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E-LABELING AND DIGITAL PRODUCT PASSPORTS

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E-LABELING AND DIGITAL PRODUCT PASSPORTS

FEATURED STORIES

IN THIS ISSUE

LETTER FROM THE USNC PRESIDENT

Veronica Lancaster – USNC President; Vice President, Standards Programs at Consumer Technology Association

This is such an exciting time for U.S. experts in the U.S. National Committee. As we bid farewell to summer, and jump into the busy fall meeting schedule including the IEC General Meeting. Our thoughts turn to the future of standardization and conformity assessment, including e-labeling and digital product passports (DPP). With the rapid evolution of electrotechnical products, there's a growing need for digital information. E-labeling and DPPs will drive efficiency, transparency, and innovation by streamlining how we communicate product information, compliance data, and sustainability metrics.

E-labeling replaces traditional physical labels with digital labels that can be accessed through QR codes or links. For consumers, it means that product information can be accessed online, which is more commonplace than keeping manuals.[1] For IEC experts, this means compliance information can be updated in real-time. Manufacturers can update product compliance status remotely if new standards emerge or existing certifications are revised, ensuring products meet evolving standards without needing recalls or relabeling.

E-labeling addresses the challenge of limited space on small devices by replacing physical labels with digital ones. Products may require numerous certifications, making it nearly impossible to display all relevant information physically. E-labeling also provides details in multiple languages and can be specific to regional variations. It also reduces the environmental impact by eliminating the need for printed manuals and labels, aligning with efforts to make production processes more sustainable.[2]

1 Muller, P. March 8, 2023. E-labeling: The Road to Reduced Medical Device Packaging Material. MedTech Intelligence. Innovative Publishing Co., Inc. https://medtechintelligence.com/feature_article/e-labeling-the-road-to-reduced-medical-device-packaging-material/

2 Smith, H. K. (2024). Sustainable packaging and material selection for green supply chains. https://www.researchgate.net/profile/Hussein-Smith/publication/382116895_Sustainable_packaging_and_material_selection_for_green_supply_chains/links/668e703ec1cf0d77ffcba1f8/Sustainable-packaging-and-material-selection-for-green-supply-chains.pdf

DPPs not only address compliance labeling but also offer a complete digital record of a product's lifecycle—from design and production to usage and disposal.[3] For electronics, DPPs provide details on design, sourcing, energy use, repairability, and recyclability. They include key information like voltage ratings and energy efficiency, helping consumers and regulatory bodies understand product details. DPPs also support the shift towards a circular economy by offering insights on materials and components. This helps consumers make informed decisions about upgrades, repairs, or disposal, promoting resource conservation and reuse.

DPPs provide transparency in global supply chains by detailing the origins of components like semiconductors and capacitors, including ethical sourcing and environmental impact data. This is crucial for regulatory compliance and helps manufacturers optimize supply chains for efficiency and sustainability. DPPs centralize regulatory demands and data, making it easily accessible to regulators, consumers, and auditors.

There are challenges in implementation, particularly around standardization. Integrating DPPs into production and supply chains requires uniform protocols for seamless data exchange. There is significant work in the IEC contributing to the broader goals of DPPs, aiming for universal adoption without disrupting operations. These include the following standards:

» IEC 62474: *Material declaration for products of and for the electrotechnical industry* – TC 111: *Environmental standardization for electrical and electronic products and systems*

» IEC 62890: *Lifecycle management for systems and products used in industrial-process measurement, control, and automation* – TC 65: *Industrial-process measurement, control, and automation*

» IEC TR 62824: *Guidance on material efficiency considerations in ecodesign* – TC 111: *Environmental standardization for electrical and electronic products and systems*

» IEC 61360: *Common data dictionary for electrotechnical products* – TC 3: *Information structures, documentation, and graphical symbols*

» IEC 63000: *Technical documentation for the assessment of electrical and electronic products with respect to hazardous substances* – TC 111: *Environmental standardization for electrical and electronic products and systems*

» IEC 62430: *Environmentally conscious design for electrical and electronic products* – TC 111: *Environmental standardization for electrical and electronic products and systems*

As DPPs store extensive product data, robust cybersecurity measures are essential to protect sensitive information. Given the likelihood of DPPs becoming mandatory in some regions, interoperability will be crucial.

From simplifying regulatory compliance to advancing sustainability efforts, e-labeling and digital product passports are transforming the electrotechnical sector. They offer a pathway to more transparent, efficient, and sustainable product lifecycles. While challenges around standardization, security, and adoption costs remain, the benefits of these digital innovations position them as key drivers in the future of electrotechnical product management and compliance.

3 Basal, M., & Demircioglu, A. (2024). Digital Product Passport in Marketing and the Future of Sustainable Development. American Journal of Industrial and Business Management, 14(5), 759-782. https://www.scirp.org/journal/paperinformation?paperid=133462

U.S. PROPOSES A NEW INTERNATIONAL STANDARD ON E-LABELING FOR ALL INDUSTRY

Hae Choe – U.S. SMB Member, USNC Technical Management Committee (TMC) Chair, USNC Council member, USNC TAG to IEC SC 62B and SC 62C

A U.S.-developed proposal to form a new IEC project committee to work on an international standard for consistent and efficient electronic labeling across industries is currently in circulation for vote with a deadline of 6 December 2024.

All products need to have a label to indicate what it is. With the emergence in technology, many sectors are developing or have developed electronic labels for their products or equipment instead of physical labels. That is not to say that physical label is not being used or needed. In fact, for safety reasons especially, having a physical label in place is vital.

However, to address regulatory requirements as well as product/equipment instructions, many sectors have developed or are looking to develop their own requirements for electronic labels or e-labels, whether it is unique device identifier in medical devices or QR codes for products or services. Depending on the sector and types of equipment or product, there are different requirements and possibly, regulatory restrictions, but general speaking, we can all agree that using some type of e-labeling will require less space on the product, may make it easier to use and is environmentally friendly.

For consumers, manufacturers, regulators and the general public, it would be ideal to have the same type of e-labeling for all devices or equipment. Can you imagine a world where if something is e-labeled, we can all expect that it will contain a specific type of information and regulation or requirement? That is where this proposal comes in; the idea is to have representation from all committees that would utilize e-labeling to see if there are some requirements that everyone can achieve consensus on. If there is a way to achieve this, it would be an IEC horizontal standard that the world can utilize. There are e-labeling standards for different industries and there may be ones that can be applied more broadly, but one thing that is different for this proposal is that it will open the participation so that all sectors and industry can and will be represented. If this proposal is approved, the new project committee will have all interested national committee members represented as well as all

interested committee members representing their IEC technical committee, subcommittee, project committee or systems committee. Liaisons from ISO and ITU-T will hopefully join this work as well.

This proposed international standard will provide requirements and guidelines for the design and implementation of electronic labels for a wide range of products across industries. The design principles, technical specifications, and implementation guidelines for electronic labels, including but not limited to those used in consumer goods, industrial products, and medical devices will be addressed. This standard will not prescribe the content of the electronic label, but rather will provide input to promote the use of consistent and effective electronic labelling practices across a broad range of sectors and products. An electronic label is intended to be machine readable. The electronic label has information embedded in it or is a pointer to the electronic storage location or combination of both. Overall, the proposed standard is a necessary and important step towards ensuring that electronic labels are consistent, effective, and meet the needs of users, manufacturers, designers, and authorities having jurisdiction across a wide range of industries.

The use of electronic labelling has become increasingly important due to the growth of e-commerce and the need for accurate product information to be easily accessible by consumers. However, the lack of a common standard for all industries has led to confusion and inconsistency in the design and implementation of electronic labels across different industries and jurisdictions.

It may be beneficial to conduct some type of feasibility study to determine what level of agreement and consensus can be achieved from different industries. Then, the project committee can lay out the framework for the standard or series of standards, being mindful to not duplicate the work that is already available or sector specific. Instead, it would be beneficial to determine if there are ways to achieve consensus on requirements that can apply to all sectors.

