Title	Just another year in the consumer electronics industry? [notes from the editor]
Author(s)	Corcoran, Peter
Publication Date	2016-01-01
Publication Information	Corcoran, Peter (2016) 'Just Another Year in the Consumer Electronics Industry?[Notes from the Editor]'. Consumer Electronics Magazine, IEEE, 5 (1):3-10.
Publisher	IEEE
Link to publisher's version	http://dx.doi.org/10.1109/MCE.2015.2485318
Item record	http://hdl.handle.net/10379/5990
DOI	http://dx.doi.org/10.1109/MCE.2015.2485318

2015 - Just Another Year in the Consumer Electronics Industry?

Welcome to another CES show issue of IEEE CE Magazine. This is aligned with the International CES held in Las Vegas, a global meeting place for the CE industry where you can view the latest developments in new consumer electronics products and associated technologies and services. It is both a time to reflect on the year gone by, and to look forward to what is to come next year in our industry.

Change and the Consumer Electronics Industry

As I've commented before the CE industry is one where you really need to get used to the constant and rapid pace of change [1]. The driving forces in our sector provides much of the impetus for new technology development and deployment in mass markets. And the competition, well that drives us to excel or find an alternative career path.

As I've said before:

"… consumer electronics engineers not only have to do it better, faster, and more efficiently but also have to figure out how to do it for next to nothing. We ignore the laws of physics and economics; we optimize algorithms beyond the capabilities of mathematics; we reliably compress data until only noise should remain; we improve images beyond the capabilities of any optics. And it all works. It has to, because we serve the most pernickety and fickle of masters—the common consumer. If it isn't perfect, consumers don't buy and the business is bust."

"… everything in consumer electronics was in a constant state of change and improvement, and it always would be. Consumer electronics engineers are the sorcerers of change. Change is our raison d'etre; it is why we are here. Ultimately, that is why it is such a compelling field with which to be involved."

So what are we going to find at International CES 2016? What new sorcery will be unveiled in our existing technologies and what new sectors and trends will emerge?

In this editorial lets take a look at some of the more exciting and interesting developments of 2015 and guess at likely developments for 2016.

Weill in part I've cheated a bit here as I recently attended the ICCE-Berlin conference and had an opportunity to wander the IFA Trade Show – the European equivalent of International CES. Some of my insights are based on new products and technologies I caught during this "wander". But lets that a quick step through some of what is new in CE for 2015.

TV Panels – Reinventing the Home Entertainment Experience

Television was for many years the backbone of the consumer electronics industry. More recently it lost out through the growth of home computers, followed by the commoditization of the Internet through the Web leading to what I like to call the "consumer ICT" segment; while most of us still have a TV panel at home the role of television has been pushed into the background in recent years through the growth of video streaming and the introduction of tablets.

However the TV panel industry has been fighting back and today most panels are equipped with Internet connectivity and a range of 'smart' functions that take advantage of that connectivity. Much of this development has been 'silent' but I have to say that I am impressed by improvements in some of the more recently panels where the integration of functionality with Internet services is far more refined than it was 12-18 month ago.

And the visual quality of the latest 4K panels is also stunning. Again I was until recently a skeptic, but if you read this column you'll know that I have recently commented on my own experience with a new 4K panel and was pleasantly surprised. So the last requirement for TV panels to reclaim their central role in the living room is to enhance the audio experience, to become a wall-mounted home cinematic experience. And we are starting to see this happen – one of the show-stoppers at IFA were the new 4K UHD OLED TV panels from Panasonic, but what was really impressive was the integrated audio experience with full THX certification built into the panels.

UHD Blueray Players Arrive

To match an array of improved panels at IFA, Samsung also delighted home-video buffs by announcing the first 4K Ultra HD Blu-ray player. The new Blu-ray format will deliver optimal picture quality for 4K TV owners with high-bitrate full HDR (high dynamic range) support, and incorporates up-scaling of standard Blu-ray discs and legacy DVDs.

In a complimentary announcement at IFA, 20th Century Fox pledged its full support for 4K UHD, and all new release titles will be available in the new Blu-ray format, while older titles are to be re-mastered and re-released over time. Samsung indicated that these new players would appear in Europe in early 2016, and possibly in the US market in time for the holidays. Clearly the increasing sales of UHD 4K TV panels has started to catalyze the market for more 4K content and we'll undoubtedly see further developments throughout 2016.

