting that in 2016, IECEx issued the first three certificates for non-electrical equipment that met the requirements stipulated in ISO 80079-36 and ISO 80079-37.

Repair and maintenance of Ex equipment

Because Ex equipment has a much higher capital cost than the same equipment used elsewhere, repairing it is often more cost-effective than replacing it. The IECEx Certified Service Facilities Scheme assesses and certifies that organizations and workshops that provide repair and overhaul services to the Ex industry do so according to the strict requirements of IEC 60079-19, *Explosive atmospheres – Part 19: Equipment repair, overhaul and reclamation.* This ensures that unique Ex safety features are not compromised during the repair or overhaul process. The system includes on-site audits prior to issuing the IECEx Certificate and periodic audit reports.

The IECEx Certified Service Facilities Scheme also covers other Ex-related services including the inspection of Ex equipment and installations.

High level of safety for Ex workforce

To cover all safety aspects in Ex environments and to complement the Certified Equipment Scheme, IECEx has developed the IECEx Certification of Personnel Competence Scheme for assessing and certifying individuals working in potentially hazardous areas.

The IECEx Certificate of Personnel Competence (CoPC) provides independent proof that the certificate holder has the required qualifications and experience for working on electrical equipment located in hazardous areas and can implement IEC International Standards covering explosive atmospheres.

For the CoPC, competence is defined as "the ability to apply knowledge" rather than simply assessing knowledge. In this sense, the assessment of persons includes assessing their ability to perform certain Ex-related tasks.

More information on IECEx: www.iecex.com

Smart home: a life-changing experience

IoT brings back some degrees of independence to those who require assistance in everyday life

By Claire Marchand

While recent developments in home automation are bound to make anyone's life easier, there are certain categories of the population for which it may be a life-changing experience: elderly and/or disabled people have very specific accessibility needs and can benefit fully from the technological advances associated with the Internet of Things (IoT) and the smart home.

Even the most mundane tasks, such as vacuum cleaning, can be performed by robots (Photo: gizmodo.com)

New solutions to age-old problems

For years, accessibility for the disabled or the elderly could be summed up in a few adjustments such as stair lifts or easy-access baths and showers. Not much more. Modern technology brings forward an – almost – infinite number of solutions that allow them to live as independent a life as possible in their own home.

While most able-bodied people switch lights on or off without thinking – the gesture is such a deeply ingrained habit – for many others the task, which may have seemed unsurmountable until recently, is now made easier by remote-controlled lightbulbs, WiFi-connected controllers that can be operated from smartphone apps or even voice-controlled light switches.

From automatic doors to cupboards and cabinets fitted on electric tracks that slide up and down and can be reached by those in wheelchairs, from automatic faucets, soap dispensers and hand dryers to robot vacuum cleaners, from window, blind and curtain controllers to motion-detection sensors, emergency phone diallers and panic buttons, technological advances can provide precious assistance and independence to people who otherwise would have to rely on others for help in their daily routines.

Benefits for all involved

Those are only a few examples of what can be done to assist elderly, disabled or handicapped people in solving accessibility problems.
While a smart environment offers elderly and disabled citizens tremendous assistance in living an independent life at home, it also helps lighten the burden put on families or carers by providing 24-hour

non-invasive home monitoring. For instance, if no movement has been detected for a certain amount of time, an alarm can be triggered to alert the family or carer that something is amiss.

Most of the time, making a home smart doesn't require a complete refurbishment. Smart home technology has become more accessible and many solutions involving the retrofitting of existing equipment and devices are available at affordable prices.

High-quality electronics a must

The common denominator behind smart homes and devices, the IoT in general, is the electronics inside.

