In transit
The new vision of transport
Comment by H. E. Abdullah Al Maeeni.

Counting down to #WorldStandardsDay2020
Let’s build a planet of #sustainablecities.

Mission possible for unmanned aircraft systems
Drones: one step closer to air traffic management.

Flying into an uncertain future
Aviation’s flight plan to recovery.

Cybersecurity in the driver’s seat
Ways in which your car can be hacked.

Driving the world forward
Why the hybrid car is coming of age.

Shaping shipping
Digital solutions for connected ports.

How to build a robust railway
New standards are coming down the track.

Calling ISO 9001 users!
Fifty years and still shining
Banking on safety
Groundbreaking PhD wins award
Rubber stamped
Virtual session breaks records
The new vision of TRANSPORT

We are witnessing the future of transportation and mobility unfold before us. Millions of hybrid and electric vehicles have been integrated into the fleets of countries, and hydrogen and fuel-cell vehicles are following suit. AI-driven vehicles are no longer a concept preserved for the distant future, and the influence of the Internet of Things is already empowering huge changes in the transportation sector. Even aviation and aerospace, relatively young in the history of humanity, have seen tremendous development over the past century. These are only some of the areas in which technological advancements of the Fourth Industrial Revolution are transforming the transport industry.

In all of its shapes, development leads to new challenges and opportunities, and our world will have to thoroughly prepare itself for the next chapter. With the rise of connected and self-navigating mobility and the decentralization of energy production, our transportation networks are becoming more complex. This unfolds against the backdrop of the 21st-century space race, where companies are increasingly looking to space as a place of business, competing to make space travel easier and more affordable. Meanwhile, continuous efforts to address ongoing transport issues remain equally crucial. Globally, transportation was responsible for 24% of direct CO₂ emissions from fuel combustion in 2019, three-quarters of which were due to road vehicles alone.

A number of scientific reports, one after the other, confirm that urgent action is needed on all levels to achieve the United Nations’ global sustainability agenda for 2030. It is now more obvious than ever that collective, accelerated efforts are required for the well-being of the planet, its oceans and the lives they host.

In this light, the role of International Standards and harmonized technical regulations becomes undeniable. Transportation is vital, and a driver for economic development and growth. But as the world urbanizes and its energy demands rise, the implementation of smart mobility becomes an increasingly prominent necessity. The standards community has been diligently supporting the shift from conventional forms of mobility into new, more integrated forms that are better suited for the future.

In 2020, ISO issued two standards to help the world use less energy and reduce the impact of mobility and transport on the environment. ISO 37161, Smart community infrastructures – Guidance on smart transportation for energy saving in transportation services, features energy-saving options to be adopted in transportation and their monitoring and maintenance measures. Meanwhile, ISO 37162, Smart community infrastructures – Smart transportation for newly developing areas, plays a key role in helping newly developing areas to implement transport services that are sustainable and that address the population’s needs.
Recognizing that the future of mobility will be radically different from its past, and in efforts to address the challenges and opportunities this will bring, the Emirates Authority for Standardization and Metrology (ESMA), the national standards body for the United Arab Emirates (UAE), launched in 2015 the annual International Conference on Future Mobility. The conference covers various themes, from innovation in smart, clean and connected mobility to mobility ecosystems for a sustainable future, and has undoubtedly become the region’s most eminent annual gathering of influential leaders in the field. ESMA has also introduced the Arab world’s first electric vehicle control scheme, which has since been adopted by other countries on the Gulf Cooperation Council. We have, in addition to that, developed the first technical regulation for hydrogen and fuel-cell vehicles in the Middle East and North Africa region. All these initiatives stem from the UAE’s resolve to shift to low-emission vehicles. The government, for instance, inaugurated and implemented the UAE National Smart Mobility Strategy, National Cybersecurity Strategy, and the UAE Strategy for Artificial Intelligence, all of which actively contribute to a sustainable transportation infrastructure. Among other incentives, many of the country’s organizations offer priority parking to low-emission vehicles and waive corresponding parking fees. In the Emirate of Dubai, Salik (Dubai’s automatic road-toll collection system) tags are granted for electric vehicles. Most prominently, the Emirate has been offering free charging for non-commercial electric vehicles since 2017, and will continue to do so until the end of 2021.

Innovation is without doubt an enabler of mobility. Paired with technological advancements, it can bring forth a new era of innovation and change in transportation. From road vehicles to aerospace systems, ISO has long played a harmonizing role, publishing standards in all aspects of transportation to ensure safe and efficient mobility. Going forward, achieving the increasingly dynamic and interconnected global priorities, and allowing for innovation and development in the design, construction and use of vehicles, calls for worldwide efforts. At ESMA, we look forward to supporting a safe and sustainable transportation sector that combines experience from the past with a fresh, new outlook on how we can transform the way we travel for the better.
In line with this year’s World Standards Day theme of “Protecting the Planet”, we launched an ISO global campaign on #sustainablecities to count down to 14 October.
2020 has been a year of adversity: the #covid19 pandemic has shaken us to our core. Before us is the challenge to rebuild our economies and safeguard life while preserving our planet for generations to come. Numerous opportunities for sustainability and resilience are presented as cities face overpopulation and pressure points surrounding transport, sanitation, energy, food and security.

Inspired by this global challenge, we started counting down to World Standards Day one hundred days before, with a weekly post on how standards can help create #sustainablecities to protect the planet, support the economy and improve quality of life.
During the COVID-19 pandemic, air drones or unmanned aircraft systems have played vital roles, from delivering aid to monitoring social distancing. However, issues such as safety, security and the sharing of airspace have continued to delay their full commercial use.
UAS have undoubtedly become the technology of the moment which, from humble beginnings, is set to create an industry to rival the automotive and aviation industries combined. UAS gained notoriety as toys, but have quickly evolved into the basis for a high-value, rapid-growth industry spanning almost all sectors, including logistics, medical, surveying, security and transport, and are being used in almost every environment on the planet.

UAS, which can be remotely controlled, but are increasingly being equipped with autonomous capabilities, have been around for a long time. It has only been in the past five years that the technology to make them commercially viable tools in a huge range of applications has become affordable. Initially small, a drive to wide-scale commercialization has seen the design of larger and more sophisticated UAS capable of the movement of cargo and, in the future, people. It is here that widescale commercial use is more likely to flourish into a global industry rather than through lots of small UAS to carry small items.

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*Delivering lifestyle improvements to people in remote areas.*
Air drones for good

UAS have been used in support of humanitarian missions and by first responders in many emergencies. They played a significant role in helping to save the structure of Notre-Dame cathedral in Paris when it was ravaged by fire in 2019. According to Asia Times, UAS were deployed to map the ground damage and rubble when the roof was in danger of collapsing, saving photographers from taking unnecessary risks. The same article points to their ability to conduct aerial mapping for wildfire response, sparing firefighters.

UAS have also proved an important humanitarian tool, supplying blood and essential medicines to remote clinics in such countries as Rwanda. This has become even more vital during the COVID-19 pandemic. According to a World Economic Forum Agenda blog, the US medical drone company Zipline is now using its deliveries to support the coronavirus fight in Africa and is also helping other countries in their response efforts to COVID-19. “We are stocking a whole bunch of COVID-19 products and delivering them to hospitals and health facilities whenever they need them instantly,” Zipline’s Chief Executive, Keller Rinaudo, told CNN Business.

