Transportation

Industry Spotlight

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Don’t look for the electric car, it’s already there!

Technology Focus

Electric vehicles
More choice of EVs may tempt more drivers

Public transport
Use of electrical urban vehicles expands

Technical Committee Affairs

ISO/IEC JTC 1
Profile: Karen Higginbottom
Focus of the month
Transportation

This issue of e-tech focuses on transportation and more specifically on EVs (electric vehicles), be they electric cars or electric urban transport vehicles. The conformity assessment aspect is also addressed with the launch of the IECEE ELVH programme for EVs and the IECQ ECMP (Electronic Component Management Plan).

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Lighting the way ahead
Drivers tempted by EVs have more choice today as manufacturers introduce new types of vehicles from hybrids and plug-in hybrids to full electric cars. IEC Standards are proving instrumental to consumer adoption.

While electric vehicles often make the headlines these days, the fact that motor vehicles, even when powered by internal combustion engines, contain an ever growing number of electric and electronic parts is often overlooked. Through its standardization and conformity assessment work, the IEC ensures that electrical equipment and electronic components used in these vehicles are of the highest quality and reliability and help make cars safer and ever more energy-efficient.

Another type of EV is under scrutiny in this issue: electric urban transport vehicles. They are now a regular feature in city streets the world over and offer an environmentally-friendly option to reduce local emission of pollutants significantly in the expanding cities of the future.

Because the safety of air traffic depends to a great extent on avionics, i.e. all electronics systems installed on board an aircraft, issue 03/2013 will give you an insight into the IECQ ECMP (Electronic Component Management Plan) and HSPM (Hazardous Substance Process Management) Schemes for the aerospace industry.

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The safety of air traffic depends to a great extent on avionics.
Electric cars take off with new standards

With EV prices falling, sales are set to soar with an obvious need for relevant Standards

Rebecca Pool

If 2012 was the year that hybrid vehicle sales moved up a gear, 2013 will be the year that brought drivers more choice. As automotive manufacturers unveil a vast array of plug-in hybrid and all-electric options, IEC standards are driving consumer adoption.

Significant growth in EV numbers forecast

Late last year, Japan-based automotive giants unveiled some serious global sales figures. Toyota revealed that total hybrid vehicle sales had reached 4.6 million while rival Honda reported selling one million of its internal combustion engine and electric motor-powered vehicles.

While hybrid electric vehicle sales have taken well over a decade to reach these heady heights, other segments of the electric car market are moving up through the gears, and fast. According to US-based analyst firm, Navigant Research, global sales of plug-in hybrid vehicles (PEVs) – containing an internal combustion engine and rechargeable battery – and all-electric cars have grown rapidly in the last two years, reaching 137,950 units in 2012.

Since its launch in December 2010, there have been 50,000 sales worldwide of the all-electric Nissan Leaf, manufactured by Japan-based Nissan. And this is just the beginning.

“We will see these markets getting closer in relative size, and evening out. There’s going to be more of a selection [of vehicles] and many more models”, he adds. Indeed, automotive manufacturers at this year’s International Motor Show, Geneva, were showcasing myriad hybrid and electric cars, providing a glimpse of things to come.

Consumer choice

More than 50 hybrid and electric cars were on show from 25 or so automotive manufacturers. Mainstream auto-makers such as Audi, Lexus, Citroen and Mercedes Benz presented concept and production vehicles while niche players such as Tesla and Fisker displayed their latest models.

Chevrolet, for one, demonstrated its battery-powered Spark; Kia unveiled a turbo-charged hybrid concept while Honda showcased its full hybrid range as well as the world’s first mass-produced fuel cell electric vehicle, the FCX Clarity.

Meanwhile, Hyundai displayed the hydrogen fuel cell, ix35; concept car developer, Rinspeed, unveiled the all-electric urban transporter, microMAX; and almost incredibly, Ferrari revealed LaFerrari, its multi-million dollar hybrid containing a V-12 petrol engine and electric motor. Factor in a new VW hybrid XL1, Renault’s Kangoo ZE, Fluence ZE, Twizy and ZOE, as well as up and coming models from Toyota, BMW, Peugeot, Volvo, Mitsubishi, Ford, and more,
and it is clear that alternatives to the conventional internal combustion engine are on a roll. But why now?

Gartner believes increases in the price of petrol and diesel are helping drive growth right now. “In markets such as Europe where the cost of fuel is the highest [compared to the rest of the world], there is a lot of consumer interest in these vehicles,” he says. “You are also seeing government support, for example in the form of carbon-free urban zones like you have in London. These make people look closer at electric vehicles.”

Gartner also points to concerns over climate change and carbon dioxide emissions, as well as countries’ desires to reduce reliance on energy imports. “Most countries are not energy independent and import oil for transportation fuel. These nations want to foster domestic energy production... and switching to electricity is an option,” he adds.

Crucially for plug-in hybrid and all-electric vehicles, there is a growing infrastructure of charging stations. Networks of chargers are spreading across the US, Japan and Europe. So-called slow-charging stations used for work-place and overnight charging are becoming more commonplace while fast-charging networks are also emerging.

Recent IEC standards have been instrumental in driving up the numbers of vehicle chargers.

**Standards for all**

IEC standards have been and will be instrumental to the safe, efficient and reliable charging of present and future electric vehicles. In November 2011, the IEC removed a major hurdle for charging infrastructures when IEC SC (Subcommittee) 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, published two international electric vehicle standards for plugs and sockets – IEC 62196-1 and IEC 62196-2. The former outlines general requirements while the second defines options for each country and manufacturer.

Crucially, the two standards build on the electric vehicle charging system standard, IEC 61851-1, published in 2010 by IEC TC (Technical Committee) 69: Electric road vehicles and electric industrial trucks, which defines 4 modes of charging an electric vehicle from a power source. Slow-charging in Modes 1 to 3 takes between 3 and 10 hours through direct connection to an AC mains supply while the fast-charging Mode 4 can charge a vehicle in under 10 minutes via an off-grid DC charger such as a high voltage battery.

The general IEC 62196-1 standard applies to all four modes while IEC 62196-2 applies only to Modes 1 to 3, AC charging from mains electricity. However, an SC 23H Project Team is in the process of finalizing IEC 62196-3, which will standardize plugs and sockets for the fast DC charging Mode 4.

**Complex standardization landscape**

“The standardization landscape has been very complex," says Professor Peter Van Den Bossche, from the Mobility, Logistics and Automotive Technology Research Centre at Erasmus University College, Brussels, and a key player in laying out the standards. “But at least for the charging infrastructure we have detailed a limited number of options that are actually being adopted by industry.”

As Van Den Bossche points out, most vehicles coming onto the market now are fitted with a standardized charging system. “And most of the charging stations in Europe are going to a Mode 3 configuration “, he adds.

On behalf of the IEC, Van Den Bossche has also been working with the relevant committees within ISO on standards for energy storage. ISO 12405 and IEC 62660-1 provide guidance for testing lithium-ion battery systems and cells in electric road vehicles. As he notes, one of the key challenges of electric vehicle standardization work has been to achieve collaboration between the electro-technical world and automotive manufacturers.

“The electric vehicle is a device which is both a road vehicle dealt with by ISO committees, as well as an electrical appliance dealt with by IEC committees,” he says. “A profound difference in standardization cultures [exists] and we haven’t always worked well, but now we are in good agreement. We have good collaboration, progress is being made and several projects are underway.”

**Future developments**

So where next for the electric vehicle industry? John Gartner now expects a communications infrastructure to emerge, initially in Europe, that guides drivers to charging locations and provides a seamless payment system at the charger.

For example IBM is currently working with Ireland-based ESB e-cars on a smart charging IT system that interacts with the power grid and manages public electric vehicle charge points. Registered users will be able to charge their vehicles anywhere in Ireland, using a single ID card; similar projects are underway in Portugal, Denmark and Spain.

“The ambitious goal is to have a billing and communications system in place...
Electric urban transport
A revival after a long decline

Peter Feuilherade
More than half the world’s population now live in cities, according to United Nations data, and that percentage is forecast to hit 60% by 2030. By 2025 there will be 37 megacities (22 of them in Asia), each home to more than 10 million people. The growing use of electric buses, trams and metropolitan “light railways” offers an environmentally friendly option to reduce local emission of pollutants significantly in the expanding cities of the future.

Nothing new
Urban public transport systems powered by electricity can trace their origins to 1879 when Berlin launched the world’s first electric suburban railway (S-Bahn), followed by electric trams in 1881 and electric trolleybuses a year later.

With transport systems estimated to account for between 20% and 25% of world energy consumption and CO₂ (carbon dioxide) emissions, electric vehicles offer greater efficiency than their diesel counterparts. Using their brakes, they can generate kinetic energy to be recycled back into the power network. Electric engines on buses and trams cause less vibration, making journeys more comfortable for passengers and reducing maintenance time and costs.

Several IEC TCs (Technical Committees) prepare International Standards for the electric buses, trams, trolleybuses and metro/light rail vehicles used in public urban transport networks, as well as the batteries, capacitors and fuel cells used in propulsion systems, and many other components.

Buses
Electric buses, which require neither great range nor speed and can be partially recharged during their journeys as they stop for passengers, are seen as the most promising area for potential growth of green urban public transport.

China is the world leader in developing battery electric buses. The southern city of Shenzhen has the world’s largest zero-carbon fleet of all-electric buses and taxis, and plans to have 6 000 electric
buses in service by 2015. Shenzhen is also home to the world’s largest manufacturer of electric buses, BYD (Build Your Dreams). The company has started to enter overseas electric bus markets. At the start of 2013 its vehicles received Whole Vehicle Type-Approval from the European Union, giving the company the green light to sell its buses to all EU member countries without further certification.