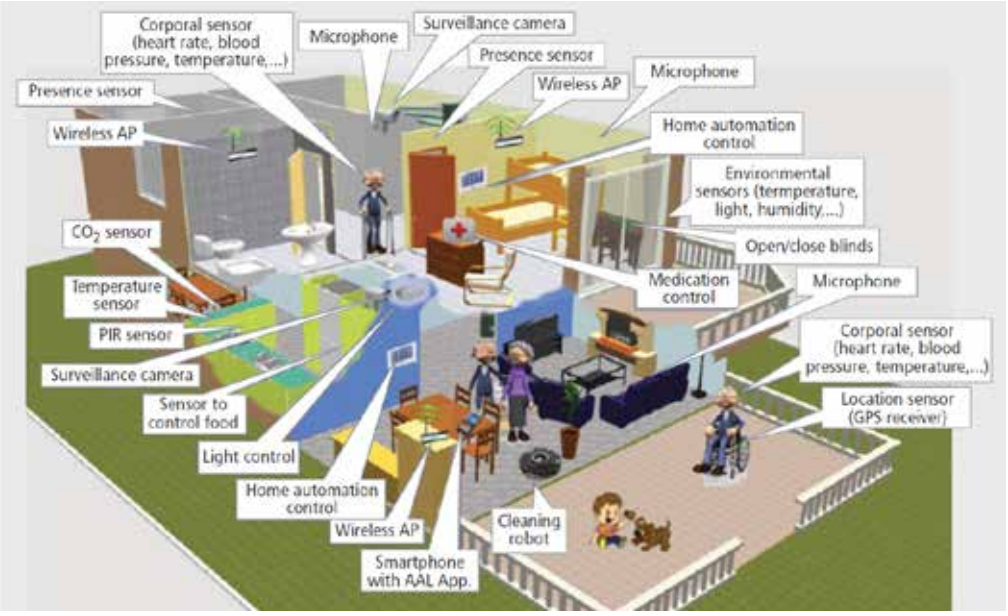
Sensors, connectors, resistors, capacitors, semiconductors, diodes, light-emitting diodes (LEDs), organic LEDs (OLEDs), microelectromechanical systems (MEMS) and nanoelectromechanical systems (NEMS) are just some of the numerous components that are widely used in all kinds of electronic equipment and devices.

To work smoothly, and especially when elderly or disabled people are concerned, these smart objects and devices have to have high-quality electronics inside. One faulty component can have disastrous effects.

IECQ ensures product safety and reliability

Electronic component manufacturers and suppliers have a very powerful tool at their disposal to ensure that their products are safe, reliable and meet the strictest requirements: IECQ, the IEC Quality Assessment System for Electronic Components.

As a worldwide approval and certification system covering the supply of electronic components, assemblies and associated materials and processes, IECQ tests and certifies components using quality assessment specifications based on IEC International Standards.
In addition, there are a multitude of related materials and processes that are covered by the IECQ Schemes. IECQ certificates are used worldwide as a tool to monitor and control the manufacturing supply chain, thus helping to reduce costs and time to market, and eliminating the need for multiple re-assessments of suppliers.



Technological advances offer independence to people who would otherwise require assistance in their homes (Photo: Decompression Stop blog)

Covering a wide range of electronic components

The numerous types of electronic component covered by IECQ are used in all kinds of technologies, from the smallest device to the most complex piece of equipment. At present, there are eight families of components certified by IECQ:

- Active components, including integrated circuits
- Electromagnetic components
- Electromechanical components
- Electro-optic components
- Hybrid integrated circuits
- Passive components
- Printed wiring boards
- Wire, cables and connectors
- Assemblies
- Component Modules
- Ancillary items e.g. insulator/ shielding materials, heat transfer compounds and materials etc.
- Electronic part enclosures and housing materials

IECQ operates industry specific Certification Schemes:

- IECQ AP (Approved Process)
- IECQ AP-CAP (Counterfeit Avoidance Programme)
- IECQ AC (Approved Component)
- IECQ AC-TC (Technology Certification)
- IECQ AC-AQP (Automotive Qualification Programme)
- IECQ Scheme for LED Lighting (LED components, assemblies and systems)
- IECQ Avionics
- IECQ HSPM (Hazardous Substances Process Management)
- IECQ ITL (Independent Testing Laboratory)

IECQ plays a major role in ensuring that your home is smart and also that all connected devices work safely and reliably.

More information: www.iecq.org

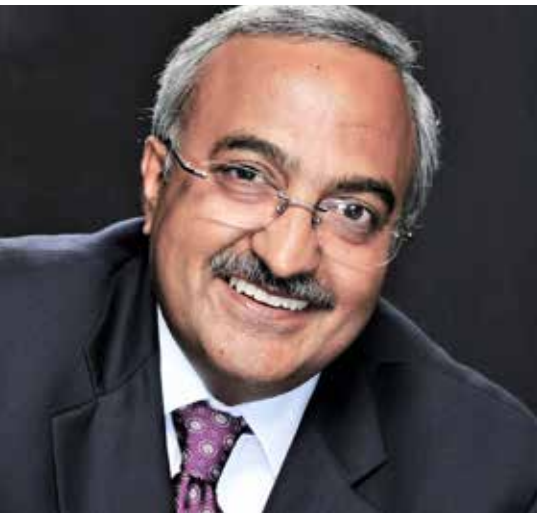
Emergency alert systems instantly connect people who need assistance to a monitoring centre that will in turn set up a connexion with a caregiver or dispatch emergency services (Photo: MyTrex Inc.)

