IEF2012 – Post Forum Summary

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FUTURE HORIZONS PRESENTS

The Global Electronics Industry Event

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The Global Semiconductor Industry Analysts

21st Annual International Electronics Forum

"Turning Recession Into Opportunity ... New Applications, Markets & Regions"

3-5 October 2012, Bratislava, Slovakia

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21st INTERNATIONAL ELECTRONICS FORUM

Bratislava, Slovakia

October 3-5 2012

Malcolm Penn is the CEO of Future Horizons, an aptly named consultancy which has been in operation for more than twenty-three years but this is their 21st Annual Conference. It was to have been held in Yerevan, Armenia, an emerging country, but recent events there meant a demerge to Slovakia, where they had originally planned to arrive in 2013. But none of the many delegates seemed to mind the move, in fact the *crème de la crème* of the semiconductor industry were in Bratislava for the two days, and Malcolm expressed his thanks to all who had made the move possible, the huge assistance from the British Embassy and the magnificent co-operation and accommodation from the Sheraton hotel.

Malcolm made the point that in attending this event the delegates showed that they, like him, cared about the industry, and were doing something about it. Ignoring the doomsayers, Malcolm wanted to focus on what we do well, and to turn recession into opportunity. He had had huge and generous support from the industry in sponsoring this event, and he said that he was continuing with his planned Raffle for a charity for disabled children in Armenia, which was close to his heart, even if we were not able to be there.

Mr. Róbert Šimončič is the Director-General of SARIO, and was very pleased to welcome the delegates to Bratislava; he emphasised that Slovakia is one of the most business-friendly countries, with many strengths, had the highest growth in GDP of all the European countries last year, and they had attracted high quality foreign investments, with the electronics cluster showing strong growth.

Ms. Zuzana Vasekova introduced us to the Slovak Investment and Trade Development Agency, or SARIO. A friendly place is Slovakia, and a great place to do business. VW, Peugeot are amongst many companies who have come here to take advantage of the low labour costs, the high productivity, a country with economic stability, with 300 million consumers within a 1000km radius, and a country with the fastest growth in Eurozone, 2.1% this year; and a good rating from Standard & Poors. Electronics is the second biggest industry in Slovakia, with Foxconn, Samsung, AuOptronics *et al*, and IT sector comprises 52 companies including IBM, Microsoft and Dell.

Talking of Samsung, the dynamic **Young Sohn** is the President and Chief Strategy Officer of that illustrious company, and he spoke on the need for disruptive technologies for growth. We are in a recession, but we are optimists, are we not? It is the consumer who drives growth, and Apple is now the No. 2 brand in the world, having produced something that everyone wants. It used to be like that for Nokia, they used to be No. 8 and are now No. 19; it is a changing picture, but based upon some amazing technology, and huge consumer benefit, a particular example being the brick-like Motorola DynaTAC from 1983 v the wafer-slim Samsung Galaxy of to-day. In the next five years, said Mr. Sohn, we shall see what he calls The Internet of Things which is all about connectivity; mobile computing, servers and Big Data all interconnected. He sees a sub-$100 computer world as the future, in which the phone is also a computer, and here the market is known as i2i, an abbreviation

of Ivory Coast to Indonesia, where there are millions of consumers who want a computer but at a low price.

The changing markets were perhaps well illustrated by the smart 'phone in China. Once it was a market held by Nokia who had a 79% share; now it is entirely local brands. Cloud computing trends were covered, these will generate a 20-fold increase in network traffic, for which a new architecture programme will provide good opportunities. In a car now there are over 100 microcontrollers, always connected, always on, and there are smart appliances everywhere, with information at your fingertips, representing data in a meaningful way, some 1 trillion inter-related devices by 2025. The challenges include affordability, implementation, battery scaling and transistor scaling. The potential for EUV is tremendous, as it reduces the number of process steps.

Samsung was not a major player before 1995, but since then they have joined with Intel and TI in being the top three representing 30% of all semiconductor revenues, and contributed to 160% of growth in the industry. They are creating a Samsung innovation technology in California's Silicon Valley and in Israel as well, to generate innovations internally, but away from the mother company.

