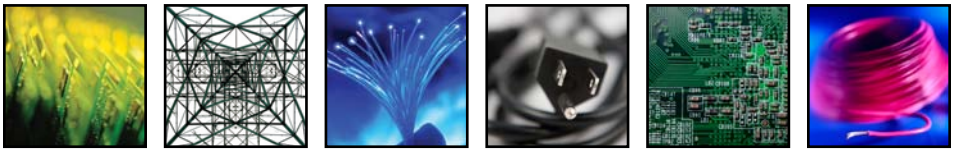
United States National Committee of the IEC

News and Notes



In This Issue

- Focus On: e-Mobility
- Laugh Track
- USNC News
- Conformity Assessment
- Latest USNC/IEC Literature
- The Standardization World
- IEC Headlines
- Save the Dates

Volume 8 Number 1 SPRING 2013

FOCUS ON: e-Mobility

In recent years, electric vehicles have been championed by government and industry for their potential to advance U.S. energy independence, promote environmental stewardship, and create jobs and economic growth. But their widesperead acceptance in the marketplace depends upon the safety, reliability, and consumer confidence that standards and conformance can help them to achieve.

Facilitating Standardization for Plug-In Electric Vehicles and Charging Infrastructure

By Jim McCabe, Senior Director, Standards Facilitation, American National Standards Institute

In April 2012, the American National Standards Institute (ANSI) Electric Vehicles Standards Panel (EVSP) released a *Standardization Roadmap for Electric Vehicles – Version 1.0*. Available as a free download at www.ansi.org/evsp, the roadmap assesses the standards, codes, and regulations, as well as conformance and training programs, needed to facilitate the safe, mass deployment of electric vehicles (EVs) and charging infrastructure in the United States. The roadmap focuses on plug-in electric vehicles, both battery-powered all-electric vehicles and plug-in hybrids, as well as the charging infrastructure needed to support them given current range limitations on battery power alone. Standardization issues that relate to consumer adoption, including safety, affordability, interoperability, performance, and environmental impact, are considered. Support services, including training of emergency first responders, vehicle technicians, and electrical installers and inspectors, are also addressed.

Why a Roadmap?

The initial push to carry out a standardization needs assessment for EVs came from interests in the electrotechnical standardization community who felt that the U.S. needed a more coordinated approach to keep pace with similar initiatives moving forward in other parts of the world. With the Obama Administration's policy objectives of reduced petroleum consumption and greenhouse gas emissions, energy independence and security, and economic growth, the decision to undertake such an initiative was taken at a meeting of key stakeholders in March 2011. A subsequent workshop convened by ANSI on behalf of the U.S. Department of Energy (DOE) and the Idaho National Laboratory confirmed the need for improved coordination, and the panel was formally launched in May 2011.

A key purpose for developing the *Standardization Roadmap* was to provide affected stakeholders – automakers, utilities, the electrotechnical industry, standards developing organizations (SDOs), and government agencies – with guidance on where to commit resources in terms of standards participation, as well as to foster the dissemination of safe and interoperable technologies for EVs and charging infrastructure.

(continued)

Published by the American National Standards Institute and its U.S. National Committee of the IEC

Facilitating Standardization for Plug-In Electric Vehicles and Charging Infrastructure *(continued)*

Targeted toward a broad audience of stakeholders, the *Standardization Roadmap* identifies standards, codes, and regulations that already exist or that are in development, as well as gaps where new or revised standards are needed, along with related conformance and training programs that respond to those needs. Included are recommendations with prioritized timelines for when standardization should occur, as well as the identification of SDOs that may be able to do the work. Harmonization efforts already underway or that may be desirable are also discussed.

Since the release of the roadmap, ANSI has been actively promoting it to various audiences. Domestically, this has included last year's EVS26 conference, DOE's Annual Merit Review, a National Highway Traffic Safety Administration (NHTSA) technical symposium, a meeting of the Infrastructure Working Council of the Electric Power Research Institute (EPRI), and a joint meeting with the Vehicle to Grid Domain Experts Working Group of the Smart Grid Interoperability Panel (SGIP).

International Coordination

The *Standardization Roadmap* was also envisioned as a resource to better enable the United States to speak with a coherent and coordinated voice in policy and technical discussions with regional and international audiences on needed standards and conformance programs related to EVs. For example, the European Standards Organizations (ESOs) the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC) produced a report from their Focus Group on European Electro-Mobility in June 2011 (updated in October 2011; see www.cen.eu/go/eMobility) in response to European Commission/ European Free Trade Association (EFTA) mandate M/468 concerning the charging of electric vehicles. The mandate was focused on ensuring EV charging interoperability and connectivity in all European Union member states, as well as addressing smart charging and safety and electromagnetic compatibility of EV chargers. In parallel, high-level government officials on both sides of the Atlantic called for harmonization of standards and regulations for electric vehicles in the context of the Transatlantic Economic Council (TEC) trade talks and, in November 2011, a TEC eMobility work plan was agreed to.