IEC calls on disruptive technology for universal energy access

Announcing the LVDC Conference on Sustainable Electricity Access, 22-23 May 2017, in Nairobi

By Janice Blondeau

Energy, and especially electricity, is the golden thread that impacts the majority of the 17 United Nations Sustainable Development Goals (SDGs), and furthermore, the development of every nation and economy. The UN recognizes electricity access as a key pillar for economic development because it helps to reduce poverty and hunger, improves educational opportunities and enables higher quality healthcare.



Vimal Mahendru, Chair of the IEC SyC LVDC and LVDC for Electricity Access, and IEC Ambassador

Electricity access – an agent of economic growth

However worldwide 1,3 billion people don't have any access to electricity and 2,7 billion people have very limited access. In Africa, more than 600 million people, that is two out of three Africans, lack access to electricity.

LVDC Conference on Sustainable Electricity Access, 22-23 May 2017, Nairobi, Kenya

The work of the IEC has a direct impact on 12 of the 17 SDGs – it provides the technical foundation for the whole energy chain and all equipment that is driven by electricity. Against this backdrop, the IEC is joining forces with the Kenya Bureau of Standards (KEBS) to host the inaugural LVDC Conference on Sustainable Electricity Access. Standardization work for LVDC is perhaps one of the biggest societal impact initiatives undertaken by the IEC to date. It requires a concerted effort by all stakeholders.

Low voltage direct current (LVDC), a disruptive technology that fundamentally changes and accelerates energy access, has the potential to transform lives, livelihoods and leisure by helping millions of people gain access to electricity. The IEC is driving the development of LVDC, making this technology safe and broadly accessible.

Thought leadership platform

The LVDC Conference on Sustainable Electricity Access will take place in Nairobi, Kenya, on 22 and 23 May 2017. Holding this conference in Africa will provide a real understanding of electricity access needs to IEC experts and stakeholders. The IEC invites participation from all those concerned with the Sustainable Developments Goals, especially Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all. The conference will bring together a diverse group of stakeholders including policy makers, power utilities, equipment manufacturers, NGOs, technology gurus, industry experts, systems engineers, funding agencies and insurers. It will be

a thought leadership platform to effectively engage with policymakers and regulators. The LVDC Conference on Sustainable Electricity Access will also help gain the technological and economic information needed to evolve LVDC standards and drive the technology's commercialization.

The recent evolution of LVDC

Over the last 20 years, several mega-trends have created a groundswell of demand for LVDC. The need to mitigate the effects of climate change has seen a renewed focus on Energy Efficiency and sustainability, taking power generation increasingly towards renewable sources and away from fossil fuels. In addition, the cost of energy generation from solar photovoltaics (PV) has become more accessible, while LED lighting has made the conventional incandescent lamp a thing of the past. These trends challenge the traditional model of electricity distribution via alternating current (AC). Also, many of the technical issues that blocked the development of DC are no longer an obstacle. A diverse group of global experts in the IEC is currently preparing the technical foundation needed for the broad roll-out of LVDC.

Without realizing it, today we live in a "direct current" world, with most of our electronic devices already being able to use current that is produced by renewable sources directly, without conversion. Everything – from electric vehicles, Renewable Energy technology, kitchen appliances, lighting, transport, smart phones and tablets; to systems with data and embedded electronics, such as the Internet of Things, smart homes and Smart Cities – runs on DC.

Get engaged!

Vimal Mahendru, Chair of the IEC Systems Committee on LVDC (SyC LVDC), and IEC Ambassador said, "For areas where grid connection is too expensive, LVDC is the only economic way to provide electricity access to everyone: it is clean, safe and affordable.

"This conference is your opportunity to input your local needs and requirements, to hear about economic opportunities linked to LVDC, and to contribute to the development of key performance and risk assessment indicators to allow regulators and systems administrators to benchmark LVDC solutions."

As well as attending the LVDC Conference on Sustainable Electricity Access, you are invited to track low voltage direct current developments and engage on the topic of LVDC and its standardization. Join the LVDC discussion on LinkedIn at: https://www.linkedin.com/groups/8587064.