New Panel Technologies are on the Way

I saw some other interesting exhibits – some quantum-dot TV panels were also on display from TCL. The company holds a market share of 8.4% in France and ranks

No. 4 in Europe after Samsung, LG and Philips. Their quantum dot panels were nothing short of spectacular, but we did wonder at the publicity videos that were running as they showed a sequence of spectacular video imagery highlighting the vivid colors available, but each featured only slowly moving scenes. No football matches or action sequences so it seem that there are still motion rendering issues with quantum dot technology. But once these are sorted we'll all be switching over!

To my mind 2015 is definitely the year the TV panel industry starts to find its feet again. Much improved connectivity, responsive switching between input sources and the network, and improved user interfaces, coupled with the growth of over-the-top services like Netflix - we now begin to see TV panels learn how to take advantage of the Internet and move seamlessly between display modes with functionality that consumers really need. Nobody is talking about 'Smart TV' any more because that smartness has become intuitive and invisible to the user as it should be. But the truth is that the user experience is back where it needs to be and I expect the panel industry to go from strength to strength during 2016.

Smartphones – the Fight for Market Share!

Well we can't really avoid talking about them, can we! Everyone's favorite CE device and the fastest market growth for a CE product ever, but market saturation is rapidly coming upon us! And the competition is something else. I've heard that there are several hundred companies now in China manufacturing smartphones and, naturally, most of those will go out of business over the next couple of years.

The fiercest competition isn't even visible to us in Europe or the US because the key markets are in India, China, Latin America, Africa and the Middle-East. And here it isn't the $100 smart-phone that is the winner – no, the new target is the $50 smartphone. And yes, many of these companies are managing to squeeze a profit – assuming they can get production levels high enough to achieve volume discounting on key components – screens, application processors and wireless subsystems. Profitability only comes after 12-18 months as these discounts kick in – but many companies will not survive long enough to reach profitability.

But there is competition at the high end as well. Apple continues to dominate, but when you compare the iPhone to the latest models from other manufacturers one has to wonder. Sony recently released (at IFA) a new phone with 4K display and 23 megapixel camera. And both the LG G4 and the Samsung S6 feature higher resolution displays than the iPhone 6 and higher specification main cameras. There are arguments that more pixels won't improve image quality, but comparisons between the images from these devices shows that they certainly don't hurt image quality. Now the iPhone 6S has brought Apple back into the game with 12 megapixels but the screen pixel density still lags the competition.

Table 1 shows the comparative specifications and its clear that there is a tooth and nail fight going on here as well. And note that it is no longer around the traditional elements of RAM and CPU, but with smartphones the focus now is on the camera, the display and the battery capacity – everything else is a commodity! No one really cares if you have 6 or 8 cores in the applications processor. And while Apple still commands a premium and holds sway over the high-end of the market it is clear from the table below that it won't be easy to hold onto that lead. We can question the utility of having a 4K resolution display on a handheld smartphone, but I did have an opportunity to see this display in action at IFA and it was impressive.

	Apple iPhone 6S	Samsung Galaxy S6	LG G4	Sony Xperia Z5 Premium
Display	4.7-inch with 1,334x750-pixel resolution	5.1-inch with 2,560x1,440-pixel resolution	5.5-inch with 2,560x1,440-pixel resolution	5.5-inch with 3,840x2,160-pixel resolution
Pixel density	326ppi	557ppi	534ppi	806ppi
Dimensions	138.3x67.1x 7.1mm	143.4x70.5x6.8mm	149.1x75.3x8.9mm	154.4x76.0x7.8 mm
Weight	5.04 ounces (143g)	4.8 ounces (138g)	5.4 ounces (152g)	6.34 ounces (180g)
Mobile OS	Apple iOS 9	Android 5.0 Lollipop	Android 5.1 Lollipop	Android 5.1 Lollipop
NFC	Yes	Yes	Yes	Yes
Camera	12-megapixel,	16-megapixel	16-megapixel	23-megapixel
Video	UHD video (4K)	UHD video (4K)	UHD video (4K)	UHD video (4K)
Front Camera	5-megapixel	5-megapixel	8-megapixel	5-megapixel
Processor	64-bit A9 chip with M9 motion processor	Octa-core Exynos 7420	1.8GHz hexa-core Snapdragon 808	Octa-core Snapdragon 810
Storage	16GB - 128GB	32GB - 128GB	32GB	32GB
Expandable storage	No	No	Up to 2TB	Up to 200GB
Battery	1,715mAh	2,550mAh	3,000mAh (removable)	3,430mAh

