

SAFETY AND SECURITY

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IN STORE

Public commenting





4



7



13



17



22



36

4 Improving civil aviation security is an endless task: as International Standards close more security loopholes, new ones emerge 7 Security is one of the key drivers for connected homes, after smart energy 13 Asset integrity and functional safety: lessons from the Gudrun offshore platform leak 17 The market for alarm and electronic security systems will continue to expand in coming years, fed by the quest for increased safety and security 22 Three new IECEx apps extend mobile offer to all certificates 36 Energy efficiency is the most effective tool to reduce greenhouse gas emissions with an aim to limit global warming to 2 degrees Celsius or below

Safety and security

Issue 08/2015 of *e-tech* focuses on the role of International Standards in improving safety and security in a wide range of areas: In industrial environments, functional safety plays a central role in the protection of assets; in homes, safety rests to a large extent on a number of electronic systems; in the air transport industry, security is of primary concern for airlines, airport operators, governments and, obviously, passengers; in swimming pools where equipment and maintenance systems include a variety of devices for heating, cleaning, sweeping, pumping and lighting; and finally in the food sector where the safety of products is a primary concern for industry, authorities and consumers.

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EDITORIAL

Taking good care 3

TECHNOLOGY FOCUS

Improving civil aviation security: an endless task 4

Keeping smart homes safe and secure 7

Swimming safely in a clean environment 10

Asset integrity and functional safety 13

INDUSTRY SPOTLIGHT

International Standards help keep food safe for all 15

TECHNICAL COMMITTEE AFFAIRS

Protecting homes and buildings from intruders 17

Pioneer in innovation 19

CONFORMITY ASSESSMENT

IEC, IAF and ILAC join forces 21

IECEx extends mobile offer 22

Shedding a light on LEDs 24

IEC FAMILY

Outstanding contributions 26

Tomorrow's leaders 27

November 2015 nominations 29

Obituary – Ron Collis 29

IEC WORLD

IRENA launches INSPIRE 31

Precious lights 32

The Internet didn't kill the TV star 34

COP21 36

Upcoming IEC and global events 37

IN STORE

The positive impact of speaking up 38

Taking good care

Safety and security measures keep on being heightened to ensure utmost protection at any given moment



Claire Marchand
Managing Editor e-tech

In our post-9/11 world, safety and security have been top priorities. We want safety and security at all times. From applications on our smartphones to complex electrical and electronic security systems in airports, from the baby monitors we install in our homes to state-of-the-art access controls in industrial plants, we try to cover and protect all aspects of our lives. But threats are still there, lurking and ready to pounce when we least expect it.

Home, safe home

In homes, safety rests to a large extent on a number of electronic systems, such as smoke alarms, carbon monoxide detectors, or sensors to detect a range of potential hazards including floods, extreme temperatures, gas, etc. For its part the security of occupants depends on many devices and products like electronic locks, access controls and intercoms, sensors, video cameras, burglar and fire alarms.

Have a good flight

Security in the air transport industry is of primary concern for airlines, airport operators, governments and, obviously, passengers. IEC International Standards are central to the myriad of electrical and electronic security systems deployed to scan passengers, baggage and cargo, as well as airport staff to ensure the security of individuals and critical assets.

Protecting industrial assets

In industrial environments, functional safety plays a central role in the protection of assets, as an assessment of the causes of the February 2015 gas leak incident on the North Sea Gudrun platform shows.

Stay healthy

Finally many IEC International Standards play a critical role in systems used to protect the health of individuals by helping prevent the contamination of food products and ensuring safety and proper sanitary conditions in leisure installations, such as swimming pools or sports halls.



Many airports are equipped with full-body scanners



Smart baby monitors let you watch over your baby day and night

Improving civilian aviation security: a never-ending task

As International Standards close more security loopholes, new ones emerge

Morand Fachot

The recent crash of an airliner has highlighted the difficulty of protecting civil aviation against deadly acts of violence. Although the investigation is still ongoing, earliest indications increasingly point at deliberate human interference rather than at mechanical failures or inadequate technical security measures. The IEC develops many International Standards for technical systems and actions that enhance security for the air transport industry.

Vital industry relying on international standards and regulation

Safeguarding the air transport industry against a wide range of risks and threats is an all-inclusive enterprise aimed at protecting passengers, staff and critical assets both on the ground and in the air.

The technical side of this task can only be achieved if the multiple stakeholders involved adhere to sets of practices, regulations and international standards prepared by the industry, organizations and relevant authorities.

The civil aviation sector is of critical importance to most countries in terms of its economic, human and security aspects. According to data from the International Air Transport Association (IATA), the trade association of the world's airlines, the total revenues of the industry reached USD 733 billion in 2014, as some 3 327 million passengers and 51,5 million tonnes of freight were transported by air that year.



Rapiscan scanner used to scan hold baggage (Photo: Rapiscan)

The international standards and regulations necessary for ensuring safe, regular, efficient and economical air transport are set by the International Civil Aviation Organization (ICAO). ICAO is a UN specialized agency created by the Convention on International Civil Aviation (Chicago Convention) that was signed in December 1944.

ICAO works with the Convention's member states and global aviation organizations to develop international Standards and Recommended Practices (SARPs), contained in 19 Annexes to the Chicago Convention, which ICAO member states reference when developing their legally-enforceable national civil aviation regulations.

Growing threats to safety over the years

Given the international nature of air transport, any act that has an adverse effect on its safety, be it aimed at aircraft or airports, results in the widespread disruption of flights

worldwide and may even affect a country's economic prospects

Aircraft hijacking, the unlawful seizure of an aircraft by armed individuals, emerged as a major threat in the late 1960s and early 1970s when dozens of aircraft were seized mainly for political reasons (terrorism, flight for political asylum) or criminal objectives (extortion). Sometimes deaths and the loss of aircraft were the outcomes.

A succession of attacks against US aircraft in 1972, including two violent hijackings and a bomb scare, led to an emergency Federal Aviation Administration (FAA) rule that introduced metal detection screening portals for passengers and X-ray inspection systems for carry-on baggage in US airports.

Similar measures, if not already in use, were soon widely adopted in other countries.

Managing risks with international regulations

Two ICAO Annexes contain SARPs directly relevant to air transport security.

- Annex 9: Facilitation, first adopted in 1949, contains SARPs derived from several provisions of the Chicago Convention that, among other provisions, oblige each Contracting State to adopt all practicable measures to facilitate and expedite navigation by aircraft between the territories of Contracting States, and to prevent unnecessary delays to aircraft, crews, passengers and cargo. These SARPs also

establish customs and immigration procedures affecting international air navigation in accordance with the practices established or recommended in the Convention.

- Annex 17: Security: Safeguarding International Civil Aviation against Acts of Unlawful Interference, was adopted in March 1974 following a dramatic increase in violent acts which adversely affected the safety of civil aviation during the late 1960s/early 1970s. This annex sets out the basis for the ICAO security programme and seeks to safeguard civil aviation and its facilities against acts of unlawful interference. Experts from ICAO member states as well as from international organizations such as the Airports Council International (ACI), the International Air Transport Association (IATA), the International Federation of Airlines Pilots Association (IFALPA) and the International Criminal Police Organization (ICPO-INTERPOL) work to keep Annex 17 under constant review. ICAO also seeks to co-ordinate the activities of those involved in security programmes, such as states, airport and airline operators.

International standards matter

The implementation of ICAO SARPS on Facilitation and Security rests to a significant extent on technical solutions relying on special equipment and systems. These must meet international standards, many of which are developed by Technical Committees (TCs) and Subcommittees (SCs) of the IEC and by SCs of ISO/IEC JTC 1, a Joint Technical Committee on Information Technology set up by the IEC and the International Organization for Standardization (ISO).

Facilitating travel and access for airport staff

Facilitation implies traveller identification and border controls. The

time when passengers could travel with passports in which details were often entered by hand or typewriter and photos were stapled to the document is long over.

Countries now issue machine readable travel documents (MRTDs), which are standardized in ICAO Document 9303: *Machine Readable Travel Documents*. These MRTDs enable faster processing of arriving passengers by immigration officials and are more reliable and more difficult to forge than the documents that preceded them.

ICAO 9303 was endorsed by ISO/IEC JTC 1/SC 17: Cards and personal identification, as ISO/IEC 7501, a three-part International Standard, which covers machine readable passports, machine readable visas and machine readable official travel documents.

Some MRTDs contain a chip; these eMRTDs can be read electronically and can contain biometric data.

IEC/ISO JTC 1/SC 37: Biometrics, develops standards for “generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems.”

IEC/ISO JTC 1/SC 37 also developed ISO/IEC 24713-2, a specific international standard covering “biometric profiles for interoperability and data interchange” specific to “physical access control for employees at airports”. This standard covers the basic biometric functions of enrolment, verification and identification, and includes a database interface.

Controlling access to critical assets

What started the introduction of screening portals for passengers and X-ray inspection systems for carry-on baggage was the large number of



Security scan of luggage showing content (Photo: Smiths Detection)

violent acts against aircraft, crew and passengers by individuals bringing weapons into aircraft.

SARPs contained in ICAO Annex 17 are adopted by national and regional organizations and bodies such as the US Federal Aviation Administration (FAA) and the European Civil Aviation Conference (ECAC), which sometimes add more rigorous measures.

A tightening of measures such as the reunion of baggage with passengers, controls over items left behind on the aircraft by disembarking passengers, security controls for commercial courier services and controls over cargo and mail under certain situations have been added over the years to reduce the risk of sabotage.

Two identification technologies are important for the proper and safe tracking and despatch of hold baggage and freight and other uses. They are bar coding and radio frequency identification device (RFID).

Thermal paper bag tags are the main means of tracking hold luggage. Standard bar code tags may be misread when damaged or crumpled, forcing bags to be hand-sorted and increasing the likelihood of problems. Some airlines and airports have started using bag tags containing embedded RFID chips. Use of these tags can result in read rates in excess of 99%.



Electronic bag tags will be introduced over the coming years (Photo: DS TAGS Group BV)

International Standards for bar coding and RFID are prepared by ISO/IEC JTC 1/SC 31: Automatic identification and data capture techniques. Standards for bar coding cover coding and also specifications for all equipment used to mark, identify or interpret the various types of barcodes, as well as the more recent Quick Response or QR codes that are used increasingly frequently to produce electronic boarding passes sent by airlines to passengers' mobile devices.

Going electronic

A number of airlines have started trialling so-called electronic tag bags that are particularly convenient for frequent travellers. They feature an integrated RFID chip and a custom built e-paper display showing an optimized barcode. These electronic tag bags can last several years, are not limited to a single airline and allow convenient remote baggage check-in and a much faster baggage drop-off process. With a combination of bar code and RFID they can already be used at any airport.

Future electronic tags will also rely on International Standards for e-paper prepared by Working Group (WG) 7: Electronic paper display, of IEC TC 110: Electronic display devices.

Improving scanning quality of baggage

The screening of passengers, carry-on and hold baggage depends on electrotechnical equipment. Although the IEC develops International Standards for medical imaging equipment using X-ray or computed tomography (CT) scan, it doesn't do so for this specific type of screening system.

However, experts from IEC SC 45B: Radiation protection instrumentation, are currently developing two International Standards relevant for baggage screening. One concerns the evaluation of the image quality of X-ray CT security-screening systems, the other focuses on bottle/can liquid X-ray inspection system – two areas of significant importance for air transport security.

IEC SC 45B has also developed a number of International Standards for radiation monitors for the detection of radioactive and special nuclear materials at national borders, and for personal radiation devices (PRD) for the detection of illicit trafficking of radioactive material.