The issue of transatlantic cooperation on EV standards was discussed at the ANSI-ESO meetings in October 2011. At the suggestion of the TEC co-chairs, ANSI, CEN, and CENELEC convened a very successful transatlantic eMobility standardization roundtable in Brussels in November 2012. This event brought together subject matter experts to discuss the progress of standards activity and the gaps identified in the European focus group report and the ANSI EVSP roadmap. Key areas of discussion included coupler safety and interoperability, communications, wireless charging, and infrastructure and battery system safety. The results of the roundtable were discussed at the February 2013 ANSI-ESO meetings in Dublin, and this cooperative dialogue will continue.

Cooperation on eMobility standardization also has been the subject of a bilateral dialogue over the last two years between ANSI, the German Institute for Standardization (DIN), and the DKE German Commission for Electrical, Electronic & Information Technologies of DIN and VDE. The Germans had developed their own national standardization roadmap for eMobility in November 2010 and issued an update in January 2012.

ANSI has also been engaged on the EV question with another large trading partner: China. In July 2012, ANSI and the China Association for Standardization (CAS) organized a technical workshop on EV standardization in Beijing. This very informative exchange covered key topics and opened doors for future cooperation. In August, the ANSI EVSP roadmap was presented at the U.S.-China EV and battery technology workshop in Boston, the event being part of the U.S.-China EV initiative launched by President Barack Obama and President Hu Jintao in 2009.

Jim McCabe
Senior Director, Standards Facilitation
American National Standards Institute

Finally, the ANSI EVSP roadmap has been shared as initial input to IEC Strategic Group (SG) 6 on *Electrotechnology for Mobility*. This group was formed by the IEC Standardization Management Board (SMB) in October 2011 to develop a roadmap of relevant standards for IEC.

All of these efforts have facilitated a greater understanding of various EV standards activities underway and fostered a healthy dialogue on opportunities for cooperation, harmonization, and alignment of standards and regulations related to EVs.

Looking Ahead

The ANSI EVSP *Standardization Roadmap* is in the process of being revised with a version 2.0 targeted for release in the Spring of 2013. The roadmap will include updates on the status of progress to address the gaps identified in version 1.0, as well as new gaps that have been identified.

Further information

For more information, or to get involved visit www.ansi.org/evsp or email evsp@ansi.org. ■

FOCUS ON: E-MOBILITY

Safety Aspects in the Area of e-Mobility: IEC ACOS 10th Workshop

By Larry Farr, Engineering Manager, Eaton Electrical; Representative of IEC SC 17A to ACOS

There is a whole new set of safety challenges quickly emerging in the world of standardization. As the world moves away from petroleum-based energy to electricity for transportation, nearly all of the tried and true safety techniques are being challenged. All need to be reviewed and rewritten, and many new techniques must be developed and then tested for effectiveness.

The Advisory Committee on Safety (ACOS) to the IEC Standardization Management Board (SMB) organized a workshop on *Safety Aspects in the Area e-Mobility,* hosted by the DKE German Commission for Electrical, Electronic & Information Technologies of DIN and VDE on February 20-21, 2013, in Frankfurt, Germany. The workshop was broken down into presentations followed by interactive discussions with a number of e-Mobility experts, conducted around the many electric vehicles (EVs) installed in the lobby of the hotel.

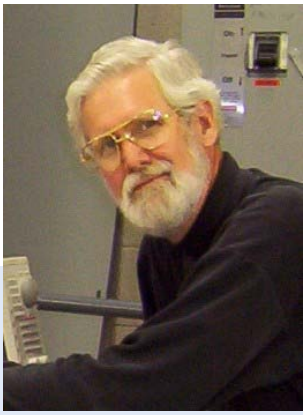
Presentations were given by IEC President Dr. Klaus Wucherer, Ly Yao of the CEEIA (China), and the chairmen of the various Technical Committees (TCs) involved in the topic. Eight of the presentations focused on issues under consideration and the standards that address those issues. One of the group discussions covered the issue of having up to five different protocols in use for the communication between the various vehicles and the chargers. These many protocols may result in barriers to trade.

Dr. Dirk David Goldbeck of the VDE Testing and Certification Institute led a discussion of issues related to battery testing, heating/cooling, outgassing, and impact and discharge. He stated that when he was a young engineer and involved in testing and certification, he would take a heavy stack of standards and travel the world. Today he is pushing toward "one standard and one test."

Peter Van Dan Bossche, Secretary of IEC TC 69, *Electric road vehicles and electric industrial trucks,* discussed the safety issues with DC charging systems for e-vehicles. The standardization work on DC has been stagnating for many years because of the ease of changing voltages, current levels, and interruption in AC systems. However, the cost and weight of installing high rate of charge equipment in the body of the vehicles makes the concept of DC charging very attractive. As a result, the safety of DC plugs/receptacles and cabling is now under investigation.

Holger Krings from IEC TC 57, *Power systems management and associated information exchange,* Working Group (WG) 17, *Communications Systems for Distributed Energy Resources (DER),* gave an interesting talk about the work TC 57 and TC 64 are doing with installation rules to include the smart gird and smart metering. One of the big safety issues is how to handle the aging of the insulation at the expected installation voltages the owner of the average e-vehicle is required to handle during recharging. Mr. Krings also discussed the various stakeholders who have expressed interest in tracking the power usage of the vehicles both for revenue and taxation purposes. The other issue he presented is how to level the recharging impact upon the return of EVs for the evening recharge cycle.