Table 1: Specifications of the latest high-end smartphones adapted from (**http://www.cnet.com/news/apple-iphone-6s-vs-samsung-galaxy-s6-lg-g4-sony-xperia-z5-premium/**)

So this market is going to be very interesting to observe throughout the remainder of 2015 and into 2016. Will Cupertino continue to rule, or can the challengers start to upset things? The introduction of a new subscription model for iPhone ownership from Apple shows that innovations will not be confined to technical improvements. It is clear that smartphones are the gateway to a consumer's life and many device manufacturers are prepared to take significant business risks in order to keep skin in this game. What will unfold throughout 2016 is anyone's guess, but we do live in interesting times!

Automotive – A Smartphone on Wheels?

Over the last few years the automobile industry has been moving to aggressively adopt consumer electronics into its vehicles. Today it is difficult to buy a car that does not feature a touch-panel display with a myriad of in-car information and entertainment electronics. Today's high-end models are a hive of electronics technologies - many vehicles now provide 4G connectivity, remote monitoring and one vehicle manufacturer recently introduced the technology to allow courier deliveries to the 'car boot' – unlocking the boot remotely when the courier arrives to make the delivery! So the connected vehicle is already here. And the industry continues to invest heavily into autonomous vehicles and a myriad of enhanced sensing and navigational technologies.

Getting the User Interface Right

I can understand this impetus to turn our vehicles into smartphones on wheels – the automotive industry has a 5-10 year product turnover cycle and is envious of the two-year cycles of the smartphone manufacturers.

But to my mind the integration of electronics into our vehicles is still lacking. But smartphones are very attention-grabbing devices and integrating their use modalities into an environment that requires high levels of user-focus is challenging. And adding complex touch panels that attempt to mimic the smartphone/tablet interface serves as a distraction to the driver, rather than an enhancement of the driving experience.

Recently there has been a trend towards new user-interface modalities, but these are typically unintuitive and awkward to use. Gestures and eye-gaze are even more challenging to integrate with driver ergonomics than a touch panel. Voice interfaces can be effective, but take time and effort to train and to date have been limited to high-end vehicles.

Disruption Ahead?

To my mind the automotive sector has made great advances in term of connected vehicles and safety enhancing technologies such as electronic stability systems that watch for conditions that might lead to loss of control of the vehicle. But these are 'invisible' technologies for the majority of vehicle owners. It is the electronics that are in front of you that remain awkward, often unintuitive and for the most part fail to enhance the driving experience.

In a sense the automotive industry is in the same place that smart-TV was 2-3 years ago and I have seen little in the last couple of years to indicate new trends here. But often change comes from new players and I feel that we are already seeing this trend in the automotive industry. This issue we have an interesting piece from Bob Frankston about his experiences with hiring the 'most programmable' car he could find to test out over his vacation. Its an interesting read and I think it shows that we can expect some new disruptive experiences coming soon to a vehicle near you – I expect to see some of this coming disruption appear at International CES 2016!

Internet of Things – But where are the Customers?

I recently gave a Webinar for the IEEE Internet of Things initiative and as a long-time IoT skeptic I did provide a changed viewpoint in this presentation. I've reworked this into an article for this issue where I summarize my views that maybe the conditions are ripe for a broader adoption of IoT. But we must also consider that despite all the hype there has not been enough effort to consolidate industry standards.

Last year we saw a strong IoT presence at CES but the industry has yet to unveil breakthrough products that can genuinely catalyze this emerging market. To paraphrase the old saying, one thermostat does not a smart-home industry make!

There are however some interesting sub-segments of IoT that seem to be moving in interesting directions, so lets take some examples and see if we can identify some broader trends from these niches.

Cameras Everywhere

One sector that has show interesting new developments in 2015 is that of wireless security cameras. The leader in this segment has been Dropcam – now owned by Nest

Labs/Google – but in 2015 the Simplicam (https://www.simplicam.com/) gained some improved features including an easy set-up process that works directly from your smartphone by generating and presenting a QR code, customized for your local network, to the camera. It features a wider field of view than the Dropcam although video quality is only 720p. Advanced notification facilities include face-based and sound-based alerts – yes this camera can recognize faces and alert you when a stranger is detected. It signals the future evolution of home security where you'll be able to find out in real time when an unauthorized person has entered your home – it isn't too much of a stretch to think that soon you'll be able to alert local law enforcement directly from your sunbed on the beach and send them mugshots of the intruder!