The number of electric buses in countries other than China is limited but growing. The US-based market research and consulting firm Pike Research forecast in August 2012 that the global market for all electric-drive buses including hybrid, battery electric and fuel cell buses will grow steadily over the next six years, with a CAGR (Compound Annual Growth Rate) of 26.4% from 2012 to 2018. According to Pike, the largest sales volumes will come in Asia Pacific, with more than 15 000 e-buses being sold in that region in 2018 – 75% of the world total. China will account for the majority of global e-bus sales, Pike predicts. It believes that growth in the e-bus market will accelerate strongly in Eastern Europe and Latin America, the latter driven largely by Brazil. Sales in Western Europe will experience steady growth (around a 20% CAGR), according to Pike.

A December 2012 report by the research and consultancy firm IDTechEx forecast that the market for electric buses and taxis will grow from USD 6.24 billion in 2011 to USD 54 billion in 2021, of which the largest part will be buses. China will become by far the largest market for both electric buses and electric taxis. According to Dr Peter Harrop, chairman of IDTechEx, “in China… over 100 000 electric buses a year will eventually be bought as part of the national programme”.

Trolleybuses
Trolleybuses are electric buses that use spring-loaded trolley poles to draw their electricity from overhead lines, generally suspended from roadside posts, as distinct from other electric buses that rely on batteries. Because they do not require tracks or rails, they are more flexible than trams and drivers can cross the bus lane, making the installation of a trolleybus system much cheaper. Trolleybuses operate in some 370 cities or metropolitan areas worldwide, according to the Trolley Project, which aims “to unlock the vast potential of trolleybuses to transform public transport systems” across Europe in line with the European Commission’s target to reduce traffic-related CO₂ emissions by 60% by 2050.

Trams
In the 1960s the tram saw a decline in favour of diesel driven buses, but the backlash in recent years against pollution and dependence on fossil fuels has seen a resurgence of interest in electric trams as another urban transport system that can carry large numbers of passengers efficiently and generates no emissions at the point of use. Tram systems do not need vast financing compared with underground systems, which are typically four times more expensive to construct. However, in addition to its relative high cost, compared to that of buses or trolleybuses, the greatest disadvantage of the tram is its confinement to a set route by the wires and tracks it requires. The largest tram networks are in Melbourne, St Petersburg, Vienna, Berlin, Milan, Toronto, Budapest, Bucharest and Prague. Dozens of cities in North America are exploring or planning tram systems.

Metro and light rail
In a December 2012 study SCI Verkehr GmbH, an international management consultancy based in Germany, forecast the global growth in railway electrification at a CAGR of 3.4% up to 2016.

Market growth is mainly driven by new metro and electric light rail urban transport projects under way on most continents, from major cities in Asia and the Persian Gulf to North and South Africa and North American urban areas.

A metro rapid transit system is an electric passenger railway in an urban area with a high capacity and frequency, typically located either in underground tunnels or on elevated rails above street level. It allows higher capacity with less land use, less environmental impact and a lower cost than typical light rail systems.
Light rail systems use small electric-powered trains or trams that generally have a lower capacity and lower speed than normal trains to serve large metropolitan areas. They usually operate at ground level, but can include underground or overhead zones.

A common feature to rail systems: IEC International Standards
All urban rail systems rely on International Standards developed by IEC TC 9: Electrical equipment and systems for railways. Areas covered include rolling stock, fixed installations, management systems (including communication, signalling and processing systems) for railway operation, their interfaces and their ecological environment. These standards deal with electromechanical and electronic aspects of power components as well as electronic hardware and software components.

Batteries and fuel cells
Buses, which have defined, short routes and daily travel distances of less than 200 km, are well suited to battery-only electric technology. Li-ion (Lithium-ion) technology is the most commonly used. Pure electric buses divide into those using high power density Li-ion batteries alone and those with large banks of supercapacitors in the roof to manage fast charge and discharge and increase battery life. Hydrogen powered fuel-cell vehicles provide longer range than battery electric vehicles. Refuelling times are short and comparable with present internal combustion engine vehicles. Currently, the main drawbacks of hydrogen powered vehicles are the high cost, mainly due to expensive fuel cells, and the lack of refuelling infrastructure. IEC TCs prepare International Standards for batteries and fuel cells used in urban transport systems.

IEC TC 21: Secondary cells and batteries, has prepared standards covering requirements and tests for batteries for road vehicles, locomotives, industrial trucks and mechanical handling equipment. Its work includes standards for performance, reliability, abuse testing and dimensions for hybrid and plug-in hybrid Li-ion batteries, which are seen as one of the most promising types of secondary batteries.

IEC TC 105: Fuel cell technologies, is responsible for standards for fuel cell commercialization and adoption. It focuses on safety, installation and performance of both stationary fuel cell systems and for transportation, both for propulsion and as auxiliary power units.

Almost all fuel cell buses incorporate a battery for energy storage and there is also a balance to be struck in the hybridization of the fuel cell power plant and the supporting battery pack. While fuel cell costs remain high and hydrogen infrastructure sparse, it may be more economical to use battery-dominant buses with fuel cell range extenders. The fuel cell bus sector is showing year-on-year growth, with more prototypes being unveiled. Successful deployments have taken place in Europe, Japan, Canada and the USA but the high capital cost is still a barrier to widespread adoption.

Pike Research forecasts that demand to grow to more than 1,3 million kWh by 2018, a CAGR of 42%. Fuel cell buses will drive demand for Li-ion batteries as well, but to a lesser degree. Pike Research estimates that they will require around 1 600 kWh in 2012, but will grow to 22 240 kWh by 2018.

More IEC standardization activities for electric urban transport
Electric urban transport systems depend also on standardization work from many other IEC TCs and their SCs, such as, TC 22: Power electronic systems and equipment, TC 36: Insulators; TC 40: Capacitors and resistors for electronic equipment; TC 47: Semiconductor devices, and obviously TC 69: Electric road vehicles and electric industrial trucks, to name only a few. Other TCs may be less obvious, such as TC 56: Dependability, which is involved in rolling stock-related standardization work. It maintains liaison activities with TC 9 and stresses that “without dependable products and services (…) transport [would be] non-functioning (…) there would be numerous car, train (…) accidents”.

“Down to Electric Avenue”
Wireless or induction charging technology to charge electric vehicles, including buses and light rail trains, is in use or undergoing testing in many countries,
including South Korea, the USA, Canada, the United Kingdom, Germany, Belgium and Italy.

Wireless charging plates built into the road at bus stops and terminals enable electric buses to be charged wirelessly through a brief connection while passengers get on or off the bus at a stop. This resolves the current battery limitations that prevent an all-electric bus from operating all day off an overnight charge. It would also mean the end of unsightly overhead cables to power trams and trolleybuses. There can be a loss of energy in the transfer, but tests using a light rail train in Germany in 2011 to demonstrate the technical capability of the system under actual conditions of daily operation indicated an efficiency rating above 90%.

Researchers at the Korea Advanced Institute of Science and Technology say the transmitting technology they road tested supplied 180 kW of stable, constant power at 60 kHz to passing vehicles equipped with receivers, and they recorded 85% transmission efficiency. Installing similar chargers at busy traffic lights and junctions and in parking spaces could extend the technology to consumer electric cars.

There are concerns, however, about different competing wireless charging technologies, the costs of installing the infrastructure and its capacity to stand up to extreme weather. Meanwhile companies, notably in China and the USA, have developed ultra-fast charging technology capable of charging an electric bus battery in five to ten minutes.

Other features likely to be become standard in the electric buses of the future include regenerative charge braking, energy harvesting shock absorbers, solar panels and quickly replaceable battery packs.

These and other innovations in transportation and urban mobility are set to play a prominent part in “smart city” projects around the world, a technology market that Pike Research forecasts will be worth USD 20.2 billion annually by 2020.

Workshop covers e-mobility safety issues

IEC President stresses importance of safety aspects of e-mobility

Morand Fachot
ACOS (the Advisory Committee on Safety) organized a workshop on Safety aspects in the area of e-mobility, in Frankfurt, Germany, in February. The aim of the workshop, attended by IEC President Klaus Wucherer, was to cover safety relating to all kinds of EVs (electric vehicles) used to transport people and goods, aspects not necessarily always looked at when dealing with EV issues.

e-mobility and safety

EVs present different issues to those encountered with other motor vehicles. ACOS notes that the system “car” and the systems “electrical products” and “electrical installations”, which until now have coexisted and cooperated, are growing together into a new system: “e-mobility”.

“EVs use high-voltage electrotechnical systems. Whenever electricity is involved, there is no room for trial and error… because every error is potentially fatal,” Wucherer said, adding, “EVs need to be designed, built, operated and repaired safely… from the start.”

Dozens of IEC TCs (Technical Committees) and SCs (Subcommittees) are involved in this quest for safety through the preparation of International Standards for systems and equipment used in and related to road vehicles in general.

“Standards for EVs need to draw on the knowledge of electrotechnical experts, particularly with regard to the safety of
humans, animals and the environment,” Wucherer reminded participants.

Multiple rules and regulations apply to vehicles

Cars must comply with the UNECE (UN Economic Commission for Europe) rules defined by its World Forum for Harmonization of Vehicle Regulations (WP 29).

However, a variety of different sets of rules, regulations and standards exist for electrical equipment from many regions or countries. They include the EU’s Low Voltage Directive or EMC Directive and, in the US, the NEC (National Electric Code). Certain regulations from the UNECE Working Party on Lighting and Light-Signalling (GRE) also apply and these rely to a large extent on IEC International Standards.