By 2025, it is estimated that the UAS market will be worth more than USD 5 billion. For businesses and other organizations, UAS can only enhance their productivity. They are not only small and agile but they tick the “green” box as well. A report in the Smithsonian Magazine suggests that, in terms of greenhouse gas emissions, package delivery by small UAS can be better for the environment than delivery by trucks.
So what’s stopping us?

Despite all these obvious benefits, there are obstacles to be addressed, such as safety, security and privacy which, according to Robert Garbett, Chief Executive of Drone Major Group, “is not achievable without robust safety and quality standards upon which the industry can grow safely”. In 2015, ISO took steps to resolve these issues when it founded its technical subcommittee ISO/TC 20/SC 16, *Unmanned aircraft systems*, to develop the ISO 21384 series for UAS standards on safety and quality for product manufacture, operations and unmanned traffic management, which will undoubtably be widely referenced by international civil aviation authorities. ISO 21384-3, *Unmanned aircraft systems – Part 3: Operational procedures*, was the first International Standard on UAS to be published in December 2019. It was developed by ISO/TC 20/SC 16 working group WG 3, *Operations and procedures*, convened by Garbett, who is also Chairman of the BSI Committee for UK Drone Standards and founder of the Drone Delivery Group.

John Walker, the Chair of ISO/TC 20/SC 16, has oversight of all standards being published within the subcommittee and, with the support of the Committee Manager Chris Carnahan, says: “During the pandemic, UAS were used around the world in support of humanitarian and social service applications. Public acceptance for these hugely beneficial applications has been overwhelmingly positive and governments are waking up to the benefits that UAS can bring to the support of these much-needed services.” He believes this has created an opportunity to expand the use of UAS for human benefit in post-COVID-19.

Face-to-face meetings of the standards committees would be a welcome return for Walker. Although working group meetings have been held virtually, he says that in-person meetings are essential for meaningful and robust discussions between participants, “especially within the international community where experts from a diverse range of countries come together to shape UAS standards for global users”.

Frank Fuchs, an international aviation law adviser and Convenor of ISO/TC 20/SC 16’s working group WG 1, which has developed ISO 21384-4, *Unmanned aircraft systems – Part 4: Vocabulary*, says: “The COVID-19 crisis offered ample opportunity for UAS systems to prove themselves as technological systems that offer support for society and help protect human lives. Using UAS in areas with high numbers of COVID-19 infections showed that the use of UAS is very sensible when dealing with such a pandemic.”
The big challenge

The lack of enabling regulations and underpinning safety and quality standards has, without doubt, slowed the progress of the industry to full commercialization, but this is changing. As the ISO UAS standards set matures, it is informing regulators and initiatives such as that called for in the Drone Delivery Group white paper entitled “The Commercialisation of the UK Drone Industry”. This initiative points to the establishment of test and development areas to accelerate the evolution of technology, from concept to commercial operations, while also providing vital intelligence to regulators and standards makers.

Initiatives such as this and others in development by industry and governments around the world seek to address the operation of UAS beyond visual line-of-sight (BVLOS). It is in such operations where the management of UAS air traffic will be essential. Unmanned Traffic Management (UTM) systems will play a vital role and ISO 23629 for UAS traffic management will help to level the playing field. Although the series is still under development, once standards for UTM have been published, they will provide the basis for UTM systems to be developed and operated to a globally recognized standard.

Walker says the ISO/TC 20/SC 16 UTM work plan for ISO 23629 is developing standards that include functional structure and requirements for UTM services and service providers. “These UTM standards will serve as the foundation that will complement operational procedure standards being developed within the ISO 21384 series and other ISO/TC 20/SC 16 standards that support requirements for safe commercial UAS operations.”

The COVID-19 crisis offered ample opportunity for UAS systems to prove themselves.

Drones are an effective border security solution.
New class of aircraft

Looking ahead, Walker believes that the development of the ISO 23629 series is as significant as advances in global aerospace development, such as the introduction of radar, GPS and the jet engine. “UTM will allow a new class of aircraft to safely enter civil global airspace in support of humankind with services including medical and other logistics, law enforcement, and transportation in both urban and rural areas.”

Given the rapid pace of technological advancement, Fuchs says that ISO standards in general, and this series of standards in particular, will become even more important. As Garbett put it in an article in Professional Security Magazine when ISO announced the new series: “The standards will deliver a new confidence among investors in the safety, security and compliance of commercial drone operations […]. Drones are a transformative global phenomenon, offering an unprecedented economic opportunity for those businesses and countries with the foresight to embrace this technology.”

Those words certainly resonate today. As transport and the aviation industry recover after COVID-19, there will be a drive for aviation to be more sustainable. Through new developments in UTM and UAS, and with the help of standards such as the ISO 21384 and ISO 23629 series, UAS look set for a great lift-off. Developing and advancing quality standards for UAS, Walker concludes, will underpin the safe evolution of this fast-moving and exciting industry. Watch this (air)space.

Drones are a transformative global phenomenon.
The great lift-off of drones

8 cool uses of drone technology coming to a sky near you

- Aerial photography
- Weather forecasting
- Geographic mapping
- Shipping and delivery
- Law enforcement and border control
- Emergency management
- Precision agriculture
- Wildlife monitoring
Flying into
an uncertain future
As the COVID-19 pandemic continues to take its toll on lives and economies around the world, there is no doubt that it has had a severe impact on the aviation industry. Séverin Drogoul, an expert with over 35 years’ experience in the industry, looks at the challenges and explains how the sector can avail of opportunities for a sustainable recovery.

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The civil aircraft industry will have the opportunity to transform itself.

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Aviation and the airline industry have had a turbulent history, facing major blows, such as the aftermath of 9/11, the SARS pandemic 2002-2004, the disruption to air travel caused by the Eyjafjallajökull volcano in Iceland in 2010, among others. But the shock to the industry caused by the COVID-19 pandemic is of another magnitude altogether – “unprecedented” is the word we see and hear time after time.

As the virus spread around the world and countries went into lockdown, airlines were grounded and air travel practically ground to a halt. According to the International Air Transport Association (IATA), airlines are expected to lose a record USD 84 billion in 2020, more than three times the loss made during the global financial crisis.

Airline stocks have moved into the red, some companies have gone to the wall – for example, Flybe in the UK in March, Virgin Australia in April – and national airlines are suffering. The International Airlines Group, for instance, which owns British Airways, reported a second-quarter loss of more than two billion British pounds after its passenger business collapsed.

Given the downturn in air travel, economic recession and ongoing health fears, it is difficult to see how the industry can respond to the challenges and make a sustainable recovery. Séverin Drogoul, French representative for technical committee ISO/TC 20, Aircraft and space vehicles, and President of SD Consulting – Aerospace Advisory, has over 35 years’ experience in the aerospace sector. As countries continue to wrestle with the virus, ISOfocus asked him how the industry is dealing with the fallout of the pandemic, finding solutions to the challenges, and how it can find opportunities in disruption.
**ISOfocus:** How do you think the aerospace and aircraft industry in general has coped with the challenge of COVID-19?

**Séverin Drogoul:** We need to recognize and understand that the reactions and response are largely based on whether you are an airline company, a leading aircraft industry such as Airbus and Boeing, an industry-related specific supplier or a services provider like airports or civil air traffic control. All those actors have been deeply affected. How they have coped also depends on the type of industry. The situation for civil aircraft, for instance, has been worse compared with helicopters and military aircraft, which have been less impacted by countries closing their borders or the downturn in the tourism industry. Likewise, air cargo traffic. Air cargo flights have continued to operate, ensuring that critical supplies are distributed across the world, reinforcing the importance of maintaining continuity in air traffic services despite the decline in passenger traffic.