Setting off alarms

As first and last lines of defence, critical installations rely on electronic security systems. This is the case for airports where these systems alert staff to potential risks of intrusion and block access to restricted areas by unauthorized individuals. IEC TC 79: Alarm and electronic security systems, prepares "International Standards for the protection of buildings, persons, areas and properties against fraudulent actions having the purpose to enter in a place or to take or to use something without permission and other threat related to persons".

Emerging threat

One area that is often neglected as technology advances is the risk of

cyber-attacks on critical infrastructure. As such the air transport sector is seen as a potential target of such attacks, as some recent incidents show.

During the first half of 2015, at least five airlines, two airport operators and one civil aviation authority have been publicly reported as victims of online attacks, according to a recent IATA analysis.

Important International Standards in the field of IT security techniques are developed by ISO/IEC JTC 1/SC 27: IT security techniques, which prepared ISO/IEC 27001, *Information technology – Security techniques – Information security management systems – Requirements*. The second edition, published in 2013, "specifies the requirements for establishing, implementing, maintaining and continually improving an information security management system within the context of the organization".

Eliminating the weakest link

Guidelines and SARPs may be very strict, International Standards very detailed, security measures very rigorous and technical equipment very sophisticated, the human dimension will remain the weakest link in the whole security chain for the foreseeable future, and it needs to be addressed.

This has been clearly illustrated by the recent airliner crash as well as by some of the following examples from US airports: 1 400 badges, which allow airport workers access to secured areas, had been lost or stolen at Atlanta International Airport between 2012 and 2014, and dozens of loaded weapons are found every day in passengers carry-ons.

Ensuring this will no longer be the case in the long term is the next major challenge for the industry.

Keeping smart homes safe and secure

Security is one of the key drivers for connected homes, after smart energy

Peter Feuilherade

Connected safety and security systems and devices with remote monitoring capabilities are expanding their share of the global smart home market. A survey in the UK in July 2015 identified security as the second most important of five key drivers for the connected home, after smart energy. The BI Intelligence research company estimates that by 2019 home security systems will account for 38% of the connected home market.

Multiple products for multiple uses

Products ranging from smoke alarms and carbon monoxide detectors to electronic locks and motion sensors are becoming more affordable as competition increases between established electronics manufacturers and innovative new start-ups. Nearly all of these products and systems can be controlled via mobile apps on consumers' smartphones and other iOS or Android devices.

Apps enable a smartphone to be used remotely as a security camera or a device to open locks or turn lights, heating and alarms on and off. Smartphone connectivity allows users not only to control and customize the operation of individual or connected devices but also to receive real-time alerts and information from sensors in the home, like sudden temperature changes that can indicate a fire or sound and movement that could mean an intrusion, and to stream the data, for example, to provide insights into longer-term energy use.

IEC Technical Committee (TC) 79: Alarm and electronic security systems, prepares International Standards



Engaging a smart house alarm security system

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.

Price cuts boost market growth

The market for smart home safety and security systems is forecast to experience substantial growth worldwide. US-based business intelligence company ON World forecasts that by 2020, there will be 200 million Internet-connected wireless smart home security and safety products installed worldwide. An expected Compound Annual Growth Rate (CAGR) of 34,6% will boost revenues in the sector over the next five years to USD 6,132 billion, according to the Allied Market Research company. The main drivers of growth include price reductions for

home security hardware, increased bandwidth availability, advances in wireless communication standards to support systems integration, evolution of mobile devices and smartphones and rising awareness levels among consumers. In Europe, the total home security market will achieve a CAGR of more than 25% between 2015 and 2020, with sophisticated integrated cameras contributing the largest share of overall growth, the research firm MarketsandMarkets predicts.

Environmental sensors that can detect dangers such as smoke, flooding or extreme temperatures all help to keep homes safe.

Basic connected wireless smoke alarms can set off all alarms in the home using domestic Wi-Fi when a single alarm senses danger in the form of smoke, simultaneously alerting homeowners via their smartphones. The latest fire alarms include gas sensors that detect carbon monoxide



Internet-connected security cameras enable homeowners to view a live feed of the inside or outside of a house on mobile devices

and nitrogen oxide to identify fires at the earlier stage before smoke appears and give residents more time to escape.

Sensors everywhere

Environmental sensors include the ability to measure moisture levels, temperature, air pressure and air quality and calculate levels of air pollution and dust. Advanced sensors can send instructions to smart thermostats or connected lights, while apps allow users to see their data history and track energy use.

Heat sensors in electronic showers let users control water temperature and flow, saving energy while reducing the danger of burns for children and people who cannot feel water temperature because of paralysis or a lack of sensation.

Water sensors installed near water heaters, sump pumps and washing machines will detect leaks and changes in humidity and temperature. A water sensor connected to an automatic water shut-off valve can alert homeowners via Wi-Fi, helping

to prevent damage caused by burst pipes or overflowing dishwashers.

Sensors are at the heart of a smart home and are built into most connected devices. IEC TC 47: Semiconductor devices, includes sensors in a number of its publications. IEC Subcommittee (SC) 47E: Discrete semiconductor devices, prepares International Standards for components used in a variety of sensors.

Security products for smart homes include cameras, motion sensors, door and window sensors and alarms, electronic locks and panic buttons. Internet-connected security cameras enable homeowners to view a live feed of the inside or outside of a house from any location on mobile devices through companion apps. Motion sensors and detectors, sound detectors and night-vision functionality enable advanced smart cameras to recognize faces or detect suspicious movement in pre-defined "activity zones" and send alert when appropriate. Some services store recorded footage for a monthly fee, usually less than the charges of traditional home surveillance companies.

Locks are a growing product category in smart home security. A smart lock connects to smartphones via Bluetooth to sense when a recognized user is approaching and unlock itself through an associated app. Users can lock and unlock doors remotely and issue digital keys to people requiring temporary access, while some smart locks include a built-in camera which can send pictures of visitors to smartphones.

Increasingly, smart security systems are integrated with a home automation system so they can be controlled from the same device used to operate other electronic subsystems in a smart home.

Active Assisted Living

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, 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.

All the sensors located around the home are connected via an Internet gateway to a cloud-based self-learning algorithm with advanced behaviour pattern recognition capabilities that analyses activity signals from the sensors to learn a homeowner's daily routines and behaviour.

Linking these sensors to an alarm system enables families and carers to check on the wellbeing of relatives at any time via a smartphone app, and sends alerts automatically to healthcare services, family members or friends when irregular patterns or variations from routine are detected.

Modern medical alert systems include wristbands, watches and mobile phones equipped with emergency buttons or apps. Their capabilities have expanded to include GPS tracking and detection of falls, one of the major causes of injuries and hospitalization among older people. Although an accidental fall cannot be prevented, fall detectors reduce the impact of a fall or injury by ensuring timely medical assistance. Fall prevention systems use mattress pressure sensors to detect when someone gets out of bed at night and alert a smart house lighting system to automatically turn on a series of

lights that can lead him or her to a destination, and turn them off when the person returns to bed.

A range of diagnostic tools and devices, including Bluetooth-connected electronic thermometers and stethoscopes, enables users to check their temperature, heart rate or blood pressure at home, collect information that they can send to their doctor via the cloud and even perform a home “check-up” using a smartphone app. In the future, a growing number of older people will be connected remotely with service providers who will be able to detect changes in physical and mental health as well as mobility.

The IEC Systems Committee on Active Assisted Living (SyC AAL) 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

enables their usability and accessibility. IEC TC 100: Audio, video and multimedia systems and equipment, has created a Technical Area, TA 16, dedicated to the preparation of International Standards for AAL, accessibility and user interface.

Standardization and data security

The smart home market involves several wireless communication technologies including Wi-Fi, ZigBee, Z-Wave, Thread and Bluetooth Low Energy (LE). Some devices will work together, but others operate only with devices from the same company or brand.

The IEC White Paper *Internet of Things: Wireless Sensor Networks* assesses the need for standards to achieve interoperability among wireless sensor networks from different vendors and across varied applications. Greater standardization is vital in order to increase interoperability between devices and platforms so that smart home applications can realize their full potential.

Keeping data secure is another major priority. Tests conducted by Hewlett-Packard in 2015 found that the network connectivity and access necessary for remote monitoring make smart devices used in home security systems like video cameras and motion detectors potentially vulnerable to tampering by hackers. Password security, encryption and authentication issues were the main concerns that emerged.

The IEC, through its work in ISO/IEC JTC 1/SC 27: IT Security techniques, a Subcommittee from the Joint Technical Committee it set up together with the International Standardization Organization (ISO), is directly involved in reinforcing data and network security in a wide range of applications. This activity represents another essential addition to the wider adoption of connected safety and security systems in smart homes.



Motion detector lighting in a house

Swimming safely in a clean environment

Public swimming pools need electricity as much as water

Morand Fachot

Public swimming pools rely on a wide range of equipment, most of it controlled electrically or electronically in one way or another. Users take a safe and clean swimming environment for granted and are generally unaware of the hidden aspects of swimming pool installations. To have a better understanding of all the systems needed to ensure hundreds of thousands enjoy a swim in the best possible conditions every year, e-tech was granted exclusive access to the technical installations of the Varembe swimming and sports centre near the IEC Central Office.

An uneasy relationship

Pool equipment and maintenance systems include a variety of devices for heating, cleaning, sweeping, pumping and lighting. They include automated systems, controllers and safety equipment. Most rely on electricity, but water and electricity have an uneasy relationship.

As risk is always present when water and electricity are in close proximity, the design and installation of such equipment and systems must meet strict criteria to protect individuals against electric shock. These criteria apply to electrical installations for swimming and paddling pools and their surrounding zones, and for basins and fountains as well as “areas in natural waters, lakes (...) specially intended to be occupied by persons for swimming, paddling and similar purposes”.

IEC Technical Committee (TC) 64: Electrical installations and protection against electric shock, developed

IEC 60364-7-702:2010, *Requirements for special installations or locations – Swimming pools and fountains*. This Standard defines the dimensions of three zones in which such equipment may be installed and stipulates what may go where, as well as the characteristics of wiring and current-based equipment used in swimming pools.

Several IEC TCs and their Subcommittees (SCs) prepare International Standards for these electrical installations. They include TC 61: Safety of household and similar electrical appliances, and SC 34D: Luminaires.

Clean and clear

Cleaning of pools is essential for health reasons and to avoid contamination. It relies on mechanical and chemical processes; which are all controlled by electrical systems.

Cleaning involves constant recycling by removing debris (i.e. hair) and dirt like creams or cosmetics, from water before sanitizing it.

This is done first by pumping water from the bottom or from the sides of the pool when it overflows into channels, before sending it to sand filters, which are large tanks filled with sand that trap dirt and small particles in the 20-100 micron range.

Following this first treatment water goes through a UV sanitizer unit that kills pathogens, germs and viruses, and reduces significantly the quantity of chemicals, such as chlorine and bromine, needed to disinfect water. Some manufacturers claim that “savings of 70%-80% in chlorine consumption are commonplace” when a UV sanitizer system is installed.