The need to ensure that the different requirements result in similar levels of safety everywhere, led the IEC and ISO (International Organization for Standardization) to set up a consistent body of relevant International Standards. To achieve this, both organizations agreed in 2010 to a revised MoU (Memorandum of Understanding) on Automotive Electrotechnics between ISO TC 22: Road vehicles, and IEC TCs. Covering standardization in vehicles

The Safety aspects in the area of e-mobility workshop looked at practical applications of IEC and/or ISO safety standards for:

- electrical safety aspects inside EVs
- functional safety in relation to EVs
- safety aspects related to EVs whether connected or not connected to the grid, including safety-related aspects of DC charging

The IEC provides a number of so-called basic safety and group safety standards which are mandatory for product standardizers within the IEC. These standards, which may deal with aspects of protection against electric shock, insulation coordination or insulation materials, are also applicable to electric vehicles. ACOS coordinates these horizontal safety and group safety standards within IEC.

EVs represent more than mere transport

EVs are about more than transport, “they require a different mind-set compared to ordinary cars. They are not stand-alone products… they are part of a much bigger system”, Wucherer stressed. “An increase in electrified transportation will massively impact existing electricity networks. As for the broad roll-out of EVs, it will require significant investment into energy and charging infrastructures”, he added.

Charging stations, whether in homes or elsewhere, will be the interface between grid and EVs. The different charging modes require close cooperation between the standardizers responsible for the e-vehicles and those on the grid side, especially with regard to maintaining the consistency and complementarity of safety requirements on both sides. The level of safety protection for EVs users must be comparable to that of users of household equipment or of machine operators.

“Literally dozens of TCs and thousands of engineers work on the global IEC platform on the electric and electronic infrastructure that allows cars to operate as expected and safely.

Many more are adding their expertise to ensure our e-mobility future”, Wucherer concluded in his address to participants.
“A great and interesting life”

Boris Kit, world leading space scientist who turned 103 in April, is a former IEC expert

Morand Fachot

Life’s course can be decided by a string of unexpected events and encounters, some lucky, others unfortunate. This has certainly been the case for world-renowned US space scientist, and erstwhile IEC expert, Boris Kit, who turned 103 on 6 April 2013. Kit’s life has been shaped to a remarkable extent by the twists and turns of 20th century history. In December 2012 e-tech met Kit in Frankfurt, Germany, where he lives. He shared some of the striking episodes of what he described, rather unassumingly, as “a great and interesting life”.

Eventful early years

Kit was born into a Belarusian family in Saint Petersburg, then capital of the Russian empire, in 1910. Following the Bolshevik revolution, the family left Russia in 1918 and moved to a village in western Belarus that was under Polish control at the time. Kit attended the local Polish school and later a Belarusian school in the town of Navahrudak.

After completing his secondary education Kit moved to Vilnius, Lithuania, which was then under Polish administration, to study at the Stefan Batory [Vilnius] University.

One small [side] step for a man, a significant leap for space research...

Queuing up to register for a history course Kit, tired of waiting, changed his mind and switched to the shorter line for enrolling in the mathematics course. Not the last or least significant chance decision or encounter in the life of that aspiring student.

After completing a master’s degree in mathematics and physics, Kit embarked on a teaching career at the Belarusian college in Vilnius, before being appointed director of the college, aged just 29.

As Vilnius became part of Lithuania at the end of 1939, Kit returned to Belarus and became headmaster of Navahrudak Belarusian school. Later, as a school inspector of the regional district, he was instrumental in setting up hundreds of primary and secondary Belarusian schools.

Spent a month in jail

Following the Nazi invasion of Belarus and the USSR in June 1941, Kit continued his teaching work and even got permission to open a higher education school that managed to provide a university programme in spite of the German ban. Kit was arrested one day as German troops rounded up people in the street. Suspected of having contacts with the partisans he was thrown into jail. “Every evening they’d come and take some at random to be shot When I was released after a month, there were only 5 of us left!”, he recalls.

Go West Young Man!

As the Red Army advanced, Kit fled to Germany with his young family. Settling in...
In 1948 he immigrated to the US and worked first as a chemist in New Jersey. “I always wanted to see California”, he recalls, explaining his move to Los Angeles where he was employed as a chemist and pharmacist by various companies from 1950.

A chance encounter at a reunion of a local Polish organization was to change Kit’s life. There he met a scientist. “He told me he had studied at Warsaw Polytechnic and asked me about my background,” Kit recalls. “When I told him I held a Master of mathematics from Vilnius University, he said: ‘I work for North American Aviation; you’re the kind of person we need – come join us!’ Which I did.”

At the time the company was working on the Navaho intercontinental missile project, but most test flights failed as “the company didn’t have the right approach to ballistics and used the wrong fuel”, Kit explains. The programme was cancelled in 1957 and some 10 000 scientists, engineers and technicians out of 13 000 were laid off, but Kit was kept on to work on other rocket and missile projects.

**No minor rocket scientist**
With his background in chemistry and his experience with North American Aviation, Kit realized the potential of liquid hydrogen as a rocket propellant and co-authored the first “Rocket Propellant Handbook”, published in 1960 but still considered a seminal work on the topic.

As US-Soviet competition in the space and missile domains was heating up, Kit’s competencies as a leading scientist and fluent Russian speaker were particularly valued. In 1964 he published a second book, “USSR space program: Manpower, training and research developments”.

“I worked then as a mathematician and systems analyst for three US government departments,” he recalls: “the Departments of the Army, of the Air Force and the Space Administration [NASA].”

During his 25 years with the US space administration, Kit worked closely with Werner von Braun, the man often described as the leading architect of the US space programme. Kit was involved in many space projects, including the Apollo programme that culminated with six missions landing men on the moon. Kit also headed the first bilateral Soviet-US meeting that paved the way for the 1975 joint Apollo-Soyuz mission.

**Multiple interests**
In addition to, and often in parallel with, his extensive work in the space domain, Kit managed to maintain activities in other fields. He taught mathematics at the University of Maryland, worked for the Federal Highway Administration and other federal and state departments, and was involved in standardization in the US.

As US representative in many space, engineering and scientific circles, Kit said he enjoyed the opportunity of travelling the world and seeing many countries and cultures. Kit’s work in standardization eventually led to his appointment as US member and later secretary of IEC TC 51: Magnetic components and ferrite materials.

In this capacity Kit chaired a number of TC 51 meetings, notably in Prague in 1967 and in Washington in 1970, as mentioned in a book published in Minsk, Belarus, for his 100th birthday.

**Staying active is Kit’s secret**
In his 60s, Kit decided to pursue a career in Europe and started teaching mathematics at the European College of the University of Maryland in Heidelberg, Germany, in 1973.

The ever active and inquisitive Kit, not content with teaching, also embarked on doctoral studies and was awarded a PhD in 1983 for his thesis on the work of Polish-born Antoni Zygmund (1900-1992), an outstanding mathematician and professor at Vilnius University (1930-1939).

Kit strikes his visitors with his warmth, good humour and constant chuckles. He has an amazingly positive outlook on life, in spite of the many tragic events he witnessed and survived. He also maintains a keen interest in scientific matters, in particular in developments in the space domain, which he still follows closely. He told e-tech he kept informed by reading newspapers, mainly in English and Russian. Besides an active life, Kit’s other secret to longevity is, as he told a German newspaper on his 100th birthday, that “he maintained a clear heart and conscience” throughout his life.
The electric car is already with us!
All car types depend on electrotechnology

Morand Fachot
Public attention is turning increasingly to the introduction of electric vehicles of all kinds. Where motor vehicles were originally almost entirely mechanical, they are now complex systems wholly dependent on thousands of electric and electronic components for safe and reliable running, a fact frequently overlooked. Dozens of IEC TCs (Technical Committees) and SCs (Subcommittees) prepare International Standards for these parts that will soon make up around 50% of the entire value of cars.

Electric vehicles: early success
When motor vehicles were first introduced, electric cars were at the forefront of technology. The first car to be driven at a speed of over 100 km/h was electric, and this was as early as 1899. Electric cars also took part in endurance trials; in 1901, one of them managed to travel over 300 km. They also proved quite robust, initially outperforming vehicles powered by internal combustion engines, and were popular with taxi fleets and as delivery vans. There were around 35,000 electric vehicles in the US in 1912.

However, petrol-engine powered automobiles started outclassing their electric counterparts in terms of range and speed and eventually took over the market for personal vehicles.

Internal combustion needs electricity too...
Internal combustion engines need an ignition system. To begin with, hand cranks (or starting handles) were used to provide the necessary initial ignition. They were awkward and dangerous to use. Electric starter engines that could provide enough power to crank and start the engine were widely introduced from the 1920s and proved a major advance for internal combustion engines. They relied on a lead-acid battery for provision of sufficiently high voltage and current.

Besides starter engines, the other electrical systems first installed in cars were headlamps and tail lights, replacing acetylene and oil lamps. Additional lamps such as indicators were introduced later. Other electric components – for instance, alternators supplying electricity to electrical loads and batteries, ignition coils, windshield wipers, etc. – were introduced step by step.

The onslaught of electrical systems
For a long time, these types of electrical system were the only ones fitted to cars and were improved over time. Otherwise, manufacturers were concentrating on enhancing engine performance and on other mechanical systems such as gearboxes, as well as on the body work and interiors of their motor vehicles. They also introduced new systems to differentiate their products from the competition and to make them easier to drive and more appealing to buyers.

The importance of electrical, and later electronic, systems and components in relation to motor vehicles has continued to grow. Today they play a major role in improving safety, energy efficiency and driving comfort.

Nearly half the value of automobiles
Electrical and electronic systems are wholly responsible for the advances made in many areas of the automotive industry. This is particularly true for electronics, which has made a spectacular contribution to the increase in overall value of cars in recent years. In the mid-2000s, electronics accounted for 10-15% of the total production cost of mid-range cars and 20-30% of the cost of luxury models. Today they represent some 20-30% of the total cost for all categories of car, and this share is expected to reach 40% or so by 2015. The figure is nearer 50% if all electrical systems are included, and is even higher for electric vehicles.