Nigel Toon of Xmos asked if there was any adventure nowadays in venture capitalists. Some companies grow very quickly, and reach $100 million in 6 years or less, but some are slower, taking 12-13 years, but not all investments succeed. A large proportion will return less than the amount invested, but the average is 1.4 times, and a really good one is 3 times. He described how to build a lean semiconductor company. Identify a new vertical market, use standard IP blocks and outsource chip layout; keep the company small, around 50 people, and focus on system software (70% of engineers write software), know who the customers are, raise plenty of cash, hire the right people, build silicon and system IPR and raise the profile.

But OEM's no longer believe that start-ups will be successful, and are slower to adapt to new technologies, and are reluctant to buy from new companies, the old conservatism,. Success is dependent on the rate of market take-off, and the speed that established players respond, so fewer and fewer semiconductor companies re getting funding, only 3 last year against 44 in 2003. This is not an area for the faint hearted.

Joe Sawicki of Mentor Graphics was concerned with design for test, which is to do with circuit modifications and/or additions to make ICs easier/cheaper to test in manufacturing. Working with AMD, Mentor have produced a paper on improvement in test quality based on a production sample of 800,000 32nm devices, using a cell-aware test, which failed components that had previously passed other test procedures. This is critical in the automotive field, as well as the medical and safety critical applications. Where they thought they had <10 DPM level failure, it turned out to be >44 DPM with the cell aware test. With embedded test compression, they had increased test/device quality and a lower per part manufacturing cost. Manufacturing test cost is a recurring cost for every wafer/die manufactured. Test cost for digital scan averages in the 5-10¢/second range, and

typically 2 tester passes are required (wafer & final package test). Optimising test cost on high volume products can translate into significantly improved margins, where even a fraction of a second can be worth millions of dollars per year, for example, 100M parts per year (iPhone volumes) => $50M/year if test time is reduced by 0.5 second for each test insertion.

Robert Ober lives in Silicon Valley where everyone is struggling. He was however cheerful enough and knows how the IT industry is changing, and it is changing disruption into opportunity. His company is LSI, which has four main business areas - networking, server and storage, HDD and Flash memory. They focus on accelerated storage and handling for data centres, mobile networks and client computing. The recession has had a profound effect on the industry - $50 billion is the value of the worldwide market for servers. One bank spent $52 million on their whole IT infrastructure, and the recession made not one iota of difference. There is a heck of lot of internet traffic – in just three minutes there can be 300,000 new Tweets, 141,000 apps downloads, 60 million photos viewed, 3.9 million video views on YouTube, 18 million Facebook views, and 183,423 hours of music downloads. For one new Apple iPhone 5 launch, some 10,000 new servers in the clouds were needed. It's a deluge. Google, for example, has 10-12 million discs drives storing data. Technology Inflections include flash, open source hardware, virtualisation, acceleration hardware, and networks. Open source is not only free, it's faster, and that worries the traditionalists who are very expensive. The scale is unbelievable; there are mega data centres such as Google, Amazon, and Apple, where the demand for data storage is vast. It's a $60 billion market. This leads to what he calls Web 2. This impacts on the OEMs who do not seem to know quite how to react, but they are being forced to have simpler, less expensive and non-proprietary systems, as ODMs are now direct, with an increase in ODM 'Cloud Services' and new OEMs emerge using 'open source' hardware such as OpenCompute and Scorpio - this will profoundly change the industry. So the opportunities will be that customers will pay higher prices to companies providing useful solutions as a complete package, and the large end customers can force OEMs to provide these solutions.

John Lofton Hall is the Founder and Chairman of Achronix Semiconductor, and he introduced the conference to the importance of embedded FPGAs enabling the next generation of flexible SoCs. His company manufacture FPGAs, initially and most notably a 22nm FPGA built in conjunction with Intel. The System-on-Chip (SoC) ecosystem is at a fundamental crossroads. With total chip development and manufacturing costs exceeding $100M at 22nm, it is no longer cost effective for most SoC designers to build a discrete chip for every application. As a result, SoC designers are investing in programmable intellectual property (IP) for IO expansion, emerging standards compliance and application acceleration. This programmable IP ranges from microcontrollers and processors to simple state machines that are register-programmable. Nearly every SoC built today has some kind of programmable IP.