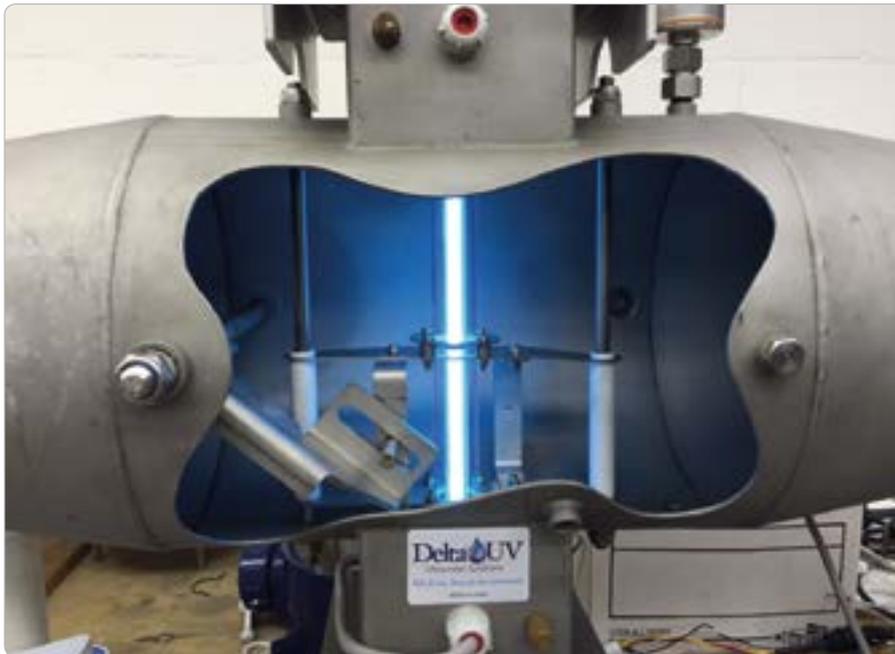


After passing through a sand filter (left) water is sanitized inside a UV unit (right)

IEC TC 62 develops International Standards for the safety of UV equipment used for water treatment appliances.

However, after UV treatment chemicals, such as chlorine, still need adding to make certain water is not contaminated. This is done using a digitally-controlled dosing pump that ensures the right amount of chemical is continuously injected into the water before it is pumped back into the pool.

Pumps are central to a swimming pool operation. Their range extends from large pumps used to pump water out of the pool into the recycling/cleaning system, to smaller dosing pumps. All pumps in a swimming pool are electrically-driven or powered. They are also built around rotating



Cutaway view of a UV sanitation unit (Photo: Delta UV)

describes tests for mechanical strength and corrosion and many other features for light fittings that are used in the swimming pool environment.

In some swimming pools, like the one *e-tech* visited, a number of lighting installations have been upgraded to LED-based lamps, resulting in a significant saving in terms of energy and maintenance costs.

Cleanliness and safety outside the pool are important too

Although focusing on clean water in basins and safe electrical installations in their vicinity is vital, extending a clean and safe environment beyond the pool areas is also essential.

electrical machines. IEC TC 2: Rotating machinery, develops International Standards for such machines.

Evacuating excess humidity from all areas in a swimming pool, from shower rooms to main swimming hall and other areas, and maintaining the right temperature all year long require extensive ventilation installations. IEC SC 61D: Appliances for air-conditioning for household and similar purposes, prepares International Standards for electrical air conditioners and dehumidifiers used in residential, commercial industrial and other buildings.

Lighting makes a difference, but must be safe

Lighting can enhance the swimming pool environment and overall user experience. Lighting fixtures may be installed outside the pool, above ground or recessed, and underwater in appropriate housings. Light can be delivered via a variety of bulbs, LEDs or fibre optics.

IEC SC 34D: Luminaires, published IEC 60598-2-18:1993, *Luminaires* –

Particular requirements – Luminaires for swimming pools and similar applications. This International Standard details general test requirements, the classification of luminaires and characteristics regarding their construction. It also

Users enter swimming installations from what is essentially a dirty environment: streets. Maintaining all areas clean and removing excess water from floors, which is a safety risk, as people can slip and fall, requires special industrial cleaning machines,



Heating, ventilation and dehumidifier installation



View of some of the swimming pool electrical enclosures that control all operations

such as automatic scrubbers and vacuum cleaners that can operate in dry and wet environments. IEC SC 59F: Surface cleaning appliances, prepares International Standards for such machines.

Keeping users safe as they get ready to leave is important and is the object of special attention from

staff. Drying hair after swimming is a normal activity, but the use of personal hairdryers is banned and an adequate number of appropriately designed fixed hairdryers, plugged into special sockets placed out of reach of users is available.

Sockets and light switches installed in humid areas are protected against

water ingress according to international IP coding and testing system that classifies the protection by enclosures for many types of electrical equipment.

IEC TC 70: Degrees of protection provided by enclosures, "prepare international standards including appropriate test methods for degrees of protection provided by enclosures against ingress of (...) water and against access to dangerous parts".

Hidden heart of installations

As the Varembe swimming pool technical staff told *e-tech* "without electricity there would be no swimming pool, it's as simple as that".

This is clearly illustrated by all the equipment and countless brightly coloured enclosures containing electrical systems that control all the equipment required to ensure that the 300 000-400 000 people who use the facility year-in year-out do so safely. Equipment doesn't tell the whole story, without the tireless attention of the swimming pool staff responsible for maintaining and operating this equipment it would quickly grind to a halt.



Taski Swing battery-operated scrubber drier used to clean floors

Asset integrity and functional safety

Lessons from the Gudrun offshore platform leak

Ahmad Hosni*

The February 2015 condensate leak on the Gudrun offshore platform, in the North Sea, highlighted many lessons learned from other incidents and the importance of functional safety. It also revealed some lessons for many practitioners in the functional safety and asset integrity fields. IEC-developed International Standards on functional safety play a central role in many industries and processes.

Critical industries rely on IEC functional safety Standards

Functional safety is the part of the overall safety that depends on a system or equipment operating correctly in response to its inputs. It is a concept applicable across all industry sectors. The oil and gas industry relies heavily on functional safety to achieve safety for the equipment giving rise to hazards. This was clearly illustrated in the condensate leak incident on the Gudrun North Sea offshore platform operated by Norway's Statoil company.

IEC International Standards on functional safety are developed by IEC Subcommittee (SC) 65 A: Industrial-process measurement, control and automation – Systems aspects. They include the IEC 61511 series, *Functional safety – Safety instrumented systems for the process industry sector*, as well as the IEC 61508 series, *Functional safety of electrical/electronic/programmable electronic safety-related systems*, and other Standards applicable to industrial processes.

As indicated in its scope “the IEC 61511 series addresses the application of Safety Instrumented Systems (SISs) for the process industries. The

IEC 61511 series also addresses a process Hazard and Risk Assessment (H&RA) to be carried out to enable the specification for SISs to be derived. Other safety systems' contributions are only considered with respect to the performance requirements for the SIS. The SIS includes all devices necessary to carry out each SIF from sensor(s) to final element(s).”

According to the incident report published by the Gudrun platform operating company, Statoil, the leak was caused by a crack in a 2-inch condensate outlet line of a separator. The flow conditions in the undersized condensate outlet control valve led to excessive vibrations. This was a failure mechanism that had not been identified as a risk and had not been dealt with in the governing documentation.

The incident report drew some important lessons. The following ones can be added:

All risk-related elements should be considered as safety-critical

The first lesson is that all elements identified as initiating risk or reducing risk to tolerable limits should be considered as safety-critical elements including control loop elements.

As per the UK Health and Safety Executive regulations guidelines: “Any structure, plant, equipment, system (including computer software) or component part whose failure could cause or contribute substantially to a major accident is safety critical, as is any which is intended to prevent or limit the effect of a major accident. Identifying an item as safety critical should follow from identifying major accident hazards as required by regulation.”



Statoil's Gudrun offshore platform experienced a condensate leak in February 2015 (Photo: Eli Skjæveland Tengedal - Statoil)

This also comes from the risk-based and performance-based approach in plant safety engineering following the IEC 61511 series, which adopts the Layer of Protection Analysis (LOPA) method in Guidance for the determination of the required safety integrity levels, found in Annex F of IEC 61511-3:2003, *Guidance for the determination of the required safety integrity levels*. Most control loops (including their control valves of course) are either included in initiating causes of hazardous events or acting as protection layers. Hence many are safety-critical by definition.

The recently-built platform's gas leak revealed the fact that many control valves are safety-critical as the valve failure was the initiating event. No Safety Instrumented Function (SIF) can be designed to safeguard against such failure of the valve except gas detection and the associated ESD (Emergency Shutdown).

Being safety-critical will require more rigorous inspection and maintenance planning instead of being just run-to-failure equipment as is the case for control valves in many plants today.

Hence for the Gudrun incident, as the control valve failure by itself could lead to gas blow-by, it was involved in an initiating event and hence safety-critical, even if it was sized correctly and in spite of the fact that the condensate line had its own safety/shutdown valve.

That being said, old practices that are still in-use by many operator companies disregard control valves from their safety-critical element list and one of the practices observed by this author stated clearly that control valves should not be part of the safety-critical elements group.

However, some relatively more recent engineering practices include LOPA protection layer elements in the safety-critical elements.

Functional safety assessments and validation activities are critical

The second lesson is that the incident also revealed the importance of functional safety assessments (FSAs) and validation activities, such as Factory Acceptance Tests (FATs), Site Acceptance Tests (SATs), etc. done prior to the start-up of the plant. They are central to detecting errors and prove the importance of planning and conducting such activities and training on how these should be done.

For many projects, stage 3 of the FSA (defined in section 5.2.6.1 of IEC 61511-1:2015, *Framework, definitions, system, hardware and application programming requirements*) is carried out in the form of yes/no checklists. For instance, the assessment team is asking the design, construction and commissioning teams: “have you done your job well?” and of course the answer is usually “yes” to the yes/no questions, thus ending the FSA easily with minor recommendations only, which should not be the aim of IEC 61511 as it highlights the importance of skills of the assessment team, who should have practical field experience and proper training.



Accidents on oil and gas installations can have catastrophic consequences, like in the Deepwater Horizon platform 2010 explosion

In addition, the incident clearly shows that safety-critical control valves should be part of that assessment in terms of design and testing during the FAT and testing during the operational period. This is often overlooked as the valve is just for control purpose not shutdown. IEC 61511 is focused on safety-instrumented systems, while not all safety critical elements are part of safety-instrumented systems. Therefore it is important to extend the scope of FAT and FSA in the Standard to safety-critical elements such as control valves.

What does it mean if a plant passes a functional safety assessment after investing in such an assessment but that valves fail and fire or explosion occur? In some organizations which implement a Pre-Startup Safety Review (PSSR) as an equivalent replacement for stage 3 of FSA, there have been fire or explosion incidents although the PSSR was done, as happened in the Bayer CropScience explosion in 2008.

Section 5.2.6.1 of IEC 61511-2:2003, *Guidelines for the application of IEC 61511-1*, states that “the use of Functional Safety Assessment (FSA) is fundamental in demonstrating that a Safety Instrumented System (SIS) fulfils its requirements regarding safety instrumented function(s) and Safety Integrity Level (SIL). The basic objective of this assessment is to demonstrate

compliance with agreed standards and practices through independent assessment of the system’s development process.”

Feedback at manufacturing stage, not just site, is important

The third lesson is that the incident also exposed the importance of testing position feedback signals at the manufacturer’s factory and not just leave this to the site activities as a secondary unimportant matter.

Finally, as the improper valve size was the cause, the incident shows also the importance of doing proper control valve sizing by the engineering, procurement, construction (EPC) contractor and not just leave it to the supplier (and pay the supplier more for that!) which is not a good practice done by some oil and gas EPC contractor engineers.

Observing the guidelines contained in the IEC 61511 series should help reduce the likelihood of incidents similar to the one that took place on the Gudrun platform

**Ahmad Hosni, is a Functional Safety Engineer (FS Eng), Certified Functional Safety Expert/Professional (CFSE/CFSP) with TÜV SÜD/CFSE Board CFSP, TÜV Rheinland, as well as a National Fire Protection Association/Certified Fire Protection Specialist (NFA/CFPS)*

International Standards help keep food safe for all

From farms to the plate, International Standards ensure consumers enjoy safe food



Refrigerators help keep food safe for consumption

Morand Fachot

The safety of food products is a primary concern for the food industry, the authorities and consumers. Over the years it has improved to such an extent that food poisoning outbreaks have become increasingly rare in many countries. This is the result of major improvement in the food safety management system from producers and the processing

industry all the way to consumers. IEC International Standards developed for equipment and systems used along the entire chain play a central role in this process.