Among other topical discussions, Volker Rothe of IEC TC 64, *Electrical installations and protection against electric shock,* presented his insights on electrical safety aspects within EVs related to aging of insulation, computer malfunction, and crashes. Dr. Wucherer also discussed how the IEC SMB has developed the Strategic Group (SG) 6, *Electrotechnology for Mobility,* to untangle the conflicts that develop as various Technical Committees work developing standards.



Larry Farr, Engineering Manager, Eaton Electrical; Representative of IEC Subcommittee (SC) 17A, *High-voltage switchgear and controlgear*

What Is ACOS?

The IEC Advisory Committee on Safety (ACOS) deals with safety matters which are not specific to one single Technical Committee (TC) of the IEC. Its task is to guide and coordinate IEC work on safety matters in order to ensure consistency in IEC safety standards.

Reporting to the Standardization Management Board (SMB), ACOS is responsible for the assignment of horizontal and group safety functions to TCs, subject to confirmation by the SMB, which are thereby mandated to prepare Basic Safety/Group Safety Publications. The aim of these publications is to provide a coherent set of safety standards, thus ensuring consistency of IEC standards in areas common to a number of TCs.

Further information

For more information on the ACOS Workshop on e-Mobility, click here. ■

FOCUS ON: E-MOBILITY

Higher Gear for Standards and Fully Networked Cars

Originally printed in IEC e-tech

How can international standards provide even greater support to the global automotive industry for developing fully networked cars (FNC) integrated with intelligent transport systems (ITS)? This was the fundamental question explored at the 8th Fully Networked Car workshop held on March 6, 2013, at the Geneva International Motor Show in Switzerland.

The workshop is an annual event organized by the World Standards Cooperation (WSC), a strategic partnership of the IEC, the International Organization for Standardization (ISO), and the International Telecommunication Union (ITU). Focusing on international standards and the development of vehicle connectivity, the workshop attracted nearly 100 automotive experts and specialists from around the world.

Introducing the workshop for the IEC, Gabriel Barta, head of technical coordination, noted the progress already made in integrating the car into both the electrical and the information networks, but encouraged the experts present to initiate the standards they saw as most urgent, in areas such as active vehicle safety. Also addressing the workshop were Rob Steele, ISO secretary-general, and Reinhard Scholl, deputy to the director, Telecommunication Standardization Bureau, ITU-T.

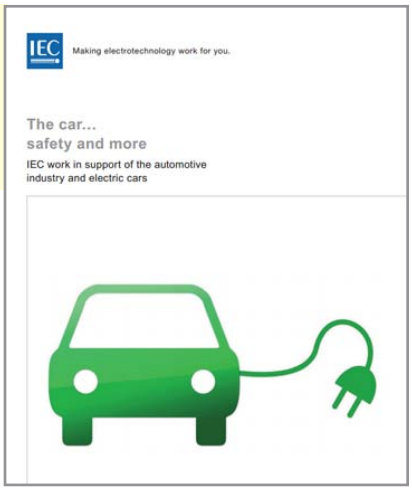
The discussions were moderated by Richard Parry-Jones, a former executive with the Ford Motor Company. He noted that while there is great understanding of the automotive space and a firm understanding of the IT arena, it is an ongoing effort to examine where these two industries intersect. However, by identifying the most valuable opportunities for standardization at this intersection, the automotive sector could break through the barriers of competing forces and realize the true value of the fully networked car.

Through roundtable panels and interactive discussions, the workshop helped foster a better understanding of the challenges the automotive sector has to face in the near future, and how international standards can be an essential support. Participants worked to confirm and update the most important international standards priorities. Work paths were identified, such as the need for further safety standards in specific areas, as well as enhanced standards for traffic information. Additional areas identified for new standards include for vehicle-to-vehicle emergency communications and information security.

In his presentation on vehicle connectivity, Dr. Matthias Klauda, Bosch Automotive Systems Integration Corporate Department, highlighted the IT security issue and aspects to tackle in order to protect the integrity and functionality of vehicle systems and the privacy of users.

Gerald Pöllmann, general manager of corporate strategy, advanced technology, and diversified industries at Magna Steyr Engineering AG, gave a briefing on developments that the workshop participants could expect to find in the motor show as a whole.

Click here to download a brochure on IEC work in support of electric vehicles.



Further information

For more information on the Fully Networked Car workshop, visit www.worldstandardscooperation.org/fnc2013. ■

LAUGH TRACK

USNC Names First-Ever Distinguished Service Award Winners

The USNC is pleased to announce the winners of the first USNC Distinguished Service Awards. These awards are presented to individuals who have a record of significant contribution to voluntary standards and/or conformity assessment, and who have demonstrated outstanding service in enabling the USNC/IEC to attain the objectives for which it was founded.

Strong suport was expressed for a dedicated award acknowledging significant contributions and service to the USNC, so the USNC Distinguished Service Award was established. Previously, the only recognition provided directly by the USNC were Certificates of Appreciation and the Honorary Life Membership. These are in addition to the IEC and ANSI Awards program, in which the USNC plays a major role. The new award has a format similar to the ANSI Meritorious Service Award, but is totally under the jurisdiction of the Nominations Committee and the USNC Council.