The programmable logic industry is addressing this SoC challenge in a different way. Coming from the "other end of the spectrum", the major public FPGA manufacturers are implementing more and more hard IP on

their dies to reduce the area penalty of the programmable logic for specific applications. These techniques, while effective for some mid-range volume applications, will not scale to high volume SoCs. The major public FPGA companies are also very hesitant to license their programmable fabric to SoC designers, fearing competition in their core markets and erosion of margins. Mr. Hall illustrated how by leveraging the Achronix CAD Environment software and industry-leading tools from Synopsys and Mentor Graphics, customers could have an integrated design flow to design their ASIC/SoC to be FPGA-aware, using an embedded FPGA in the design. This will enable the next generation of flexible SoCs, while minimising cost and time to market.

Malcolm Penn took a long look at the future for the semiconductor industry. Why the industry wants to persistently talk itself down was a mystery to him, he wants it to take a more sanguine view and a long-term one at that. The glory days are not over at all, there are new products, new opportunities, and these were evidenced in the presentations of the morning. Now there is a positive explosion, all consumer driven, but in the IT world. It is all about excellence, and execution. Innovation is the key factor in getting out of a recession, and the need to do what is right, and not what is politically correct. We are going through a period of fundamental change, with too many 'me too' fabless firms, and too few leading edge factories, and poor long-term strategic vision i.e. Christine LaGarde, IMF Chief who said that we must all work together, which is neither original, nor helpful, nor inspirational. World confidence, for good global reasons, is lacking. So if in doubt, do nowt, as they say in Yorkshire.

Recessions always stimulate innovation, and this in turn stimulates demand. Last year, when things did not seem to be getting any better, GDP grew 3.9%. In 2012 world GDP should be 3.2%, not bad all things considered. The chip industry WILL recover, said Malcolm, as growth will be based on stronger foundations now than it was before which was unsustainable as proved by the collapse of Lehmann Brothers. With emerging countries accounting for 85% of the world populations and their economies have not been hit so hard as the established economies. China will overtake the USA as the world's leading economy by 2013, and Brazil has now replaced the UK as the world's 6th largest economy.

Unit demand – this is hard one to call, it may look easy in theory but it isn't. With month by month unit shipments, the trends remain upwards, but with a variation in actual numbers. But it is at least predictable, and whilst capacity needs to match IC unit growth, it rarely does, and a sudden increase in demand can wreak havoc with the supply chain. Fundamentally the growth is quite good,

Fab capacity – fundamentals have not changed. It is tight and is staying tight, and getting a new fab under way takes time, months in fact, so we are looking at -10% growth, we have been under spending on front-end equipment, and so the ramp up time is always extended. Revenue for wafer has remained the same for the last 30 years, $9 per sq. cm, at the top end, and $2 at the bottom end, so Malcolm urged companies to get the mix right. ASPs have fallen consistently, and have only managed to come out of free-fall in the last 5 years, but the rise is only very slim. As are the margins, as a result.

Malcolm summarised it all by suggesting that 2013 will see +10% growth, valuing the chip market at $325 billion. But this assumes no wars, floods, fires, bank meltdowns, economic collapses, wafer fab explosions or earthquakes, which is quite a tall order.

He and his team had been involved with an EU project entitled SMART 2010/62 Project, which was to investigate the benefits of and measures needed to set up 450mm semiconductor prototyping and to keep semiconductor manufacturing in Europe. The project concluded that 8nm will be the first node that is exclusively on 450mm wafers, but there is no appetite amongst the equipment manufacturers on developing dual platforms, with both 300mm and 450mm wafers being produced on the same equipment, hoped some people. This was unlikely to be supported, but as it coincides with the end of CMOs, a split in the industry seems likely.