A global problem

According to the World Health Organization (WHO) it is estimated that two million deaths occur every year

from contaminated food or drinking water. Many more people are victims of food poisoning every year.

Many IEC Technical Committees (TCs) and Subcommittees (SCs) prepare International Standards for equipment and issues that are immediately associated with health and medical issues. These include the safety of medical equipment, acoustics or medical imagery equipment. A less noticeable but critical aspect of IEC standardization work concerning health issues is to ensure food products and water are safe from the place they are produced all the way down to the end-users.

Very diverse activities

A number of IEC TCs and SCs prepare International Standards for equipment and processes used to increase food production, to clean, sterilize, disinfect and conserve food products and water all along the food chain from the farm to the plates or glasses of consumers. In addition to existing equipment and processes essential to achieve these goals new ones are being discovered all the time and require constant standardization work.

More mouths to feed, safely

As it becomes necessary to increase food production to meet the needs of a growing global population at the most reasonable cost possible, raising production levels in all areas is essential. Using fertilizers and processed animal feed has resulted in higher production levels, but presents a number of drawbacks, including



Infrared electroheating is used to process foodstuff

increased levels of chemicals in soil and ground water, and health risks for consumers.

New methods, such as providing additional and selective lighting to improve vegetable growth, increase milk yields in dairy farms or egg production in chicken farms are proving very effective. The recent introduction of light-emitting diode-based (LED) lamps in particular is opening new prospects in these areas. International Standards for lamps and related equipment are prepared by IEC TC 34.

Heat and cold ensure food is safe to consume

Heating is widely used in processing food products prior to bottling or packaging to maintain their quality over a longer period before consumption. Electrical processes, such as microwave volumetric heating, which uses microwaves to heat liquid or semi-solid food products, and electroheating (including infrared electroheating) are used to treat food products to ensure they stay longer safe to consume. IEC TC 27: Industrial electroheating and electromagnetic processing, develops International Standards for equipment

for microwave heating, for infrared radiation heating and for induction heating, among other things.

From producers to consumers food products must be kept at low temperatures to prevent them from becoming unfit for human consumption or toxic. The provision of appropriate cooling and freezing equipment is essential to maintain the cold chain and prevent decay and the possible proliferation of pests and diseases.

In the commercial and retail environment keeping food products cool is essential.

In homes, fridges have allowed households to keep foodstuff fresh for longer periods and to cut down instances of food poisoning.

International Standards for general and performance requirements of electrical household and similar cooling and freezing appliances are prepared by IEC SC 59M.

Safety first

Using chemicals to disinfect food products and utensils is effective but

may present adverse side-effects for humans and the environment. These can be avoided with the use of various electrotechnical processes, such as UV radiation and ultrasonic cleaning and disinfection.

UV radiation is used for water treatment as well as to destroy epidemic bacteria such as E-coli, salmonella and germs directly on eggs, other products or on food processing equipment and plants.

IEC TC 62 develops International Standards for the safety of UV equipment used for water treatment appliances.

As for ultrasonic equipment it is present in the food industry to clean equipment and handle food products. IEC TC 87: Ultrasonics, prepares International Standards for equipment and systems in the domain of ultrasonics.

More IEC TCs and SCs are involved in the development of International Standards which are essential for producers, distributors and consumers to ensure food products and water that reach individuals at the end of a long production and supply chain are safe to consume.

Protecting homes and buildings from intruders

Multiple sectors to drive steady growth for the alarm and electronic security systems sector

Morand Fachot

The market for alarm and electronic security systems will continue to expand in coming years, fed by the quest for increased safety and security, constant concern over terrorism and crime as well as the need to protect critical infrastructure. IEC Technical Committee (TC) 79 develops International Standards for alarm and electronic security for a wide range of applications, including new ones like medical and social alarm systems, which are driven by the needs of an ageing population.

Wide scope and multiple systems

IEC TC 79's remit is to prepare International Standards for systems for "the protection of buildings, persons,

areas and properties against fraudulent actions having the purpose to enter in a place or to take or to use something without permission and other threat related to persons".

The wide range of applications and needs of the sector mean many different systems are in deployment. TC 79's work does not cover the production of Standards for fire detection and fire alarm systems in general, but does include the following:

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

These systems can be operated by ordinary or trained persons to provide a local or remote alarm. They can be used for calling private guards, social assistance, emergency services or the police, and for recording and transmitting information (dated or undated), sounds and pictures of places and people for surveillance purposes.

Growth areas

Alarm systems have been used for decades as deterrents against theft and hold-up and for fire detection and evacuation warning purposes. However, owing to emerging requirements, such as better perimeter intrusion prevention to protect critical infrastructure and the needs of an ageing population, and to technological advances in electronic components they have expanded to other fields. As a result they have also become popular in the field of access control, video surveillance, and medical and social alarm systems.

This has led TC 79 to create three Working Groups (WGs), WG 11: Electronic access control systems, WG 12: Video Surveillance Systems (VSS), and WG 13: General requirements for building intercom systems.

In addition to traditional markets such as in businesses or government buildings, the expansion of access control and video surveillance systems is a consequence of an increasing need for more safety and security in residential places such as homes, hotels, hospitals and schools.



Customers not only expect a reliable system but also want an appropriate answer and/or service to follow the alarm immediately



Bosch Advantage Line security system (Photo: Bosch)

The other domain in which there is steady growth is that of medical and social alarm systems and services, which allow, for instance, elderly or disabled residents in specially equipped accommodation and dwellings to activate an alarm and call for assistance in the event of an emergency (domestic accident, health problem or other issue).

IT revolution

Information technology has had a major impact on alarm systems, making it easier, cheaper and faster than ever before to transmit and record information or data, including sending sounds, pictures and video through communication systems from the premises being monitored to an alarm

receiving centre. Reporting system faults and remote correction of such faults has also become easier.

Modern alarm systems no longer rely solely on the public switched telephone network (PSTN) to transmit signals, but increasingly on other networks too: the Internet, cable TV distribution systems, cellular phone networks or other radio systems.

Protocols are everything...

Customers not only expect a reliable system but also want an appropriate answer and/or service to follow the alarm immediately. This has several consequences for alarm and surveillance systems.

A modern system must be able to transmit the alarm through a reliable communication channel. The consequence of the shift of communication from the PSTN to other networks is a need for standardized transmitting procedures and communication protocols between the components installed both in the place under surveillance and those in the alarm receiving centre.

The alarm receiving and/or surveillance centre should be able to verify and record the alarm, monitor the communication and control the local equipment. There is therefore a demand for remote modification of parameters within the alarm and/or surveillance systems which can only be performed under certain conditions. For social alarms, a direct dialogue between the alarm receiving centre and the user is often necessary.

The equipment installed in the premises or places under surveillance should not only be easy to use but should also provide an appropriate answer to the user. Enhanced computer analysis with high recording capacity and automatic verification is necessary for avoiding unwanted alarms.

Reliability is paramount

Manufacturers, certification bodies, users, etc. should benefit from Standards dealing with access control, VSS communication and protocols. Standard communication procedures between the local alarm system and the receiving centre are also necessary. It is obviously important to have reliable detection systems and transmission channels as alarms are meant to protect lives as well as property.

Although these systems are based on sophisticated electronic design, they differ from other electronic systems in their requirement to be able to work reliably in case of emergency. In addition, intrusion and hold-up systems must be designed to trigger the alarm if someone decides to interfere with the system (tamper protection). Although mostly connected to power outlets, they must also operate in backup mode on batteries in case power is cut off accidentally or wilfully – for instance in cases of attempted burglary or break-in.

EMC (Electromagnetic compatibility) requirements in the field of alarm



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



This turnstile, used in conjunction with card readers, can reliably control access without the need for monitoring by personnel

systems are also extremely important from the point of view of reliability. For example, some components used in alarm systems may behave as antennas, either influencing their environment or being themselves influenced by electromagnetic fields. TC 79 prepares International Standards on EMC immunity requirements for components of fire and security alarm systems.

Full agenda and no end in sight to expansion

The complexity of modern alarm and detection systems and the wide range

and nature of the components they include, such as infrared, microwave and ultrasonic or glass break detectors and transmitters, mean they rely on many Standards to operate and communicate signals and orders. TC 79’s work on these Standards involves liaisons with other IEC TCs, like IEC TC 9: Electrical equipment and systems for railways.

TC 79 works with the other two global standardization organizations, the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU), active in some aspects of standardization for alarm and electronic security systems. This work is carried out within ISO/IEC/ITU-T Strategic Advisory Group on Security (SAG-S), which oversees standardization activities relevant to the field of security.

IEC TC 79 works also with ISO TC 21/SC3: Fire detection and alarm systems, and ISO TC 22/SC3: Electrical and electronic equipment for road vehicles.

It also liaises with other bodies, such as the Open Network Interface Forum (ONVIF, a global and open industry forum, with the goal to facilitate the development and use of a global open standard for the interface of physical IP-based security products, and the

Physical Security Interoperability Alliance (PSIA) to avoid standards overlapping and being duplicated.

As of November 2015, TC 79 had issued more than 50 publications. 43 are currently available and 10 were withdrawn in 2011; 31 of the publications are recent, having been published since 2010. The Standards cover hardware components, interfaces and communication protocols for voice, data and other signals.

Growing security concerns in many countries, an ageing population and more accessible, better performing and cheaper alarm and electronic security systems now being installed in private homes and residential buildings, are indicative of a vibrant market. This is projected to top USD 46 billion in 2015, according to US-based research company Global Industry Analysts, Inc. (GIA).

As utilities roll out Smart Grid applications they expand their offer in the form of monitoring equipment to attract customers by proposing more connected services like fire alarms, gas and water leaks warning systems, as part of their packages, thus opening up another area of growth for the sector.

All this expansion will be supported by additional standardization work from TC 79.

Pioneer in innovation

ISO/IEC Joint Technical Committee 1 on information technology

Karen Higginbottom, Chair JTC 1
ISO/IEC JTC 1 is the Joint Technical Committee of the IEC and the International Organization for Standardization (ISO) for International Information Technology Standards. Created in 1987, JTC 1 currently has 20 Subcommittees (SCs), one Study

Group and three Working Groups. It has published more than 2 800 Standards.

Forward thinking

The reasoning for a joint committee was, at the time, a fairly forward-thinking concept. An information

technology system comprised of hardware and software, networks and interfaces, applications and data, must all be interoperable to resolve complex technological problems. In a “system”, the programme of work of one SC relies heavily on the Standards being developed in another.



Karen Higginbottom, Chair ISO/IEC JTC 1

The TC-level experts in JTC 1 are able to oversee the varied activities as they strive for greater cohesion among the Standards. This direct engagement allows member bodies to put all the puzzle pieces in place. However, the ICT industry's innovative spirit also sets out to address the need for aggressive, creative problem solving.

Close links with consortia

The valuable development of technical specifications in consortia and other standards organizations was recognized by JTC 1 in 1994 with the implementation of the JTC 1 Publicly Available Specification (PAS) transposition process. The PAS process is a two-step effort that allows for broadly implemented specifications to be approved by JTC 1 National Committees as ISO/IEC International

Standards. JTC 1 currently has 11 recognized PAS submitters and IEC and ISO have published almost 200 PAS submitted International Standards. In addition to the PAS process, JTC 1 SCs maintain over 400 liaison relationships. Of those interactions, 130 are with non-IEC, non-ISO organizations.

Cooperation is key

JTC 1 makes significant use of the fast track process, has a unique cooperative process with ITU-T and benefits from a Partner Standards Development Organization (PSDO) arrangement with IEEE. The myriad of coordination opportunities has served the ICT standards community well, but it hasn't occurred without a cost. Subcommittees must find the resources to maintain these relationships, analyze the technical content of neighbouring efforts, jointly work on technical content and ensure that successful implementations can occur – all while successfully completing their own programme of work.