Another exciting development is the Arlo camera from Netgear – this is 100% wire-free, weatherproof, and provides a full-HD wide field of view video stream with 3-4 months of battery life. Yes, a genuine wire-free camera! How can that be managed on battery power alone? Well Arlo hints at another smart development – it only processes video when it detects movement so most of the time the data from the image sensor is analyzed and if there are no significant changes, frame-to-frame then nothing is processed, or transmitted to the base station. As you can imagine the Arlo is engineered to use very low power during normal 'scan' mode using only a fraction of the main sensors pixels for motion detection and working at low frame rates. However once motion is detected it quickly ramps up to 30 frames-per-second and full-HD resolution, compressing the video with a state-of-art MPEG codec and transmitting to the wireless base-station where the video stream is uploaded to a cloud storage service.

Now if the smart 'energy efficiency' of Arlo could be combined with the face recognition capabilities of the Simplicam we'd have a real killer IoT product! Something to look forward to in 2016 perhaps?

Heath, Wellness and Lifestyle?

The march of the smart-watch continues with Apple announcing record pre-orders for their entry models. Samsung's new Gear S2 smart-watch was officially launched at IFA in September and it is pretty impressive. Based on the "Android Wear" ecosystem this is the first real competition for the Apple Watch. On the wrist, the Gear S2 feels stylish and slick. It is lightweight being made from stainless steel which is sturdier than aluminum. The dial feels precise and easy to navigate with.

There is a home button and a back button – pretty standard for Android – and these are pretty easy to find with your off-hand. The vast majority of navigation is done with the dial, followed up by a tap on the touchscreen to confirm the selection.

With these new devices we see a trend to bring out devices into more intimate contact with our bodies. This enables more detailed measurement of our physiological parameters with the potential to gauge not only our immediate body state, but also to measure and learn about our responses to our environment and eventually to determine our likely state of mind in real time.

While the ability to monitor and analyze the state and health of the body is valuable it is important to be aware of and provide safeguards against more extensive monitoring and analysis of the individual. I'll touch on this topic below, but for now consider if you really want Apple or Samsung to instantly measure and track your physiological response and stresses? Imagine the potential to direct advertising and real-time

services to the consumer – on a hot Summer's day, if you are hot and bothered a cloud service could send you nearby locations of café-bars where you can get a relaxing drink - but is that going a step too far?

Smart-Homes Ahoy, Captain?

Back in the early 1990's I authored an article for a magazine called "Technology Ireland" entitled "Smart-Homes head for the highway" – it was about the integration of the IEEE CEBus home networking technology with the Internet. In that article I was optimistic on the commercialization of smart-home technology – you can read a bit more in my IoT article in this issue. But over the intervening 25 years I have grown to feel a bit like captain Ahab with the "smart-home" being my personal Moby Dick.

But smart-homes are tantalizingly closer today. Apple's HomeKit looks like a good step in the right direction and their emphasis on security protocols for compliant products and subsystems is encouraging. HomeKit products with Apple's MFi ("Made for iPhone") certification have an authentication chip built-in and have undergone rigorous testing to get this seal of approval including compliance with the iCloud keychain. Apple TV will be the main gateway for HomeKit devices, but industry-wide adoption is still slow. As a semi-eternal optimist I have hopes to see Smart-Home take off and perhaps 2016 will become the year that happens. (I still keep that harpoon sharpened and ready in the garage.)

Remote Control Anyone?

It is easy to overlook the obvious, but at IFA Logitech announced new additions to its Harmony remote control lineup, including the Harmony Elite. So maybe the best home gateway for the IoT is the remote control system in your living room? And who doesn't long for "one remote to control them all" (apologies to Lord of the Rings fans!).

The Harmony Elite works with Logitech's Harmony Hub to control not only your entire entertainment system, but smart home devices such as lighting, thermostats, door locks, window shades and more as well. You can program so-called "Harmony Activities," which will sequence several commands at once. Could this remote control approach be the killer product that brings IoT into our homes? And helps your editor catch his whale? Only time can tell!

And Everything I've Left Out …

Well I think I've probably rambled on enough; there are many new things I haven't touched on – drones were one example of an emerging CE sector at IFA, even if most of them were kept in cages; there was also a surprising emphasis on new food preparation technologies – many with hands-on demonstration areas where you could test these new gadgets; there were double-load washing machines with wifi connectivity; even a 'connected' microbrewery system that could mash the grain and prepare the must for fermenting your own beer – definitely a novel IoT technology that was getting a lot of attention! Not quite 'free' beer, but definitely a way to get high quality 'cheap' beer made from natural ingredients.