For further reading, please see the article *DC takes the driving seat* in *e-tech* of June 2015, and also visit the SEG 4 and SyC LVDC web pages.

Standardization work for LVDC is perhaps one of the biggest societal impact initiatives undertaken by the IEC to date

IEC work on cyber security for energy infrastructure

International conference presents IEC activities in cyber security

By Morand Fachot

Protecting energy security and critical energy infrastructure against cyber attacks is fast emerging as an absolute priority. In mid-February, the EnergyPact Foundation organized an international conference in Vienna on cyber security aimed at protecting such infrastructure. Eyal Adar, an expert on cyber security, outlined the extent of IEC standardization and Conformity Assessment (CA) activities in the domain, giving details of the areas to which they apply.

Critical infrastructures most vulnerable to cyber attacks include electricity generation plants...

Critical infrastructure: target of choice for cyber attacks

The perception of which parts of critical infrastructures are most vulnerable to cyber attacks varies between regions. However, many of them include electricity generation plants, transportation systems and manufacturing facilities controlled and monitored by Industrial Control Systems (ICS) such as Supervisory Control and Data Acquisition (SCADA) in the critical infrastructure category. This holds true for the European network and information security agency (ENISA) and for the US Government.

Energy infrastructures have been targeted in a number of countries in recent years, or are reported to be vulnerable.

Ukrainian power distribution companies were the targets of a wave of cyber attacks that resulted in widespread power outages in late December 2015-early January 2016.

In January 2014, The Nuclear Threat Initiative (NTI), a non-profit, nonpartisan organization, warned that nuclear facilities in 20 countries might be easy targets for cyber attacks.

In the early 2000s, a number of US nuclear power plants were the targets of cyber attacks: Ohio in 2003, Alabama in 2006 and Georgia in 2008,

according to a late 2015 special report by the London-based Chatham House think tank.

International multistakeholder conference

The EnergyPact Foundation conference, held at the Austrian National Defence Academy, was co-organized by the Austrian Cyber Security Platform (CSP) and the Austrian Institute of Technology (AIT), and was supported by IEC, the UN Office on Drugs and Crime (UNODC) and the International Telecommunication Union (ITU).

It was attended by officials and representatives from industry, academia and think tanks. Topics discussed included modern data science to protect critical infrastructures of tomorrow, legal and regulatory frameworks, critical infrastructures, and business enablement.

Outline of IEC activities in cyber security

Eyal Adar, a member of IEC TC 65/WG 10: Security for industrial process measurement and control – Network and system security, and of IEC Conformity Assessment Board (CAB) Working Group (WG) 17: Cyber security, and CEO of White Cyber Knight Ltd. (WCK), gave details of IEC activities in the cyber security sphere.
Global vulnerability to malicious acts in cyber space is growing, Adar said, adding that the exploitation of cyber vulnerabilities of infrastructure systems represents a mounting threat to the security of businesses and societies overall.

The IEC has published over 200 International Standards that address cyber security and the privacy of health, business and critical infrastructure systems directly, Adar said, telling participants that “implementing the right Standards for your needs is a challenge, but with many benefits especially for complex infrastructures with Information/ Operational Technology and Internet of Things (IT/OT/IoT) technologies.”

Adar also added that IEC Conformity Assessment Systems were included in this area.

IEC cyber security framework advantages

As an example of the significance of IEC Standards and CA in the IT security domain, Adar focused on the advantages of the IEC 62443 series, which to date includes seven available Standards, Technical Requirements and Specifications, out of a total of 14 eventual deliverables. These publications:

- provide an ecosystem of Standards for different needs.
- provide Standards for unique needs. Adar gave as an example the "Extended Set of Standards that support Smart Grids deployment" document, prepared by the European Committee for Standardization, the European Committee for Electrotechnical Standardization and the European Telecommunications Standards Institute (CEN-CENELEC-ETSI) Smart Grid Coordination Group. This document lists a number of IEC Standards that cover power systems, information systems and industrial automation and apply to vendors, integrators and operators
- ensure international recognition: the IEC brings together 170 countries which represent nearly the entire world population and account for virtually all electricity generated
- guarantee that devices built to IEC International Standards are accepted in most countries in the world. They fully satisfy the requirements of the World Trade Organization Technical Barriers to Trade (TBT) Agreement.
- ensure coexistence with other standards by building the right hybrid of standards in selecting the best standard for each need
- guarantee compatibility with leading standards: e.g. implementing IEC 62443 means compatibility with the US (NIST) cyber security framework
- integrate market needs: Adar gave as an example the International Association of end-users of components, systems and IT related items in the Process Industries (WIB). WIB needed a standard for industrial automation and control system (IACS) solution suppliers; it wrote the original standard based on industry needs; IEC adopted it as IEC 62443-2-4:2015, *Security program requirements for IACS service providers*
- are adopted by vendors: most of the world's leading multinationals and countless many small and medium-size companies actively participate in IEC work via their National Committees
- represent a knowledge base for developing countries: certification bodies and evaluators are available worldwide, they can support energy organizations in providing the following key pieces of information:
  - What standard to implement in different use cases
  - How to implement it step by step
  - How to make gap analyses
  - And finally – how to be approved by regulators

...manufacturing facilities...

Working on CA Schemes

A number of IEC CA systems are in place. Adar explained that CAB/WG 17 was investigating the market need and timeframe for CA services (global certification schemes) for products, services, personnel and integrated systems in the domain of cyber security. However CAB/WG 17 work will exclude the scope of Industrial Automation Applications covered by IECEE CMC Task Force (TF) cyber security.

Keen interest from participants

Adar's presentation to the conference attracted considerable interest and many questions from participants as the wide range of International Standards developed by IEC and by the Joint Technical Committee created by the International Organization for Standardization (ISO) and IEC, ISO/IEC JTC 1 make a major contribution to the protection of critical energy infrastructure.

...as well as nuclear power plants

Upcoming global events (March-June 2017)

On the agenda: Smart Grids, metering, IECEx, cyber security, energy storage, emerging technologies, digital utilities, LVDC, IoT and solar PV

By Claire Marchand

The IEC regularly supports key global and regional industry events, which can present the IEC endorsement on their website and materials.

SGTech Europe 2017 - Smart Grid Technical Forum

Amsterdam, The Netherlands, 28-30 March 2017

On the agenda: smart substations, next generation SCADA, and packet telecoms. 250+ automation directors and their teams will look at utility case-study presentations, have technology panel discussions, interactive roundtable debates, and more.

IEC participants benefit from a 10% discount, using the promo code SGTECH-17-IEC.

Metering India 2017 - towards smart and sustainable utilities

New Delhi, India, 6-7 April 2017

Utilities, consultants, businesses, regulators and manufacturers will look at how ICT can make Indian power utilities more sustainable. On the agenda: metering, communication technologies, demand-side management, IT infra, sustainable business processes and more.

More information on the event website

2017 IECEx International Conference

Shanghai, People's Republic of China, 11-12 April 2017

On the agenda: an overview of IECEx and its three Schemes and the IECEx RTP programme; an update on IEC International Standards for Ex atmospheres; a practical approach to Ex installations; area classification's importance in the design of new plants and changes to existing plants and infrastructure; intrinsic safety; end-user feedback; the conclusions of a UNECE Global Study into regulations for the Ex field; and more.

ICS Cyber Security Conference

Singapore, 24-27 April 2017
Cyber security for industrial control systems sector for energy, utility, chemical, transportation, manufacturing, and other industrial and critical infrastructure organizations. On the agenda: protection for SCADA systems, plant control systems, engineering workstations, substation equipment, programmable logic controllers (PLCs), and other field control system devices.

IEC participants benefit from a discount.

Hannover Messe Hydrogen, Fuel Cells and Batteries Exhibition

Hannover, Germany, 24-28 April 2017
Key energy storage industry players will discuss latest technologies, hydrogen generation (electrolyzers,, reformers), storage and transport, fuel cells, systems and applications (stationary, automotive, mobile, special markets), battery testing and more.

10th Energy Storage World Forum

Berlin, Germany, 8-12 May 2017
Energy providers, utilities and regulators will discuss latest technologies, technical challenges, standards, battery management, business case, regulation, planning & operations, power conversion and more.

IDTechEx Show - Emerging technologies unleashed

Berlin, Germany, 10-11 May 2017
3000+ attendees will discover developments and roadmaps for latest technologies, including: 3D printing, EVs, energy harvesting and storage, graphene & 2D materials, IoT apps,

printed electronics, sensors and wearables.

Digital Utilities Europe 2017

London, UK, 10-11 May 2017
Key industry stakeholders will address challenges of digitization in the utilities sector and examine business cases, financial aspects, technology advances, cyber security and more.