A maximum of three USNC Distinguished Service Awards can be presented each year, as long as qualified recipients are identified. Whenever possible, the awards will be presented to recipients at a USNC Council meeting. Any member of the USNC constituency, with the exception of current officers of the USNC and current members of USNC staff, is eligible for the award. Nominations may be submitted by any member of the USNC.

Each of the following individuals has demonstrated outstanding service to the USNC and to IEC and have been named the 2013 winners of the USNC Distinguished Service Awards:

Howard O. Barikmo
President, Sunset Technology Corp.
Howard Barikmo serves as Technical Advisory Group (TAG) Secretary for the USNC TAG for IEC Technical Committee (TC) 82, *Solar photovoltaic energy systems,* and International Secretary of the TC. Mr. Barikmo's most visible contribution to standardization may be a result of the growing importance of IEC TC 82 to the renewable resources area. As a function of his responsibilities, he must not only administer a very large and active TAG (88 participants), but, as International Secretary, also has primary responsibility for the work program of the TC. Mr. Barikmo is most deserving of this honor because of his dedication to national and international standardization and his many contributions to the cause of renewable resource standardization.

Mark W Earley, PE
Chief Electrical Engineer, National Fire Protection Association (NFPA)
Mark Earley is a member of the USNC Council and helps to develop policy issues for this country's interface with the IEC. He also contributes at the technical level by serving as Technical Advisor (TA) for the USNC TAG for IEC TC 64, *Electrical installations and protection against electric shock*, and as Deputy TA for the USNC TAG for IEC TC 79, *Alarm and electronic security systems*. He also serves as one of the USNC representatives to the IEC Advisory Committee on Safety (ACOS). His most visible contribution to standardization may be his service as secretary of the National Electrical Code Committee, conceivably one of the most known and adopted voluntary consensus standards in the United States.

Scott A. Neumann
Chief Technical Officer, UISOL
Scott Neumann serves as TA for the USNC TAG for IEC TC 57, *Power systems management and associated information exchange.* Possibly, Mr. Neumann's most visible contribution to standardization resulted from the importance of IEC TC 57 to the global smart grid effort. As one indication of the level of interest and the resulting coordination effort for which he is responsible, the related USNC TAG currently consists of 103 participants. As a natural part of his responsibilities, Mr. Neumann must actively collaborate with the IEC Standardization Management Board (SMB) Strategic Group (SG) 3 on *Smart Grid* and with NIST's related activities.

The USNC proudly congratulates the esteemed winners! ■

Attend the 6th USNC TAG Leadership Workshop

All those involved in the management of any U.S. Technical Advisory Group (TAG) to an IEC committee are highly encouraged to attend this year's **USNC TAG Leadership Workshop on Friday, September 13, 2013, at the NEMA Offices in Rosslyn, VA.**

TAG leaders include secretaries, technical advisors, deputy technical advisors, group managers, and any TAG members that take a leadership role. The workshop is an incredible opportunity for everyone involved in TAG operation, and broad participation helps to build a stronger USNC.

For more information or to submit suggestions for the agenda, contact Megan Hayes (megan.hayes@nema.org; 703.841.3285).

USNC NEWS

USNC Releases New Brochures on the Importance of IEC Standards and Conformance Activities

The USNC has published two new brochures providing information about the important benefits associated with involvement in IEC-related standards and conformance work.

The first brochure, *Why IEC Standards Work Is Important to My Company,* features first-hand testimony from business leaders regarding the significant advantages that come from taking an active role in the IEC standards development process *(see example at right)*.

The second brochure, *An Introduction to IEC Conformity Assessment Systems in the United States,* provides an informative overview of the IEC's system of conformity assessment schemes for electrotechnical equipment and components, and how the USNC interacts with each. These programs include:

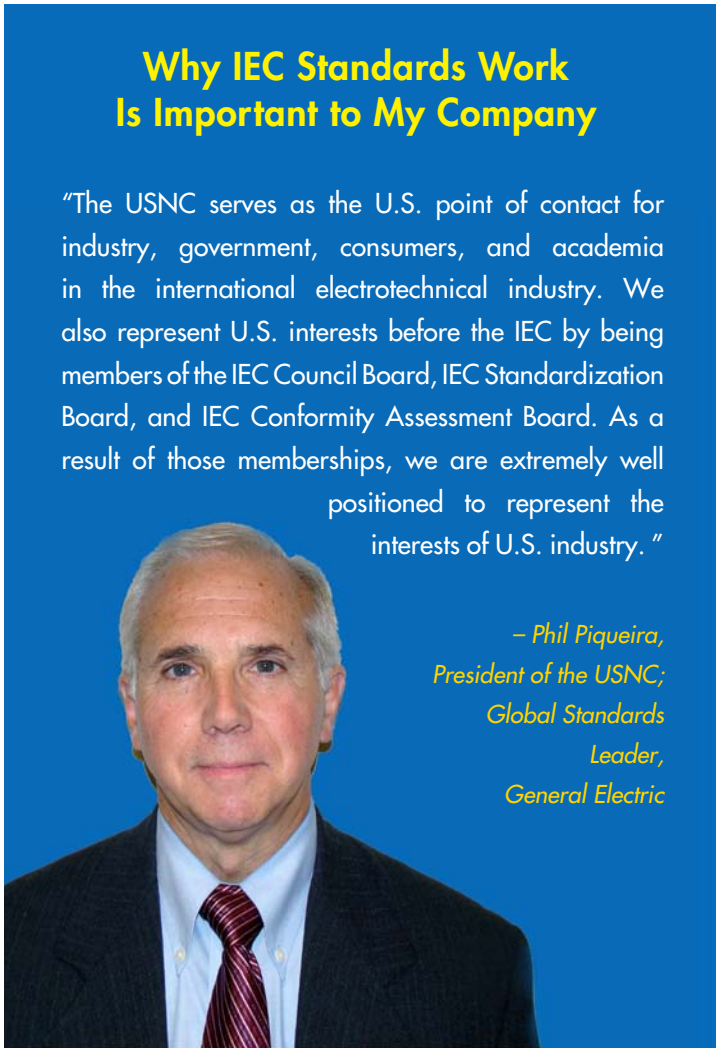
- IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE)
- IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres (IECEx)
- IEC Quality Assessment System for Electronic Components (IECQ)