At the current time, we have identified the following groups that should be consulted to have representation on the project committee, if this work is approved to go forward:

IEC/SC 3D, IEC/TC 17, IEC/TC 21, IEC/TC 35, IEC/TC 38, IEC/TC 47, IEC/TC 57, IEC/TC 59, IEC/TC 61, IEC/TC 62, IEC/TC 65, IEC/SC 65E, IEC/TC 66, IEC/TC 91, IEC/TC 111, IEC/TC 119, IEC/TC 124, IEC/SyC SM, ISO/IEC JTC1/SC 27, ISO/IEC JTC1/SC 29, ISO/IEC JTC 1/SC 31, ISO/IEC JTC 1/SC 41, and ISO/IEC JTC1/SC 42

This U.S. proposal has been in the works for a couple of years because the USNC CAPCC task force on e-labeling was created to address this issue. With many of the members belonging to NEMA, this led to NEMA's group on e-labeling and a position paper on this topic.

NEMA represents over 300 electrical equipment and medical imaging manufacturers that make safe, reliable, and efficient products and systems. NEMA, as an SDO, is accredited by the American National Standards Institute (ANSI). NEMA is also accredited by the USNC of ANSI as a U.S. TAG administrator. NEMA administers over 70 TAGs or mirror committees to IEC TC/SC/SyC/PCs.

As the Managing Director of International Standards and Technical Services at NEMA, this came across my desk to be proposed as a new U.S.-initiated proposal. As the Chair of the USNC TMC (Technical Management Committee) and the U.S. voting member to the IEC SMB, TMC members asked for this item to move forward. I was able to socialize this with other SMB members and received positive input. SMB asked for a webinar with IEC TC/SC/PC/SyC leadership to socialize this proposal. This was conducted on 7 August 2024. The input that was received at the webinar as well as input from the SPCG (Standardization Programme Coordination Group) was used to update this proposal before being circulated in IEC.

If there are any questions, please feel free to reach out.

JUST PUBLISHED

Check out the latest and greatest recently published standards by the IEC. A complete list of recently published documents can be found here. Here's just one (of many!) we think you'll find interesting:

IEC 60335-2-80:2024 EXV-CMV HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – PART 2-80: PARTICULAR REQUIREMENTS FOR FANS

IEC 60335-2-80:2024 deals with the safety of electric fans for household and similar purposes, their rated voltage being not more than 250 V for single-phase appliances and 480 V for other appliances including direct current (DC) supplied appliances and battery-operated appliances.

Examples of the types of fans that this standard is applicable to are:

- ceiling fans;
- duct fans;
- infant fans;
- partition fans;
- pedestal fans;
- table fans.

This standard also applies to separate controls supplied with fans.

Infant fans are also tested to the applicable requirements of the ISO 8124 series, since it covers hazards other than those arising from the use of electricity such as toxicological hazards.

Appliances not intended for normal household use but which nevertheless can be a source of danger to the public, such as appliances intended for use in shops, in light industry and on farms, are within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account:

- persons (including children) whose physical, sensory or mental capabilities; or lack of experience and knowledge prevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

JUST PUBLISHED, CONT.

Attention is drawn to the fact that:

- for appliances intended to be used in vehicles or on-board ships or aircraft, additional requirements can be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

This standard does not apply to:

- appliances intended exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour, or gas);
- fans incorporated in other appliances.

This fourth edition cancels and replaces the third edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

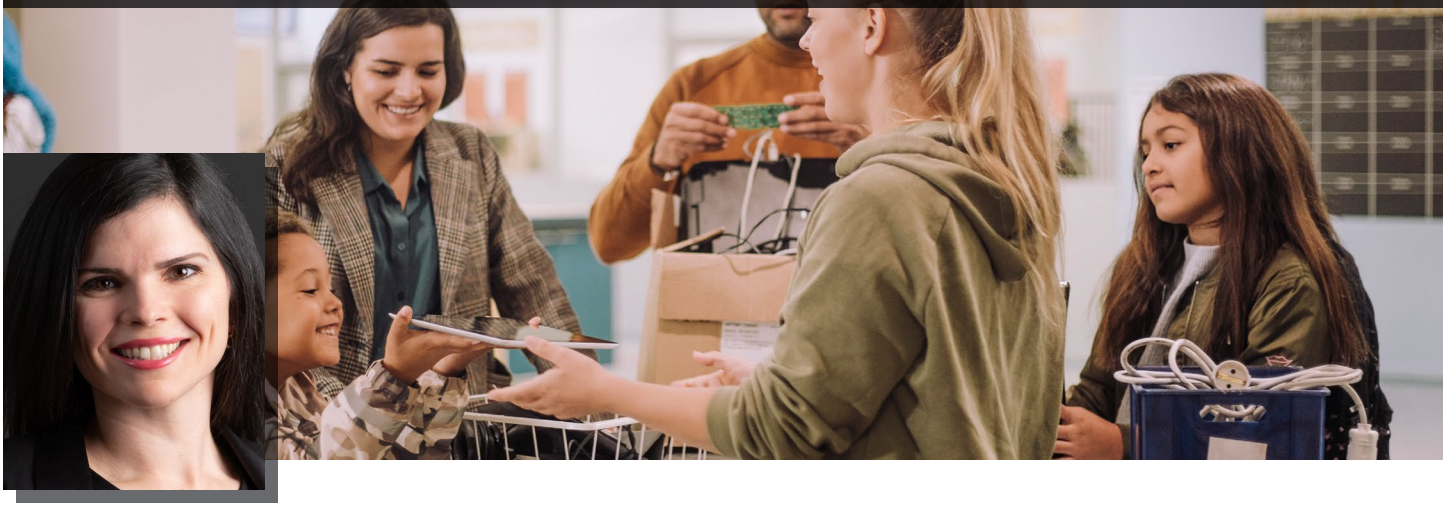
- alignment with IEC 60335-1:2020;
- conversion of some notes to normative text (Clause 1);
- introduction of requirements for infant fans (7.12, 7.12.1, 8.1.1, 11.8, 20.2, 21.103, 22.44, 22.54, 22.102, B.22.3, B.22.4);
- introduction of the use of test probe 19 (8.1.1, 20.2, B.22.3, B.22.4);
- introduction of surface temperature limits (Clause 11);
- clarification of testing of fans for use in a tropical climate (5.7, Annex P 11.8);
- clarification of requirements for remote operation of fans (22.40, 22.49, 22.51).

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

Developed by IEC TC 61 Safety of household and similar electrical appliances.

DIGITAL PRODUCT PASSPORTS HELP DRIVE BATTERY CIRCULARITY IN FORTHCOMING UL STANDARD

Caitlin D'Onofrio – Sustainability Program Manager, UL Standards & Engagement



In an era marked by the urgent need for sustainable practices, the significance of standardized frameworks to measure and report circularity cannot be overstated. Circularity—the process of minimizing waste by maintaining the value of products, materials, and resources for as long as possible—has emerged as a critical component in the lifecycle of products, particularly in the rapidly evolving landscape of energy storage solutions like lithium-ion and other secondary batteries. At the forefront of this movement is UL Standards & Engagement's Sustainability program, which successfully spearheaded the development of the forthcoming standard UL 3601, *Measuring and reporting circularity of lithium-ion and other secondary batteries*.

COMPLETING THE CIRCUIT—SUSTAINABILITY THROUGHOUT THE BATTERY LIFE CYCLE

This standard is designed to enable circularity and reduce adverse environmental impacts associated with the design, manufacture, use, and end-of-life management of lithium-ion and other secondary (rechargeable) batteries. While multiple existing standards have addressed circularity and batteries as separate subjects, there is a need for a synergy of both concepts together in one standard. The standard will therefore provide essential circularity guidance for battery manufacturers to implement meaningful and quantifiable circularity interventions through the battery life cycle. It will address the urgent need for leading practices amidst rapid electrification and increasing regulatory pressures.