As well as this, the industry reaction also strongly depended on regional and country-specific responses to COVID-19 as the virus ebbed and flowed around the world. The burden on the aerospace sector was not helped by the unilateral decision of some countries to close their borders, which also closed avenues to a more common approach. Specifically, in Europe, each civil aircraft industry has been supported by its respective country to get through the difficulties of 2020. However, that will probably not be enough for the next two years.

**How challenging have the quarantine measures been on the industry? What strategies, if any, can help improve the situation moving forward?**

Quarantine measures are a huge impediment to a recovery in air traffic. An IATA passenger survey has indicated that between 75% and 85% of people in France, Germany and the UK will not travel if a quarantine is in place. It is estimated that airports in Europe will receive seven hundred million fewer passengers in 2020, 28% less than was expected earlier. Airlines and airport-managing companies have been forced to seek bailout packages from government. In Europe, for instance, airport-managing companies are expected to incur a loss of USD 15.4 billion due to the pandemic.
Therefore, governments looking to reopen their economies need an alternative, risk-based solution. The answer is a strategy that combines coordinated, internationally consistent health measures for air travel with effective national plans for managing COVID-19. It is essential that governments coordinate to restart air connectivity consistently and in line with international best practice.

The most optimistic view is that the civil aircraft sector is expected to make a 100% recovery around mid-2023; others believe not before mid-2025. During this period, some airline companies will disappear and a lot of personnel will lose their jobs. The need for continued financial and regulatory aid is clear.

Many European governments, for instance, have recognized the strategic importance of their aviation industries and provided support. Much of the financial aid has been in the form of loans, which are adding to the airlines’ debt burden and will hinder their ability to invest in new services, cleaner aircraft and expanded employment.

What will be the long-term impact of the pandemic on the global aviation industry?

We need to look at the different kinds of short- or mid-term impacts on passenger airlines, cargo airlines, aircraft manufacturing companies, airport-managing companies, and catering and other service providers, and their effects on, firstly, aircraft traffic and, secondly, on the number of aircraft orders coming from the airline companies, due probably to some reorganization of the airlines.

Industry and stakeholders will adapt their scope and perimeter depending on the complete recovery from these impacts. As mentioned before, it will take a minimum of two to three years to get back to the situation at the beginning of 2020. In the longer term, say the next 15 to 20 years, the analysis becomes more complex.

Before the pandemic, the number of aircraft, as well as worldwide aircraft traffic, was set to double over the next 15 years. Now, the key question is: “Are we able to maintain...
for the next 15 to 20 years previous objectives as planned before COVID-19? ” To answer this, we also need to ask: Are people likely to continue to want to travel as they did before the crisis? What is the real impact of air traffic on climate change? Are we able to evolve the aircraft industry with a new paradigm using unknown disruptive technologies (i.e. electrical aircraft or hydrogen propulsion)?

What do you think the “new normal” will look like for the industry and where are the opportunities?

I believe the “new normal” will probably not be so far from the situation before COVID-19, despite the current pessimistic views from the aircraft industry. As soon as a safe and effective vaccine has been developed, and even if the mutation of the virus occurs, we will return to a pre-pandemic situation in terms of market. Passenger airlines, cargo airlines, aircraft manufacturing companies, airport-managing companies, and catering and other service providers will probably need some years to recover – but they will do it.

Already, some airline companies have decided to scale back their operations, which includes cutting flights and removing less economical aircraft. The civil aircraft industry will have the opportunity to transform itself – to become more eco-efficient, with sustainable air traffic. Some European governments are ready to support efforts to develop new potential disruptive technologies, specifically by financing research and technology activities. For instance, the French government will finance the aircraft industry to the tune of EUR 4 billion to EUR 5 billion in that field. Another opportunity is to reduce CO2 emissions by developing and operating more “green aircraft” and “green air transport systems”, including airports. The development of aircraft engines fuelled by hydrogen, for example, could become a reality by 2035.

The French Association for Hydrogen and Fuel Cells, which brings together 33 major groups in the sector, including key stakeholders within the aircraft industry, has asked the state to invest nearly EUR 10.3 billion between 2020 and 2030 in the development of this technology. The objective of the multi-year energy programme is to achieve 10% carbon-free hydrogen in the industry by 2023, and from 20% to 40% in 2028. The end goal is to make Europe a leader in the sector between 2020 and 2030.
How will ISO standards help to meet the new needs?
The benefit of ISO standards here will be to support the new developments in research and in new disruptive technologies. Electric and hybrid-electric propulsion will rapidly be revolutionizing mobility technologies across industries, from automotive to marine. And the aviation industry is no exception. In major aircraft companies such as Boeing and Airbus, work on electric flight aims to lay the groundwork for future industry-wide adoption and regulatory acceptance of alternative-propulsion commercial aircraft and urban air vehicles.

Given these challenges, what steps will ISO/TC 20 take to maintain its significant presence in the aerospace industry?

It is probably too early to say now what steps ISO/TC 20 will have to take for the coming period. I believe the most important challenge for the technical committee will be its ability to evolve day to day depending on the new needs that will surely occur. In that sense, it could be interesting to think about the creation of subcommittees dealing with the new aviation challenges related to climate change, eco-efficiency and sustainability to support our aviation industry.
Cybersecurity in the driver’s seat

by Clare Naden

As the world gets more connected, so do our cars. But greater connectivity equates to more data that could get into the wrong hands. Cybersecurity in automotive engineering is an industry with the wind in its sails, but the battle is not yet won.

Thanks to Internet technology, our cars enable us to not only make calls but tell us if we are veering into the wrong lane, give us live traffic updates or tell us where the nearest gas station is. Moving us from A to B is almost secondary. Yet all this functionality increases the risks, which range from stealing your personal information to literally driving you off the road.

In various experiments to test the robustness of cybersecurity systems in vehicles, “white hat hackers” – i.e. computer security experts who deliberately hack into systems to test and assess their security – have demonstrated that it is possible to remotely control cars. For example, as far back as 2015, such hackers demonstrated that they could take control of a Jeep’s braking and acceleration systems, its dashboard and more – a terrifying thought.

In another experiment on a Tesla, computer security experts managed to trick the car’s Autopilot self-driving software and swerve into the oncoming traffic lane. “Other incidents, such as those not involving white hat hackers, would also need to be handled with reasonable care and attention,” says Dr Gido Scharfenberger-Fabian, a project leader in ISO’s expert working group WG 11 that deals with cybersecurity for electrical and electronic components of road vehicles.1)

Cybersecurity, therefore, is big business, particularly when it comes to vehicles. Various estimates of the value of the global automotive cybersecurity market put it growing from USD 2.4 billion in 2019 to some USD 6 billion by 2025. But despite this thriving industry, the war on hacking has only just begun.

1) WG 11 operates under technical committee ISO/TC 22, Road vehicles, subcommittee SC 32, Electrical and electronic components and general system aspects.
A long history of data

Data has been collected from our cars as far back as the early 1990s, says Jack Pokrzywa, Director of Global Ground Vehicle Standards for SAE International, a global association for the “mobility” engineering profession and a key ISO partner. Devices such as Event Data Recorders, or the “black box” of a car, provide information about our vehicle’s operations before and after a crash, for example. Now, of course, the technology has advanced well beyond that. Capabilities include capturing outside information, such as location, weather and traffic conditions, while sensors inside the vehicle can collect data about the occupants to provide meaningful information in case of an accident. “Let’s not forget about the biometric information, which can also track, for example, eye movement to detect a driver’s attention in order to determine if a driver is falling asleep behind the wheel,” he adds. “And now we have so many apps that connect to a car’s operating system, enabling, for example, the information about your calls made through a car speaker system to be recorded. There are benefits of this related to safety, but there is also concern about data privacy.”