Main factors for wider adoption of electronics in cars
Improving the driveability of vehicles has been a major contributor to the adoption of electronic components in cars. Power windows, light and rain sensors that
from roadside infrastructure systems and systems that use information transmitted warnings. Drivers by issuing sound, vibration or light hazards or alert careless or drowsy drivers. Collision-avoidance systems that detect mitigate the seriousness of accidents, and brakes and steering automatically so as to as pre-crash systems. These allow better and leaner engine management, which translates into reduced consumption of fuel and levels of noxious emissions. Fuel consumption is a major sales argument. It can be lowered significantly by improving the performance of electronic fuel injection systems, as well as by introducing other devices such as stop-start systems. These use double-layer capacitors that shut down and restart engines automatically when vehicles wait at traffic lights or stop frequently.

IEC Standards apply across all domains

Road vehicle standardization relies on a number of international, regional and national regulations and directives. Cars must primarily comply with the UNECE (UN Economic Commission for Europe) rules as defined by its World Forum for Harmonization of Vehicle Regulations (WP 29). They must also comply, when relevant, with national and regional rules and regulations. Many of those apply to equipment that depends on electrical and electronic systems.

In March 2011, IEC and ISO signed an agreement concerning the standardization of electrotechnology for road vehicles and the cooperation between ISO/TC 22 “Road vehicles” and IEC Technical Committees. All road vehicles, even those powered by internal combustion engines, rely increasingly on such systems. More than 3 dozen IEC TCs and SCs cover the standardization of equipment used in and related to road vehicles as well as of other associated issues.

They include: IEC SC 17B and SC 17D: Low voltage switchgear and controlgear, and their assemblies; TC 20: Electric cables; TC 21: Secondary cells and batteries; SC 22G: Adjustable speed electric drive systems incorporating semiconductor power converters; SC 23E: Circuit breakers and similar equipment for household use; SC 23G: Appliance couplers; SC 23H: Plugs, Socket-outlets and Couplers for industrial and similar applications, and for Electric Vehicles; SC 32B: Low voltage fuses; SC 32C: miniature fuses, TC 34: Lamps and related equipment; SC 37A: Low-voltage surge protecting devices (surge protection of electronic devices will be a very important consideration for plug-in EVs) and SC 47A: Integrated circuits. Naturally IEC TC 69: Electric road vehicles and electric industrial trucks, plays a crucial role in the development of future automotive products and its importance and workload are set to grow in coming years.

Manufacturers producing electrotechnology components and systems for the automotive industry also rely on IECQ, the worldwide approval and certification system for covering the supply of electronic components and associated materials and assemblies, to ensure their products meet the car industry’s requirements.

Supporting an industry worth hundreds of billions

As the electrical and electronic content of cars has increased, so has the overall value of the industry, opening up many opportunities for manufacturers. The current size of the global car market gives a good indication of the size and growth potential of the electrotechnology content of cars and of its overall value. Over 66 million motor cars were produced in 2012. This does not include commercial vehicles, a huge market in itself.

Together, the world’s top 6 car producers had revenues of nearly 1 000 billion dollars in 2012. As electronic components alone account for a substantial share of the total costs for all categories of car, they constitute a highly significant global market, and one that is set to grow further. This expansion would not be possible without the standardization work done by many IEC TCs and SCs.
Profile: Karen Higginbottom
Chair of ISO/IEC JTC 1: Information Technology

Janice Blondeau
Karen Higginbottom has been Chair of ISO/IEC JTC (Joint Technical Committee) 1: Information technology since November, 2008 and she has participated in the Committee since 1992. In 2012, Higginbottom was recognized with the Thomas Edison award for her leadership and dedicated work with ISO/IEC JTC 1. e-tech spoke to Higginbottom about her role as Chair of JTC 1, how things have evolved and future priorities.

Keeping ahead of the curve

e-tech: What are some of the challenges that JTC 1 faces?

Higginbottom: Some of the challenges that JTC 1 faces are making certain that we reflect market requirements and that our efforts are responsive to market needs. We work strenuously to ensure that our activities result in global, voluntary, technology-driven standards. In the IT community, we are especially concerned about the interoperability of all the pieces, making sure that the standards can come together to solve real problems. For a long time, the development of Standards was viewed just as “geek work”. Now, because of procurement and cultural issues, there’s a lot of competition for different types of standards among a broad range of organizations. A major challenge of JTC 1 is to be seen as a partner to those organizations. It’s important to ensure that we work collaboratively with other standards development organizations and consortia so that even the pieces that aren’t developed in JTC 1 can take advantage of the JTC 1 standards and vice versa.

JTC 1 is well known – this work is done almost as if the standards participants are part of a larger development team. Their mode of operating is reminiscent of an R&D lab – they build things, they test them out, and then everybody comes back together and decides where there need to be changes.

I think that JTC 1 appreciates the flexibility that our committee is being allowed to develop standards. This flexibility helps us stay relevant and bring value to the standards world. Both IEC and ISO have shown that they value JTC 1 and both organizations have been very supportive.

We have our own procedural supplement to the ISO/IEC directives. Some of this is because, in some cases, ISO and IEC procedures are different. But, in other efforts, both within the technology areas and the process areas, JTC 1 sort of pushes the envelope. And I would say that right now, both IEC and ISO value the way we sometimes see things.

JTC 1 seeks to reflect market requirements with global, voluntary, technology-driven standards
IT standardization and developing countries

E-tech: Are there some other challenges?

Higginbottom: In the beginning, the IT standardization effort was primarily led and managed by an identifiable number of large companies concerned with multi-national requirements. But more and more, developing countries are trying to figure out how they can use the technology to enhance their IT infrastructures and get better social networking off the ground. So it’s important that we engage more of the developing countries in our programmes. It’s important that a broader set of requirements are taken into consideration when developing the standards so that all users determine JTC 1 is the place to come to and, that with their engagement, their IT standardization needs will be met.

Another challenge we face in JTC 1 is that different organizations have a different view of when to undertake standardization. So, there’s a balancing act that takes place as standards developers decide where, in the bell-shaped curve of technology development, is the right “window” for standardization.

Systems approach to IT standardization

E-tech: How does a systems approach impact on JTC 1’s work?

Higginbottom: I don’t think that JTC 1’s approach is exactly the same as the one used by the SMB (Standardization Management Board). We may have a slightly different “take” in information technology because we’ve always had to have an approach that deals with standards as though they are part of a larger system.

For example, we have SC (Subcommittee) 17: Smart cards (Cards and personal identification), SC 27: IT security techniques, and SC 37: Biometrics. There are many times when all three of these groups need to be working together, for example, so that smart cards can perform the comparisons of biometric samples (such as fingerprints) that are required. There’s a lot of thinking that goes into having an interoperable, system response.

It has been in the JTC 1 mission statement since 1996 that we develop the building blocks of standardization that need to be brought together to develop system answers – recognizing a total system approach for information technology.

New website for JTC 1

E-tech: Could you tell us about the new JTC 1 website?

Higginbottom: I’m very excited about the new website! The website resulted from IEC and ISO together responding to a request that the visibility and branding of JTC 1 have a higher profile. With all of our engagement with the various implementers and consortia, we’d like to be able to have outreach to a greater number of people.

The new JTC 1 website showcases the work of JTC 1, highlighting the types of solutions possible from the JTC 1 standards that are developed. It explains our on-going work, as well as how the Committee works. Information is presented in a clear, easy-to-follow, modern format so even people new to IT standardization can determine where best they can engage in JTC 1 activities.
Avoiding accidents
Adding electrical equipment to industrial machines for safer operation

Morand Fachot

Equipment such as machine tools and robots has been used extensively in a variety of manufacturing sectors for decades. Individuals working with or in close proximity to these machines are reliant on their safe operation for protection, as are nearby installations. IEC TC (Technical Committee) 44: Safety of machinery – Electrotechnical aspects, prepares International Standards to ensure this is the case.

Protecting users of industrial machines from risk
However industrial machines are powered, in many instances their operation entails risks. Even when used carefully, they may cause injuries or death.

The addition of electrical equipment, such as electromechanical sensors and switches that can activate safeguarding mechanisms to keep operators at a safe distance or halt operation automatically in case of danger, can prevent accidents occurring or reduce their severity.

Among the many IEC TCs that prepare International Standards for these devices, IEC TC 44 is notable as it aims to protect users from the risks posed by all kinds of machines by preparing standards for electrical equipment associated with machinery.

Its work is closely linked to horizontal safety standards in the IEC 61508 series prepared by IEC SC 65A: System aspects [of industrial-process measurement, control and automation].

Adding electrical equipment to ensure safety
Industrial machines may be powered by kinetic, electrical, hydraulic or pneumatic energy. Whatever the source, there are often similar safety issues. By adding electrical equipment, individuals can be prevented from coming too close to, or interfering with, machinery in operation. The addition also enables machines to be shut down in case of malfunction or failure. The added equipment may help prevent injuries or even death occurring.

International Standards developed by TC 44 include general and specific requirements for different types of electrical equipment used with machines. They may concern indication, marking and actuation – including visual, acoustic and tactile signals – as well as the location and operation of actuators.

TC 44 International Standards also cover ESPE (electro-sensitive protective equipment), such as various kinds of AOPDs (active opto-electronic protective devices) and other equipment designed to detect human presence.

Wide scope, broad international participation and interest
TC 44 was created in 1957 to develop safety-related standards for electrical equipment associated with industrial machines, particularly machine tools and large machinery. It held its first plenary meeting in 1959. Its scope has been reviewed and amended regularly to reflect technological developments and the demands of the industry sectors it serves, ensuring that it continues to meet their needs. Its present activities comprise three main elements:

• preparation of International Standards relating primarily to non-portable electrotechnical equipment and machinery systems, including machinery assemblies
• preparation of International Standards for electrotechnical equipment and systems relating to the protection of persons from specific machinery hazards, taking into account a coordinated systems approach
co-ordination with ISO (International Organization for Standardization) on all matters concerning the safety of machinery

The TC brings together 130 experts from 34 participating and observer countries, reflecting the significance of its work. As all TC 44 standards are safety-related, they are widely used by regulators for detailing their technical laws and regulations (e.g. European Machinery Directive 2006/42/EC) and in B2B (business to business contracts). The major customers of TC 44 standards are Technical Committees dealing with machinery safety within ISO and CEN (European Committee for Standardization).