Batteries covered in this standard include:

- Electric vehicle batteries
- Industrial batteries, such as those used for solar energy storage
- Batteries for light means of transport, such as e-bikes, electric scooters, and golf carts
- Batteries for outdoor power tools, such as lawn mowers and leaf blowers
- Emergency power backups

The proposed standard is targeted toward battery manufacturers and is designed to encompass all the stages of the battery's life cycle. Major sections include Compliance; Evaluation and Assessment Criteria; Design; Materials; Manufacturing and Operations; Extension of Useful Life; End of Life Management; Marking; and Corporate Practices.

DIGITAL PRODUCT PASSPORTS

Within the section for Corporate Practices is an optional requirement for digital product passports, which are emerging as a vital tool in the transition toward a circular economy. The DPP requirement will be achieved by printing or engraving each battery with a QR code in accordance with ISO/IEC 18004. Together with required markings, these digital records will encapsulate detailed information about a product's materials, components, and lifecycle—from design and manufacturing to recycling and disposal—in compliance with the requirements of EU Regulation 2023/1542, which states:

"In order to enhance transparency along supply and value chains for all stakeholders, it is necessary to provide for a battery passport that maximises the exchange of information, enables tracking and tracing of batteries and provides information about the carbon intensity of their manufacturing processes as well as the origin of the materials used and whether renewable material... is used, about composition of batteries, including raw materials and hazardous chemicals, about repair, repurposing and dismantling operations and possibilities, and about the treatment, recycling and recovery processes to which the batteries could be subject to at the end of their lifetime."

By providing transparency and traceability, these DPPs will empower consumers, manufacturers, remanufacturers, and regulators to make informed decisions that promote sustainability. They help ensure that batteries are designed for longevity, can be easily repaired or recycled, and comply with environmental regulations—ultimately reducing waste and conserving resources.

For consumers, the DPPs and required markings in UL 3601 will provide clear instructions for proper disposal methods. According to a recent ULSE consumer insights survey, a majority (78%) of U.S. adults are concerned about the fire, environmental, and health risks associated with improper battery disposal, but almost half (46%) do not know lithium-ion batteries can be recycled. This confusion leads to unsafe behaviors, as 36% reported throwing lithium-ion batteries in the trash, and 30% mixed them with other recyclables. These behaviors have consequently led to an average of three lithium-ion battery fires at waste management facilities per month between 2013 and 2020. By providing easy access to information on proper recycling methods, UL 3601 will help ensure batteries are returned to designated collection points rather than discarded improperly.

For recycling and remanufacturing facilities, these requirements will help ensure that batteries can be

properly identified to facilitate safe discharge, disassembly, and material recovery. Because there are several different types of lithium-ion batteries, with each containing a different chemical composition, each requires a different process to discharge and disassemble. By referencing the digital product passports on these batteries, recycling and remanufacturing facilities will be able to easily determine the chemical makeup and corresponding procedures—improving both safety and efficiency during the recycling process while also maximizing the yield of valuable materials in the batteries to reduce waste and environmental impact.

For regulators, the DPPs and required markings in UL 3601 will help ensure that batteries comply with legislation and incentive programs. In 2023, New York City enacted Local Law 39, which prohibits the sale, lease, or rental of e-mobility devices and their batteries that do not meet UL safety standards UL 2849, UL 2272, and UL 2271. And at the federal level, H.R. 1797—the Setting Consumer Standards for Lithium-Ion Batteries Act, which would require the U.S. Consumer Product Safety Commission to issue a safety standard for rechargeable lithium-ion batteries used in e-mobility devices, recently passed in the U.S. House of Representatives and is currently awaiting a vote in the Senate as S. 1008.

DEVELOPMENT OF UL 3601

Development of UL 3601 began at ULSE with the recognition that lithium-ion batteries, while essential for modern technology, present significant environmental challenges. These batteries are crucial for everything from electric vehicles to renewable energy storage, but their lifecycle poses risks if not managed properly. Thus, the concept of circularity—ensuring that batteries are designed, used, and disposed of in ways that minimize environmental impact—became a critical point of focus for ULSE's Sustainability program.

To tackle this complex issue, the ULSE sustainability program assembled a team of expert stakeholders from various disciplines, including data science and engineering, battery technology, environmental science, sustainability standards, and testing, inspection and certification. The team's goal was to create a dynamic and multidisciplinary group capable of addressing the myriad aspects of battery circularity.

Over the course of 15 weeks, the team orchestrated a dynamic process that included multiple stakeholder engagements, thorough workshops, desk reviews, and both in-person and virtual meetings to refine the draft document. There were two critical workshops held during the project to gather real-time input on the proposed standard draft, identify potential challenges, and build consensus around the key criteria for measuring battery circularity.

With the proposed standard draft complete, UL 3601 is now moving through the UL standards development process and will be reviewed and balloted by a technical committee. The proposed standard will be submitted for preliminary review in September 2024; ballot and public review is estimated to be open in Q4 2024, with the standard expected to be published in Q2, 2025.

Because of the speed and efficiency of the UL standards development process, UL standards like UL 3601 can also serve as valuable seed documents for IEC standards. The ULSE process leverages a network of industry expertise to accelerate the creation of standards, often incorporating global insights from stakeholders around the world early in the process to ensure more globally relevant standards. The advanced development stages and comprehensive international input of these standards provide a solid foundation for drafting and refining IEC standards.

UL Standards & Engagement is proud to lead this effort through our collaborative framework with industry stakeholders. Once published, this standard for circularity of lithium-ion batteries will be a crucial step toward advancing the UL mission of working for a safer world.

GET INVOLVED

UL standards are developed through a consensus-based process, which integrates scientific and testing expertise with input from our TC members and stakeholders. TC members represent a variety of interests including industry, academia, government, retail, and manufacturing. If you are involved in the design, construction, sale, or remanufacturing of lithium-ion batteries, and you would like to share your expertise in the development of UL 3601, please take a moment to learn how you can get involved.

AUTHOR BIO

Caitlin D'Onofrio is the Sustainability Program Manager for UL Standards & Engagement, a safety advocacy organization dedicated to advancing change on pressing risks affecting people, property, and planet. In her work, Caitlin leads the sustainability program team, actively presents, and collaborates with industry experts on launching & building the Standards Sustainability Portfolio. She is also the Technical Committee Chair for ULSE's Sustainability Portfolio including the following TCs: TC 3600, Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations; TC 2904, Chemical and Particle Emissions from 3D Printers; TC 2700, Sustainability of Cleaning Products; TC 110, Sustainability of Mobile Phones; and TC 7001, Sustainability of Household Appliances.

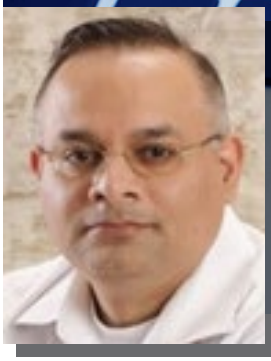
THANK YOU TO OUR SEPTEMBER 2024 USNC MANAGEMENT MEETING HOST, ARESCA!

On September 10–12 the three USNC policy committees (USNC Council, Technical Management Committee (TMC) and the Conformity Assessment Policy Coordinating Committee (CAPCC) met in Norwich, VT at the ARESCA facilities for three days of fruitful meetings. Thank you to ARESCA for hosting us!

USNC policy committee members at the ARESCA facilities in Norwich, VT for the September 2024 USNC Management Meetings.

UNDERSTANDING THE AI-/ML-BASED MEDICAL SOFTWARE: MODEL DEVELOPMENT AND REGULATORY COMPLIANCE, EXPLAINED!