Malcolm sees slower growth than we have had for the last two years, and this will last for the next decade. Emerging economies and microelectronics will outperform the market. The challenges of technology cost and complexity were covered, and in the supply chain high- tech electronics will always be in the top right hand corner of the Market Value charts. ASML is now Europe's most valuable semiconductor company, and Europe does collaboration very well, of which there were many good examples – and it's where the future is. The world is changing, there will be the haves and the have nots, and globalisation will change, such that China will no longer be the centre of production, it will move to more attractive local production, rebalancing world economics with sustainable international logistics, a better regard for ethics, where small and slow are beautiful. The world of microelectronics has not matured; like so many people it is still maturing, we have an aging society, with busy lifestyles, greater mobility and burgeoning urbanisation. Here the demands will persist.

Mojy Chian is the Senior VP Design Enablement at Global Foundries and spoke on why the foundry model works – it allows the smaller innovative company to bring products to market, and with fab lite allows manufacturers to shed expensive and unnecessary overheads. There are some economic realities to be faced, and in an innovation based industry, the business model they have selected is to have an ideal and deeper relationship between foundry and fabless companies.

They have their 'Collaborative Device Manufacturing' programme, which is a vertically integrated product development covering design, IP, process, manufacturing and packaging. One example is collaboration with ARM, going back to 2009. Despite some predictions to the contrary, the foundry-based fabless model is not going away, and moreover it is driving manufacturers and device designers closer together. There are warning signs, both technical and economic, emerging in the foundry business which require a re-thinking of how best to apply resources and energy. Recent talks of fabless companies investing in their own fabs, and of foundries developing 'single company fabs' underscore the sense of urgency. This change - Foundry 2.0 – will be driven by a move towards a more IDM-like model. Strategic collaboration that creates a 'virtual IDM-like interface' to chip design companies will help close the gap between process teams at the manufacturing companies and design teams at the fabless companies. With daunting technical challenges like 3D stacking, 450mm fabs, new transistor architectures, multi-patterning, and the long-term viability of extreme ultraviolet (EUV) lithography, collaboration – early, often and deep - is really the only practical approach given the cost and complexities involved. Mr. Chian examined the evolution and future of the foundry model, the technical and business drivers reshaping the landscape, and how fabless and IDM companies must change their perspective on what has worked in the past. He gave some real life examples of collaboration across the ecosystem, using ARM as an example; the challenges of

moving toward with advanced processes at 14-nm and beyond; and the adoption of new technologies such as finFETS. Success will be a result of much closer joint development at the technology definition level, he thought, with early engagement at architectural stage, and a more integrated and cooperative ecosystem.
As technology scaling nears the "final frontier", designers are confronted with an increasing number of restrictions. Printing smaller and smaller features remains possible, but requires more and more
regular layout patterns. Transistors can still be reduced in size, but may fall short of meeting electrical specifications. Smaller wires are becoming a performance bottleneck, and as technology scaling becomes less ideal, established design paradigms start to break. Creative and innovative solutions are required to sustain the momentum of Moore's law: hitting the sweet-spot for
cost and performance requires tight interaction between the technology development community and the design community. **Rudy Lauwereins** of IMEC looked at the vision needed to find out what a customer wants, and this is called INSITE. When looking at the sectors involved, which include sensors, smart mobiles, data centres and servers, they all need low power, performance, and heat dissipation as factors and in resolving these demands the solution must be seamless, ubiquitous, ergonomic, cheap, and low power. In equipment heat must be dissipated, performance increased, and there must be longer life in the batteries. Rudy illustrated ways in which maximising functionality and reducing power per sq.cm could be achieved by system scaling. In an increasingly fabless world, IMEC's INSITE program builds the bridges between the communities of technology and design.