Technology and market trends
The following technology trends have an impact on the TC’s work:

- safety functions
- functional safety, including software
- development and application of smart sensors
- remote diagnostics of plant and equipment
- use of communication networks (bus systems) for machinery safety-related control functions
- cableless control
- switching devices on semiconductor basis

Market trends also drive safety considerations. Industrial machines are not produced, traded and operated in a single country but globally. International customers expect to be presented with common solutions that can be used in several countries. This allows them to harmonize their sites and plants globally to rationalize their production procedures and to save costs through the globally-organized purchase of production equipment. These TC 44 International Standards are increasingly applicable worldwide.

Structure and standards
For developing International Standards covering a wide range of equipment TC 44 is organized into 4 WGs (Working Groups), one Project Team that looks at requirements for the electrical equipment for machine tools, 7 MTs (Maintenance Teams) for existing standards, and a JWG (Joint Working Group) with ISO TC 199: Safety of machinery.

TC 44 has published 13 International Standards. They include the IEC 60204 series of International Standards covering the electrical equipment of machines, the IEC 61310 series dealing with indication, marking and actuation, and the IEC 61496 series for electro-sensitive protective equipment.

TC 44 has also published two TRs (Technical Reports) and a TS (Technical Specification).

Objectives and prospects
TC 44 aims to keep its International Standards up to date to reflect new/ changing technologies and to ensure they are state of the art at the time they are drafted.

It states that it will work with ISO TC 199 to merge IEC 62061 and ISO 13849-1 into a dual logo IEC/ISO standard.

TC 44 wants to raise worldwide awareness of its International Standards by increasing awareness amongst industrial customers who apply TC 44 standards. This may be effected through contact with NCs, workshops, presentations and other distributed material.

As industrialisation extends to more and more countries, and automation is introduced to all sectors, the safety of industrial machines, which are traded on a global scale, becomes ever more important. The work of IEC TC 44 experts, which is constantly being updated and expanded will therefore remain essential to ensure that the safe operation of machinery throughout the world continues to increase.
Supporting EV development
IECEE certification key to EV technologies

Claire Marchand

Although many automotive manufacturers have added EVs (electric vehicles) to their product lines in recent years, they remain very much a niche market, albeit one that is dynamic and developing steadily. And while potential buyers may still be somewhat concerned by the short range and long charges generally associated with EVs nowadays, industry is striving to come up with innovative solutions to remedy these problems.

The bigger picture
The EV industry is still in its infancy. Granted, they were first seen in the 1900s and then briefly in the 1970s, but since then, technologies have evolved at such a rapid pace that these previous experiments cannot really be taken into account.

Today’s EV development cannot be conceived without taking the bigger picture into account. EVs are not stand-alone products. Connection to the grid, two-way communications, energy storage, to name but a few issues, have to be taken into account. A broad roll-out of EVs will require significant investment into the energy and charging infrastructure.

Wide support
Car manufacturers however are not alone in this still new venture. Governments increasingly push for electrified transportation and in many cases offer incentives for EV development.

Support also comes from the standardization and conformity assessment sector. The IEC in particular has recognized very early on the benefits that EVs could offer in terms of potential energy storage and environmental issues.

Electric and electronic infrastructure
Many IEC TCs (Technical Committees) and thousands of experts work on the electric and electronic infrastructure that allows cars to operate as expected and connect safely to the grid. IEC standardization work includes:
- a multitude of components, switches, connectors, wires
- lighting and displays that are built into any modern car
- audio, video, in-vehicle communication and connection
- batteries, capacitors and fuel-cells
- connectors and charging infrastructure, electric accessories, inductive charging, and more
- functional safety of charging stations and vehicles
- overall electrical safety and protection from shocks, overvoltage and fires
- electromagnetic compatibility (EMC)
- interfaces and protocols for vehicle-to-grid communication, IT security and data protection

The IEC SMB (Standardization Management Board) has also set up a strategic group, SG 6: Electrotechnology for mobility, to investigate interactions between EVs on the one side and the electricity supply infrastructure on the other. The aim is to analyze market and industry developments, identify gaps and overlaps in IEC International Standards and to ensure that a timely delivery of the appropriate standards.

Certifying compliance to standards
However, compliance with IEC International Standards is only the first step. To make sure the parts and components used in manufacturing EVs are of the

The new IECEE EV programme focuses on charging systems as well as plugs, socket outlets and inlets
The new general IEC 62196-1 standard applies to all four of these modes while IEC 62196-2 applies only to mains charging (Modes 1 to 3). A third standard, IEC 62196-3, is being developed to standardize DC (direct current) charging (Mode 4).

In addition, IEC 61851-1 defines three cable and plug setups which can be used to charge EVs: Case A, where the cable is permanently attached to the EV; Case B, where the cable is not permanently attached to anything; and Case C where the cable is permanently attached to the charging station.

IECEE-certified automotive parts and components
But IECEE was involved in the testing and certification of parts and components for the automotive industry long before it launched the EV programme. Lighting, switches, electrical safety, EMC, hazardous substances have all belonged to the IECEE portfolio for many years.

Relying on batteries
And so have batteries. Fuel-powered and hybrid cars, trucks, buses, locomotives and aircraft also rely on batteries to start their engine or, in some cases, the APU (auxiliary power unit).

When testing and certifying EV batteries, IECEE focuses on multiple aspects. Electrical energy storage is an important element that will have an impact on EV range and battery-charging frequency. Endurance and lifespan are also under scrutiny. To avoid risks such as overheating and short circuits, parameters such as voltage, current, power and temperature also need to be measured and tested.

Through its standardization and conformity assessment work, the IEC offers a truly global platform that covers the electric and electronic infrastructure that allows cars to operate safely and helps the EV industry make the connection to the grid.
Competitive advantages

IECEx present at Australasian Oil and Gas Exhibition and Conference

Claire Marchand

We all know and accept that safety in the workplace is a must for everyone everywhere in the world. The safety issue becomes crucial in potentially explosive atmospheres, where explosions can be fatal or cause serious injuries as well as significant damages. There, safety becomes a non-negotiable factor. Explosive atmospheres can be caused by flammable gases, mists or vapours or by combustible dusts. If there is enough of the substance mixed with air, then all it needs is a source of ignition to cause an explosion.

Personnel and equipment protection

The Ex sector encompasses more than just the most obvious oil and gas or petrochemical industries. The risk of fire or explosion exists in a variety of sectors, such as transportation – including aerospace – furniture manufacturing, automotive manufacturing and repair, pharmaceuticals, food processing, grain handling and storage, sugar refineries and coal mining.

Focus on Australia

The oil, gas and mining industries are major contributors to Australia’s economy. The country’s abundant and diverse natural resources attract high levels of foreign investment. They include extensive reserves of coal, iron ore, copper, gold, natural gas, uranium, and renewable energy sources. In 2011, Australia was the world’s largest coal exporter and in 2012, the oil and gas industry represented around 2.0% of Australian gross domestic product.

Annual exhibition and conference

Bringing together major players in the Ex sector, the AOG (Australasian Oil and Gas) Exhibition and Conference, which took place on 20-22 February 2013 in Perth, is Australia’s largest oil and gas industry annual event. It covers all aspects of the sector, from exploration and production to subsea and offshore technology, pipelines, engineering, procurement, personnel, design and construction. The 2013 Conference programme included sessions that featured presentations and discussion on health, safety and the environment, and on education, training and skills.

IECEx present at AOG event

Two representatives of the IECEx Secretariat, Mark Amos and Wal Robson, attended the AOG Exhibition and Conference. Both were delighted to see the high levels of awareness of IECEx and the prominence of its logo on many exhibitor stands. It clearly showed that, whilst IECEx Certification is one means of satisfying the regulatory requirements in Australia for industries and businesses associated with hazardous areas and explosive atmospheres, it is certainly the most attractive to suppliers. The unanimously positive feedback and constructive suggestions provided by the oil and gas professionals they contacted over two days of discussions were gratefully received.

Positive and constructive feedback

The most memorable comments from delegates and exhibitors included:

“IECEx certification is critical to our business and provides many competitive advantages. We made the decision to go down the IECEx path several years ago – it gave us a head start on our competitors and they are still trying to catch-up!”

“IECEx provides for the needs of suppliers and customers – it’s a win-win for everyone!”

“IECEx makes business much easier – it’s the one to have and it’s the first thing Australian customers ask for.”

“IECEx Certification is the most onerous and stringent scheme… that’s what makes it the best…. you can be sure IECEx-certified equipment is as safe as you need it to be!”
Many exhibitors were interested to hear about the IECEx Service Facilities and IECEx CoPC (Certification of Personnel Competence) Schemes and requested more information. In particular, many had a personal interest in the CoPC Scheme as providing credible recognition of their experience as a credential to assist their business operations. A number of other exhibitors in the fields of personnel recruitment, labour supply and training saw the benefit in an internationally-recognized and consistent scheme that has the potential to streamline worker mobility as well as to provide a path for ongoing skills development.

Pride and support
While at the AOG event, Amos and Robson had the opportunity to meet with Joe Venuti, Manager, Design and Engineering of Flameproof Engineering Pty Ltd in Australia, and thank him for his ongoing support for IECEx and the Australian EX sector. Venuti was proud to display his own Certificate of Personnel Competence as well as the certificates granted his company: Flameproof Engineering’s IECEx Equipment Certificate, IECEx Service Facility Certificate, and IECEx Conformity Mark License.