Abhineet Johri – Regulatory Affairs Manager and Senior Key Expert, Siemens Healthineers. USNC TAG to IEC SC 62B and expert on IEC SC 62B/PT 63524

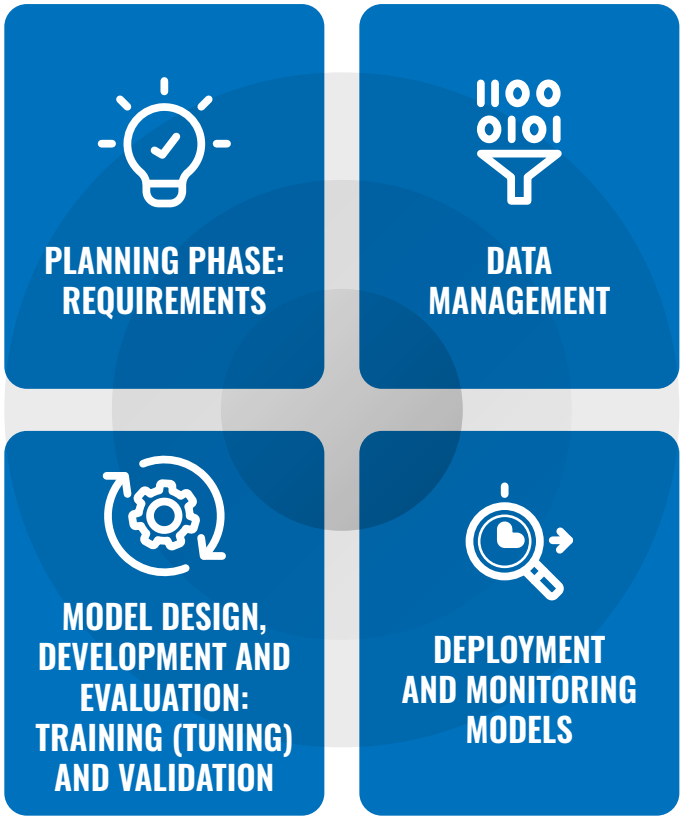


We can think of an artificial intelligence / machine learning (AI/ML) model development life cycle as the sequence of steps which involves much more than data processing, model training, and model deployment.

There needs to be business and data understanding, data collection techniques applied, data analytics, model building, and model evaluation. Furthermore, after deployment, we need constant monitoring and maintenance on various aspects like performance to maintain device safety and effectiveness.

The AI/ML life cycle workflow process consists of steps that provide a streamlined structure to the model development and effectively utilizes the various stakeholder communications and provides a clear expectation on their roles and responsibilities. Following these steps helps manufactures build sustainable, scalable, cost-effective, quality AI devices.

THE FOUR FOUNDING PILLARS OF THE PROCESS WORKFLOW:



REQUIREMENT DEFINITION (PLANNING) PHASE.

This phase is where the problem to be solved or the opportunity to be explored using AI is defined. It's a critical stage that sets the direction for the entire development. Having a clear, well-defined requirement helps guide data collection, model development, and ultimately, the successful implementation of the solution.

The planning phase involves assessing the scope, success metric, and feasibility of the ML application. This is to understand the business needs and how to use machine learning to improve the current process.

One must understand the cost-benefit analysis and how the solution will develop in multiple phases. Furthermore, this phase defines clear and measurable success metrics for business, machine learning models (claims, accuracy, F1 score, AUC etc.), and economic (key performance indicators) perspectives.

This helps create and perform a feasibility analysis, which generally consists of the information about availability of the data, applicability, legal constraints, robustness, and scalability, explainability, and resources information.

DATA ACQUISITION AND PREPARATION PHASE.

After identifying the requirements, the next step is to collect and prepare data. AI and machine learning algorithms need data to learn, so this stage involves gathering relevant data and preparing it for use. This would include cleaning the data, data curation, or transforming the data into a format suitable for the chosen AI models. This could be the most time consuming and crucial stage in the development cycle.

The data preparation section has four steps: data procurement and labeling, cleaning, management, and processing.

DATA COLLECTION AND LABELING

This step decides how we will collect the data: by gathering internal or publicaly available data, buying it from data brokers or collaboration partners, or generating synthetic data.

After collection, we need to label the data. Buying cleaned and labeled data is not feasible for all scenarios and all manufacturers; it heavily depends on the claims that would be made for the AI/ML device. We may also need to tune the data selection during the development process.

Data collection and labeling are one of the most time consuming and cumbersome tasks. Manufacturers also need to observe all legal requirements in the countries where the device would be marketed.

DATA CLEANING

Next comes data curation and cleaning the data by imputing missing values, analyzing incorrectly labeled data, removing outliers, and reducing the noise. A data pipeline is created to automate this process and perform data quality checks. There are various quality gates and techniques of verification that can be applied.

DATA PROCESSING

The data processing stage involves feature selection, dealing with imbalanced classes, feature engineering, data augmentation, and normalizing and scaling the data.

For reproducibility, store and version the metadata, data modeling, transformation pipelines, and feature stores.

DATA MANAGEMENT

Finally, there needs to be an infrastructure for data storage solutions (long term archival), data versioning for reproducibility and traceability, and storing metadata. This will ensure a constant data stream for model training. There are regulatory requirements for data reproducibility and traceability that the manufacturers must comply with.

MODEL DEVELOPMENT AND TRAINING (MODEL ENGINEERING) PHASE.

This phase involves developing the AI model and training it with the prepared data. All the information from the planning phase is used to build and train a machine learning model.

This is an iterative activity, often involving multiple rounds of model development and refinement based on the model's performance during training until the expected performance or output is reached.

- Building effective model architecture by doing extensive research
- Defining model metrics
- Training and validating the model on the training and validation dataset
- Tracking experiments, metadata, features, code changes, and machine learning pipelines
- Performing model compression
- Interpreting the results by incorporating domain knowledge experts
- This phase focuses on model architecture, code quality, machine learning experiments, and model training.
- The features, hyperparameters, ML experiments, model architecture, development environment, and metadata are stored and versioned for reproducibility.

MODEL EVALUATION AND REFINEMENT PHASE.

Once the model has been trained, it must be evaluated to see how well it performs. This involves testing the model on unseen data and analyzing its predictions. If the model's performance is not satisfactory, it is refined and tweaked. This could mean adjusting the model's parameters, changing the model's architecture, or even returning to the data acquisition phase to gather additional data.

- There is a regulatory requirement to have separate training and validation data sets.
- The model is tested using test dataset involving subject matter experts to identify the error in the predictions.
- As a follow-up step, test model for robustness on random and real-world data.
- Every process is recorded and versioned to maintain quality, traceability, and reproducibility.
- This stage decides if the model is ready for productization or not.

MODEL DEPLOYMENT PHASE.

Once the model is performing as expected, it is deployed to a production environment where it can start solving real-world problems. Deployment might involve integrating the model with existing systems, creating an application or service that uses the model.

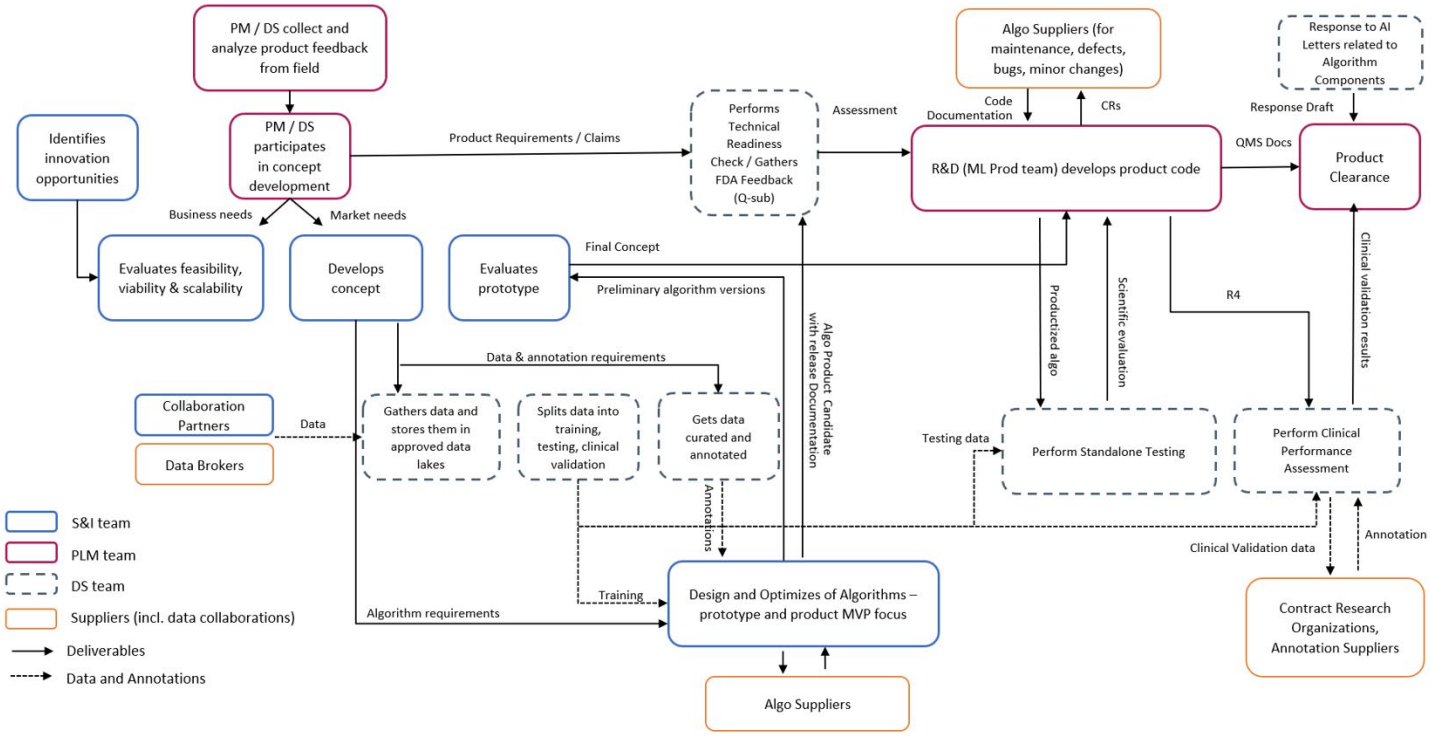
Generally, the models can be deployed on cloud and local servers, web browsers, packaged as software, and on edge devices. After that, you can use API, web apps, plugins, or dashboards to access the predictions.