The USNC maintains focused standing committees to each IEC conformity assessment group, allowing for the effective development of U.S. viewpoints and comments on all matters pertaining to IECEE, IECEx, and IECQ. These conformity assessment standing committees give relevant stakeholders the opportunity to make their voices heard in these essential areas.

Download the brochures:

Why IEC Standards Work Is Important to My Company

An Introduction to IEC Conformity Assessment Systems in the U.S.



Last Call! 2013 Young Professionals Nominations Due by April 30

The USNC invites all members and stakeholders to submit nominations for U.S. participants for the Young Professionals Workshop. The workshop will be held in conjunction with the 77th IEC General Meeting in New Delhi, India, in October 2013.

The U.S. young professionals selected will learn more about the IEC, standardization strategies, and conformity assessment. In addition to the dedicated workshop, they will have the opportunity to attend technical and management meetings, benefit from the guidance of a mentor, visit local industry, and network. Up to three recipients will be financially supported for their travel and up to three nights of accommodation.

U.S. stakeholders are encouraged to nominate young professionals involved in standardization from industry, government, academia, consumer organizations, or any entity within the U.S. voluntary standards and conformity assessment community that uses, benefits from, or contributes to the IEC's work in electrotechnical standardization and conformance. The program is targeted towards outstanding individuals in the early years of their professional career, post university. Submissions are due by April 30, 2013.

Nominations must be submitted electronically to Charlie Zegers, general secretary of the USNC (czegers@ansi.org) by Tuesday, April 30, 2013. Letters of support from members of the standardization community attesting to the nominee's outstanding achievements and appropriateness for receipt of the award are strongly encouraged. Download the nomination form here.

CONFORMITY ASSESSMENT

A CA System for Marine Energy? IEC Working on New Conformity Assessment Structure

Originally printed in IEC e-tech

Oceans offer an enormous source of renewable energy with the potential to satisfy an important percentage of the world's demand for electricity. Reducing production costs through efficient design and reasonably priced quality materials and components is crucial to improving the overall economic viability and acceptability of wave and current energy converters. This is where standards, IEC International Standards in particular, can play a major role.

More than 10 years ago, the IEC identified the need to address the standardization of marine energy, and in 2007 established IEC Technical Committee (TC) 114, *Marine energy - Wave, tidal and other water current converters,* to prepare International Standards for marine energy conversion systems. At the end of 2011, TC 114 issued its first publication, IEC TS 62600-1, *Marine energy - Wave, tidal and other water current converters - Part 1: Terminology,* which was followed in August 2012 by IEC 62600-100, *Marine energy - Wave, tidal and other water current converters - Part 100: Electricity producing wave energy converters - Power performance assessment*. The TC is currently working on several other International Standards addressing the design and performance of marine energy converters.

Establishing a TC to develop standards was a first step for the IEC. The logical next step was to address the conformity assessment (CA) aspect. At the request of TC 114, in 2010 the IEC Conformity Assessment Board (CAB) authorized the establishment of an ad hoc Working Group (WG) to explore the CA needs of this sector. Since then, the ad hoc WG has been transformed into WG 15 to develop possible CA solutions, and has produced a "Blueprint" as the basis for CA in the marine energy industry.

At a meeting of WG 15 in Singapore on January 29-30, 2013, the WG sought to reach an agreement on the proposed structure for the new CA System. Also on the agenda was consideration of a pathway leading to the operation of a common approach to certification for the industry, and a draft set of rules that would enable the establishment of a new CA System was included. While the IECEx System and Schemes provided a likely model, the unique aspects of the marine energy industry required more of a "systems approach" to cover stages from design concept to prototype, in addition to production of equipment and components, transportation, installation, and commissioning.

Several options were reviewed, including a proposal for a Renewable Energy (RE) System within which different RE sectors will be able to operate schemes. Contact with the Wind Turbine Conformity Assessment Committee (CAB WT CAC), the group working on a CA solution for the wind energy sector, will be sought to allow for an exchange of views.

The standards being developed by IEC TC 114 address a critical need for an industry that is characterized by a diverse range of technology concepts that will be deployed in harsh environmental conditions. The International Standards will provide a basis for ensuring the reliability of these technologies and their safe deployment.

As is the case with other industries, device developers will additionally have to provide evidence to interested parties (financiers and insurers) that they have designed, manufactured, and tested their devices in accordance with an accepted protocol. In general, this type of assurance is best served through third-party verification and certification.