In some jurisdictions, such as Europe, the vehicle identification number (VIN) is seen as personal identifiable information (PII), warns Dr Markus Tschersich, another project leader in ISO’s expert working group. “Therefore, all data generated by vehicle systems and associated to a VIN can be interpreted as PII. This is information that, on its own or combined, can be used to identify, locate or contact an individual. For example, data gathered from braking, steering systems and other car components can be used to derive information about the driver’s skills and behaviour.” And as long as there is a connection between the car and external sources, there is a possibility of hacking.
Today’s cars are filled with complex software and they are expected to be even more so in the not-so-distant future. According to management consultancy McKinsey & Company, cars have around one hundred million lines of code today, but it is thought that by 2030 there will be three times that number. This is compared to, say, a passenger aircraft, which has approximately 15 million lines of code and your standard PC operating system with up to 40 million lines of code. The more complex the machine, the more opportunities for cyber-attacks along the entire value chain.

As technology becomes more deeply embedded into cars in general, the automotive industry is facing the task of our generation. That is, securing the global automotive infrastructure from those cybercriminals who want to steal data and take control of automated systems for malicious purposes. “Cybersecurity measures need to be adapted from system generation to system generation, but also in systems in the field via updates,” says Dr Scharfenberger-Fabian. “It is a never-ending challenge.”

Pokrzywa points out that any device that runs on software can be hacked. Countering such problems requires a high degree of knowledge sharing in the industry and particularly between car manufacturers and their supply networks. One organization that does that in the US, he says, is the Automotive Information Sharing and Analysis Center (Auto-ISAC). Industry members share and analyse information about any possible risks to vehicles, thus contributing to the strengthening of cybersecurity technologies. But a worldwide holistic approach is also needed.
A global call

Aligning processes and methods along the supply chain as a baseline for considering cybersecurity appropriately in the engineering of automotive systems is the key, says Dr Scharfenberger-Fabian. “There are many established International Standards for IT security (e.g. ISO/IEC 27xxx series) or industry-specific security standards (IEC 62443 series for industrial control systems),” he says, “but they don’t address the specific needs of the automotive industry.”

In 2015, SAE International created the Vehicle Cybersecurity Systems Engineering Committee to address these threats and vulnerabilities in the US market. A year later, the committee published SAE J3061, Cybersecurity Guidebook for Cyber-Physical Vehicle Systems, which defines a complete life-cycle process framework that can be tailored and utilized within each organization’s development processes to incorporate cybersecurity into cyber-physical vehicle systems, from concept phase through production, operation, service and decommissioning.

The new International Standard will draw on the SAE guidance and build a comprehensive cybersecurity tool that addresses all the needs and challenges of the industry at a global level. Currently in development, ISO/SAE 21434, Road vehicles – Cybersecurity engineering, is due to be published in 2021 and aims to address cybersecurity in the engineering of electrical and electronic (E/E) systems within road vehicles. Use of the standard is thus intended to help manufacturers keep up with changing technologies and cyber-attack methods.

Involved in the project are Dr Scharfenberger-Fabian and Dr Tschersich, who explain that the standard is intended to supersede SAE J3061 recommended practice. It will enable organizations to define cybersecurity policies and processes, manage cybersecurity risk and foster a cybersecurity culture. It can also be used to implement a cybersecurity management system, including a proper management of road vehicle cybersecurity risk.
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The security question

For an industry used to breaking down complex challenges and standardizing responses, cybersecurity remains an unstandardized anomaly. So can the standard promise true cybersecurity? “Alas, there is no such thing as a ‘secure technology’ that could be standardized,” says Dr Tschersich, “so following ISO/SAE 21434 alone would not make the cars secure. But the processes described therein can most definitely build the baseline for a good cybersecurity engineering and help to tighten things up.”

These processes, he says, include the assessment of cybersecurity risks and approaches to identify and align on cybersecurity solutions for the systems, and to communicate them along the supply chain. This includes the concept, development, production, operation, maintenance and decommissioning of road vehicle electrical and electronic systems, including their components and interfaces.
The standard establishes a cybersecurity framework for automotive companies and features a common language for communicating and managing cybersecurity risk. “While ISO/SAE 21434 does not address or push technologies directly, the framework provided will enhance the collaboration on cybersecurity within the industry and thereby lead to technology and solutions that better meet today’s and tomorrow’s cybersecurity problems.” It will help consider cybersecurity issues at every stage of the development process and in the field, creating a checklist for engineers that includes scanning for bugs, increasing the vehicle’s own cybersecurity defences and creating a risk analysis of potential vulnerabilities for every component.

ISO/SAE 21434 is already in demand to support existing regulations, he says. For example, it is seen as a reference document for the implementation of a cybersecurity management system (CSMS) demanded by recently introduced United Nations (UN) regulations related to cybersecurity in vehicles. “This is due to a tight collaboration between the ISO/SAE joint working group and the respective UN Task Force based on a liaison,” he explains.

To further improve the relationship between the UN regulation and standardization, work has recently started on a publicly available specification, ISO PAS 5112, that gives guidance on organizational audits with respect to cybersecurity engineering. It will be based on ISO/SAE 21434 and is intended to be used to audit a CSMS as defined by the UN regulation. The end goal is widespread implementation of the standard into the industry’s daily engineering practices, along with increased awareness achieved by including the standard in the training curriculum of engineers.

“If the product development is based on solid principles included in ISO/SAE 21434, vehicle security could be further increased,” adds Dr Scharfenberger-Fabian. The future standard is designed to improve automotive cybersecurity and risk mitigation across the entire supply chain – from vehicle design and engineering through to decommissioning. Many in the industry are already making plans to ensure its integration.
In today’s motor industry, each step of the supply chain is guided, monitored and analysed by high-tech software.
And so the battle continues

While still relatively new, the in-car cybersecurity threat will remain an ongoing concern. As such, automakers must now consider cybersecurity as an integral part of their core business functions and development efforts. “I don’t think we can ever prevent attempts to breach the system,” says Jack Pokrzywa, “but by raising the security barriers higher, we can certainly reduce the risk.” This will also keep development and maintenance costs under control – a win-win for all industry players.

In addition to ISO/SAE 21434, the automotive industry will continue to develop common cybersecurity standards to ensure manageable end-to-end secure solutions, including the upcoming standard for the auditing of cybersecurity engineering. The work is just beginning, but with an industry dedicated to securing automotive systems at every step of the process, the wheels will keep on turning as the cars we drive get safer and safer.
Modern vehicles have up to 50 different automotive connected devices that hackers can attack. Here are some areas of your car that need protecting.
With fast and convenient charging still a headache for the fully electric car, a hybrid actually makes a lot of sense. ISO is on the road to provide the standards to support it.
Encouraging more people into electric vehicles is at the heart of governments’ efforts to tackle climate change. That’s because transport accounts for a bulk of the world’s CO₂ emissions – more than any other sector. Sales of all hybrid electric vehicles are up, leading to suggestions that we have reached a turning point.