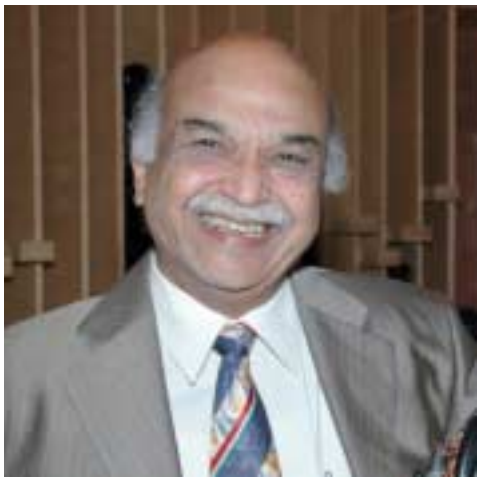
Day 2 – Friday 5th October 2012

Tony King-Smith is the VP Marketing at Imagination Technologies, who spoke to us on a video link from the UK as he was unable to travel. The title of his paper was Disruptive technology, where the low end is driving the high end. His company has a very powerful IP portfolio involving video, graphics, display, processors, connectivity, cloud connectivity and receivers. First there was the 'phone, and then came the apps, so the phone has many other functions, and this has changed the game in a very short space of time. But can you get supercomputing into a mobile? Well, yes, apparently. A PowerVR CPU has to be a parallel processor, and development is taking it rapidly towards supercomputing performance. A GPU increasingly dominates SoC processing, as it enables far more extensive processor scaling than CPUs. Most Chips coming into use now will have GPUs on them, a parallel processor *par excellence*, where graphics and videos are possible alongside real-time processing. Their OpenCL APIs will be used alongside OpenGL ES APIs to bring a wealth of new capabilities to mobile and embedded platforms, in image processing, image analysis, complex physics and data analysis. Look out for the new words – heterogeneous computing – which are already being used worldwide. His company is a founder member of the HAS Foundation, along with ARM and Samsung, and many others who are joining every week, and it's all about heterogeneous computing. This is applying mobile technologies to CE equipment, and the potential is huge. Linking mobile technology and consumer computing to The Cloud is one very exciting area of development, and we are entering the era of mass market supercomputing, driven by highly parallel architectures such as GPUs, complementing todays CPUs. Cloud and other high performance computing will I increasingly rely on mobile technologies to continue to scale. As Mr. King-Smith put it, the world is turning on its head. The bottom end is driving the top end, and the consequences are truly

profound. On a more down-to-earth aspect, it all depends upon having reliable internet access, wherever one may be. As broadband is still some way off in many places, only time will tell. And then there is the cost….

Mr. V.G.Gujrathi, formerly of Tata Electronics, is now with the Government of India pursuing an initiative on alternatives to fossil fuels. Will oil still be available long-term? Costs of transportation are rocketing, and the price rise of fossil fuels, due to economic reasons, not to mention political ones, and the impact of hedge funds, all contribute to a need to look elsewhere, and very smartly too. There are alternatives: ethanol, bio-diesel, hydrogen, electric, compressed gas, and solar. But new solutions bring new problems. Prolonging the inevitable is not really the answer. Bio-fuels are a balance between food v fuel. Which should have priority in a world of massive population growth?

Hydrogen sounds good, but there are questions about storage, safety, flammability, and there is no existing infrastructure. The electric power train is interesting, but batteries have weight/life constraints, and whilst there are advances they are some way off maturity, and again the infrastructure is not yet there. Solar power is in a nascent stage, but maybe nano technology applied to solar cells offers some hope. In India, projections show that their population by 2050 will be 1.63 billion. This would mean some 85 million vehicles on the road, against 9 million to-day, so the days of the single fuel vehicle have to be numbered. Mr. Gujrathi illustrated the Powertrain Matrix and discussed the pros and cons of all the options; the integrated starter generator with auto start stop was interesting, giving a 12% improvement in fuel economy; then there are the HEV configurations, series hybrid and parallel hybrid, and here the applications can be very specific, ranging from car SUV, LCV, MCV and HCV, in either version. The Li-ion battery and variations thereof are also interesting, and have been proved as the best type for development in battery technology development, but the cost, life and the weight are still negative factors. In conclusion he suggested that in the short-term (3-5 years) there should be blended fuels for the IC engine vehicles, dual-fuel vehicles, and micro and mid hybrid vehicles; in the medium term, 3-8 years, there could be dual and tetra fuel vehicles, hybrids, range extenders for city cars, and EVBs for neighbourhood vehicles and bio-fuel based vehicles as well as trolley buses for intra-city mass transportation. In the long-term >8 years, we would need EV for city cars and delivery vehicles. LCV public transport and hydrogen based vehicles (fuel cell & H2 ICE) for inter-city and intra-city buses.