IEC participants benefit from a discount.

LVDC Conference – Sustainable Electricity Access

Nairobi, Kenya, 22-23 May 2017
Organized by IEC and Kenya Bureau of Standards. Technical experts, government representatives, funding agencies, investors, insurance companies, power utilities, equipment manufacturers and NGOs will learn about what is driving LVDC development, how to safely and broadly roll-out this technology, the role it will play in universal energy access and economic development, use cases from other countries and more.

IoT Tech Expo Europe 2017

Berlin, Germany, 1-2 June 2017
200+ speakers. 100+ exhibitors. 4,000 attendees. On the agenda: the entire IoT ecosystem including Smart Cities, connected living, developing & IoT technologies, connected industry and data & security.

IEC participants benefit from a 20% reduction using the code IEC20.

European Solar PV Asset Management

London, UK, 28-29 June 2017
Leading executives and sector experts will discuss: maintenance strategy, best practices, tech innovations, avoiding asset failure, operations & maintenance for utility scale projects, challenges and more.

The next generation of IEC leaders

Get to know the 2016 Young Professionals Leaders

By Janice Blondeau

Meet the IEC 2016 Young Professional Leaders and learn more about how YPs are becoming involved in the technical work of the IEC.

Go ahead, Get ahead

The IEC Young Professionals (YP) Programme brings together upcoming expert engineers, technicians and managers from all over 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. For this month's *e-tech* magazine, we introduce the three 2016 Leaders of the IEC Young Professionals Programme who were elected by their peers in Frankfurt and we show how YPs can continue to develop within the IEC Family.

Introducing the 2016 Young Professional Leaders

The three 2016 Young Professional Leaders are:

- Chan-keun Park, Republic of Korea
- Alan Sellers, UK
- Polad Zahedi, Canada

Young Professionals in a breakout session during the IEC YP 2016 workshop in Frankfurt, Germany

Chan-keun Park

Chan-keun Park studied electronic engineering in Kwangwoon University. In 2005, during his senior university year, Park joined Samsung SDS as an electronic engineer and demonstrated talent in software and hardware development. Since 2008, he has been working at Korea Testing Certification (KTC) as a safety test engineer with work based on the series of International Standards IEC 60335 on household and similar electrical appliances and IEC 60950 on information technology equipment. He has an interest in new technology fields such as wireless power transfer, the Internet of Things, wearable devices, virtual reality and others.

Park is an expert in Maintenance Team (MT) 15: Electrically heated blankets and similar appliances, of IEC Technical Committee (TC) 61: Safety of household and similar electrical appliances; in Technical Area (TA) 14: Interfaces and methods of measurement for personal computing equipment, and TA 15: Wireless Power Transfer, of IEC TC 100: Audio, video and multimedia systems and equipment. He is responsible for R&D projects which include standardization in new fields of technology to encourage industry advancement.

Polad Zahedi, IEC 2016 Young Professional Leader, from Canada

Park is currently studying for a Master's degree in Ajou University.

Alan Sellers

Alan Sellers graduated from Aston University in 2008 with First Class Honours in Electronic Engineering and Computer Science. He started his career at a small engineering company where he worked for five years. He developed and tested simulator training devices for the aerospace and defense market and stumbled into the world of standards and conformity assessment. Sellers then moved to a large global industrial process control manufacturer and worked as part of a small team responsible for the global approvals of hazardous area products used in flammable atmospheres.

Sellers began to contribute to standards development with a particular focus on industrial process control and functional safety. In early 2016, Sellers started work for Dyson. As an integral part of design teams, he is responsible for providing expertise and advice to support product development to satisfy global approvals, standards and legislation. He participates as an expert in Joint Working Group (JWG) 13: Safety requirements for industrial-process measurement, control and automation equipment, excluding functional safety, of IEC TC 65: Industrial-process measurement, control and automation, and in Working Group (WG) 12: Electrical sensors, of IEC TC 72: Automatic electrical controls. He is also an IEC YP representative on the Conformity Assessment Board (CAB) WG 17: Cyber Security.

Polad Zahedi

Polad Zahedi is a Process Control Engineer with Ontario Power Generation Inc. His main areas of expertise are modeling and

Chan-keun Park, IEC 2016 Young Professional Leader, from the Republic of Korea

Alan Sellers, IEC 2016 Young Professional Leader, from the UK

simulation, process control design and analysis, instrumentation and control implementation and software categorization. He has also held management, operations and project management roles within the company. Zahedi obtained his Bachelor in Computer Engineering from Western University, where he was the Gold Medal recipient in his programme. Zahedi received his Masters in Mechanical Engineering from the University of Toronto.