Electric and hybrid vehicles have come a long way since the early 1990s when the first serious attempts at producing such a vehicle were made. Only a few of them were a true success. Since then, electric and hybrid vehicle technology has made some significant progress and these types of vehicles have become cleaner, faster and more efficient. With the sophisticated technology they have at their disposal today, the next challenge is the development of standards that harmonize its use and leverage all the possibilities it has to offer.
Coming to terms with COVID-19

The impacts of the recent health crisis on the world have extended far beyond mandatory shutdowns, the challenges of teaching active young children while working from home and looming economic uncertainty. The International Energy Agency found that the fallout from the pandemic led to a 50% reduction in global transport activity in March 2020 compared to March 2019, with commercial flights dropping more than 75% in mid-April. Despite this gloomy outlook, a distinctly positive outcome has been the fall in daily global CO₂ emissions, with research journal *Nature* reporting that carbon outputs had decreased by 17% by early April 2020 compared to the same time last year.

This combination of reduced transportation levels and lower carbon emissions has sharpened our awareness to the importance of hybrid electric vehicles (HEVs). Hybrids combine the advantage of both the internal combustion engine and electric motors that use energy stored in batteries, resulting in less gasoline burned and better fuel economy. ISO is leading the way in developing and publishing standards for HEVs that provide effective guidelines and measures for assessing fuel consumption and emissions. These standards are especially useful because they focus on both externally chargeable (ISO 23274-2) and non-externally chargeable (ISO 23274-1) vehicles.

So at a time when governments are developing programmes and incentives to boost purchases of more environmentally friendly vehicles and maintain the downward trend of CO₂ emissions, ISO is perfectly placed to identify improvements in HEV technologies and develop standards and measures that can be adopted by manufacturers and government agencies alike.

The COVID-19 pandemic drove home the importance of environmentally friendly vehicles.
An opportunity for cars?

This shared journey has also seen some surprising statistics. While traditional car sales dropped dramatically around the world, HEV sales in Europe and China actually grew during the stay-at-home decrees earlier this year. Reasons for this increase include the renewed focus by the European Union (EU) on reducing CO₂ emissions standards for cars and light commercial vehicles. The EU has designated 2020 as the key year to implement tighter emissions standards that reduce new cars’ average CO₂ emissions per kilometre driven. Germany, for example, plans to install one million public electric-vehicle charging points as part of its economic recovery programme, having increased its electric vehicle subsidies in February this year. Meanwhile, the French government announced that it would fund grants of up to EUR 7 000 to encourage drivers looking to buy electric vehicles. Experts anticipate that many other countries will soon follow the steps taken by Germany and France.

According to Bloomberg New Energy Finance, car manufacturers will not be daunted by the uncertainty created by the recent pandemic but will continue to work on complying with stricter regulations introduced in Europe and China. The increased government support and incentives will help fuel the move towards purchasing, leasing and driving hybrid electric cars. By 2022, Bloomberg estimates that there will be over five hundred different hybrid electric vehicle models available to buy. With so many options to choose from, it also forecasts that sales of electric vehicles will increase from their current 2.7% market share to 10% by 2025 and should be closer to 60% by 2040, with Chinese and European markets pulling ahead. Conversely, it is thought that traditional internal combustion vehicles hit their peak in 2017 and have now started their sales slide downwards.
Masao Kubodera is a member of ISO’s subcommittee SC 37 on electrically propelled vehicles, which operates under technical committee ISO/TC 22, Road vehicles. Its main areas of standardization are conductive charging systems, wireless power transfer, electric propulsion components and energy consumption. Kubodera’s role at both Honda and the Japan Automobile Research Institute has increased his appreciation of ISO’s ability to plan for future needs and identify standards that are introduced before countries and agencies are ready to develop and apply their own regulations.

“The good thing about ISO is that it starts work before regulations are implemented, which allows the regulations to be created based on its standards. This means that the latest and most appropriate technologies and methods will be applied,” he says.

ISO’s standards for hybrid electric vehicles are already being referenced all around the world.
The beauty of hybrid

For non-car experts, defining the differences between hybrid and “ordinary” electric vehicles is an important first step when considering standards and the effective measurement of emissions. “Hybrid electric vehicles have a rechargeable energy storage system that can be charged and then discharged, with the energy being used for propulsion or moving the car. This type of vehicle runs on an electric motor with the electricity being generated by an internal combustion engine. Electric vehicles, on the other hand, run only on electricity charged directly from the grid,” Kubodera explains.

In a traditional internal combustion engine (ICE) vehicle, the energy of the fuel charged from outside is converted to mechanical energy by the engine to accelerate it and is decelerated by the braking device. In hybrid electric vehicles, the electric motor is the generator and not a braking device; it recovers kinetic energy (energy from motion) as electric energy. By using this energy to accelerate, it reduces the fuel consumption of ICEs and resulting CO₂ emissions.

That’s an extremely important outcome, yet despite these environmental benefits, reducing CO₂ emissions is not the only reason why people are turning to hybrid electric vehicles. Originally, the price tag of an HEV meant that it was not just seen as a responsible form of transport but as a way to show off one’s wealth, writes French journalist Frédéric Filloux, since the cost significantly outweighed that of traditional vehicles and was beyond the reach of most drivers. Kubodera agrees: “In addition to affordability, in order to really popularize electric vehicles, there will always be a need to focus on improved performance and measurement and to ensure that governments around the world create subsidies and policies that encourage their purchase and use.”
Where in the world...?

Providing guarantees of measurement and performance, standardization can make a solid contribution to the worldwide acceptance of electric mobility. ISO’s standards for hybrid electric vehicles are already being referenced all around the world. The Philippines, for example, has a ten-year plan to boost production, local market opportunities and technology upgrades to increase the number of HEVs it has on its roads. The government reports that it is currently working with 28 companies, including 11 parts and components manufacturers and seven importers, with ISO 23274-1 (non-externally chargeable vehicles) and ISO 23274-2 (externally chargeable vehicles) being a key factor in its programme.

Yet, in order to transition from internal combustion engines to electrified vehicles, governments need a long-term vision and a robust portfolio of policy measures, including new fiscal schemes to make up for lost fuel tax revenues, states the *Global EV Outlook 2020*, the flagship publication of the Electric Vehicles Initiative, a multi-government policy forum dedicated to accelerating the introduction and adoption of electric vehicles. India is currently the fourth largest ICE-based car maker, with its purchase rates bucking the declining trends experienced by the rest of the world thanks to a sales peak in 2018. According to a technical study conducted by Ernst & Young, the Indian government intends to address the country’s rising levels of pollution, population needs and high crude oil imports by creating solutions for sustainable vehicles and travel. ISO standards for HEVs also play a crucial part in their plans.

Technological advances and societal changes have triggered a drastic evolution in mobility.
Following China’s lead, the EU market for electric road vehicles has grown significantly in recent years, largely dependent on standards and support policies. In its February 2020 white paper, the International Council on Clean Transportation noted that both regions are doing well because they have “a broad mix of policies across government levels [that can] overcome the key barriers of electric vehicle affordability, convenience and awareness”. Leading the way for Europe, Norway aims to sell only zero-emissions vehicles by 2025. Today, the country already counts more than one in ten HEVs on the road, with 50% of imported vehicles having a plug and the ability to run on grid electricity. Its neighbours Denmark and Sweden have both resolved to phase out the manufacture and sale of ICE vehicles after 2030 and the United Kingdom has set a similar goal for 2035.

Technological advances and societal changes have triggered a drastic evolution in mobility. Stricter emissions regulations, lower battery costs and more widely available charging infrastructure will help to create momentum for the penetration of electrified vehicles in the market. As for the speed of adoption, it will be determined by consumer pull and regulatory push, backed by the availability of International Standards. ISO has an important role to play in supporting the transition to smarter, more sustainable vehicles. But with so many countries, governments and manufacturers now on board, the potential is there for even more productive and safer partnerships in the world of environmentally sustainable HEVs.