There is no doubt that there has been a lot going on in the consumer electronics industry during 2015. And we are going to see a lot of continuing developments during 2016 many of which will shape the development of this industry over the next decade. I hope this review of the year has built up your enthusiasm to sally forth at International CES and see what new developments are here to kick off the next year in CE. And may 2016 be an even more interesting years for our industry, and for the consumers who fuel this cauldron of change that we live and work in.

Now back to more immediate concerns, my regular summary of this latest issue of CE Magazine!

In this Issue

CE Society News

This is a busy time for the CE Society. Here we provide news and stories of the activities and initiative undertaken by the society board of governors, by the local chapters and relating to conference, workshops and other activities such as standards that may be of interest to our members. Here you can see that your interests as a member are being looked after by those elected to the society board. If you've voted for a candidate you should be able to note their contributions here!

CE Society President's Visit to Engineer's Ireland

Our society president Sharon Peng and Joe Lillie recently visited Ireland on the way back to the US from ICCE-Berlin conference and met with senior executives of Engineer's Ireland (EI). Joe Lillie, who is our current treasurer is also the principle IEEE liaison with National Engineering Bodies and so this visit represented a formal meeting between IEEE and Engineer's Ireland. You can read more about this visit and some of planned collaborations between IEEE and EI in this news item.

The IEEE Panel of Conference Organizers (POCO 2015)

Known as POCO this is an internal IEEE conference run by MGA with a view to training and informing conference organizers and administrators of current best practice. There are also many panel and break-out sessions where delegates have opportunities to share and exchange their individual experiences. This year POCO was held in Glasgow, Scotland and there was a definite Scottish flavor to the proceedings including swordfights, whiskey tasting and a fabulous venue for the "multi-sensory" conference banquet.

ICCE-Berlin

We have an overview article on ICCE-Berlin which is now 5 years old. This has become the IEEE CE Society's main European conference and it attracts participants from across Europe - from Spain, Ireland, the UK and Germany in the West of Europe and from Serbia, Greece, Romania and other East European nations. There was also a strong presence from Russia (St. Petersburg Chapter) and quite a few Korean participants, so while this is a European conference it remains very much an International one in the spirit of ICCE.

Young Professional's Activities at ICCE Berlin

The CE society's annual European conference is ICCE-Berlin, held in conjunction with the IFA trade show. This year the society's young professionals went kayaking in the rivers around Berlin. You can read all about it here.

Future Directions Reports & Linkages

One of the more active people within our society is Tom Coughlin who manages and chairs the CE society Future Directions (FD) committee. This issue Tom has a detailed report gathered from the chairs of some of the FD sub-committees. Here you can read about conference participation by the FD groups across all of the society's conferences, some of the articles submitted by FD participants during the year to the magazine and future plans for 2016. Future direction spans a range of emerging fields of interest across IEEE including Transportation & Electrification, Cloud Computing, Internet of Things [2], [3], Augmented Reality, Consumer Privacy & Security [4], [5], Safe Advanced Mobile Power [6], [7], and the Future of Making. All of these areas have an affinity with the CE sector and if you have an interest in some of them then Tom Coughlin is the person to direct you to the relevant chair of your interest group.

Future Directions IoT Activities – 2015 & 2016

And not to forget Soumya-Kanti Datta who is chair of the Future Directions Internet of Things (IoT) interest group. Soumya has been very active this year running IoT related panels at ISCE, ICCE-Berlin and again at ICCE-2016 in Las Vegas. Here he gives details both of successfully completed activities during 2015 and planned events for next year. If you are interested in or working on IoT related technology – and I know that many of you are! – then Soumya is the person to contract to get involved as a volunteer! Feel free to contact him at: Soumya-Kanti.Datta@eurecom.fr.

Chapter Events – Battle Royale

Thank to Wahab Almuhtadi for this fascinatating news article on Canada's answer to the classic film. And I thought all those young engineers would be out enjoying the Summer sunshine after the hard Canadian Winter!

Chapter Profile – Santa Clara Valley

Chapter Profile – Dallas, Texas

January Feature Articles

This issue we have a special section on "Internet of Things and Smart Homes" in addition to our regular "Social Impacts" section. We also have our regular "Soapbox" and "Champions of CE" spots as well as a range of interesting feature articles. Lets start with the main features.