The deployment strategy is important, ensuring that the changes are seamless and that they have improved the user experience. Moreover, there should be a disaster management or a rollback plan. It should include a fallback strategy, constant monitoring, anomaly detection, and minimizing losses.

MACHINE LEARNING OPERATIONS (MONITORING AND MAINTENANCE) PHASE.

Most of the time, after deployment the model will need to be maintained and updated. In this phase, the team monitors the model's performance to ensure it's still working as expected, updating the model with new data, or refining it based on feedback from its intended users. This also sometimes called as AI logging.

Monitoring can be on model metrics, hardware and software performance, and customer satisfaction.



In the event of reduced performance, the team will assess the issues and try to train the model on new data or make changes to model architectures. It is a continuous process.

Furthermore, teams often need to go back to a previous phase (e.g. going from model evaluation back to model development). This is to be expected and should be considered a normal part of the AI life cycle.

In rare cases, we must revamp the complete machine learning life cycle to improve the data processing and model training techniques, update new software and hardware, and introduce a new framework for continuous integration.

IMPORTANCE OF EACH STAGE IN THE AI/ML MODEL LIFE CYCLE

Each stage in the AI life cycle has a specific and critical role. The problem definition phase establishes the device development strategy. The data acquisition and preparation phase create the foundation for the AI solution. The model development and training phase turns this foundation into a functional tool. Then, the model evaluation and refinement phase ensure that the tool/model meets the expected standards. Finally, deployment brings the AI solution to its intended users, and maintenance keeps it running smoothly over time.

In addition, AI devices often need to adapt to changes quickly, whether these are changes in the project's

requirements, unexpected issues with the data, or new developments in AI technology. Building this adaptability into the project life cycle can be difficult but is crucial for long-term project success.

BENEFITS OF IMPLEMENTING A ROBUST AI PROJECT LIFE CYCLE

Employing a structured AI/ML model development life cycle has numerous benefits:

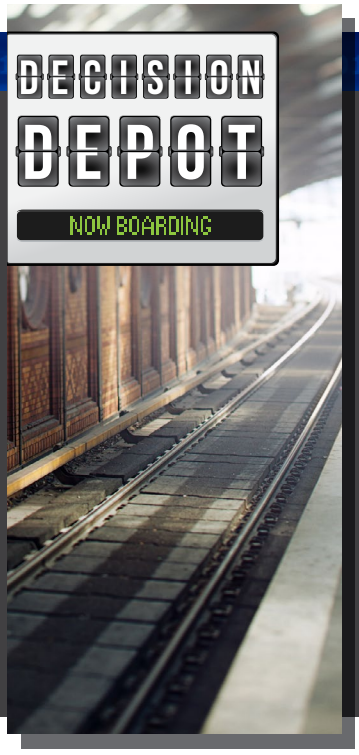
- Increased success rate
- Risk reduction.
- Improved efficiency and productivity from all stakeholders.
- Enhanced quality of AI solution

In short, a well-defined AI life cycle can help teams plan their AI projects more effectively, maximizing their chances of success while minimizing potential hurdles.

CONCLUSION AND KEY TAKE-AWAYS

Defining and using a well-defined AI/ML model life cycle process or workflow framework should not just be considered a best practice, but rather an essential and critical part of quality management system of the device manufacturer. It should be an integral part of successful AI development. Following and complying with a life cycle approach can significantly improve the efficiency, productivity, and overall success of AI projects, making it an essential consideration for any team venturing into the world of AI.

This would also greatly support the fulfillment of various regulatory requirements and expectations from various regulatory agencies across the globe.



DECISION DEPOT

This column provides easy access to recent decisions that have been made regarding IEC and USNC policies and procedures that directly affect our members. Click the links below to access the recent decisions.

See the Decision Lists below for decisions made at the following meetings: SMB meeting 181 held on 2024-10-21 in Edinburgh (UK); CAB meeting 56 held on 2024-10-21 in Edinburgh (UK); General Assembly meeting held on 25 October 2024 in Edinburgh (UK); and IEC Board meeting held on 23 October 2024 in Edinburgh (UK).

SMB/8260/DL

CAB/2561/DL

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POSITIVE LEADERSHIP: LESSONS FROM TED LASSO

Veronica Lancaster – USNC President; Vice President, Standards Programs at Consumer Technology Association

This article is part of a series around the USNC Strategic Objectives.

It is not always easy to stay positive as a leader, especially when faced with challenges like competition, cultural shifts, or adversity. However, leading from a positive place can be transformative. This lesson is epitomized by Ted Lasso, a fictional American football coach hired to lead a British soccer (football) team. The show, while humorous, offers profound leadership insights—which I am reminded of even when streaming the series for the eighth time.

Ted's leadership style demonstrates the power of positivity, empathy and belief. It's a reminder that positivity breeds positivity. Many articles extol the leadership lessons from the show, and this is my love letter and contribution to celebrate the power of positive leadership.

LEAD FROM POSITIVITY

Ted is an optimist. He wants to help his team reach their potential. Not just his team, but he wants each individual team member to reach their potential. This is an important lesson; being a realistic and optimistic leader creates an energetic climate, creating a sense of purpose.[1] Change is not easy. Positive change requires that leaders consider change itself as science and art, meaning a shift in thinking.[2] This is where Ted thrives as a coach. He understands that he does not have to be a master of soccer for his team to succeed, but he needs to be a great leader. In the face of adversity, he prevails through positive change, and his team thrives.

Change is typically met with resistance, and facing adversity as a leader is difficult. It means standing your ground, being flexible, supporting choices, but guiding

1 Yaeger, D. (2023, July 12). Ted Lasso Shows That Great Leadership Travels. Retrieved from Forbes: https://www.forbes.com/sites/donyaeger/2023/07/12/ted-lasso-shows-that-great-leadership-travels/

2 Sutton, J., & Neuhaus, M. (2024, February 28). Change Management: The Art of Positive Change. Retrieved from Positive Psychology.com https://positivepsychology.com/change-management/

those choices. In essence, it means coaching. It would be easy to get frustrated. If we can shift our mindset as leaders to support change through positivity, we help employees see opportunities through their own growth.[3] Hopefully, we've taught them how to pass that along, creating a positive culture.