IECEx Certified Service Facilities and CoPC Schemes

The IECEx Certified Service Facilities Scheme

This IECEx Certified Service Facilities Scheme is an International Certification Scheme that covers the assessment and the on-site audit of organizations that provide services such as repair and overhaul service to the Ex industry.

Due to the very high capital investment made by industry in most Ex equipment, it is much more economical to repair and overhaul equipment rather than to replace it with new. This also has obvious environmental benefits.

The challenge for industry is to ensure that all the very unique Ex safety features, included in the design and manufacturing of Ex equipment, are not compromised during the repair process.

Ex repair and overhaul facilities and workshops, certified under the IECEx Certified Service Facilities Scheme, provide industry with the assurance that repairs and overhaul to Ex equipment will be undertaken according to the strict requirements of IECEx Scheme and in compliance with International Standard IEC 60079-19, Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation.

IECEx CoPC (Certification of Personnel Competence)

The IECEx CoPC Scheme is an International Conformity Scheme that provides the global Ex industries with a single system for the assessment and qualification of persons meeting the competence prerequisites needed to properly implement the safety requirements based on the suite of IEC International Standards covering explosive atmospheres, e.g. the IEC 60079 and IEC 61241 series of standards.

The CoPC Scheme provides the international Ex industries with a qualification system that is transportable across borders.
Avionics aims to manage green issues

How the avionics industry limits the use of lead in its components

Aliyah Esmail

The IEC has recently published the 2nd edition of IEC/TS 62239-1, Process management for avionics – Management plan – Part 1: Preparation and maintenance of an electronic components management plan, which now includes the management of lead-free termination finish and soldering of avionic components.

Impact of electronics industry on avionics

Today’s electronics industry is having a growing impact on the aerospace industry with its worldwide move to reduce the use of hazardous substances – lead in particular, still extensively used in coatings and solders – from all electronics in the commercial sector.

In 2002 the EU (European Union) enacted two pieces of legislation that restrict or eliminate the use of substances with lead in most electrical and electronic equipment. This directive took effect in 2006. It was developed as part of targets set for the collection, recycling and recovery of electrical goods to help reduce e-waste.

In 2007, China and South Korea implemented regulations that are intended to establish similar restrictions to those of the EU. In the United States, California, Vermont, Maryland and Louisiana have enacted lead-free legislation and several states have enacted green laws. In preparation of the impact of such legislation, IECQ (IEC Quality Assessment System for Electronic Components) developed the HSPM (Hazardous Substances Process Management) Scheme as a mechanism for component suppliers that they comply with hazardous substance free legislation.

The avionics industry, and increasingly other industries, depend on the IECQ Electronic Component Management Plan to assess suppliers and safely manage their components’ supply chain. IECQ also allows manufacturers to more easily comply with increasingly strict hazardous substances regulations.

Lead-free not for aerospace or the military

Aerospace and military applications are excluded from the abovementioned lead-free requirements. Vendors, however, especially those who rely on consumer electronics companies, will have to begin to incorporate lead-free production if they have not already done so. This will be so that they can remain competitive in the international markets on which they depend.

ADHP (Aerospace, Defence and High Performance) is one of the few industrial sectors where lead-free materials and processes are relatively new. An aerospace-wide approach has been developed. The industry can now create a plan that allows manufacturers to ensure the reliability of the components it uses and make sure that these components are secure for the long-term.

IEC/TS 62239-1 documents processes that assure customers and regulatory agencies that ADHP electronic systems containing solder (either traditional tin/lead or lead-free solder), lead-free or tin/lead finished piece parts, and printed wiring boards will meet the performance, reliability, airworthiness, and safety requirements throughout the component’s lifecycle.

IECQ

IECQ is a worldwide approval and certification system that covers the supply, assembly, associated materials and processes of a large variety of electronic components that are used in millions of devices and systems.

The IECQ Certification System provides manufacturers with independent verification that IEC International Standards and other specifications were met by suppliers who hold an IECQ certification.

IECQ operates five certification schemes: HSPM (Hazardous Substances Process Management), ECMP (Electronic Component Management Plan), AP (Approved Process), AC (Approved Component) and ITL (Independent Testing Laboratory). www.iecq.org
CANENA 2013: A global outlook
Cooperation at all levels is key for standards development organizations

Claire Marchand
CANENA, the Council for Harmonization of Electrotechnical Standards of the Nations of the Americas, held its annual meeting on 27-28 February 2013 in Montreal, Canada.

A forum for harmonization discussions
CANENA focuses on electrotechnical standards harmonization activities within the Americas, providing a forum for discussions among its various organizations, manufacturers, conformity assessment bodies and individual participants that make up its membership.

Focus on Canada
The theme of this year’s meeting was “Putting Regional Standardization in a Global Context” with focus on Canada. Michel Girard, Vice President Policy and Stakeholder Affairs, SCC (Standards Council of Canada), delivered the keynote address. Girard began by stressing SCC’s commitment to promote standardization as a means of achieving numerous public policy objectives in Canada. The gist of his intervention revolved around the intended approach to further institutionalize cooperation between Canada’s trading partners; to establish harmonized standards in areas of nascent technology; and to expand efforts in established sectors.

The first day of the CANENA annual meeting was taken up by the Members Forum, where experts discussed issues pertaining to CANENA membership and heard presentations on “Latin America converging to a single electrical code”, “Electric vehicle supply equipment” and “Equipment for class and division classified hazardous locations”.

Harmonizing standards at regional and international level
The afternoon was devoted to a roundtable on “Contributors and inhibitors to standards harmonization”, featuring presentations by industry and SDO (Standards Development Organization) representatives from Canada, Mexico and USA, followed by an open discussion involving all delegates.

Presentations and discussions during the meeting highlighted the fact that IEC International Standards are playing an increasing role in the organization’s harmonization efforts and the need for CANENA to interface on a regular basis with IEC NCs (National Committees) in member countries.

Technologies of the future
During CANENA Council Day, IEC Vice-President and SMB (Standardization Management Board) Chairman James E. Matthews III provided an update on IEC activities and priorities, and offered insights into the role of the MSB (Market Strategy Board) in identifying and setting strategies for IEC involvement in future technologies.

Matthews began by underlining the global reach of the IEC through its standardization and conformity assessment work and the importance of the Masterplan, which outlines the Commission’s objectives for the coming years.

Matthews explained that the IEC today is an extremely efficient organization providing those who participate in its work with a fully transparent and tightly managed A to Z process that benefits industry and increasingly other stakeholders. He went on to say that there is also a strong need to anticipate what will be required tomorrow. This is where the MSB plays a major role.

Market watch and White Papers
The MSB, comprising a group of CTO-level members from industry worldwide, is tasked with keeping a close watch on technologies and trends as well as setting strategies that will enable the IEC to respond in a timely manner.

The MSB, in cooperation with renowned international research institutes, also publishes White Papers focusing on specific technologies. So far three have been issued, all well received by regulators, industries and governments and another one is expected to be issued in 2013, dealing with Microgrids for Disaster Recovery.

The three White Papers already published are:

- Coping with the Energy Challenge, published in 2010
• Electrical Energy Storage, published in 2011

Looking ahead
Matthews then presented the new areas of work the IEC has engaged in recently, introducing the new IEC TCs (Technical Committees) and SGs (Strategic Groups), and spending time in particular on SG 6: Electrotechnology for Mobility. The SG is responsible for investigating interactions between the EV (electric vehicle) and the electricity supply infrastructure. The group also defines collaboration between IEC, which has a number of TCs involved in EV work, and other standardization organizations both at the international and regional level.

Systems approach is key area of action
Matthews also broached another area of action identified in the IEC Masterplan, i.e. the systems and sectorial approach for standardization and conformity assessment activities. He explained that increasingly complex systems and converging technologies called for this new approach. Systems standards require an overarching understanding of the top-level structure of the system as well as its many individual elements. This approach entails coordinated and early participation and cooperation of many experts from the different technical areas. He added that the IEC has put in place processes and structures to enable the development of these types of standards.

Global collaboration and participation
In the last part of his presentation, Matthews gave an update on the activities of the three IEC Conformity Assessment Systems, the Affiliate Country Programme and the Young Professionals programme. He also stressed the need for increased global collaboration with standardization organization, intergovernmental and international agencies, regulators and policy makers.

In his conclusion, Matthews reiterated the major role played by IEC International Standards in global trade and the importance for industry to participate in standards development at the international level: “When your company doesn’t sit at the table where the rules for global trade are written, then the competition will write the rules you will have to work with in the future.”

About CANENA
CANENA is a volunteer-based organization focused on electrotechnical standards harmonization activities within the Americas, with the aim of facilitating trade.

Originally founded in 1992 by the electroindustry manufacturers associations of North America, CANENA was formed as a result of a negotiated trade agreement to foster the harmonization of electrotechnical product standards, conformity assessment test requirements, and electrical codes.

Today, CANENA promotes, encourages and receives participation from leading industry organizations, standards developers, conformity assessment testing laboratories, regulators, and other interested parties.

CANENA acts as a facilitator for electrotechnical standards harmonization. It provides a focal point for contacts within each country, information exchange, and a forum in which the technical harmonization committees can function.

While CANENA was initially created by the manufacturers associations of North America, it is a continuing objective that CANENA be open to participation by all industry organizations throughout the Americas.
CANENA 2013: a perspective from Stephanie McLarty

Bringing the next generation of experts into the IEC’s work

Janice Blondeau
IEC 2010 Young Professional Leader, Stephanie McLarty presented on ensuring continuity through developing the next generation of international standardization experts at CANENA (the Council for Harmonization of Electrotechnical Standards of the Nations of the Americas) 2013. In this interview, e-tech asked McLarty to share her experiences and learnings from this forum.