Main Features

Game-On 2 – the Atari PCS 400

Joe Decuir is a regular contributor and here he describes the background and technical history of one of the classic home gaming consoles – the Atari 400. Joe was part of the team that designed and built this system so he can tells it as it was. And if you like this article you'll be delighted to know that Joe has a full book in the works with even more details, anecdotes and insights into the early days of the console industry.

State of the Art in Life Cycle Analysis (LCA)

Our next feature articles turns to a more serious topic. These days we keep hearing about sustainability and the importance of our energy usage and the environmental consequences of our industrial society. One key challenges for the consumer electronics industry is to measure the impact of our products and this is achieved through a methodology known as Life-Cycle Assessment (LCA). Some of you will be aware of LCA, but this issue we have a leading LCA researcher provide a summary of the current state-of-art in this emerging field.

Anders Andrae works with Huawei in Sweden and has been involved in several recent major collaborative studies working with researchers from other mobile device manufacturers to compare and understand their individual methodologies and reach consensus on best practice in this emerging field. Here we share some of the current state-of-art and provide some insight into where LCA is headed over the next few years. There is no doubt that its importance in the CE sector can only increase over this time and I hope you find these insights of value in your own work activities.

IP Core Security

I can still remember the time when expensive software came with a "hardware dongle" to plug into the printer port so you couldn't get it to work on another computer. Since those days software has become largely commoditized and if it does need to be secured we have 'server-side' licensing engines that remove the need for the 'dongle'. But we are seeing a new frontier for theft of our precious engineering work – the potential to steal the designs and layout details of the IP cores from system-on-chip (SoC) designs.

This problem becomes more relevant as many smaller suppliers of specialized IP core subsystems try to build specialized expertise in a particular aspect of SoC data processing, transcoding or interfacing – from USB hubs, to MIPI[1] peripherals, HDMI interfaces and specialized audio or video processing subsystems. These small companies sell their IP core designs, often representing many man-years of design work, into larger SoC platforms and rely on licensing royalties to generate their revenues. The need to be able to secure these designs and prevent unauthorized usage by larger companies operating in highly competitive consumer electronics markets.

One of our new associate editors, Dr. Anirban Sengupta will introduce and review the state-of-art in IP core protection techniques and provides a useful summary of current research directions in this field. If you are involved in IP core design work you'll likely be interested in this article.
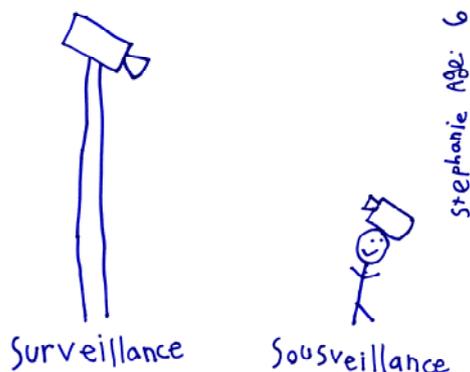
Evolution of the Digital Watch

Next up Greg Wood, VP of Technology for the ZENO group provides use with an overview of the evolution of the digital watch and how it is transitioning to become the 'smart-watch'. Can this be the next success for an emerging CE product category or has too much been promised by the industry? You'll get some interesting insights from Greg and I guess this is another question to be answered as we progress through 2016.

---

[1] MIPI is not an acronym; it is a high-speed bus for mobile peripherals that is well known in the CE sector.

Soapbox – Veillance Integrity for CE

Last issue we had our first Soapbox in a while with Kyle Wiens sounding off about the 'right to repair'. This issue we have Steve Mann writing about the need for transparency and ethical standards in our consumer devices. More specifically modern devices spend more time spying on and learning about their owners than ever before. Steve is famous for his contributions to wearable technology and has pioneered the concept of Souveillance which empowers the individual consumer to 'spy back' on big brother. Here he explores these themes in the context of connected CE devices and explains the need for standards or a code of conduct governing the 'Veillance Integrity" of our electronic devices and their associated products and services.

Surveillance   Sousveillance

Stephanie Age: 6

Champions of CE (Steve Wozniak)

Our champion this issue is Steve Wozniak who recently joined our society. To celebrate his achievements Tom Coughlin has provided an article on the Mac II and your trusty editor has embellished this with excerpts from an old Practical Computing interview with Steve conducted by another venerable CE society member, Robin Bradbeer. Hope you enjoy the article and maybe even catch up with "the Woz" at one of our conferences in 2016.