Systems thinking and working

So here is where things will get interesting for many IEC and ISO Technical Committees. The onslaught of "systems" – the Internet of Things, Smart Cities, Industry 4.0, Smart Manufacturing and Active Assisted



An IT system, comprised of hardware and software, networks and interfaces, applications and data, must be interoperable to resolve complex technological problems

Living – are all grand efforts that will require an unprecedented level of collaboration and coordination.

Both IEC and ISO have begun to develop and implement oversight structures for new system activities. The question for TCs is "How will they manage the necessary resources to deal with the plethora of new systems and still ensure that "volunteers" accomplish that for which their organization is paying them?"

An awful lot of puzzle pieces to put together.

About ISO/IEC JTC 1

The JTC 1 of IEC and ISO is a consensus-based, globally relevant, voluntary international standards group.

Since 1987, ISO/IEC JTC 1 has brought about a number of very successful and relevant information and communication technologies (ICT) International Standards in many fields: IC cards (smart cards), automatic identification and data capture (AIDC) technologies, information security, biometrics, cloud computing, multimedia (MPEG), database query and programming languages as well as character sets, to name just a few.

This article originally appeared in the IEC SMB newsletter, October 2015.



ISO/IEC JTC 1 is a joint committee that develops International Information Technology Standards

IEC, IAF and ILAC join forces

Tripartite Memorandum of Understanding prolongs collaboration for the next three-year

Claire Marchand

The IEC has had a tradition of cooperating with other standardization and conformity assessment (CA) organization for many years. In addition to the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU), with which it forms the World Standards Cooperation (WSC), one of the Commission's main partners is the World Trade Organization (WTO) in the context of the Technical Barriers to Trade (TBT) Agreement. These are but a few of the 180+ bodies with which the IEC has close links.

Long-standing cooperation

On the conformity assessment side, one agreement, made between the IEC and its CA Systems on the one part, the International Accreditation Forum (IAF) and the International Laboratory Accreditation Cooperation (ILAC) on the other, has proved highly rewarding, with increased levels of collaboration.

From day one, cooperation between the three organizations has evolved extremely positively on a number of technical and administrative fronts. These collaborative efforts culminated in the three organizations signing their first MoU in October 2010. In 2012, the high level of confidence established between them led the IEC CA Systems and the members of ILAC and IAF to expand the scope of the first tripartite MoU when it was up for renewal.

Maximizing efficiency

The aim of the initial agreement was to maximize efficiency when dealing with common Certification Body (CB) and Testing Laboratory (TL) clients. One means of achieving this was by re-assessing these CBs and TLs jointly to avoid duplication of processes. Under the 2012 agreement, collaboration was no longer limited to joint re-assessments, but also covered initial assessments and surveillance as appropriate.

Since 2010, more than 40 unified assessments/re-assessments have been performed throughout the world.



Under the IECEE CB Scheme, test laboratories can perform all types of electrical testing, for example...

To continue this most fruitful cooperation, a new MoU was signed on 28 October 2015 in Milan, Italy, by ILAC Chairman Peter Unger, IAF Chairman Randy Dougherty and IECEE/IECRE Executive Secretary Kerry McManama, on behalf of IEC General Secretary and CEO Frans Vreeswijk.

While the scope of the agreement remains the same, the three interested parties said how pleased they were with the work accomplished in recent years.

Indeed, the agreement is more than just about assessment/re-assessment.

Pooling resources

To ensure that collaboration is as full as possible, the three organizations have agreed to coordinate the application of standards and guidance documents for the assessment of the CBs and TLs accredited by IAF and ILAC and operating in the IEC CA Systems.

The MoU also stipulates that joint training and workshops should be organized for the pool of technical assessors that are entitled to perform unified assessments of CBs and TLs.



From left, Randy Dougherty, Chairman IAF, Kerry McManama, Executive Secretary IECEE/IECRE and Peter Unger, ILAC Chairman, during the signing ceremony in Milan, Italy, on 28 October

High-level Steering Committee

In the wake of the 2010 MoU, the IEC-IAF-ILAC Steering Committee was formed to explore the possibilities for further harmonization of the three organizations' assessments and related activities.

The Steering Committee, currently chaired by ILAC Chairman Peter Unger, is responsible for developing the cooperation strategy; establishing working parties to deal with specific issues pertaining to the three organizations; monitoring, reviewing and providing assistance for agreed projects; approving changes to these projects; resolving conflicts and making decisions on formal acceptance of project deliverables.

The IEC-ILAC-IAF Steering Committee has prepared guidelines to enhance the existing procedures for unified



...portable appliance testing (PAT) i.e. the examination of electrical appliances and equipment to ensure they are safe to use (Photo: AVC Electronic)

assessments of participating certification bodies and testing laboratories.

A dedicated website provides information on the tripartite agreement, the Steering Committee

and its task forces, relevant documentation and a list of the re-assessments performed since the first MoU came into force.

More info: www.iecee.org/
www.iec-ilac-iaf.org/

IECEX extends mobile offer

Access all IECEX Certificates anytime, anywhere

Claire Marchand

Workers are increasingly mobile and a growing number of enterprises around the world provide their workforce with mobile devices such as tablets, phablets or smartphones. Moreover, many people favour tablets over laptops when traveling or doing field work. The Ex industry sector is no exception.

Using email and calendar applications, viewing, reading or editing documents are just a few of the tasks that can now be routinely performed on mobile devices. But people working in the Ex industry sector now have new tools specifically designed to help them in their work: three mobile applications

that give them instant access to all valid IECEX certificates.

Accessing all IECEX certificates

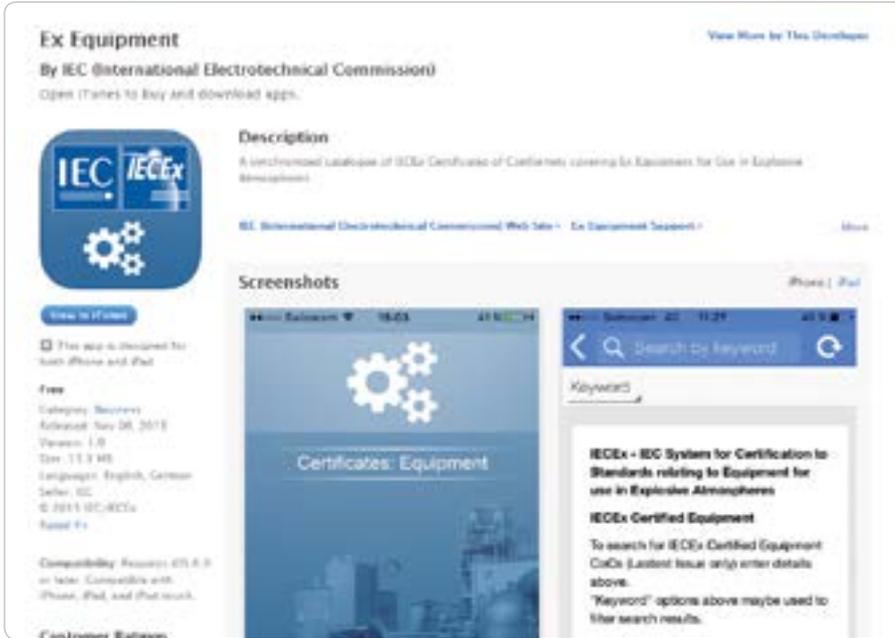
IECEX, the IEC System for Certification to Standards relating to Equipment for Use in Explosive Atmospheres, innovated three years ago with the launch of the first mobile application to show international certificates for equipment used in explosive atmospheres. The System now provides an update to the original app and extends the offer with two additional apps, respectively for service facilities and personnel certificates.

With the new set of applications, anyone working in the Ex sector has access to the complete database of valid IECEX



IECEX has launched three new mobile apps for iOS and Android devices

Certificates not only for installed pieces of equipment, but also for pieces of equipment that have undergone repair



The three apps can be obtained from the Apple App Store...

and overhaul or for persons that carry a Certificate of Personnel Competence.

Not just oil and gas

A huge number of people throughout the world may potentially benefit from these new apps because the Ex sector is much more than just oil and gas. Think chemical processing plants, coal mining, printing industries, paper and textiles, gas station, aviation refuelling

and hangars, grain handling and storage, woodworking areas, sugar refineries, metal surface grinding, especially aluminium dusts and particles, surface coating industries, waste treatment, sewerage plants. The list is by no means exhaustive.

The apps

Each of the three applications is a powerful tool that can be used in the field,

onsite, sitting at a desk or in meetings. It provides users with the ability to search the system offline so that products really live up to Ex safety needs.

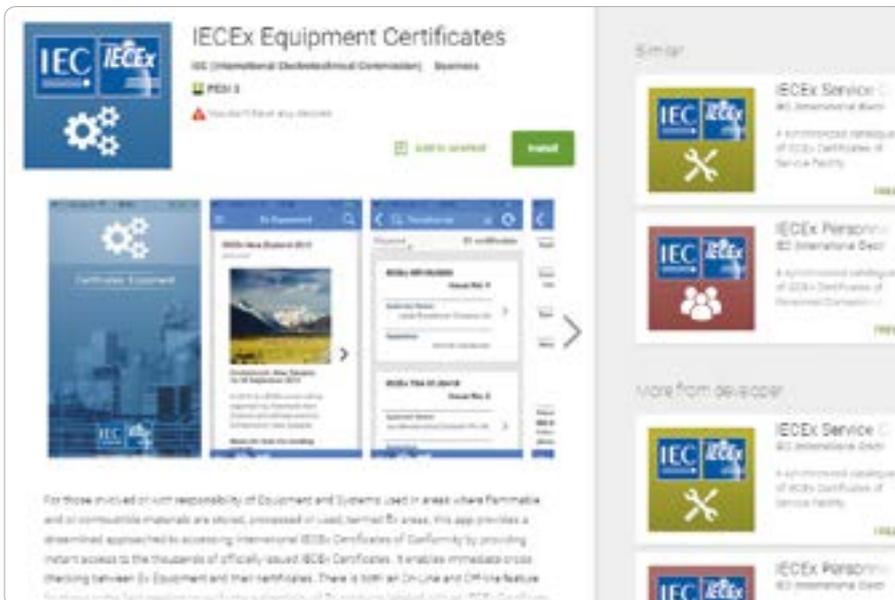
These free applications, for iOS and Android tablets and smart phones, can be found on the Apple App Store and on Google Play. They install a simplified version of the main IECEx online Certificate System covering the three IECEx Schemes:

- IECEx Certified Equipment Scheme
- IECEx Certified Service Facilities Scheme
- IECEx Scheme for Certification of Personnel Competence

End-users can synchronize the apps with the IECEx online Certificate System, as required.

The offline mode provides advanced search capability and CoC (Certificates of Conformity) abstracts (simplified details), while the online version gives the full details of CoC.

With the simplified details, the user is able to determine that the equipment has been installed or repaired in compliance with the relevant International Standards or that a person working on an Ex site has the required level of competence and skills.



...and from Google Play

They can immediately verify the authenticity of a Certificate as the IECEx online Ex Certificate System holds the definitive original certificate. Search criteria include:

- keyword, applicant and apparatus (for Ex equipment),
- keyword, applicant, service and location (for Ex service facilities)
- keyword, issuer, applicant, location and competence (for Ex personnel)

These three apps should be on the mobile devices of anyone working in Ex areas. Get them today!