Positive and constructive atmosphere

e-tech: What were your impressions of the CANENA meeting?
McLarty: The CANENA group was very warm and welcoming to me. Many people told me that they were looking forward to my presentation, which was nice. I was impressed by how very serious and passionate about their work everyone was, and there was a tremendous amount of respect for one another. It was a constructive atmosphere.

The same issues across organizations

e-tech: What would you say was useful to you?
McLarty: The connections I made were useful, and I hope to collaborate with some of those individuals in the future. I also enjoyed learning about the state of standards in North America, and particularly understanding some of the changes that have been going on in Canada, and elsewhere in North America.

Positive and constructive atmosphere

e-tech: What did you enjoy about this opportunity?
McLarty: One of the best benefits of international standardization is the opportunity to interact with people from all over the world whom you would not normally meet. So I enjoyed meeting everyone and learning about what they do and where they are from. It was a nice cross-section of individuals from Canada, the USA, and Mexico.

Need for social media guidelines

e-tech: What did you learn there or what can help you in future work?
McLarty: What struck me is that organizations of any size or focus are struggling to deal with how to get more young professionals involved in standards work. This isn’t just happening within standards organizations, but also within companies.

Mobilizing “GenNext” to ensure continuity

e-tech: What did you learn there or what can help you in future work?
McLarty: What struck me is that organizations of any size or focus are struggling to deal with how to get more young professionals involved in standards work. This isn’t just happening within standards organizations, but also within companies.

Synopsis: Mobilizing “GenNext” for the Next Generation of Standards

The need for succession planning has become critical to ensure the future of standardization and its multifaceted benefits. This presentation looked at succession planning from a standards lens, including lessons learned from the IEC Young Professionals Programme. Practical strategies were covered including how to get young professionals involved and how they...
can usher in the next generation of standardization to help improve cost-effective market access.

**Advice for Young Professionals**

e-tech: Do you have any advice for IEC Young Professionals if they have a similar opportunity to give a presentation?

McLarty: If you have the opportunity to speak at such an event, go for it. It is an amazing opportunity to dive deeper into the standards community, network and share the outcomes of the IEC Young Professionals Programme. The issue of how to get more young professionals involved is one that all organizations are struggling to deal with. There is an important story to be told about how this can be improved and what the IEC Young Professionals Programme has done right.

e-tech: Is there any other interesting information you’d like to share?

McLarty: Approximately 75 individuals from Canada, US and Mexico were in attendance for CANENA. One person commented on how they were impressed that 92% of the IEC Young Professionals Programme participants had spread the information with their colleagues. This is a very good sign. Another commented that a Young Professional in their company had attended the IEC programme and was thoroughly impressed.

**Brief biographical note**

Stephanie McLarty is President and CEO of REfficient, an online reuse marketplace where companies can source equipment for their businesses as well as sell and donate their surplus to others. Since 2008, McLarty has been the Canadian Technical Expert on reuse and recycling for IEC TC111: Environmental Standardization for Electrical and Electronic Products and Systems. McLarty was selected by her peers as one of three IEC Young Professional Leaders in 2010.

**IEC Young Professionals: Go ahead, Get ahead**

The IEC Young Professionals 2013 workshop will be held in New Delhi, India, on 21 to 23 October, in parallel with the IEC 2013 General Meeting. Please contact your NC for further information.

Another IEC 2010 Young Professional Leader, Juan Rosales from Mexico, has just been appointed to the SMB ahG (ad hoc Group) 47: Household and similar robot technologies.
Standards play a leading role
Eliminating technical barriers to trade

Aliyah Esmail

The cooperation between the WTO (World Trade Organization) and the IEC helps advance trade and eliminate technical barriers to trade. A lack of International Standards can hurt trade as products are no longer made in one country; products are now made in the world.

International Standards help trade
Before a product is consumed in one market it travels through many others. Countries are more interdependent than ever and electric and electronic goods, and their components represent an important percentage of global trade.

If the world did not have International Standards to help manufacturers, exporters, or component makers of electric and electronic goods, they would have to comply with different requirements and regulations in each point of landing for each piece of the product.

Different testing, inspection, and certification rules would need to be met. The cost in time, effort, and money would be enormous. IEC International Standards eliminate these costs and allow for economies of scale to develop. Harmonized rules in International Standards allow large and small companies to participate in global value chains.

The WTO TBT (Technical Barriers to Trade) Committee meeting, which took place from 5 to 7 March 2013, gave the IEC a chance to showcase how it facilitates trade by complying with the Six WTO TBT Principles for the Development of International Standards – transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, and development dimension.

IEC works with the six principles
Vreeswijk talked to the Committee about how the IEC helps developing and developed countries build safe and efficient energy and communication infrastructures and allows them to participate in global value chains for electric and electronic components and goods. He also spoke about how the IEC supports the six WTO TBT principles.

• Transparency

All IEC Members have immediate and full access to all drafts and Standards. Affiliate Countries are able to fully access 10 technical fields of their choice. Participants in IEC work can receive automated notifications of all new publications and there are clear processes in place to regulate the development and publication of Standards.

• Openness

Any UN (United Nations) member can join the IEC and IEC National Committees have an obligation to include all relevant national stakeholders from the private and public sectors and to coordinate and represent their needs at the global level in the IEC.

• Consensus and impartiality

IEC International Standards are voluntary and consensus based. Consensus
does not mean that there is a need for unanimity; however, in technical work all scientific or engineering arguments must be taken into account and sustained opposition must be overcome.

- **Effectiveness and market relevance**

IEC work directly responds to the needs of all stakeholders in all countries. IEC International Standards include performance, interoperability and other criteria but always avoid being descriptive so as to enable innovation. The Standards are scheduled for regular reviews and updates, which are accessible on the IEC website.

The three IEC CA (Conformity Assessment) Systems represent the world’s largest working multilateral agreement in electrotechnology. Several thousand testing laboratories and manufacturer’s testing laboratories participate in the CA systems. Each system member recognizes and accepts the conformity certificates and reports of other members within each of the CA System.

- **Coherence**

The IEC extensively collaborates with regional and international bodies to increase efficiency, limit duplication and overlap in standardization fields. The ultimate goals are to avoid conflicting Standards that hinder global trade and to avoid duplication of work.

- **Development dimension**

Developing countries can participate in the IEC as Full or Associate Members, or in the Affiliate Country Programme. Active involvement and understanding of Standards and CA increases a country’s ability to benefit from technology transfer.

**Affiliate Country Programme helps to advance trade**

Rauser, whose work involves emerging economies, is focused on trying to help these countries to build infrastructure and move trade forward.

She spoke to the TBT committee about three surveys:

- The first survey was to assess the situation of IEC Affiliate Countries regarding conformity assessment and their use of IEC three CA Systems. Fifty-two countries took part in this survey and their feedback will help the Affiliate Country Programme further develop how to get them involved in IEC CA Systems.

- The second survey will help to activate the Mentoring programme for Affiliates. This approach will consist of twinning IEC experts with Affiliates to help them participate in the work of the TCs (Technical Committees), as an example.

- The third survey, about IT tools and services, addressed 82 IEC National Committees in order to improve and intensify the support IEC gives to its members through activities such as national workshops.

There will be two more WTO TBT committee meetings this year – in June and October – with further thematic discussions on good regulatory practice, transparency, technical assistance and conformity assessment.
Access to energy is something many of us take for granted. We have lights so that our kids can do their homework, heaters that keep us warm in the winter and refrigerators to keep our produce fresh and tasty even five days after it was purchased.

But not everyone expects the lights to work, or refrigerators or heaters to make their lives comfortable. Globally, about 3 billion people use traditional biomass for cooking and heating (UN Foundation). The IEA (International Energy Agency) states that around 1.3 billion people have no or little access to electricity.

**SE4ALL**

In 2011, the UN (United Nations) Secretary-General, Ban Ki-moon, made sustainable energy one of his five priorities by creating the SE4ALL (Sustainable Energy for All) initiative. By 2030, the UN has envisioned universal energy access for all countries, with the focus being on access, efficiency and sustainability especially in rural and remote areas.

The IEC a part of this conversation

The IEC is one of many organizations and agencies participating in the UN’s efforts to further its sustainable energy goals and it recognizes that IEC International Standards play a major role in meeting this challenge.

In late 2012, the IEC Affiliate Executive Secretary was approached by IEC TC 82 to liaise with the global SE4ALL initiative. This project brings together the UN and other private stakeholders to focus on addressing global poverty, energy efficiency and renewable energy solutions across all emerging markets.

The UN Foundation Energy and Climate section leads a Practitioner Network to address market barriers to achieve universal energy access and works closely with other international organizations such as the World Bank, the United Nations Industrial Development Organization, the International Renewable Energy Agency, the International Finance Corporation, and many other organizations from the private and public sectors that are part of the Practitioners Network.

On March 17 and 18, 2013, a workshop called Towards Universal Energy Access: An Asian Perspective took place in Phnom Penh, Cambodia. The IEC was represented by Dennis Chew, Regional Director IEC-APRC (Asia-Pacific Regional Centre).

The workshop

The two day workshop brought together more than 100 participants to have practitioners, investors and experts share and learn about the market developments, innovations and financing opportunities relating to energy access in rural areas. It was supported by the Asian Development Bank; Blue Moon Fund; and Renewable Energy and Energy Efficiency Partnership. Presentations were made on technologies and innovations for energy access, which Chew presented on, as well as the role of micro/mini-grids in promoting the availability of energy, community engagement and market development, how to get “Sustainable Energy for All”, and financing market-led solutions for energy access.

The workshop was also an excellent opportunity to promote awareness of the IEC and make potential future IEC experts aware of the work and focus of the IEC.