EVERY CHOICE IS A CHANCE

Again, without spoilers, a personal condition is revealed about Ted to a member of the media. The journalist who learned the info writes an article exposing the personal information, but respects Ted enough to disclose the source. In making that choice, the journalist faces his own consequences, but sets the tone for his future relationship with Ted. And their relationship is quite beautiful. It's the type of relationship we all want with an adversary, which this particular journalist was. It also sets Ted up to decide to keep this condition to himself, or to be honest and own the story. After he is exposed and before he addresses the media, he shares his condition with his team to create trust and as a vulnerability.

"Y'all found out about something from somewhere, when you should've found out about it from me first. But I chose not to tell y'all, and that was dumb. You know, fellas, we make a lot of choices in our lives every single day, ranging from, "Am I really about to eat something called Greek yogurt?" To, "Should I leave my family and take a job halfway around the world?" Me choosing not to be forthright with y'all, that was a bad choice. But I can't be wasting time wishing for a do-over on all that. 'Cause that ain't how choices work."[4]

Preach on, Coach Lasso. The choices we make are important—whether it's stopping for coffee knowing we will be late getting to the office through a bad commute to taking advantage of a situation that we know will hurt someone else in the process. We should think through our choices and consider them as opportunities to be better. Think through the ramifications of the choice before you make it.

DO THE RIGHT THING

Many books, articles, laws and procedures are written around the importance of ethics. It's important to acknowledge that people have different aspects of ethics, facts, values, and beliefs, which drive what we believe to be right. We are all familiar with the term "alternative facts" in the American political climate. The term "alternative facts" creates an interesting dichotomy in considering the development of our personal beliefs and ethical approaches to challenges.

I believe Ted Lasso takes a virtue approach to ethics. Virtue ethics emphasizes virtues and moral character as foundational. We know that virtue is an excellent trait, but it is also complex in that many things in our lives shape our virtues. For example, our virtues are shaped by our motivations, vices, and morals through character, education, wisdom, relationships, and our emotions.[5] These shape the type of people we strive to be and how we live, becoming characteristic of who we are.[6]

Virtue drives who Ted is, and that is shaped through his life choices, experiences, and learnings. When he is faced with the opportunity to throw one of his colleagues under the bus, he chooses to make fun of himself and shift the perspective. He chooses not to disparage others to make himself look better. We should all strive to live like that and do the right thing—because it is the right thing. If we can't do it without having to explain it, or if we wouldn't do it to our grandmothers, then it shouldn't be done. Lead by doing the right thing, even if it's hard and even if you lose.

3 Ibid.

4 Sudeikis, J., Lawrence, B., Hunt, B., & Kelly, J. (2021, October 8). Inverting the Pyramid of Success. Apple TV.

5 Hursthouse, R. a. (2023, Fall). Virtue Ethics. Retrieved from The Stanford Encyclopedia of Philosophy: https://plato.stanford.edu/archives/fall2023/entries/ethics-virtue

6 Velasquez, M., Andre, C., Shanks, T., & Meyer, M. J. (2015, August 1). Thinking Ethically, A Framework for Moral Decision Making,. Retrieved from Santa Clara University: http://www.scu.edu/ethics/practicing/decision/thinking.html

BE CURIOUS, NOT JUDGMENTAL

There's a great moment in the show where Ted is about to school his nemesis Rupert in darts. He offers a Walt Whitman quote as a lesson in how people judge others so quicky rather than asking questions and being curious. Understanding and learning about your team and teaching your team to do the same will serve all well and it serves Ted well. Rupert takes on a challenge against Ted without knowing anything about him, and while passing judgment that he is not worthy based on very little. Being curious and asking questions leads to better understanding which reduces judgment (Monaco, 2023). Being curious opens our minds to understanding each other, to better understand each other's motivations, to be open to other cultures, and to be open to learning, which makes us better leaders (Monaco, 2023). Because Rupert doesn't find Ted to a threat, he discounts him.

"You know, Rupert, guys have underestimated me my entire life. And for years, I never understood why. It used to really bother me. But then one day, I was driving my little boy to school and I saw this quote by Walt Whitman and it was painted on the wall there. It said, "Be curious, not judgmental." I like that. So I get back in my car and I'm driving to work, and all of a sudden it hits me. All them fellas that used to belittle me, not a single one of them were curious. They thought they had everything all figured out. So they judged everything, and they judged everyone. And I realized that their underestimating me... who I was had nothing to do with it. 'Cause if they were curious, they would've asked questions. You know? Questions like, 'Have you played a lot of darts, Ted?' To which I would've answered, 'Yes, sir. Every Sunday afternoon at a sports bar with my father, from age ten till I was 16, when he passed away.' Barbecue sauce."[7]

This is a key lesson. Be curious enough to learn the details of those that you are working with, and understand their motivations. Again, without spoiling anything, Rupert's lack of interest in understanding Ted or his motivations results in Ted having the upper hand, both ethically and strategically. Ted knows his opponent has underestimated him, and he has the upper hand. Also, Rupert thinks he is better than Ted, which creates a disadvantage.

"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."[8]

I always keep a copy of Sun Tzu's "The Art of War" with me. There is the occasional international trip where I do not move the book from my backpack to my carry-on, but that is rare.

BE A GOLDFISH

One of my favorite lessons from Ted Lasso is being a goldfish. He explains this to a player who is struggling with his mistake that a goldfish is the happiest creature because it has a ten-second memory. The purpose is to encourage his players to forget their mistakes by being goldfish (Greenhalgh, 2023). This usefulness of this lesson is without parallel.

As a human with those icky human feelings, it's easy to focus on negative input rather letting it go and moving on (Greenhalgh, 2023)." Teaching our teammates to be goldfish and reminding ourselves to be goldfish will create an environment where we can take feedback as constructive but also learn to let it go. It's a hard lesson to ascribe to because we cannot just teach it, we have to live it.

BELIEVE

Where Ted thrives in his optimism is his understanding that the leader needs to believe that the end goal is achievable. "Believe" is a key word used throughout

7 Sudeikis, J., Lawrence, B., Hunt, B., & Kelly, J. (2020, September 18). The Diamond Dogs. Apple TV.

8 Tzu, S. (1963). The Art of War. London: Oxford University Press.

the show, and I think it's something important that we should remember. We should always "believe," and we should teach our teams to "believe." If we believe in the mission, we are inspired to achieve it. Belief is a powerful tool that moves people to achieve. As leaders, we have to model the outcome we want to see, which is why fostering belief is important to achieving end goals. Again—no spoilers—but Ted hangs a sign on the first day of his coaching job displaying the word "Believe," which he hopes will motivate his teammates.[9] This simple sign resonates throughout the series. We have to remember to believe in what we can achieve, and we need to teach our teammates to believe. When our team is centered on the belief that we can achieve our goal, we will be unstoppable.

CONCLUSION

When I started writing this article, Ted Lasso as a Apple TV series was a wrap, so I was excited to hear my morning news crew report that a spinoff may be in the works. Not only did my heart burst with joy at this thought, but I found it a nice way to put a bow around this article. We need positive leadership in our lives, and we need the lessons we learned from Ted Lasso. We need to remember to do the right thing simply because it's right. We need to be goldfish. And it doesn't hurt if a man with a midwestern drawl and a brilliant moustache gives us that lesson.

9 Yaeger, D. (2023, July 12). Ted Lasso Shows That Great Leadership Travels. Retrieved from Forbes: https://www.forbes.com/sites/donyaeger/2023/07/12/ted-lasso-shows-that-great-leadership-travels/

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- USNC & IEC Conformity Assessment 101
- Why IEC Standards Work Is Important to My Company
- Benefits of Standards Work for Emerging Professionals

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The USNC hosted, in collaboration with the IEC Academy, a **webinar on OSD commenting.** View the webinar recording here.

Looking for more? IEC Academy & Capacity Building hosts frequent webinars. You can access past webinar recordings and register for upcoming webinars.

IEC GENERAL ASSEMBLY VOTES TO APPROVE JIM MATTHEWS AS INCOMING PRESIDENT

ANSI and the USNC congratulates distinguished standards leader **James E. Matthews III**, formerly of Corning Incorporated, for his election at the 88th International Electrotechnical Commission (IEC) General Meeting in Edinburgh as IEC president-elect. He will begin his term as IEC president-elect in January 2025 and assume the office of the president from 2026–2028, succeeding Jo Cops.