Through his experience with programmable logic controllers (PLCs) in his Research Assistant position as well as his internship in a design agency, he was introduced to IEC International Standards. He is a Canadian National Committee member and an expert in IEC Subcommittee (SC) 65B: Measurement and control devices. Zahedi has numerous publications on power plant process control analysis and I&C design and implementation, and he is hoping to expand his publications into standards-related research.

Continuing in the work of the IEC

The following IEC Young Professionals have been selected as YP representatives on the IEC Standardization Management Board (SMB) and CAB WGs. For the SMB:

- Xiaonan Shi, IEC 2016 YP from Japan, is YP representative in *ad hoc* Group (ahG) 70: Review of Systems activities
- Mandar Sinnarkar, IEC 2011 YP from India, is YP representative in the Directives Maintenance Team

Marion Gottschalk, IEC 2015 YP from Germany, is YP representative in the Systems Resource Group (SRG)
For the CAB groups:

- Edward Hong, IEC 2016 YP from the US, participated in the Lake Forest, California, meeting of WG 11: Systems issues
- Siarhei Nazaranka, IEC 2016 YP from Belarus, and Alan Sellers, see above, are participating as YP representatives in WG 17: Cyber Security
- Jemima Jackson, IEC 2016 YP from Australia, and Mikalai Masheda, IEC 2015 YP from Belarus, are YP representatives in WG ahg BizL which aims to create a future business watch list

The IEC Young Professionals – 2017 workshop will be held in Vladivostok, Russia, from 9 to 11 October, in parallel with the IEC 81st General Meeting.

For more information about this, please contact Robert McLaren.

Obituary - Alastair Ramsay

IEC SyC AAL member passed away on 28 January 2017

By Claire Marchand

Alastair Ramsay, IEC SyC AAL member, passed away on 28 January 2017

It is with great sadness and regret that the IEC learnt of the passing of Alastair Ramsay, a member of the IEC Systems Committee Active Assisted Living (SyC AAL), on 28 January 2017, after a short battle with cancer.

Ramsay was Sustainable Development Manager at Legrand UK and Ireland. He joined the Legrand team in 2001 as part of the Wiring Devices business, and soon became the company's representative on many national and international standards committees. His expertise, energy and enthusiasm led him to be a member of many industry committees, including Chair of the Construction Products Association and the Building Regulations Technical Committees, as well as Vice-Chair of the Lighting Controls Group and Environmental Technical Committee through the British Electrotechnical and Allied Manufacturers Association (BEAMA).

Ramsay used his experience to provide significant input to SyC AAL particularly developing use case descriptions from real scenarios. He had personal experience of the need for people to have access to appropriate adaptations to enable them to continue to live independently, and he was a passionate supporter of the work in SyC AAL.

Of Ramsay, his peers in SyC AAL say: "With an unbounding vivacity for life and a continuing thirst for knowledge, Alastair was a joy to meet and an honour to know. He will be remembered for his kind and generous nature and for his unrivalled knowledge of our industry. We are very grateful that we had the chance to work alongside Alastair. His knowledge and enthusiasm will be sorely missed."

Safety Standards for sealed batteries for portable use

Two new IEC Standards cover a crucial aspect of secondary batteries: safety

By Morand Fachot

As the range and demands placed by portable electrical and electronic applications expand rapidly, IEC International Standards for portable sealed secondary batteries are being regularly reviewed. Two International Standards that focus on a key aspect of secondary sealed batteries, safety, have been published.

IEC 62133-1 deals with safety requirements for nickel batteries

Two Standards for two chemistries to replace a single publication

IEC Subcommittee (SC) 21A: Secondary cells and batteries containing alkaline or other non-acid electrolytes, of IEC Technical Committee (TC) 21: Secondary cells and batteries, has recently published two International Standards: IEC 62133-1:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications - Part 1: Nickel systems,* and IEC 62133-2:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems*. These Standards deal with

Tesla Powerwall is a rechargeable lithium-ion battery designed to store energy at a residential level (Photo: Tesla Motors)

IEC 62133-1 deals with safety requirements for nickel batteries

safety requirements for portable sealed secondary cells and batteries for use in portable applications.