*Powering up in the Norwegian countryside near Bergen.*
Shaping shipping

by Rick Gould

As technology advances and industry dynamics evolve, more and more maritime businesses are focusing their time, energy and resources on digitalization. Technological advances are expected to make shipping – and the whole supply chain – much more efficient for the more than 11 billion tonnes of goods that are traded annually by sea across the globe. This move will have numerous benefits for trading, safety, security and the environment, with ISO standards playing a key role in this process.
Ever since people could tie logs together to form rafts and use them to transport goods by water, seaborne trade has flourished and grown. Historians believe that the first international trade routes were developed five thousand years ago between the Arabian Peninsula and Pakistan, whilst by the 18\textsuperscript{th} century, trade routes spanned the globe. Transporting goods and people by sea is an efficient and cost-effective process and, today, shipping is big business with more than 90\% of the world’s trade, in volume, carried by sea, according to the International Maritime Organization (IMO).

Whilst trade is beneficial, trading through ports is complex. When ships enter and leave ports, vital information about cargoes, crews, vessel details and many other things has to be exchanged with the authorities ashore.

Access to accurate and complete data records is essential to making the right decisions at the right time. Ship operators are required to provide numerous types of records, certifications and data relating to their cargoes, passengers, safety, environmental protection and customs declarations.

The process might also require several regulatory authorities, as well as interacting with business-to-business functions such as freight unloading, storage and forwarding. This, in turn, requires communications between a multitude of different systems in businesses, ships, ports and regulatory authorities. Such an intricate network enables vast amounts of information and data to be exchanged to get a ship and its cargo through a port. Sounds simple, right? Not quite.
Technology currents abound

As technology advances and industry dynamics evolve, more and more maritime businesses are focusing their time, energy and resources on digitization. The right digital technology can uphold continuity in even the most challenging circumstances, including operations that are exceedingly complex with a high volume and velocity of activity. As technology moves the shipping industry by storm, it is estimated that a 10% to 30% improvement in efficiency in the EU logistics sector equates to a cut in costs of between one to three hundred billion British pounds for European industries, with a consequent reduction of 15% to 30% in CO₂ emissions.

Digitalization, big data and new technologies such as artificial intelligence are key in enabling the post-COVID recovery, IMO Secretary-General Kitack Lim told a webinar on digital connectivity earlier this year. "Cooperation between shipping, ports and logistics will be vital for enhancing the efficiency and sustainability of shipping and therefore facilitating trade and fostering economic recovery and prosperity," Lim said. "Digitalization and new technologies will also be the key to allowing standardization and therefore enhancing the efficiency of shipping."

So how is effective and efficient trade facilitated? "Trade facilitation requires three activities, which are simplification, harmonization and standards," explains Sue Probert, Chair of UN/CEFACT, which is the United Nations’ global centre for trade facilitation and electronic business. UN/CEFACT is supported by the United Nations Economic Commission for Europe, UNECE, in Geneva. Probert has worked in trade facilitation for 30 years, advised governments, regulatory bodies and businesses worldwide, and is currently the lead editor of the UN/CEFACT’s Core Components Library, which is a set of data semantic standards that aids seamless trade.

Cranes and an automatic container transport system in operation at Hamburg’s state-of-the-art container handling terminal, Germany.
The need for standardization was also highlighted by IMO’s Facilitation Head, Julian Abril, who noted the mandatory requirement for electronic data exchange in the IMO’s Facilitation Convention, effective since April 2019. Discussions are currently underway towards making a “Single Window” for the maritime sector mandatory – so that all data for arrival and departure of ships is submitted through a single point and transmitted to the relevant agencies involved.

The standardization and harmonization needed for this to happen is captured in the IMO Compendium on Facilitation and Electronic Business. The IMO Compendium is a set of tools for software developers who create the systems necessary for sending electronic data for all the records, data and information that must be exchanged between ships, shore and regulatory authorities. The Compendium comprises a data set and reference model for electronic data interchange (EDI) now required by the latest amendment of the Facilitation Convention. The goal is to make it easier for companies involved in maritime trade or transport to create software that can communicate, no matter which standard they are based on.

“Single Windows act as a centre for regulatory authorities involved in trade, and businesses that have to submit information to them. A Single Window will only deal with regulatory authorities for businesses, whilst a Port Community System (PCS) can cover many other functions as well, and they often do, such as logistics and freight forwarding,” describes Richard Morton, Secretary-General of the International Port Community Systems Association (IPCSA). “So, in a sense, PCSs were the original Single Window,” he adds.

A PCS can also serve as the Single Window if the applicable governmental body in a country mandates this, and if the PCS meets the five criteria required. IPCSA’s members also have a strong interest in data standards, as this is at the core of their business, making a diverse range of systems communicate seamlessly.

Cooperation, communication and collaboration between the various stakeholders to maintain and further develop the compendium, as well as looking into expanding its data set and data model to areas beyond the Facilitation Convention, have been formalized in a partnership agreement signed in March 2020. Its signatories – ISO, IMO, the World Customs Organization (WCO) and UNECE – are supporting this increased maritime digitalization.

The partnership agreement paves the way for updating the IMO Reference Data Model and for its further development towards harmonization of data standards in other areas, beyond the Facilitation Convention, such as exchanging operational data that could help facilitate just-in-time operation of ships. Just-in-time operation allows ships to optimize their speed, so they arrive at their destination port when their berth is ready for them, thereby saving energy and cutting costs and emissions.

The parties of this agreement have already been cooperating to develop the IMO Reference Data Model, which is a key element of the IMO Compendium on Facilitation and Electronic Business and covers the reporting requirements defined in the Facilitation Convention to support transmission, receipt and response of information required for the arrival, stay and departure of ships, persons and cargo via electronic data exchange. This work ensures interoperability between the respective standards of each organization.
Clearing customs and other regulatory requirements is one of the biggest potential log jams at any port, so ISO and its partners began working through technical committee ISO/TC 8, Ships and marine technology, to address this need. Two key standards have arisen from this, which are ISO 28005-1, Security management systems for the supply chain – Electronic port clearance (EPC) – Part 1: Message structures, and ISO 28005-2, Security management systems for the supply chain – Electronic port clearance (EPC) – Part 2: Core data elements.

“ISO 28005-1 provides an overall management system structure for EPC whilst ISO 28005-2 describes the detailed requirements for messages,” explains Ørnulf Rødseth, Senior Research Scientist at SINTEF in Norway. Rødseth, who has worked in this field for decades, is within the ISO working group now revising ISO 28005-2 and played a key role in formulating the agreement between IMO, WCO, UN/CEFACT and ISO. SINTEF, meanwhile, is a not-for-profit research institute with a strong focus on marine shipping and maritime technologies. “The aim of SINTEF’s researchers is to make trade through ports more efficient by developing and applying automated systems and standardization,” adds Rødseth.

ISO 28005-2 goes into the detail of the core data elements for EPC, such as the reporting requirements that must take place between ships and ports. These include those specified in the Facilitation Convention, other IMO requirements and the International Ship and Port Facility Security (ISPS) Code.
So far, there has been a fragmented application of existing tools for the effective and efficient digitalization of trade. “In Norway, we have an extensive National Single Window, which also takes care of port-call logistics, so few Norwegian ports use a Port Community System,” says Rødseth. This variation also applies to the use of standards for data elements. EDIFACT, for example, is a global set of rules defined by the UN for intercompany electronic data exchange between two or more business partners via EDI. “EDIFACT has been applied very successfully to container ships and some other liner ships, but not to the 96 000 or so other ships that transport less complex cargo,” he informs. “There were other systems available and some owners used them, but not always.” Therefore, there is great scope for the adoption of standards and further harmonization, which is what prompted the agreement between the partners.