Special Feature – IoT & Smart Homes

We've featured a few recent articles on the Internet of Things (IoT) but this issue I have an interesting selection for you – different perspectives from different people.

IoT Bubble

Pablo Valerio is an analyst who has worked in the IT industry for 25+ years. Primarily based in Spain, he has also lived in Germany, The Netherlands and Denmark. His knowledge of the European IT business and his interest in EU technology initiatives spurred his move to technology writing with a focus on privacy, security, mobile technology and smart cities. His work has appeared in InformationWeek, Enterprise Efficiency, EE Times, and SAP Business Innovation, among others.

Here he provides an interesting and timely article on the problems IoT has experienced, mainly in a European context, with scaling from research/demonstration projects to larger city-wide infrastructure. Indeed the lack of success is so endemic that many past supporters have become frustrated and there are significant risks that IoT might not make it out of the commercialization starting blocks. But you can find all the details and analysis in Pablo's piece.

IoT – Why Now?

The technology to connect 'things' to the Internet has existed for more than 20 years, so if we take a look back at recent history we might well be tempted to ask the question why now? In this article, adapted from a recent IEEE webinar, your editor examines the origins of the Internet of Things, and attempts to answer the question

"Why Now?" He also looks forward to the next wave of disruptive technologies that will be coming to a device near you over the next few years.

IoT Services

Here we hear from Chris Koverman, who is an expert in the field of Software as a Service (SaaS) based technologies for customer support in the Internet of Things (IoT). This article presents the key tenets of next generation connected support. If embraced these could mean the difference between an Internet of Things that enhances and improves our busy lives as opposed to a "Bunch of Electonic Gadgets" that only succeeds in complicating them further.

Energy Efficient DC Homes

I met with Josep Guerrero at ICCE-Berlin where he gave an excellent keynote on microgrids. At the suggestion of Tom Coughlin we asked him to think about repurposing his article for CE Magazine and he came back with a draft inside a week. A bit of discussion and some minor editorializing and this article fits in excellently with our IoT and Smart-Homes section!

The Doorbell Hack

Our VP of Publications, Stu Lipoff, presented me with this cheeky piece. It shows how engineers are frequently driven to create new solutions that sometimes lie outside the accepted norms of socially responsible behavior – in this case Stu was ahead of the IoT curve having achieved a remote hack of the main door of his apartment complex – and all in the interests of receiving his morning paper safe from the ravages of the weather and neighborhood dogs.

Note that I have been promised a second installment to this story if there is a positive response from our readership. So if you liked Stu's whacky-hack please let one of us know!

Social Impacts

If you are a regular reader you'll know that we think beyond the engineering in CE Magazine and here we explore the broader impacts of CE technology on our lives and the planet we live on.

The Tracking Point

In this article Katina Michael explores the consequences of having a sporting rifle that can be controller remotely and has a 'heads-up' display similar to that in many first-person shooter games. But this is a real rifle that shoots real bullets and is intended for live game hunting. Are the lines between violence in the computer gaming world and in the real world starting to blur? Read on to find out more.

Interview Highlights with Early Adopters of Glass

Here we introduce you to 10 early adopters of the Google Glass wearable to find out their key comments and reactions to their time spend with this new technology. Google has withdrawn Glass for now – perhaps these interviews will throw some light on new aspects of Glass? Lets read on to find out.

Video Gaming Addiction

If you don't complain about having a teenager who spends too much time playing computer games, then that's probably because you are just such a teen, or an adult who is envious and would like to have more time to play them. Yes, a good computer

game is almost by definition extremely addictive because that is what makes it popular and successful. But have we reached the stage where the social effects of gaming addictions are having similar effects to drug, gambling and alcohol addictions? There is no doubt that many of the symptoms and end outcomes are very similar both for the addict and their immediate family and friends.

How can we manage and tackle this growing problem of the Internet age? We may not have all the answers, but a good start will get the ball rolling so read on to see what Katerine Albrecht and co-authors have to say on this topic.

Bring your own Device (BYOD)
An increasingly popular approach in industry, many companies now encourage employees to use their own devices to execute day-to-day IT and business activities. But there are risks in exposing your internal systems to a myriad of difference devices and OSes. In this article Robert Ogie explores some of the risks and examines what sort of policies can help to ensure that these are minimized. Helpful and practical advice if your company is looking at BYOD as a solution to growing complexity of IT systems management.