More information on IECEx: www.iecex.com

Shedding a light on LEDs

Build trust in your products with new IECQ Scheme for LED Lighting



Legacy streetlights are being replaced with new and more efficient LED, or solid-state lighting technology

Claire Marchand

Solid-state lighting (SSL) is rapidly becoming the preferred light source for many lighting applications and the demand will continue to grow. SSL solutions are widely used in industrial and commercial environments. They are also making inroads in urban and airport lighting, automotive headlamps, traffic signals and advertising. They can be used in almost any kind of applications.

What is SSL?

Some of you may wonder what solid-state lighting or SSL is all about. Wikipedia helps shed some light – on SSL technology: it “refers to a type of lighting that uses semiconductor light-emitting diodes (LEDs), organic light-emitting diodes (OLEDs) or polymer light-emitting diodes (PLED) as sources of illumination rather than electrical filaments, plasma or gas.”

LED streetlights become smart

LEDs in particular, on the market since the early 1960s, have been

very successful in recent years. Mostly used as indicator lamps for electronic devices in the early days, recent developments have seen them used increasingly in domestic, public, commercial and industrial applications.

Take street lighting for example: according to a Research and Markets report, from 2015 to 2025, countries are expected to invest USD 53,7 billion

in LED street lighting. The report states that “there are currently 304 million total streetlights in the world. This number will grow to 352 million total streetlights by 2025. The public outdoor lighting market is currently undergoing a period of change where legacy streetlights are being replaced with new and more efficient LED, or solid-state lighting technology. Taking this new technology a step further, these LED streetlights are also being networked together with communications to become ‘smart’ streetlights.”

Ongoing innovation

The already phenomenal success of LED lighting solutions is far from over. Prices continue to drop and manufacturers continue to come up with new and innovative ways to make LED lighting attractive and relevant.

LEDs have many advantages over incandescent or compact fluorescent lamp (CFL) light sources, including:



LEDs play a major role in urban lighting and in advertising



LEDs are a staple of smart devices

- low energy consumption
- long lifetime
- robustness, i.e. reduced cost of maintenance and replacement
- easy control
- fast switching

In addition, they are intrinsically safe – they are low voltage and generally cool to the touch – and their small size makes them ideal to light the tinniest of spaces.

Maintain quality and reliability

As an outcome of the success of LED lighting solutions for domestic and industrial use, the risk of having the market flooded by a large number of manufacturers making unverifiable claims about their products’ quality and reliability has increased exponentially.

Mass production of LED lighting systems cannot be made at the expense of quality and reliability. All electronic components, parts, modules and assemblies must work satisfactorily together. One faulty component can result in poor performance or even worse, the overall failure of the LED lighting system.

Trust in all components

IECQ, the IEC Quality Assessment System for Electronic Components, has the solution that gives manufacturers, suppliers and buyers the confidence that the products they sell or purchase have been independently verified and meet all requirements and specifications.

The new IECQ Scheme for LED Lighting, established under the

umbrella of the generic IECQ Approved Component (AC) Scheme, offers a valuable qualification and supply chain management tool that provides for the identification and verification of compliance with component and process specifications.

Benefits for industry

In line with the approved scope of the IECQ System, the IECQ Scheme for LED Lighting can be applied to certify manufacturers and suppliers of electronic components, modules and assemblies used in the production of LED packages, engines, lamps, luminaires and associated LED ballasts/ drivers. It provides a “standardized way” of evaluating suppliers and is used as a powerful supply-chain management tool when assessing and monitoring the various tier-level suppliers.

This removes the cost burden of monitoring and controlling the supply chain, from the original equipment manufacturers (OEMs) to their suppliers, while also protecting the OEM brand name in the market. This also helps prevent poor-quality LED systems from entering the market.

One goal: Lighting and energy for all

The United Nations proclaimed 2015 as the International Year of Light and Light-Based Technologies, recognizing “the importance of raising global awareness about how light-based technologies promote sustainable development and provide solutions to global challenges in energy, education, agriculture and health”.

IECQ has celebrated the International Year of Light in its own way, with the creation of the IECQ Scheme for LED Lighting.

More information: www.iecq.org



LED are used for safety signs

Outstanding contributions

IEC Young Professionals Programme alumni receive 1906 Award

Janice Blondeau

The IEC has recognized the efforts of three Young Professionals Programme alumni with 1906 Awards in 2015. Congratulations on this achievement.

Advancing electrotechnology standardization

Jonathan Colby, René Jensen and Adam Murdoch are among the recipients of the 1906 Award for 2015. To receive this award, experts must have made a major contribution to furthering the interest of electrotechnology standardization and related activities.

Jonathan Colby

Jonathan Colby, IEC 2011 YP Leader from the US, is Chair of the Marine Energy Operational Management Committee (ME-OMC) and Convener of the REMC WG001, both under IECRE, the IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications. He received the 1906 Award in recognition of his commitment to Renewable Energy by establishing marine



Jonathan Colby

energy standards and his dedicated work for IECRE, which is needed for this industry's success. Colby's meticulous and enthusiastic leadership in key positions was described as outstanding.

Colby is also Technical Advisor of the US Technical Advisory Group to IEC Technical Committee (TC) 114, with his initial IEC involvement starting in 2008 as a US subject matter expert on IEC TC 114: Marine energy - Wave, tidal and other water current converters. Colby is currently the Director of Technology Performance for Verdant Power, a tidal energy technology developer based in New York City.

René Jensen

René Jensen is an expert in TC 121: Switchgear and controlgear and their assemblies for low voltage. He is also active in Subcommittee (SC) 121B: Low-voltage switchgear and controlgear assemblies, Maintenance Team (MT) 2, Joint Working Group 1 and Working Group 9. Jensen received the 1906 Award in recognition of his ongoing representation of the views of a smaller company operating in a global market to this Technical Committee. He adds diversity to the debate and enriches the work outcome. Jensen has been a very active member of SC 17B MT 2 and the preceding committees for a number of years. More recently he contributed to SC 17B/D Joint Working Group 1 on the sensitive subject of device substitution. Technical Instructor R&D at Cubic Modulsystem S/A, Jensen was an IEC 2010 Young Professional. He is invited to the national Danish Standards Young Professional event each year to make a presentation



René Jensen

about his work as an IEC expert in TC 121B. In a YouTube video Jensen is speaking about his work in standardization (<http://go.iec.ch/20>).

Adam Murdoch

Adam Murdoch is a Member of IEC TC 61: Safety of household and similar electrical appliances. Murdoch received the 1906 Award in recognition of his contributions in each TC 61 plenary meeting and his participation and valuable contributions to TC 61 MT 4: Temperature limits and resistance to heat and fire, TC 61 Editing Group (EG) 1 and TC 61 Advisory Group (AG) 28.



Adam Murdoch

Adam Murdoch became the Chair of SC 61H: Safety of electrically-operated farm appliances on 1 March 2013. He was an IEC 2010 Young Professional and is Manager of Equipment Safety at Energy Safe Victoria.

Hong Zhang, recipient in 2012

In 2012, Hong Zhang, an expert in TC 100: Audio, video and multimedia systems and equipment, was a recipient of the 1906 Award in recognition of his contribution to the standardization of various new projects including IEC 62634, *Radio data system (RDS) - Receiver products and characteristics*

- *Methods of measurement*, IEC 62514, *Multimedia gateway in home networks - Guidelines*, and IEC TR 62678, *Audio, video and multimedia systems and equipment activities and considerations related to accessibility and usability*, and for his active involvement in the project PT 62608 resulting in the publication of IEC 62608, *Multimedia home network configuration - Basic reference model - Part 1: System model* in 2014. He inspires members of TC 100 at their meetings with his simple yet incisive comments, encouraging everyone to upgrade their activities. Hong Zhang was an IEC 2010 Young Professional.

About the 1906 Award

The 1906 Award was established to commemorate the founding of the IEC. It honours technical experts around the world whose work is fundamental to the IEC. The aim of the 1906 Award is to recognize current achievements that can be considered as a major contribution to furthering the interest of electrotechnology standardization and related activities. Specifically the Award must be granted for exceptional, recent contribution to work related to the development - either technical or from an organizational point of view - of a specific work project.

Tomorrow's leaders

Introducing the IEC 2015 Young Professional Leaders



The three IEC 2015 Young Professional Leaders

Janice Blondeau

The IEC Young Professionals Programme is a forum for upcoming expert engineers, technicians and managers from throughout the world, who aspire to become more involved in the IEC and help shape the future of electrotechnology

international standardization and conformity assessment. For this month's magazine, e-tech introduces the three 2015 Leaders of the IEC Young Professionals Programme who were elected by their peers in Minsk. Please give them your support!

Fatima Al Khoori, United Arab Emirates

Fatima Al Khoori, whose background is in transportation engineering, holds the position of Standards Analyst, Standardization Services Division in the Abu Dhabi Quality and Conformity Council.



Fatima Al Khoori, United Arab Emirates

Here Al Khoori has been introduced to the world of standardization especially standards development, terminologies, managing and participating in working groups and Technical Committees. Her work covers integrated transportation planning, transportation mobility management systems, monitoring and control management systems with detection and auto recognition of solutions and systems. Al Khoori has also developed learning materials as orientation for newcomers to the standards world. These cover the quality infrastructure elements from the standards perspective.



Roberto Fernandez, UK

Roberto Fernandez, UK

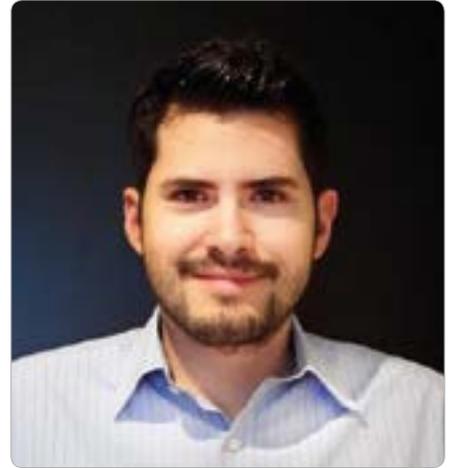
Roberto Fernandez, who is qualified in electrical and electronic engineering, is Switchgear Engineer, National Grid UK, where his main focus is asset management of instrument transformers and high voltage bushings. Fernandez's responsibilities include technical support for operational site staff, management of strategic spares stock, development of long term replacement strategies and asset life extension strategies. His areas of interest include electrical engineering, electronics, specifically instrument transformers, high voltage bushings, protection and control.

At National Grid, the Technical Specifications that Fernandez uses are written in relation to the IEC and BS En (National Committee) standards. In addition, oil tests that Fernandez requests for instrument transformers are to specific IEC Standards. He is looking to getting more involved with standards as part of his National Grid role.

Ricardo Luis Nava Garibay, Mexico

Ricardo Luis Nava Garibay is a mechatronics engineer who has also studied renewable energies. Nava Garibay's areas of interest are electrical engineering, electronics, energy and heat transfer engineering, household, safety, and solar photovoltaics (SPV). His experience in standardization includes a role as Test Engineer Intern at the Asociacion de Normalizacion y Certificación (ANCE) in Mexico.

In 2013 he started working as a Design & Release Engineer at Ford Motor Company, performing design with standardized development processes on Body Interior Systems. While working in the automobile industry as CAD Team Leader, Nava Garibay cofounded two companies: TMDM



Ricardo Luis Nava Garibay, Mexico

and Coletech. Coletech focuses on the installation of SPV systems within both residential and commercial sectors. Nava Garibay is currently Chief Development Officer at Coletech. He is looking forward to support and collaborate with Smart Grid industry since its combination with renewables energies will drive the transition to a sustainable and environmentally responsible energy consumption for the years to come.

IEC Young Professionals Programme

This programme brings together the world's upcoming expert engineers, technicians and managers and provides them with opportunities to shape the future of international standardization and conformity assessment in electrotechnology.