Matthews brings a unique global perspective, vast experience in electrotechnology standardization, and a notable history of leadership in international standardization activities. He has served as IEC vice-president and chair of the IEC Standardization Management Board, and sat on the IEC Council Board and the IEC Executive Committee. He also served as president of the U.S. National Committee (USNC) to the IEC, chair of the IEC Directives Maintenance Team, and as an IEC Ambassador.

As the director of worldwide standards engineering activities for Corning's global technology and industry standards group, he was responsible for external standardization activities across Corning, where he worked for more than 42 years. He was awarded by Corning with its Once-in-a-Lifetime Division People Development Award.

Throughout his career, Matthews has served in volunteer leadership roles across multiple organizations, contributing to their strategy, organizational structure, inclusive processes, and technical innovation. A longtime member of the ANSI Board of Directors, he also served on the ANSI Executive Committee, and as chair of ANSI's Company Member Forum. He has also served on the IEEE Board of Directors, was president of the IEEE Standards Association, and was an IEEE SA Board of Governors member. He currently chairs the U.S. mirror committee for IEC Technical Committee 110, *Electronic displays.*

In addition to his other accomplishments, Matthews is the recipient of numerous awards, including ANSI's Howard Coonley Medal, Elihu Thomson Electrotechnology Medal, and Astin-Polk International Standards Medal.

"On behalf of the USNC, we're thrilled with the selection of Jim Matthews as the next IEC president-elect," said Veronica Lancaster, USNC president. "Jim has a wealth of experience and unparalleled insights into international electrotechnology standardization, and his leadership will be instrumental in moving the IEC's work forward. We congratulate Jim and we look forward to continuing to work with him in the years to come."

The Company Member Forum encourages participation. For more details on how to get involved in the CMF, please see the ANSI Membership Brochure or contact ANSI Membership at membership@ansi.org.

NOW ACCEPTING APPLICATIONS: USNC DON HEIRMAN AWARD PROGRAM

The USNC is pleased to begin accepting applications for the 2024–2025 Don Heirman Award Program! Student and emerging professionals are invited to compete in this annual award program on the topic of Electromagnetic Compatibility (EMC) for a $1,000 cash prize! Accepted submissions this year will be in the form of a short article or video clip. Check out the flyer for more details!

Congratulations to our 2023 – 2024 USNC Don Heirman Award Program recipient, Darryll Bachoo of Rockwell Automation! See below for Darryll's winning submission:

ELECTROMAGNETIC COMPATIBILITY: HOW EMC IMPACTS OUR DAILY LIVES

by Darryll Bachoo

The discovery of electricity unlocked a new understanding of the physical world around us. The notion that energy can be harnessed and controlled led to the start of the industrial revolution, lighting in our homes, and advancements in telecommunication. These new inventions birthed a dependency of electricity use for our everyday tasks and without it, we experience great inconveniences. Imagine the horror a mother feels at not being able to Facetime her children on Christmas day or the labour employed in hand-washing laundry after a hard day's work. Whether we commute via electric vehicles (EVs) or simply enjoy the mid-week playoffs, everyone in the developed world has electricity central to their lives.

It has been scientifically proven that electricity and magnetism are intrinsically linked. Faraday states that a change in the flow of electricity, within a conductor, will result in a changing magnetic field and vice versa. His contemporary's equations (Lorent Lenz) describe the resultant forces experienced by particles in such changing magnetic fields. These theories serve as the base for our present day understanding of electromagnetism. Kirkham[1] and Voccio et al.[2] describe IEEE 1460 and other measurement procedures to determine the electromagnetic fields (EMF) produced by a hairdryer and an iPhone 8. They have concluded that the magnetic and electric fields present around these working devices can reach 10 μT and 500 V/m respectively. From this evidence, we can appreciate that our insatiable appetite for electricity has resulted in the creation of invisible forces around us. The more we use electrical devices, the more EMFs we create; the more EMFs created, the greater the chance of interactions amongst them. These interactions can cause malfunctions or a cease of operations in electronic equipment.

Like an unsung hero, electromagnetic compatibility (EMC) is best appreciated when absent. An electronic device's electromagnetic compatibility refers to its ability to operate correctly in an environment where other devices emit electromagnetic waves or disturbances. For a device to be affected there must be source, a coupling medium, and a victim.[3] One explanation of these players and their interactions is described using a typical spring-cleaning scenario. Many of us like to listen to music on our FM or AM radio (victim). However, we may have noticed that when the vacuum cleaner (the source of the Electromagnetic Interference or EMI) is switched on, we hear a drop in the sound quality.

1 Kirkham, H. (2006). Measurement of electric fields generated from alternating current. pp. 9(5):58 - 61.

2 Voccio, J., Seredinski, A., Song, J., Khabari, A., Chuery, M., Oshman, H., & Mujica, P. S. (2023). Low-frequency electric fields. AIP Advances.

3 Delaballe, J. (2001). EMC: electromagnetic compatibility. Schneider Electric.

This is due to a produced EMI from the vacuum which pollutes the air (coupling medium) that the station uses to transmit its signal to the radio.

The development of the transistor and integrated circuits paved the way for a boom of electronic equipment. Future inventions such as the microprocessor allowed for the entry of lower cost manufacturers and startups worldwide. Therefore, the need to regulate EMC became paramount. In the United States EMC is regulated by the FCC[4] and in Europe the Electromagnetic Compatibility Direction seeks to prevent electromagnetic disturbances caused by electronic devices. Agencies that seek to enforce EMC regulations do so by stating EMC requirements for device usage in markets. They mandate manufacturers to comply with good engineering practices and can impose measures on manufacturers for non-compliance. The FCC's Act of 23-14[5] describes the regulations and compliance testing procedures that must be adhered to for entry into U.S. markets. Other notable bodies for EMC regulation around the world include China's CNCA (Certification and Accreditation Administration), Canada's ISED (Innovation Science and Economic Development) and the Bureau of Indian Standards.

While many sources of EMI are manmade, it is worthwhile to mention that natural occurrences of EMI do exist. During stormy weather and levels of high precipitation, the air can transmit lighting strikes to ships and buildings. To prevent malfunctioning of sensitive electronic equipment such as navigational systems and servers, grounding rods are used. Grounding is an EMC technique that is utilized to provide a safe path for the flow of electricity thus preventing electrical shock, fire hazards and equipment damage.

Personal devices such as cellular phones, laptops, and tablets rank amongst the most common producers of EMFs that humans interact with. Cell phones, apart from using electricity to function, become low power radio wave transmitters and receivers which actively send out an EMF signal. It is for this reason airlines have rules stating they must be off or in airplane mode when flying. It is believed that the cell signal can affect the airplane's sensors, anti-collision system, and pilot communication. In 2003 a pilot flying in New Zealand made a call to home just before landing. The call was never disconnected and lasted three minutes. Sadly, investigations showed that this may have contributed to a deadly crash killing eight persons onboard by interfering with the plane's navigation system.[6] Gas stations have signs posted stating that cell phone use at pumps is strictly prohibited. Nowadays many experts believe that a cell phone's signal is not enough to cause a spark potential at a gas station. Nevertheless, prevention is better than cure and many of us respect this policy.