Self-Absorption
Joe Carvalko reflects on some important moments from his own career and muses on how difficult it can be to understand and envision the potential, both for good and bad, of some of the technologies we work to develop and create. With his grand-daughter starting college this Fall he considers what message and advice he can give her. An interesting and contemplative piece; as Joe says, "One cannot predict with any precision where technology will lead us …".

High Tech Child's Play in the Clouds!
 Katina Michael and Alex Hayes are not impressed with Mattel for creating "Video-Barbie"! A fun toy for innocent children to record and share their playtime with cyber-colleagues in the 'Cloud'? Or a child pornographers dream-tool? Well the authors lean quite strongly towards the latter and are quite aghast that a large corporation in the specialized business of making toys for pre-teen children could get this so wrong. If you too find a combination of the time-honored Barbie doll with a state-of-art wireless spy-cam to be a somewhat grotesque approach to a 21st century children's toy then you'll enjoy this one. It raises many sensitive issues, but that is what our Impacts section is all about!

Columns and Regular Features

Lastly we have our various regular columnists.

IP Corner
In this issue's IP corner Kieran Heneghan of Noerr Alicante IP, S.L. writes about the "Registered Community Design" – a Europe-wide mechanism that provides 3 years protection for your product design. This article covers the process to benefit from this cost-effective pan-European mechanism – a useful read for anyone involved in designing or commercializing consumer electronic products in the EU.

Bits Vs Electrons
Bob Frankston recounts his "Hackers Vacation" and his experiences with technology last Summer, including a programmable car and smart-luggage.

Art of Storage

Tom Coughlin on "Crossing the Chasm to New Solid State Storage Architectures" – for the latest industry trends in storage Tom is definitely the man and you can keep abreast of the most important development by following him column in CE Magazine.

Market Based Analyses

David Alan Grier on the history of the "Microwave Oven" and some of the engineers who shaped its evolution from an enormous monster bolted to the kitchen floor to today's sleek, lightweight product present in every apartment and home on the planet. As usual David provides some interesting insights into the CE industry and the engineers who work in it.

CEA Insights

Dave Wilson, VP of Technology & Standards with CEA, writes about CEA and its role in the CE industry as a facilitator. CEA is a neutral party often acting as an honest broker between industry consortia with competing standards and technologies. This article nicely summarizes CEA's role and mission w.r.t. the consumer industry and is a timely reminder we can reflect on while wandering the halls at CES.

Publications Round-Up

Finally we wind up with Stu Lipoff's Publications column. This issue Stu puts the focus on the "IEEE Transactions on Cloud Computing" and the "Transactions on Computational Intelligence and AI in Gaming" – two more of the IEEE journals where CE Society members are entitled to discounted subscription.

Bibliography

[1]   P. Corcoran, "Change and the Consumer Electronics Industry [Notes from the Editor]," *IEEE Consum. Electron. Mag.*, vol. 1, no. 4, pp. 3–16, Oct. 2012.

[2]   P. Corcoran, "Consumer Electronics and the Internet of Things [Society News]," *IEEE Consum. Electron. Mag.*, vol. 3, no. 3, pp. 29–34, Jul. 2014.

[3]   P. Corcoran, "Smartphones and the Internet of Servants [Notes from the Editor]," *IEEE Consum. Electron. Mag.*, vol. 3, no. 4, pp. 4–9, Oct. 2014.

[4]   S. Grzonkowski and P. M. Corcoran, "A privacy-enabled solution for sharing social data in ad-hoc mobile networks," in *2011 IEEE International Conference on Consumer Electronics (ICCE)*, 2011, pp. 147–148.

[5]   P. Corcoran, "Biometrics and Consumer Electronics: A Brave New World or the Road to Dystopia?," *Consum. Electron. Mag. IEEE*, vol. 2, no. 2, pp. 22–33, 2013.

[6]   P. Corcoran and T. Coughlin, "Safe Advanced Mobile Power Workshop [Society News]," *IEEE Consum. Electron. Mag.*, vol. 4, no. 2, pp. 10–20, Apr. 2015.

[7]   T. Coughlin, L. Stogner, and P. Corcoran, "Mobile Power Initiatives Moves into Second Year [Future Directions]," *IEEE Consum. Electron. Mag.*, vol. 4, no. 3, pp. 31–32, Jul. 2015.