“The focus of this initiative [SE4ALL] is to give developing countries access to energy. This does not mean that developed countries will not benefit from this work. How we bring efficient and sustainable energy could help any country that has remote areas,” said Chew. “Several of the people I met were already aware of the IEC and they use IEC International Standards. They were actually pleased to meet someone from the IEC.”
Nominations and extensions

Latest nominations approved by SMB

Claire Marchand
The SMB (Standardization Management Board) has approved a number of nominations as well as the extension of the term of office of one Chairman

New Chairman for IEC TC 104
IEC TC (Technical Committee) 104: Environmental conditions, classification and methods of test welcomed its new Chairman, Olaf Hübschmann, at the beginning of April for a period of six years.

Hübschmann has been a member of DKE K131, the German national mirror committee of TC 104, since 1998 and an expert in IEC TC 104 and its MTs (Maintenance Teams) 17: Dynamic conditions and tests, and 18: Special cases, since 2011.

Hübschmann has a degree in aerospace engineering from the University of Applied Sciences FH Aachen. He is Deputy Head of the Wind Tunnel, Dynamic & Vibration Test Department, part of the Flight Physics division of Cassidian’s Military Air Systems Centre in Manching, Germany, a company he joined in 1987. He was a founding member of the Noise & Working Group of Eurofighter GmbH and its German representative until 2008.

International Standards prepared by TC 104 provide classification and test methods for environmental conditions to which products are most likely subjected to when transported, stored, installed and handled.

First Chairman for IEC TC 120
The SMB approved the nomination of Erik Wolf as Chairman of TC 120: Electrical Energy Storage (EES) Systems, for a six-year term of office beginning in April 2013. Wolf has a Master Degree in air and space technology from the University of Applied Sciences FH Aachen. He joined the Siemens group in 2000, where he has held several positions both in the USA and Germany. Since 2006 he is working on the integration of renewable energies into the grid, focusing particularly on energy storage technologies.

Wolf joined the German VDE working group on energy storage and, in 2009, co-authored a VDE/ETG* study on EES. He was also a founding member of EASE (European Association for the Storage of Energy) in 2011.

TC 120 was set up in 2012 to accelerate the integration of REs (renewable energies) into the grid and to enable a more reliable and efficient supply of electrical energy. As successful RE integration depends on EES, small and big centralized and decentralized EES systems will become increasingly important to meet growing global energy needs.

Extension
The extension of the term of office of the following IEC TC Chairman has been approved by SMB:

IEC TC 99
Enrico Maria Carlini, extension of term of office as Chairman of IEC TC 99: System engineering and erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and 1,5 kV d.c., particularly concerning safety aspects.

* ETG is VDE’s Power Engineering Society, one of several Technical Societies under the VDE umbrella

Electronic products such as smart phones are expected to work all over the world irrespective of climatic conditions, operational mode, and mechanical environment or handling.

TC 120 was set up to accelerate the integration of renewable energies into the grid and to enable a more reliable and efficient supply of electrical energy.

TC 99 prepares International Standards for the safe installation of high voltage electrical equipment.
Easier voting
IEC offers IT tools that increase efficiency

Aliyah Esmail
The IEC helps its members keep their IT costs down. This is done by developing and providing free of charge, industry leading IT solutions that do not require expensive licensing or other fees to make them work.

The IEC philosophy
The main philosophy of the IEC is to serve the user: the experts who develop standards; people who work in conformity assessment; and the IEC National Committees. The IEC offers them simple, common platforms that are robust, safe and reliable. With these platforms it becomes easy to disseminate documents and facilitate group discussions while controlling access rights.

Today, more than 30,000 people have access to the collaboration tools created by the IEC. They are used in IEC technical committees and working groups, national mirror committees in many member countries as well as by IEC partner organizations. This provides experts with a single tool for all of their national, regional and international activities.

An example of efficiency
In an effort to increase the efficiency of existing IT tools for all IEC Members, the IT Department updated the IEC voting system in March 2013. At the same time, it launched a further customized voting system requested by CENELEC (European Committee for Electrotechnical Standardization).

CENELEC is responsible for standardization in electrotechnology in Europe. Under the Dresden Agreement many IEC International Standards are adopted by CENELEC and implemented nationally by their Members. Today, about
80% of European Standards are identical to or based on IEC Standards. During the development process many experts participate in CENELEC and the IEC. The standards that are voted on by the two organizations are often the same.

The new voting system, similar to the one that was built for the IEC, will help facilitate the activities of IEC and CENELEC members.

Tools which are easy to use
“About two years ago we launched the idea to better integrate our [CENELEC] system with the IEC. Our strategy is to align ourselves with the IEC for our IT tools, which supporting the collaborative process where many common users are involved,” said Renée Vander Cammen, the Director of Electronic Data Processing.

A continued collaborative environment
With this updated tool the voting process for members has now been simplified. It saves them time and eliminates much of the duplication that existed in the past. Vander Cammen explained that the user can now directly vote at the CENELEC and IEC sites without having to login and shift between two different voting platforms. This makes the voting process more efficient for them. Additionally, the tool automatically compiles comments and generates voting results, something that was only partially automated in the past.

Apart from collaborations with CENELEC, the IEC’s IT Department has also worked with a number of National Committees, as well as COPANT (Pan American Standard Commission), AFSEC (African Electrotechnical Standardization Commission), and CIE (International Commission on Illumination) to facilitate the work of their experts.

Let there be light!
A new International Standard takes into account the latest developments in lighting technology

Morand Fachot
Electric lighting was fitted to automobiles years after they first appeared on roads. The introduction of electric lighting for headlamps and tail lights represented a major advance. Today’s motor vehicles are equipped with dozens of lamps of different types to meet multiple needs. The IEC recently published the latest edition of an International Standard detailing the performance requirements of lamps for road vehicles.

From oil lamps to electric lighting
The need for drivers to see other vehicles – and to be seen by them – after dark emerged naturally as soon as cars first appeared on roads. Lighting had been present on horse-drawn vehicles for a long time because of the same requirement.

Initially, in the 1880s, cars were fitted with acetylene and oil lamps. Electric lamps were first introduced on a large scale in the 1920s. Early car electrical systems were rather unstable and the lamps were subjected to harsh conditions: shock and widely varying climatic conditions and temperatures. All of these contributed...
to the somewhat slow introduction of electric lamps.

Other lamps besides headlamps and tail lights have been introduced gradually to meet additional needs. They include fog lamps and various kinds of signalling lamps, such as indicators and brake, emergency, parking side marking and reversing lights. Other types of lamps may be required for other categories of road vehicles such as lorries or buses.

The need for International Standards

Road vehicles are produced and traded globally and are used regularly across national borders. The need for International Standards is obvious: road safety requires that lights are standard in terms of characteristics such as performance, colour durability and interchangeability.

The UNECE (UN Economic Commission for Europe) is the international body that sets many of the regulations that “facilitate the international movement of persons and goods by inland transport modes” through its World Forum for Harmonization of Vehicle Regulations (WP 29). Its Working Party on Lighting and Light-Signalling (GRE) is the subsidiary body that prepares regulatory proposals on active safety for vehicle lighting and light-signalling. This group of experts conducts research and analysis to develop lighting requirements for vehicles.

Much of the GRE’s work depends on and references various IEC International Standards on lighting for road vehicles prepared by IEC SC (Subcommittee) 34A: Lamps, of IEC TC (Technical Committee) 34: Lamps and related equipment.

Evolving standards for road vehicle lamps

IEC 60809, Lamps for road vehicles – Dimensional, electrical and luminous requirements, sets out the requirements (marking, colour, dimensions, caps and bases, UV radiation, etc.) and test conditions for filament and discharge (xenon) lamps. IEC 60810, Lamps for road vehicles – Performance requirements, details the basic function and interchangeability, mechanical strength, some life characteristics (measured on a test quantity of 20 lamps), lumen maintenance, resistance to vibration and shock, and glass-bulb strength published for the same types of lamp (filament and discharge).

In addition, as lighting solutions based on LED (light emitting diode) technology have been phased in gradually – first to top of the range cars and then to a broader class of vehicles – this standard, published in February 2013, contains updates including the requirements and test conditions for LED light sources, as these may be significantly different from those that apply to other types of lamps.

They include basic function and interchangeability, UV radiation, lumen and colour maintenance, resistance to vibration and shock, electromagnetic compatibility and powered thermal cycling. This last characteristic determines the ability of the LED light source to withstand changes of ambient temperature. Tests and requirements for filament and discharge lamps are based on IEC 60809 data sheets for different types of lamps.

All lamps (including LED-based ones) must also comply with IEC 60061-1, Lamp caps and holders together with gauges for the control of interchangeability and safety.

Wide adoption of latest standard is expected

As LED-based lighting solutions are being introduced by all car manufacturers, IEC 60810, which now includes requirements and test conditions for LED light sources, will be adopted widely by the automotive industry, contribute to the introduction of new safer lights and form part of the reference documentation used by the GRE in its work.
Medical electrical equipment

Issue 04/2013 of e-tech will focus on standardization work and conformity assessment for certain types of medical electrical equipment and systems.

TC 62 and its SCs prepare International Standards for Electrical equipment in medical practice. Its work entails coordination with many other IEC TCs, such as TC 29: Electroacoustics, which develops International Standards that have contributed to major advances in the performance of hearing aids over the years.

TC 29 also prepares International Standards for equipment used to measure sound levels. These are used in many sectors, including the civil aviation industry to curb noise levels.

Medical robotics now represents a fast-developing and significant domain which is having a major impact in the medical environment. It greatly improves the treatment of many illnesses and contributes to a speedy recovery for patients. Experts from IEC SC 62A work in an IEC/ISO Joint Working Group to develop International Standards for medical electrical equipment and systems using robotic technology.

While IECEE ensures that electrical and electronic devices and equipment are reliable and meet expectations in terms of performance, safety, durability and other criteria, IECQ certification provides manufacturers of medical electrical equipment with the assurance that the electronic components they use are of the highest quality.