“We would like to see more harmonization and more involvement with development. We would like to see more people with an understanding of standards get involved in their development,” says IPCSA’s Morton, whilst UN/CEFACT’s Probert points out that “we are responsible for writing the standards that facilitate trade and e-business globally”. Fair, well-regulated, harmonized and standardized trade itself is consistent with inclusive economic growth and poverty reduction. “Ninety per cent of traded goods are transported by ship, so the work we are doing supports the lifeblood of the world,” concludes Rødseth.
Set sail for a new route

The global maritime user community is vast and diverse, with approximately 1.2 million people currently employed at sea. Even greater than the number of people in the ecosystem is the volume of e-mails they transmit. “Maritime transport is and will remain a vital global link in supporting sustainable international trade,” said IMO’s Kitack Lim at a digital connectivity and data standards webinar. “And that is because, whatever else may happen, one thing is certain. The movement of raw materials, energy and the transport of manufactured goods and products between continents would not be possible without maritime transport. These are things on which sustainable recovery and growth will depend.”

New partnerships for cooperation and sustainable economic recovery will be needed for the benefit of all humankind. And the standards being developed will be key. These standards are expected to move the maritime industry forward on its digital journey, delivering all the tools and capabilities it needs to ensure data continuity, maximize stakeholder connectivity and embrace process automation at scale. One thing is for certain: ISO is ready to sail into this new future. “Fair winds and following seas” to all!
How to build a robust railway
As the world’s number one overland transport system, trains are routinely expected to deliver safety, efficiency and comfort for passengers and goods. Supporting the sector, ISO standards for railways will help to make rail travel the preferred choice for the future.
Safety, security, convenience and the passenger experience have long been priorities of the railway sector, and looking forward, it is expected for this to continue. It goes without saying that security and the role of technology in keeping passengers safe will continue to be a big issue. This is particularly true when it comes to earthquakes.

The effect of an earthquake on a moving train depends on both the earthquake and the train. The slower the train and the smaller the earthquake, the higher the probability that the train will stay safely on the tracks. The larger the earthquake, the higher the chances that the train will tip or derail. The direction of ground motion is also important. Problems for moving trains can be caused by earthquakes in a couple of ways. Shaking the tracks beneath a moving train can directly cause derailment. Or the earthquake can cause offset on, or damage to, the tracks ahead of a train, causing a derailment even after the earthquake is over.

We’ve seen in the past that a railway system impacted by earthquakes can cause critical damage, and, more importantly, great sorrow. Take, for instance, the massive earthquake of 8.9 magnitude that hit mainland Japan on 11 March 2011. Various kinds of solutions have been executed based on previous experiences of disasters and accidents. So what are the lessons learned from such phenomena?

*ISOfocus* sat down with Roberto Previati, who is pioneering this work in technical committee ISO/TC 269, *Railway applications*, subcommittee SC 3, *Operations and services*, as its Chair, to discuss why railway is getting it right with new earthquake-resistant standards and what ISO standards will bring for the future of rail transport – earthquake or not.
**ISOfocus:** What improvements are being implemented to increase railway safety and efficiency, for instance during an earthquake?

**Roberto Previati:** It is worth reminding that earthquakes affect all modes of transport, but most notably railway service networks. With the United Nations-sponsored Global Seismic Hazard Assessment Program, an international project was designed to help countries prepare for future earthquakes and take steps to mitigate potential damage and reduce injury and deaths. For the first time, we were able to assemble a consistent worldwide map of earthquake zones. Assembled by a team of scientists, it provides the “magnitude” of the earthquake issue that many countries face all over the world.

How to address an earthquake has always been a major concern for the railway system. In fact, the subject has long been on the rail radar in ISO/TC 269 for railway applications, but it became centre stage when a new work item proposal (NWIP) on earthquake risk assessment was submitted by JISC, ISO’s member for Japan. Designed to help and support the rail network and its stakeholders, including authorities, infrastructure managers and railway supervisors, the standard, which was published earlier this year, gives a set of procedures to ensure that all the risks, during and after an earthquake-shaking occurrence, have been considered, assessed and mitigated.

ISO 22888, *Railway applications – Concepts and basic requirements for the planning of railway operation in the event of earthquakes*, provides the means and basic requirements for planning railway operations in order to reduce the risks in the event of an earthquake. Its aim is to mitigate the adverse effects, including damages, injuries and fatalities, on train services, which results from adequate control of train running during a seismic incident, and to predict operations and reduction of downtime, both of which are facilitated by adequate inspection and early operation.
What is your vision for the recently published ISO 22888?

Although most transport systems may be affected in the event of an earthquake, railway systems are much more vulnerable due to their complexity. Not only can railway services be jeopardized, but certain services such as high-speed trains can suffer potentially catastrophic consequences.

As some readers might be aware, there has been an impressive development of high-speed networks in the last 20 years all over the world, hence new and/or updated measures have to be put in place to cope with an eventual earthquake. ISO 22888 was born out of this need in the hope that it will allow the most appropriate countermeasures to be chosen for each railway line by taking into account the seismicity, ground condition, structural conditions and level of traffic.
How can ISO standards help to overcome any potential barriers?

Our world is getting progressively smaller thanks to the power of digitalization and new interconnected networks, as high-speed trains deliver more passengers to their destinations faster than ever before. More recently, the current sanitary emergency demonstrates that our world has become the “common home of the citizens”. In this global village, standardized strategies will have some significant benefits.

Globally speaking, the positive effects of standardization are well known and recognized. As part of a transport innovation policy, standards promote cutting-edge and sustainable technical solutions for the railway industry – from digital communications to electrification schemes – that will help to increase its competitiveness in years to come. ISO standards are therefore a powerful means of removing any “barriers” that may have existed for a long time and are still present in some cases.

ISO/TC 269 and its subcommittees are committed to developing standards that are essential to the rail sector. Essential to build state-of-the-art trains and rail infrastructure. And essential to build trains and rail infrastructure that comply with common requirements for a more competitive railway system.

*State-of-the-art rail infrastructure at Zürich main station, Switzerland.*
We are witnessing a revival in railway, for both commuters and freight. What are the trends to look out for in the coming years?

It is well known that, all over the world, the railway systems, including urban transport, are seeing prominent and huge investments in order to improve railway services. It is worth mentioning that the European Commission has proposed designating 2021 as the “European Year of Railways” to support the achievement of the objectives of the European Green Deal in the transport sector. It will promote railways as a sustainable, innovative and safe mode of transport in 2021 and, in so doing, highlight the benefits generated for its citizens, the economy and, above all, the climate.

Even in the US where, traditionally, air transport has always prevailed over rail, significant investments have been launched to improve the railway systems.

Let’s also remember the role that the railroad network has played in the current development of China, which, in the last 20 years, has come to cover 139,000 km, of which 35,000 with high-speed lines – that’s 5,000 km more than those estimated in the 2020 plan (30,000 km). Moreover, in April 2020, the first full-length container trains started their scheduled runs between China and Europe. Since then, 17 trains in total have been handled on the network.