Advancements in EMC engineering designs such as shielding and filtering have resulted in higher concentration of personal devices being used in proximity to one another. This coupled with rigid EMC testing, has allowed for seat mates on a train to freely use their personal devices.[7] One may enjoy YouTube videos while another prefers to catch up with a friend via a phone call. This is a practical example of FCC Part 15 at work. This standard specifies a high immunity to EMI for cell phones and other electronic devices. It also imposes limits on the use of the radio spectrum, to stop interference with other communications systems that use shared or similar frequencies.[8]

4 Federal Communications Commission. (2023). In FCC 23-14. Washington, D.C.: Federal Communications Commission.

5 Ibid.

6 *The New Zealand Herald*. (2011, January 20). Retrieved from NZ air crash cited in cellphone interference study: https://www.nzherald.co.nz/nz/nz-air-crash-cited-in-cellphone-interference-study/CPWLC5VG2DGNDLNIJUYOLVKB2E/

7 *FasterCapital*. (n.d.). Retrieved from Emc Standards And Regulations In Telecommunications: https://fastercapital.com/topics/emc-standards-and-regulations-in-telecommunications.html

8 *CT Compliance Testing*. (2024, February 7). Retrieved from FCC Certification for Cell Phones Guide: https://compliancetesting.com/fcc-certification-for-cell-phones-guide/

Undoubtedly electricity has improved healthcare and life expectancy across the globe. However, wearers of pacemakers also have lifestyle restrictions. For example, pacemaker wearers adhere to separate screening at airports or keep safe distances from operational microwaves for fear of a skipped heartbeat! Patients and operators of MRI or X-ray equipment must wear protective clothing or stand behind specially designed walls to prevent exposure to harmful EMF exposure.[9]

Currently there is no conclusive evidence or studies to demonstrate exactly how EMF has been affecting the human body. This may be because electricity is a relative newcomer to the history of our world. With ever-increasing exposure to EMF, one must admit that there is the possibility of effects on health and wellness. We have already seen that birds' orientation and navigational capabilities are affected from pulses of magnetic fields causing them to become disoriented.[10] Researchers have noted in humans feelings of dizziness, loss of cognitive ability and sleep disturbance from EMF exposure. More serious health issues include the risk of glioma or acute myeloid leukaemia development.[11] These studies carry a disclaimer that more research and monitoring is needed since there may be other variables at play. Still, health experts have been advocating for measures to help alleviate exposure and symptoms to EMF. These include buying devices that conform to international standards for EMC testing and limiting use of electronic devices. The ICNIRP (International Commission on Non-Ionizing Radiation Protection) has issued guidelines for public exposure to magnetic fields at 606μT and electric fields at 9.9 KV/m.[12] Crossing these limits can become detrimental to one's health.

Globalization and a push for more open markets is bringing novel and complex challenges with EMC issues. The movement away from carbon emissions, notably the combustion engine, has been churning out new machinery and improvements in EVs. 5G technology promises higher data rates and better interconnectivity of devices. 5G will use millimetre waves with high frequencies that are not capable of travelling as far as lower frequency waves previously used. The result is a denser network of antennas that will bring with it an increase in EMI among communities.[13] Wireless charging of devices also complicates resultant EMFs created within an environment.

To combat these emerging EMC challenges, a need for global standardization and conformity is needed. One such standard is IEC 61000, which is the base EMC standard for the European Union and from which many other EMC standards are generated. This standard compromises nine sections: functional safety, measurement uncertainty, emission limits, immunity limits, measurement techniques, testing techniques, installation guidelines, and generic emission and immunity requirements in various environments.[14] Regulation amongst various manufacturers and mandatory conformity testing of products is highly recommended. By enforcing standards on companies, the risks of post-production issues and failures can be reduced and

9 *Living with a Pacemaker or Implantable Cardioverter Defibrillator ICD*. (n.d.). Retrieved from John Hopkins Medicine: https://www.hopkinsmedicine.org/health/wellness-and-prevention/living-with-a-pacemaker-or-implantable-cardioverter-defibrillator-icd#:~:text=Stay%20away%20from%20certain%20high,from%20your%20pacemaker%20or%20ICD.

10 *ENVIRONMENTAL HEALTH TRUST*. (2021, October 2022). Retrieved from BIOLOGICAL EFFECTS OF ELECTROMAGNETIC RADIATION ON BIRDS: https://ehtrust.org/biological-effects-of-electromagnetic-radiation-on-birds/#:~:text=Previous%20studies%20have%20shown%20that,to%20their%20normal%20migratory%20direction

11 Cirino, E., & Lamoreux, K. (2023, December 8). healthline. Retrieved from Should You Be Worried About EMF Exposure: https://www.healthline.com/health/emf

12 EMFs.info. (2024). Retrieved from Exposure limits and policy: https://www.emfs.info/exposure-limits-and-policy/exposure-limits#230548828-3752827987

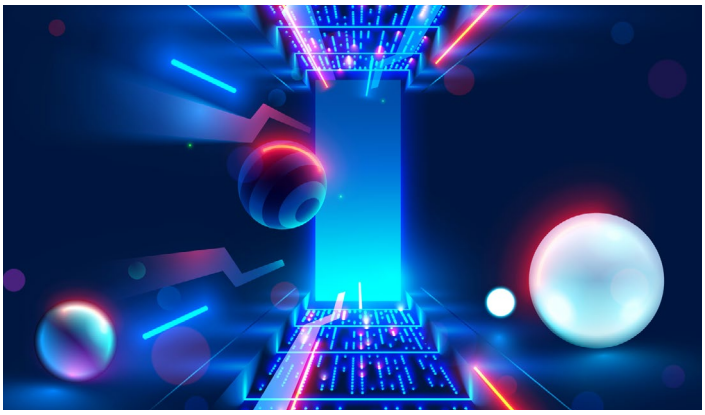
13 COM-POWER. (n.d.). Retrieved from 5G Networks and Effects on Radiated Emissions and EMI Shielding: https://www.com-power.com/blog/5g-networks-and-effects-on-radiated-emissions-and-emi-shielding

14 KEYSTONE COMPLIANCE. (n.d.). Retrieved from IEC 61000 Testing / EN 61000 Testing: https://keystonecompliance.com/iec-61000/

product recalls due to incompatibility issues can become a thing of the past. Market access will be granted to producers thus improving business opportunities, and competition can drive down prices thereby increasing consumer power.

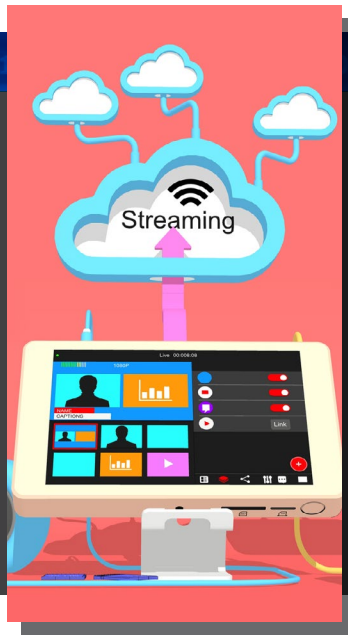
In conclusion, Electromagnetic Compatibility compromises engineering designs, policies as well as conformity to standards and testing procedures. EMC affects our daily tasks, the way we interact with one another and our general safety. It can also impact the wellbeing of humans and have a financial effect on our lives.

USNC ONLINE PORTAL FOR TAG PARTICIPATION MANAGEMENT



In April, the USNC was thrilled to launch the new online portal for TAG participation management. Features of the new portal include: roster management for TAG officers and more user-friendly way to view and pay TAG invoices.

ANSI IT and USNC staff held a demo of the new program in April; TAG officers that missed the session are encouraged to review the user guide and review the demo recording. Questions can be directed to usncbilling@ansi.org.



ANSI MEMBERSHIP WEBINARS

Membership in ANSI is the key to unlocking the benefits and opportunities that standardization can provide. Standardization and conformity assessment activities lead to lower costs by reducing redundancy, minimizing errors, and reducing time to market, resulting in enhanced profitability.

These interactive 30-minute webinars—held on the first Friday of each month and free of charge—are hosted live and provide an overview of ANSI's activities, as well as information on how to take full advantage of ANSI membership. A Q&A session encourages active dialogue between all participants.

For more details, visit our website!

United States National Committee of the IEC

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ABOUT THIS PUBLICATION

The USNC *Current* newsletter is distributed to the constituency of the U.S. National Committee (USNC) of the International Electrotechnical Commission (IEC). It provides updates on technical activities and other information of interest to members of the electrotechnical community. Some articles are reprinted with permission from the IEC News log.

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Contributions are gladly accepted for review and possible publication, subject to revision by the editors. Submit proposed news items to: Megan Pahl, mpahl@ansi.org.