The CAB WG 15 Blueprint covers the CA needs of the new and burgeoning marine energy industry within the scope of TC 114, with the goal of building confidence among existing and new stakeholders. IEC experience in operating CA Systems and Schemes under the control of the CAB, coupled with expertise from the marine energy industry drawn from TC 114, will ensure that the marine energy industry will be well served. ■

LATEST LITERATURE FROM THE USNC AND IEC

Stay up on all the recent brochures, documents, and other offerings from the USNC and IEC by clicking on the titles below.

Why IEC Standards Work Is Important to My Company

An Introduction to IEC Conformity Assessment Systems in the United States

New Harmonized IEC/ISO Commenting Template

Download the updated user guide and the new commenting template

In Search of MEMS Standards

Excerpted from "In Search of MEMs Standards" by Bryon Moyer, January 2013
Reprinted with permission from EEJournal.com. The full original article can be found here.

In keeping with the goal of making IEC the "home of industry" in accordance with its 2011 Masterplan, the following article is included in this issue to illustrate a stakeholder group whose work would greatly benefit from standards and conformity assessment but may not be aware of the IEC as a platform for their electrotechnical needs.

"MEMS is in need of standards."

I've heard that declaration many times over the last few months. But just try to search the Internet for evidence of standards or even standardization efforts, and you'll find…stuff, but you have to look hard and follow many fruitless threads to get there, and it's anything but conclusive. Discussions with the actual people involved paint a very different picture from that which emerges from the Internet.

This article is an attempt to capture the major activities underway, at least to the extent that I've become aware of them. Obviously this whole field is moving even as I type, so specifics will become dated. In addition, many standards have their origins in hallway hellos and cocktail conversations; it's impossible to say which such musings might at this very moment be fermenting into formal activities. What follows is, then, clearly a snapshot.

Standards are a touchy topic for industries experiencing rapid growth. There's a sense that manufacturers need to be free to try any and all new ideas to harness their potential, that freezing elements of technology at some arbitrary time, before there is proof that further change is unlikely, will stifle innovation and will ultimately hurt the industry.

Conversely, there comes a time in the growth of an industry when the chaos stops acting as quantum turbulence spawning wild new ideas and starts to act more like thermal vibrations that get in the way of progress. That's when purveyors and purchasers alike begin to clamor for some order in the form of standards.

The trick is in figuring out when the timing is right. Done too early, the standards will simply be ignored as running counter to the interests of important players. Done too late, not only will the industry undergo suffering, but entrenched ad hoc positions will increasingly harden, driving up the disruption that must occur when the time comes to harmonize – or creating the risk that ignoring the standard will prove less painful than changing to meet it. Ultimately, there has to be a long-term economic benefit to the work involved in creating and adopting standards. Customers can often rationalize benefits from standards – especially if they don't have to spend any effort in helping set the standards. Vendors, on the other hand, aren't so sure, and different vendors will judge the right time for standards differently.

All of that said, there appears to be relatively broad consensus that the time is right for judicious standard setting for microelectromechanical systems (MEMS). In fact, there are already some standards in place – it's just not clear who, if anyone, is using them. Of course, many generic standards put out by organizations like JEDEC and IEEE will affect MEMS devices for things like package dimensions and communication protocols. The discussion that follows focuses only on standards established and intended specifically for MEMS and sensors.

Starting at the start

Believe it or not, there are ten existing standards set by SEMI, an organization that focuses on the processing of semiconductors and other related technologies. There are four active areas of effort: microfluidics, materials characterization, wafer bonding, and terminology.

Metrology-related standards have originated to a large extent by disagreements between equipment manufacturers and buyers about the performance of various processes. For example, wafer bonds must achieve acceptable strength, but equipment makers were measuring one way and their customers were measuring another; eventually they realized they had to agree on a methodology – hence the need for a standard.

The following are the metrology-related SEMI standards:

- MS1, *Guide to specifying wafer-wafer bonding alignment targets*
- MS2, *Test method for step height measurements of thin films*
- MS3, *Terminology for mems technology*
- MS4, *Standard test method for young's modulus measurements of thin, reflecting films based on the frequency of beams in resonance*
- MS5, *Test method for wafer bond strength measurements using micro-chevron test structures*
- MS8, *Guide to evaluating hermeticity of mems packages*
- MS10, *Test method to measure fluid permeation through mems packaging materials*

What's interesting is that this effort is more than just a cry for help from customers. It has come together from a number *(continued)*

In Search of MEMS Standards *(continued)*

of efforts, not the least of which originated in work done by the National Institute of Standards and Technology (NIST) to create some test structures for evaluating critical materials properties like Young's modulus. This was a very specific project that might have been envisioned as enabling a standard testing methodology – both structure and measurement protocol. But it didn't go anywhere.

According to Michael Gaitan, NIST's Man About MEMS (my characterization, not his, due to the frequency with which his name comes up), NIST has two purposes: one is to improve measurement science; the other is to set standards. They have an active MEMS program going back to when their interest lay in using MEMS devices to improve their measurement equipment. Over time, the MEMS activity moved from that into a standard-setting mode. The test structure project made it clear that a critical ingredient was missing from the process: industry consensus.