IEC Young Professionals – 2016 Workshop, Frankfurt, Germany

The IEC Young Professionals - 2016 workshop will be held in Frankfurt, Germany, from 10 to 12 October, in parallel with the IEC 2016 General Meeting. Please contact your NC for further information.

November 2015 nominations

The latest TC Chair nominations approved by the SMB

Antoinette Price

October saw a new Chair nomination and as well as the extension of term of an existing Chair by the Standardization Management Board (SMB).

About Helio Librantz

With a career spanning 35 years at Embraer in Brazil, Helio Librantz is a senior specialist engineer in electrical systems, EMI, HIRF and aircraft lightning protection. He has also worked with different international advisory committees and working groups on harmonizing requirements and guidance material for the certification of aircraft electrical systems. Librantz is currently manager of electrical engineering at Embraer head engineering office. In 2013, he began participating in the work of IEC Technical Committee (TC) 107: Process management for avionics.



Helio Librantz, Chair, IEC TC 107: Process management for avionics

Librantz has been voted Chair of IEC TC 107 for the period 2015-10-01 to 2021-09-30.

About Friedrich Kramm

Friedrich Kramm has enjoyed a career of 30 plus years in the field of lead acid battery technology. During this time, he

was involved in the materials, design, manufacturing processes and testing for batteries and has developed more than 10 international patents. He has worked on a number of IEC Technical Committees and is currently Chair of IEC TC 21: Secondary cells and batteries.

Kramm's term of office has been extended for the period from 2015-10-01 to 2018-09-30.



Friedrich Kramm, Chair, IEC TC 21: Secondary cells and batteries

Obituary – Ron Collis

IECEE Chairman passed away on 10 November 2015

Claire Marchand

It is with immense sadness and regret that we have to inform the IEC community of the tragic death of IECEE Chairman Ron Collis on 10 November 2015. Ron Collis had been the victim of an unfortunate accident a month ago and never woke from a deep coma. He leaves behind his wife Marion.

Long-standing involvement and dedication

Ron Collis had been involved in IEC activities for many years, both on

the standardization and conformity assessment sides.

Since January 2013, Collis had been Chairman of IECEE, the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components. He was about to step down at the end of the year after a three-year term of office.

Of his chairmanship, he said: "I thought this position would be relatively easy to hold, but I was wrong. It is almost a full time job as we expand the areas of certification for



Ron Collis at the CAB meeting during the IEC General Meeting in Tokyo, Japan, in November 2014



Ron Collis with Hironichi Fujisawa, who was IEC Vice-President and CAB Chairman until the end of 2014

electrical products at the international level and discuss future activities with other Geneva-based international Standards bodies.”

As IECEE Chairman, he was the System’s representative to the IEC Conformity Assessment Board (CAB). Before his chairmanship, Collis had been the Australian CAB Member from 2002 to 2011.

He was very much involved in IECEE work and, according to his colleagues, never missed an annual meeting.

Focus on cybersecurity

Collis was also the Convenor of CAB Working Group (WG) 17: Cybersecurity, established in June 2014, and at the IECEE level, he was Chairman of the Policy and Strategy Committee (PSC) WG 3: Industrial Automation, the scope of which was extended to include, among other things, cybersecurity.

He was very passionate about cybersecurity and felt the IEC needed to get involved in it sooner rather than later. He pushed for the Commission to develop and implement conformity assessment solutions to the threats posed by ever more frequent cyberattacks not only linked to industrial automation, but aimed at all sectors of society.

Collis was also a member of CAB/WG 10: Policy and Strategy.

Explosive atmospheres

On the standardization side, Collis was a member of IEC TC 31/WG 37: Equipment for explosive atmospheres/ Electrochemical cells and batteries in equipment for explosive atmospheres.

He was also actively involved in IECEX, the IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres, as the Australian head delegate to many of the System’s Management Committee meetings.

Over the years, Collis also chaired the Australian Member Bodies of IECEE and IECEX.

International career

Ron Collis had more than 40 years of experience in the electrical and controls Industry in several countries around the world.

In June 1972, he joined the State Electricity Commission of Victoria, Australia, and in 1978 he relocated to the UK to work for the Carrier Corporation, subsequently acquired by Haden. He then became Head of Electrical Engineering at the Haden R&D Labs.

In each of these positions he had the opportunity to participate in international projects as a member of a product or systems development team, often partnering with US-owned companies.

From 1985 to 1989, he was Senior Electrical Design Engineer for the Haden Management Company in the USA, working mainly on major projects for General Motors Inc.

In 1989, Collis returned to Australia to join Allen-Bradley (AB) as System Engineer. At the time, AB was part of the Rockwell Automation portfolio of brands (Rockwell had purchased AB, the North American leader in the industrial automation equipment market, in 1985).

Five years later, Rockwell sent him to China to establish their China Office in Beijing. From there, he moved to Hong Kong to serve as Project Consultant for Rockwell in their mandate for the new Hong Kong airport.

Standards and Trade

In 1999 Collis returned to Australia where he became Programme Director for Rockwell Automation Global Standards and Trade Regulations activities in the Asia Pacific region, a position he held until his death. In his own words, “the position required an understanding of the international trade laws and certification practices that underpin the health and safety regulations of many economies around the world.” For him it also meant being engaged at the management level of international trade and standards organizations.

The IEC extends its deepest sympathies to his family, friends and colleagues around the world.



Ron Collis at the 2015 IECEE annual meetings in Dubai, United Arab Emirates

IRENA launches INSPIRE

New collaborative platform drives RE innovation



The INSPIRE platform is the result of a collaborative effort between IRENA, IEC and the European Patent Office

Janice Blondeau

Hundreds of standards for Renewable Energy technology are now accessible in one easy-to-use platform.

Advancing Renewable Energy

A significant advance for policy makers and other energy sector players means they can now access the world's largest collection of global Renewable Energy standards and patents, through a new online platform launched by the International Renewable Energy Agency (IRENA). INSPIRE, the International Standards and Patents in Renewable Energy platform, is the first and most complete solution of its kind. Users can search through, locate and analyse 400 International Standards and more than 2 million patents for Renewable Energy technology.

One-stop shop

Through collaboration between IRENA, the European Patent Office (EPO) and the IEC, the INSPIRE platform enables users to search through a database of more than 400 internationally-

used standards and generate reports as needed. It also explains what standards are, how they can be used and why they are important for quality assurance, investor confidence and technology trading. The patents section houses the world's most comprehensive global patent database for carbon mitigation technologies, the EPO's PATSTAT, which contains nearly two million patent documents.

Precious for regulators

By linking the technical information in IEC International Standards to practical applications in renewable energy, INSPIRE will be a precious resource for energy regulators. It will assist policy makers to find relevant International Standards faster and more efficiently. It will also help educate stakeholders about the strategic role of International Standards and conformity assessment for the cost-efficient expansion of Renewable Energy generation.

In standardization, the IEC work covers Renewable Energy generated from water, the sun and the wind via IEC Technical Committee (TC) 4: Hydraulic turbines, TC 82: Solar photovoltaic energy systems, TC 88: Wind turbines, TC 114: Marine energy - Wave, tidal and other water current converters, and TC 117: Solar thermal electric plants. The work of TC 105: Fuel cell technologies is also key for ongoing RE development.

IECRE, the IEC System for Certification to Standards Relating to Equipment for



The IEC develops International Standards for the wind energy sector...

Use in Renewable Energy Applications, aims to facilitate international trade in equipment and services for use in Renewable Energy Sectors while maintaining the required level of safety. To do so it operates a single, global certification system and aims for acceptance by local/national authorities or other bodies requiring and benefiting from certification.



...and for the solar power sector

About IRENA

The International Renewable Energy Agency (IRENA) is mandated as the global hub for renewable energy cooperation and information exchange by 141 Members (140 States and the European Union). Roughly 31 additional countries are in the accession process and actively engaged. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy

security and low-carbon economic growth and prosperity. www.irena.org

About Renewable Energy

What is the link between IEC Standards and renewable energies? It has to do with the environment. IEC recognizes the growing importance of preserving the environment and the role electrotechnical standardization has to play to foster sustainable development.

Large scale use of Renewable Energy, or RE, is important for the future for several reasons: to eliminate dependence on fossil fuels, to combat global warming, and to raise the living standard of people in developing countries. Much of RE is an emerging field of research, technology and manufacturing and a new industry is growing up.

Precious lights

Lighting, leisure and the International Year of Light



The International Year of Light is a United Nations initiative under the patronage of UNESCO

Janice Blondeau

Next time you visit a museum, enjoy a live cultural performance or support your favourite sports team at their stadium, spare a thought for the light and lighting that helped make these activities so

enjoyable, and for the International Year of Light.

The global initiative, International Year of Light, is highlighting to the citizens of the world the importance of light and optical technologies in their lives, for their futures and for sustainable development. The IEC is delighted to be associated with the International Year of Light (IYL2015), adopted by the United Nations under the patronage of UNESCO.

Lighting up sporting events

Experiencing a major sporting event live is unique. Advances in lighting have made it possible to hold sporting events both indoors and at night. The

most common floodlights used as primary lighting in stadiums are high intensity discharge (HID) lamps such as metal halides, which can pack a lot of lumens into a small package. Advances in light-emitting diode (LED) technology mean that LED floodlights are now bright enough to be used for illumination purposes on large sports fields. They can be switched on and off instantly, requiring no warm-up period.

IEC Technical Committee (TC) 34: Lamps and related equipment, and its Subcommittees (SCs) prepare International Standards for all types of lamps and luminaires used in sports venues. (Read Lights, sensors, game on! in *e-tech* December 2014)



Concerts and musical performances without light shows are inconceivable today

Museums and exhibitions

Visiting a museum is a visual experience. Light is a key factor that contributes to creating the right atmosphere and showcasing the artefacts.

“Ultimately, a visit to a Museum is lasting in our memory thanks to lighting. An artefact that is set in the right ambiance and accentuated with precise lighting brings an enduring image to our brains that lasts for a long time,” says Victor Palacio, President Elect of the International Association of Lighting Designers (IALD). (Read Palacio’s International Year of light blog post Museum and Exhibition Lighting at: <http://go.iec.ch/1t>)

Architecture and Light Art

Architectural lighting design is a new discipline that brings together architecture, interior design and electrical engineering, to create lighting systems that combine natural and electric light. The illumination of buildings or spaces relies on three fundamental aspects: aesthetic appeal, ergonomics and energy efficiency.

One step further is Light Art, which is emerging as a popular International movement through exhibition spaces at festivals. This has grown especially with the outdoor LED low energy developments. Festivals such as the Fête des Lumières (Festival of Lights) in Lyon and Vivid Sydney in Australia are

two renowned examples of what can be created when light meets arts.

IEC activity

A number of IEC TCs and SCs prepare International Standards for components and systems in the fields of lighting and sensors that help make these leisure activities possible.

The TC primarily responsible for drawing up International Standards for lighting is IEC TC 34: Lamps and related equipment. TC 34 includes four SCs which prepare international standards for specific fields: IEC SC 34A: Lamps including LEDs, organic light-emitting diodes (OLEDs) and glow starters, has published over 130 Standards covering, among other things, metal halide lamps and LED lamps; IEC SC 34B: Lamp caps and holders; IEC SC 34C: lamp controlgear, with the focus on controlgear standards for metal halide lamps (square wave operation), fluorescent lamps and LED modules; and IEC SC 34D: luminaires.

IEC TC 47: Semiconductor devices, includes sensors in a number of its publications and IEC SC 47E: Discrete semiconductor devices, prepares

International Standards for components used in a variety of sensors.

The scope of IEC TC 76: Optical radiation safety and laser equipment, is to prepare International Standards for equipment incorporating lasers and LEDs.

There is also considerable work carried out in the field of fibre optics through IEC TC 86: Fibre optics, established in 1984, and its Subcommittees. They are central to the development of the entire sector and all related industries.