These two publications replace IEC 62133:2012, which covered both nickel and lithium systems.

Greatly expanded publications

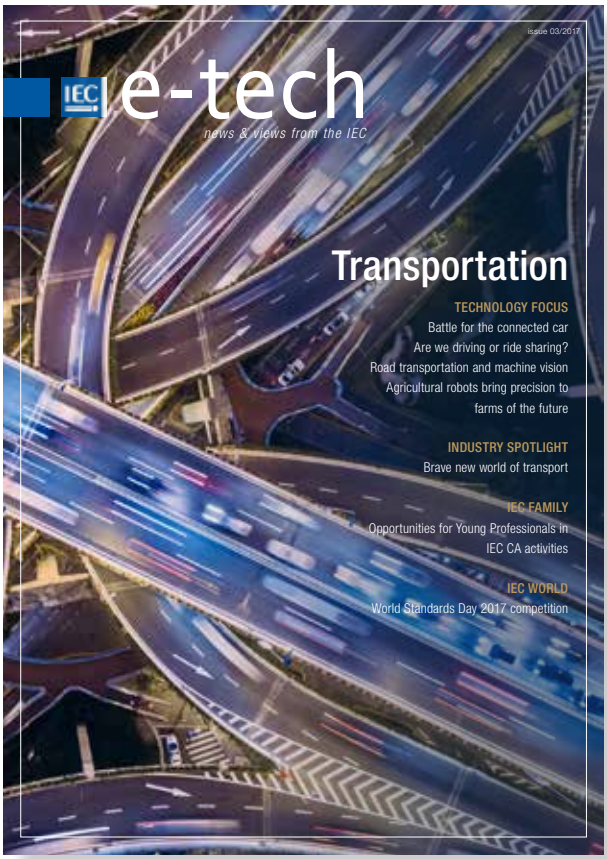
IEC 62133:2012 was much less comprehensive, in particular as regards lithium systems. Whilst the part covering nickel systems is broadly similar between IEC 62133-1 and the previous Standard, IEC 62133-2, which deals with lithium systems, is much more comprehensive as regards tests as well as normative and informative annexes than its equivalent in the previous edition. This is not surprising as lithium cells and batteries are to be found in a much greater number of devices as before and as some highly-publicized incidents resulting in fires and even explosions have affected a number of portable lithium systems.

With sealed secondary batteries set to equip many more devices in the foreseeable future, it is clear that these two newly-published International Standards will be welcome by the industry and help improve the safety of secondary batteries themselves, the equipment they power and, ultimately, users.

IEC 62133-2 provides a comprehensive series of tests for lithium systems to avoid risks of fires or explosions that have affected a number of devices in recent years (Photo: AP)

In the next issue:

Transportation - Issue 03/2017



The transportation sector is undergoing drastic changes, especially road transport.

Artificial intelligence is set to make our roads safer and more efficient. Biometrics is bound to play a major role in facilitating vehicle access and security; and so is machine vision, as the sector moves towards autonomous vehicles. Wireless power transfer (WPT) to charge electric road vehicles is emerging as an attractive proposition in many cases, such as for urban transport.

As road vehicles become computers on wheels, communicate with other vehicles and receive traffic information, the protection of these on-board systems against malicious attacks is becoming a major security issue.

Standardization in these areas will require innovative approaches and working with other standardization bodies as the technologies bridge several areas.

Fuel cells (FCs) are being introduced in transportation applications as an alternative to battery-based solutions. IEC TC 105 develops International Standards for a variety of FC technologies including propulsion systems, range extenders and auxiliary power units used in vehicles.

IEC e-tech is a magazine published by the International Electrotechnical Commission in English.

Editor in Chief: *Gabriela Ehrlich*
Managing Editor: *Claire Marchand*
Contributors: *Amy Bionda - Catherine Bischofberger - Janice Blondeau - Morand Fachot - Antoinette Price - Zoë Smart*

Read us on the web:
e-tech can be accessed electronically on: iecetech.org

Subscription:
If you would like to receive a publication alert, please click the "subscribe" button on iecetech.org
The information in this issue of e-tech is for information purposes only.
The IEC assumes no liability or responsibility for any inaccurate, delayed or incomplete information.
Articles may be reproduced in whole or in part but must mention: Source: iecetech.org (issue number and year), www.iec.ch

IEC e-tech
news & views from the IEC

International Electrotechnical Commission

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

T +41 22 919 0211

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