They have since taken on a roadmapping effort and have put out recommendations for testing standards, also done in conjunction with MIG. But the consensus-building process has also moved the area of focus out: before you can standardize a test or test process, you have to agree on what needs to be tested. And before you can agree on what needs to be tested, you have to agree on what customers care about and what should be put on the datasheet. So Michael Gaitan has noted that he's very encouraged by the efforts to pin down the datasheet contents. It establishes consensus and sets a starting point from which, given continued consensus, further work can proceed.

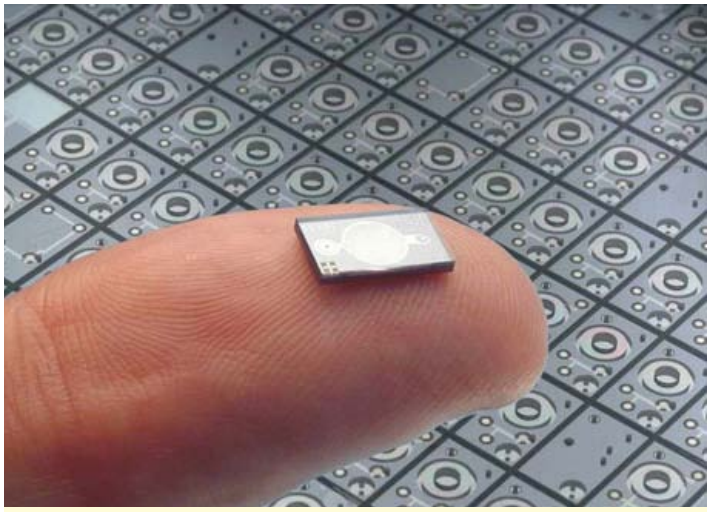
Where folks fear to tread

If there's one MEMS standards topic that raises hackles, it's the thought of standardizing actual processes. MEMS is all about novel ways of building tricky structures, and no one is willing to subject a core process to a standard.

The good news is, no one is requesting that. But there have been suggestions – and, at this point, they're only suggestions – that there might be some elements of processing that can be standardized. The thinking is that there are such pieces in MEMS processing that could be harmonized, making it easier for devices to be manufactured in different fabs or by different foundries. So the topic has been broached – gently – but, as far as I'm aware, it's only talk for now.

Unaccounted for

When I was rummaging through the Internet trying to find productive leads on this topic, I ended up a few places that were completely unreferenced in all of my other discussions. The Internet being the collector of all things relevant and ir-, it's hard to decide how to disposition these things. Are they prior incarnations of projects that got renamed and then handed to other organizations and then renamed again? Were they failed projects? Are they alive and well in a different, parallel universe? I'm not sure, but here is a sampling of what I've stumbled across. I'm sure that, with a couple more months of work, I could sort through all of this, but I'm succumbing to the will of the publishing deadline as an excuse for saying "Enough!"



Microelectromechanical systems, or MEMS, is a technology that can be loosely defined as miniaturized mechanical and electromechanical elements that are made using the techniques of microfabrication.

Note that some of these may or may not look specifically like MEMS standards (see, for instance, the DIN ones), but they came up specifically in MEMS-related contexts when I first found them.

IEEE 1451. This is a "Standard for a Smart Transducer Interface for Sensors and Actuators." There are eight components, 1451.0-1451.7. It includes the definition of a "transducer electronic datasheet" or "TEDS." Seriously: this never once came up spontaneously in any conversation I had with anyone. When I asked, Mr. Gaitan confirmed that NIST has been very involved with the project, although through a different NIST lab and individual. I will follow up on this for future coverage; this seems to be a complex standard. To be fair, it does appear to apply to all sensors and actuators, not just MEMS.

Numerous projects under IEC TC 47/SC 47F, covering MEMS. The Japan Micromachine Center tracks this activity as well. The projects include the following, at various stages of development:

- IEC 62047-11, *Test method for linear thermal expansion coefficients of MEMS materials*
- IEC 62047-15, *Test method of bonding strength between PDMS and glass*

(continued)

THE STANDARDIZATION WORLD

In Search of MEMS Standards *(continued)*

- IEC 62047-16: *Test methods for determining residual stresses of MEMS films; wafer curvature and cantilever beam deflection methods*
- IEC 62047-17: *Bulge test method for measuring mechanical properties of thin films*
- IEC 62047-18: *Bend testing methods of thin film materials*
- IEC 62047-19: *Electronic compasses*
- IEC 62047-20: *Test method for Poisson's ratio of thin film MEMS materials*
- IEC 62047-22: *Electromechanical tensile test method for conductive thin films on flexible substrates*
- PNW 47F-139: *General rules for the assessment of micro-geometrical parameters*
- PNW 47F-140: *Silicon-based MEMS fabrication technology - Basic regulation for layout design*
- PNW 47F-141: *Silicon-based MEMS fabrication technology - Measurement method of cutting and pull-press strength of micro bonding area*

Commercial applications of MEMS technology include consumer electronics devices such as cell phones, game controllers, personal media players, digital cameras, PCs, laptops, inkjet printers, headsets, projectors/displays, automobiles, switching technology, data communications, medical and health related technologies, and many more.

I am attempting to contact the U.S. National Committee Member (I'm intimidated already), and I will follow up in the future on this as well.