In addition, the IEC Conformity Assessment Systems help ensure that the products we buy and use have the required safety levels.

About the International Year of Light

The International Year of Light and Light-Based Technologies (IYL 2015) is a global initiative adopted by the United Nations to raise awareness of how optical technologies promote sustainable development and provide solutions to worldwide challenges in energy, education, agriculture, communications and health.

For more information: www.light2015.org/



Vivid Sydney is an annual outdoor lighting festival with immersive light installations and projections

The Internet didn't kill the TV star

Far from fading into oblivion TV is enjoying a renewal thanks to new technologies



The 10" screen RCA 630TS went on sale in 1946 (Photo: by Fletcher6)

Morand Fachot

As World TV day was observed recently, it is worth looking at what makes television more popular than ever, enabling it to evolve and reach new audiences via different platforms and new distribution modes. This was highlighted also during the 2015 World Radiocommunication Conference, which ended recently consolidating central aspects of TV broadcasting for coming years. Television enduring popularity can be ascribed to many innovations in the hardware and software domains, many of which rely on standardization work by a number of IEC Technical Committees (TCs) and Subcommittees (SCs).

From niche product to global adoption

Television is a fairly recent invention that started being adopted in the early and mid-1950s only. The nearly square box that brought more or less

sharp black and white pictures in living rooms was a phenomenon limited mainly to countries in North America and western Europe. Colour television was introduced in the mid-1960s, but sets were relatively expensive for many households, and it was available in a few countries only. The choice of TV programmes was limited (by regulation and technical reasons) to a handful of channels in most markets.

Later, mass adoption meant significant cuts in the prices of sets, leading to wider adoption across the world and even the acquisition of multiple sets in some households.

According to Nakono Research worldwide average TV penetration today is 92,2%, with all regions of the world averaging between 90% (Asia-Pacific) and 99% North and Latin America, and Europe. However, Middle East and Africa countries average 77% penetration only, mainly due to the lack of universal electricity in some sub-Saharan countries.

International Standards for TV sets are prepared mainly by IEC TC 100: Audio, video and multimedia systems and equipment, and some of its Technical Areas (TAs).

TC 100 was established in 1995 by disbanding and merging the following TCs and SCs:

SC 12A: Receiving equipment and SC 12G: Cabled distribution system (from TC 12: Radiocommunications, created in 1926), SC 60A: Audio recording and SC 60B: Video recording (from TC 60: Recording, established in 1964) and TC 84: Equipment and systems in the field of audio, video and audio-visual engineering (created in 1983).

The second birth of television

The introduction of new technologies, such as cable and satellite distribution, video recording equipment and digital broadcasting gave an impetus to more developments in television, including the availability of more channels and a growing demand for TV sets.

Digital television broadcasting, the transmission of digitally-processed audio and video signals, represented a major advance when it was introduced in the 1990s as it can support more programmes on the same channel bandwidth than analogue broadcasting.

Digital TV also led to the introduction of new types of displays to replace the cathode ray tube types (CRT) in use since the beginning of television.

These include plasma display, liquid crystal displays (LCDs), light-emitting diode and organic light-emitting diode (LED and OLED, respectively). These screens are needed to support higher



Sony S80C curved UHD TV (Photo: Sony)

HEVC needs only half the bit rate of its Advanced Video Coding (AVC) predecessor to deliver the same content.

All these advances on the equipment software sides, made possible and supported by IEC International Standards, mean that TV is certainly in its prime with viewers of all age spending more time today watching TV programmes live, on demand or recorded on TVs, computers or mobile devices.

In view of the universal reach of television and of its growing popularity, the 1946 prediction of US movie executive Daryl F. Zanuck that television wouldn't be able to hold on to any market it captured after the first six months as people would soon get tired of staring at a plywood box every night, will certainly be remembered as one of the worst technical predictions ever made. Similarly, predictions that the Internet would kill television seem still far off as the Internet has certainly strengthened certain aspects of television.

definition pictures, such as those provided by ultra-high definition TV (UHD TV), which offers four times the resolution of current 1080p HDTV.

International Standards for displays supporting these broadcast modes and new ones, such as broadcasting to computers and mobile devices via Internet or streaming, are developed by IEC TC 110: Electronic display devices, and its SCs.

It's not just about hardware

One significant issue with the delivery of more and more digital content for HDTV and UHD TV, computers and mobile devices, is the large bandwidth it requires. This places significant strain on existing terrestrial or satellite distribution channels using current compression standards.

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

which has been developed jointly by ISO/IEC MPEG, the Moving Picture Experts Group, and the International Telecommunication Union Telecommunication Standardization Sector (ITU-T).



Television programmes can now be accessed on tablets and mobile phones

COP21

Energy efficiency is a key to combat climate change



The 2015 UN climate change conference will take place in Paris, France, from 30 November to 11 December 2015

Janice Blondeau

As the world prepares for COP21, the 2015 Paris Climate Conference, the International Energy Agency (IEA) estimates in its 2015 Energy Efficiency Market Report that energy efficiency is the most effective tool to reduce greenhouse gas emissions with an aim to limit global warming to 2 degrees Celsius or below. IEC work is behind the scenes helping to increase energy efficiency and reduce the amount of energy that is lost in everyday consumption.

The IEA has found in 2014 that energy efficiency improvements in IEA countries over the last 25 years have saved households and businesses USD 550 billion. In addition, energy efficiency improvements since 1990 have avoided a cumulative 10,2 billion tonnes of CO₂ emissions in IEA countries.

Redesign the energy chain

In order to increase energy efficiency there is also a need to look at how we generate and consume energy, to redesign systems on a global scale, rather than individual products in specific countries or regions. Right now a lot of raw energy is wasted. The smarter use of electric energy, what the IEC calls “smart electrification”, can help reduce emissions. For this, globally accepted metrics and technological expertise such as those developed by the IEC need to be applied to achieve optimal outcomes and eliminate market confusion.

Industrial energy saving motors

Reducing energy waste in electric motors is a concrete example of IEC work in action. Industry, especially electric motor systems are estimated to account for more than 40% of global electricity use (1). Two thirds of all electricity used by industry drives electric motor systems. They convert electrical energy to mechanical

energy, rotate pumps, drive compressors, move materials and run fans, blowers, drills or mixers. Motors are huge consumers of electricity, even small improvements can lead to large energy savings.

IE codes drive efficiency

The IEC has put in place energy efficiency classes for electric motors. These allow manufacturers and regulators to easily identify how efficient an individual motor performs. Each level of efficiency has its own IE code. Their performance criteria are summarized in IEC International Standard IEC 60034-30-1. The IEC classification system includes four levels of motor efficiency:

- IE1 Standard efficiency
- IE2 High efficiency
- IE3 Premium efficiency
- IE4 Super premium efficiency

Widespread adoption

The IE codes help regulators to clearly define minimum efficiency levels for



Electric motor systems are estimated to account for 46% of global electricity use



Standards are voluntary, the European Union (EU) and numerous other countries have adopted the IEC classification system.

In the EU, Directive 640/2009, became effective as of January 2015 for motors with a rated output from 7.5-375 kW and from 2017 for motors with a rated output from 0,75-375 kW. This measure, which is generally referred to as EU Minimum Energy Performance Standard (MEPS), is expected to result in energy efficiency improvements of 20% to 30%. An internationally harmonized efficiency Standard, IEC 60034-30, was developed under German leadership within the IEC.

More information about IEC IE energy efficiency classes for electric motors at <http://go.iec.ch/1x>

IE codes help regulators to determine the minimum efficiency levels for electric motor energy performance in their regulations

electric motor energy performance in their regulations. The IEC 60034-30-1 classification system has stimulated

competition among motor manufacturers and generated massive technology improvements. While IEC International

Upcoming IEC and global events

Final events for 2015

Antoinette Price

The IEC organizes events, as well as regularly supporting other key global and regional industry events, which can present the IEC endorsement on their website and materials.

World Standards Cooperation (WSC) - Conformity Assessment Workshop

Geneva, Switzerland,
1-2 December 2015

Experts will discuss conformity assessment issues, exchange practical experience and propose working solutions. Regulators, industry

representatives, transition economy leaders, economic leaders and other interested stakeholders will attend.

More information at:
www.wscaworkshop.com/

iPad Cameroon Energy & Infrastructure Forum Yaounde, Cameroon, 1-2 December 2015

The event will offer a unique platform and forum for investors in infrastructure transmission and distribution, including project developers, technical partners and financiers, looking to invest in Cameroon.

More information at:
www.ipad-cameroon.com/



WSC Conformity Assessment Workshop



iPad Cameroon Energy & Infrastructure Forum

The positive impact of speaking up

New IEC tool is a success

Public commenting gives anyone with pertinent knowledge the chance to shape the International Standards used in their field

Antoinette Price

For the first time in International Electrotechnical standardization, an innovative platform, IEC Public Commenting, is allowing people the opportunity to have a direct impact on the Standards used in their industry.

In September this year, the IEC launched a public commenting platform, which has had a great response. "In just under two months, more than 50 people have signed up and commented on our Standards. The feedback from a number of our National Committees (NCs) has been very positive, and the German NC is particularly pleased to promote it",

said IEC Community Manager Jan-Henrik Tiedemann.

How does it work?

As soon as a new Committee Draft for Vote (CDV) Draft Standard has been published, it is publicly available for a two months commenting period. Anyone wishing to can preview Draft IEC Standards and comment on them at the CDV or last stage at which technical comments can be considered as input into the final IEC International Standard.

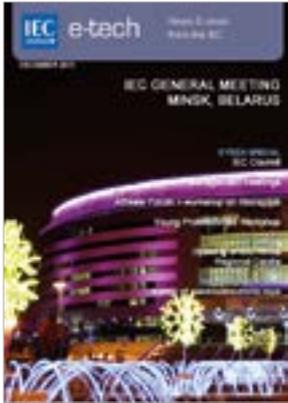
All comments are forwarded to the National Committee of the country that the person commenting lives in. They

are then reviewed and may be put forward as national input for the final IEC International Standard.

Anyone, anywhere can participate

The beauty of this tool is that anyone, anywhere can create an online account and comment on any of the Draft IEC Standards which have reached the CDV stage. It effectively broadens the scope of expertise contributing to the preparation of International Standards and gives anyone with pertinent knowledge the chance to shape the International Standards used in their field.

Find out more at:
www.iec.ch/comment/



IEC General Meeting & Entertainment

The end of year season is an opportunity for lighting designers and individuals to bring a festive atmosphere to streets, buildings and houses in many countries. The range of lighting equipment now available gives great flexibility to offer dazzling effects whilst keeping energy consumption well under control thanks to more energy-efficient systems. IEC TC 34: Lamps and related equipment develops International Standards for electric light sources, and focuses increasingly on energy-efficient solutions.

Electrotechnology has had a great impact on toys making it possible to move beyond mechanical toys and board games to a wide range of intelligent and interactive toys. Some toys, like battery-powered ride-on electric vehicles, offer children the experience of driving and controlling motor vehicles which are tailored to their size and capabilities. All these toys depend on many IEC International Standards, which ensure they are as safe and reliable as possible for use by children.

The next edition of *e-tech* will summarize much of the 2015 IEC General Meeting proceedings in Minsk, Belarus.

It will cover the President's address to Council and the IEC activity report presented by IEC General Secretary and CEO Frans Vreeswijk. Further reports will include management meetings such as Standardization Management Board (SMB), and Conformity Assessment Board (CAB) as well as an outline of the Council Open Session on the theme "Energy Efficiency: From theory to reality with IEC International Standards and Conformity Assessment". The Affiliate Forum, the Young Professionals and Industrializing Country workshops will complete the table of contents. Not to forget a photo gallery of the event.





e-tech

News & views from the IEC

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

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