It is certainly not a coincidence that ISO 22888 was proposed by Japan, a country where the railway system is acknowledged for its efficiency, capacity, punctuality and technology through continuous improvements. Its high-speed trains – and technological innovations – are known the world over. Take, for instance, the grand opening in 1964 of the first Shinkansen line between Tokyo and Shin-Osaka. Since then, the high-speed lines, together with even conventional railway services, have been developed extensively.
What are your goals and hopes for the future of safe railway applications and the development of such standards?

Undeniably, standards are a powerful means to foster the liberalization, interoperability, digitalization and sustainability of the railway sector. These will provide a valuable advantage to consumers in terms of accessible prices, reduced pollution and increased comfort. ISO/TC 269 works with other ISO committees to contribute to the rail cause, including ISO/TC 268 and ISO/TC 204. These committees are dealing with topics such as smart cities, intelligent transport systems and digitalization, which will enable increasingly integrated services for consumers. Together, we’ll make the global railway transport system work better for every citizen in every country around the world.

Last, but not least, we’re looking at the “green deal”, the new frontier which envisages the “zero climate impact by 2050”. This could leverage standardization to support the ambitious plans aimed to provide solutions for the climate, smart mobility, zero pollution and alternative energy sources (e.g. hydrogen, batteries, hybrid, etc.). Without doubt, the future of rail is going to be elevated as a mode of transport that reduces the energy use and environmental impacts associated with transport. Whatever happens, passengers are on track to benefit from standards.
CALLING **ISO 9001 USERS!**

What does having a quality management system mean to your organization? To find out, ISO/TC 176, the technical committee in charge of maintaining **ISO 9001. Quality management systems – Requirements**, is conducting an online survey to better understand what users want from their quality management standard and how they would like to see it change in the future.

Available in 14 languages, the survey seeks to obtain the views of ISO 9001 users on whether the standard is fit for purpose or should be improved. In addition, the technical committee has been giving consideration to “future concepts” for quality and would like to test their acceptability for inclusion in a subsequent edition of the standard.

As a current, past or even potential user of ISO 9001, your feedback is important in helping to evolve the standard in the right direction. This is a unique chance for you to contribute to shaping the world’s best-known management system. Please take a few minutes to complete the online survey by 31 December 2020. Thank you!


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**FIFTY YEARS AND STILL SHINING**

It’s a golden anniversary for **Standards Council of Canada (SCC)**, ISO’s member for the country. SCC recently marked its 50th anniversary as Canada’s respected voice and advisor for standards and accreditation, both at home and internationally. Celebrating this milestone, the standards body launched a 50th anniversary programme along with a modernized brand that will take it forward into the next five decades.

Chantal Guay, SCC’s CEO and ISO Council member, said the Council is proud to acknowledge its long history of improving the quality of life and economic prosperity of the Canadian people. “This year, we are highlighting the contributions of SCC and our partners of the Canadian standardization system, such as standards development organizations, provincial and territorial governments, Canadian businesses, regulators, Canadian experts, conformity assessment bodies and others.”

The brand’s modern look and feel “honours our history, reflects who SCC is now and looks to the future,” the CEO went on to say. In particular, SCC’s crisp, new logo features interlocked shapes that represent collaboration and harmonization, two themes at the core of the organization’s work.

Follow SCC’s anniversary celebrations on **#SCC50CCN**

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**BANKING ON SAFETY**

Whether you’re looking for a safe to store cash and important documents or a locker system to deposit valuable items, your bank is your first reliable port of call for safe solutions of all kinds. But not all security products are alike and substandard equipment or facilities could put the safety of your possessions at risk.

Recognizing the need to support the industry and ensure minimal levels of safety, ISO has just formed a technical committee for safes and vaults to help keep our valuables out of harm’s way.

ISO/TC 332, **Security equipment for financial institutions and commercial organizations**, was created to develop standards that address the safety aspect of products intended to be used in banks, financial institutions and commercial organizations. Overseen by BIS, ISO’s member for India, the committee consists of physical security experts from the financial sector across the world.

Future standards from ISO/TC 332 will cover specifications and test methods for a range of products, including safes, cash boxes, safe deposit locker cabinets, vault strong rooms, fire-resistant computer media protection cabinets and more.

Contact your national ISO member to get involved.
GROUNDBREAKING PHD WINS AWARD

PhD alumnus Dr Paul Wiegmann of the Rotterdam School of Management, Erasmus University (RSM) is the recipient of this year’s ISPIM Innovation Management Dissertation Award. In his dissertation, “Setting the Stage for Innovation: Balancing Diverse Interests Through Standardisation”, Dr Wiegmann demonstrates how standards enable innovation and help to bring new technologies to market.

Actors involved in innovation face a range of often conflicting interests from stakeholders in different areas of business and society. Based on a case study of the development of an innovative technology in the central heating industry, Dr Wiegmann’s research shows standardization to be key in achieving the balance of interests that is required for innovations to prosper.

Of his former student, Henk de Vries, Professor of standardization management at RSM, says: “In this thesis, Paul shows the relevance of standards for innovation. This is, in the first place, a recognition for the quality of his work, but it can be seen as a recognition of the relevance of standards as well.”

Dr Paul Wiegmann is Assistant Professor in the ITEM group of the Department of Industrial Engineering and Innovation Sciences, Eindhoven University of Technology. He is a member of the Board of the European Academy for Standardisation, EURAS.

VIRTUAL SESSION BREAKS RECORDS

Some 700 participants from 141 countries attended a special virtual event organized by ISO on 24 September 2020, in lieu of the General Assembly which was due to take place in Abu Dhabi, United Arab Emirates.

The challenges faced by ISO members during the COVID-19 pandemic and business continuity were two key issues highlighted during the event. Thanking members for their commitment to the organization, ISO President Eddy Njoroge said he was confident that “we will all emerge from this crisis stronger and more resilient than ever.” He also urged members to vote for the approval of the proposed ISO Strategy 2021-2030, which will be a key milestone for ISO.

The virtual session also featured a report from the ISO Secretary-General, Sergio Mujica, who expressed his pride in the organization’s “capacity to deliver in very difficult circumstances.” This was later followed by the announcement of the winner of the Lawrence D. Eicher Award, which this year went to ISO technical committee ISO/TC 45 for rubber and rubber products (see above).

Finally, participants were introduced to the candidate for next ISO President, Ulrika Francke from Sweden, before a round of questions, centred for the most part on the organization’s future, concluded ISO’s first-ever virtual session for members.

RUBBER STAMPED

From washing up gloves to hose pipes, to the shock absorbers used in earthquake-proof buildings, rubber touches everyone all over the world. The ISO committee for rubber products has just been granted the prestigious Lawrence D. Eicher Award, which recognizes excellence in ISO’s technical work.

ISO/TC 45, Rubber and rubber products, was selected amongst more than 330 ISO technical committees for its outstanding contribution to international standardization. The high level of expertise, strong leadership and collaborative spirit made the expert committee a prime candidate for the award, the selection panel noted. Held up as an embodiment of ISO values and processes, ISO/TC 45, whose secretariat is held by DSM, ISO’s member for Malaysia, was commended for its ability to respond rapidly to market needs by providing standards that help manufacturers deliver materials and products that are safe and effective for use.

Safety, quality and trade facilitation are just some of the benefits that International Standards bring to the global rubber industry. There are currently 442 ISO standards used throughout the rubber world covering rubber processing tests, chemical tests, physical tests of vulcanizates, specifications for compounding materials and a variety of product tests including hoses and latex.

Watch the video at gotoi.so/TC45video.