DIN 1495-3, *Sintered metal plain bearings subject to specific requirements for use in small-power and fractional horse-power electric motors - Part 3: Requirements and testing.* (DIN refers to the German Standards Institute.)

DIN 32561, *Production equipment for microsystems - Tray - Dimensions and tolerances.* Future work includes production equipment for microsystems, classification of microsystem components, terminology, and the interface between equipment and "end-effectors" (the business end of robotic tools/fingers/whatever).

ASTM E08.05.03 – several thin-film related standards (E 2244, 2245, and 2256). This is older work (the visible activity is vintage 2003), so it may have been worked into other things given that this comes under the auspices of NIST.

Boiling it down

To summarize, then:

- Several low-level metrology standards exist.
- A few microfluidics standards exist.
- A Smart Sensor standard exists.
- A datasheet standard/ agreement is in the works.
- Test and reliability standardization efforts are building.
- A sensor communication standard is being considered.

My head hurts. ■

IEC HEADLINES

IEC Revamps Homepage for Easier Access

The IEC has launched a new look for its institutional website homepage, designed to provide an improved user experience and simpler navigation. One of the objectives of the new homepage's look is to provide a digital work environment that responds to the needs of the almost 13,000 experts worldwide who contribute to the development of IEC International Standards and the functioning of its conformity assessment systems.

The new homepage features tabs for Home, Work, Learn, News, and Buy, which bring users directly to the content they are most interested in. At the same time, IEC has launched an upgraded myIEC tool to provide the IEC community with a set of personalized and role-based direct links to working information, tools, and applications on a single web page. Users are able to tailor their personal work page so that it responds to their specific standardization or conformity assessment needs.

The new homepage and the upgraded myIEC tool aim to better serve the vast IEC community by offering the most efficient working platform to existing and new users. For example, if someone is a Technical Committee or Subcommittee expert, a Conformity Assessment System expert, has responsibilities in an IEC National Committee, or participates in an IEC Management Committee, they can now find all their documents and links in a single place.

Further information

Visit the new homepage at www.iec.ch. ■

ITEM OF GENERAL INTEREST

Standards Purchased on ANSI's Webstore Support USNC Activities

Standards developed by IEC can be purchased from a variety of sellers. But to see the greatest benefits from dollars spent, USNC members should purchase standards directly from the American National Standards Institute (ANSI), since the revenue from ANSI's eStandards store directly supports the activities and initiatives of the USNC.

The USNC/IEC is a totally integrated committee of ANSI. The Institute provides administrative support to the USNC and its nearly 1,400 managerial, engineering, scientific, and professional participants. ANSI also provides the fiduciary framework by which the USNC's financial obligations are met, including the payment of annual dues to IEC. And since ANSI is a non-profit organization, the revenue earned from your purchase helps to support the programs and services offered to USNC members.

When you purchase IEC standards from ANSI, you are making a commitment to bolster U.S. leadership at the IEC table. And purchasing standards directly from ANSI's eStandards Store offers the additional benefits of cost savings for ANSI members, personal service, and the convenience of one-stop shopping for more than 230,000 standards available for immediate download.

Further information

Contact the ANSI customer support team (212.642.4980; info@ansi.org) or visit the eStandards Store (webstore.ansi.org). ■

Upcoming Issues of *News & Notes*

Q II Linking Standardization and Research

Q III Multimedia

Q IV Highlight of IEC SMB Strategic Groups

SAVE THE DATES

Mark Your Calendar for Upcoming Meetings & Events

APRIL 2013

COPANT General Assembly, April 22–26,
Gros Islet, St. Lucia

MAY 2013

CAPCC/TMC/Council Meetings, April 30–May 2
Dell Inc., Austin, TX

PASC/PAC, May 20–23, Honolulu, Hawaii

JUNE 2013

CAB Meeting, June 10, Geneva, Switzerland

SMB Meeting, June 11, Geneva, Switzerland

SEPTEMBER 2013

CAPCC/TMC/Council Meetings, September 10–12
NEMA Headquarters, Rosslyn, VA

6th TAG Leadership Workshop, September 13
NEMA Headquarters, Rosslyn, VA

ANSI World Standards Week, September 30–October 4
Washington, DC

OCTOBER 2013

U.S. Celebration of World Stadrds Day, October 3
Washington, DC

77th IEC General Meeting, October 21–25
New Delhi, India

SMB	October 21
CAB	October 22
CB	October 23
Council	October 25

For more event information, visit www.ansi.org/calendar and enter "USNC" or "IEC" in the key word search field.

ANSI American National Standards Institute

Published in ANSI's NYC Office
25 West 43rd Street
Fourth Floor
New York, NY 10036
www.ansi.org

ABOUT THIS PUBLICATION
The USNC *News and Notes* newsletter is distributed to the constituency of the United States 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.

DISCLAIMER
The opinions expressed by the authors are theirs alone and do not necessarily reflect the opinions of the USNC/IEC nor ANSI.

HOW TO CONTRIBUTE
Contributions are gladly accepted for review and possible publication, subject to revision by the editors. Submit proposed news items to:
Tony Zertuche, USNC/IEC Deputy General Secretary, ANSI
212.642.4892
tzertuche@ansi.org