It might be better if there was some degree of coordination on a world-wide basis, rather than leaving every country to solve its problems on its own, which seems to be the case. It seems odd that there is no world consensus on a major problem which affects every single country.

Russia is an emerging market, says **Mr. Alexander Kurlyandskiy,** who is the CEO of Elint SP in Moscow, and has been working with Malcolm Penn for the last 20 years. He reported that the situation in Russia is much the same as it was, but the country is stable, and in the field of electronics, much has taken place. There is 3G coverage across the country, internet coverage is

about 45%, mobile internet about 35%, mobile 'phone market up >40M units, and the IT market is now $22 billion, up 3x 2007. The Russian Government has shown strong support for the electronics industry, with $9 billion of assistance, and in 3 years the value could increase by 7x, so by 2025 the market value would be in the region of $180 billion, with 50% of this being supplied by domestic supply, with some 3000 companies involved.

There is already one company, Mikron, a privately owned company working on semiconductors, backed up by STM, producing 180nm 200mm chips, and working with STM on a 90nm chip. Angstrom has had a € 815 million loan to manufacture wafers, and will be up and running by 2014 with 130-90nm chips. NIIIS will be working with 3D packaging and MEMS and is under construction, as is Crocus Nano Electronics making MRAM late 2013. On the next level down there are 5 companies, SRISA with 150nm & better with a pilot line, Pulsar, who are 'on hold' with equipment being procured; Istok, in planning, and ZNTC a new player in MEMS and CMOS, equipment being installed for 0.25um technology.

RusNano is interesting – a form of VC for investment in innovative technology, who have financed many projects, including Crocus, SiTime, Optogun, Elvees, Nanotechnology Centres, NeoPhotonics, and Mapper, a Dutch company who received a 40 million investment in e-beam technology. Skolkovo is their Silicon Valley, near Moscow, and is on track, under construction, and will have many residents including Nokia, Siemens, Microsoft, Boeing, Cisco, DOW Chemicals, IBM, Ericsson, Alcatel, Alsthom, EADS. 30,000 residents, 5 villages, on 400 hectares. Like anything Russian, it's big.

The CEO Panel Discussion comprised Malcolm Penn, Nigel Toon, President of Xmos, Maria Merced, the President of TSMC Europe, and Young Sohn, President and CSO of Samsung Electronics. NT tended to think that the economic downturn had much to do with the lack of VC to support start-ups. YS said that their last start up was in 2010, but could we do an ITO now? You would need to look at the niche available, but it could be a lengthy process now, and software is adding so much to the costs. MM wanted to talk about the market – Europe is shifting, it is turning more into an analogue region, not digital. Who are the OEMs driving the business? Nokia has missed the train, and we are going to miss the train again if we are not careful, we should be concentrating on mixed signal, power, huge opportunities here. How do we deal with start-ups? In 2009 there were 100, and in 2010 they had 126 accounts that were start-ups, dealing with ASICs, or silicon, to their own design. NT thought that the automotive sector will be transformed in the coming years, which will be a massive opportunities, the same with servers, too, but Europe is strong in automotive at least, as we are in MEMS and sensors. MM said that in 2008 the RF analogue mixed signal was 60% of the market, and by 2012 it is now more than 80%, and growing. Fabless has grown 20%, and is still growing. NT said that the fabless model worked well in the SC industry, but now companies such as Qualcomm and NVidia control costs in the economies of scale, and the supply side is under pressure. Concepts are fine, said YS, but the devil is in the detail. NT appreciates the value of being able to listen to his customer's customers. YS said that the entrepreneurial spirit is not dead, it is just the opportunities – MM worried about complacency, and she added that we need more passion!

Mr. Y.W.Lee, of Samsung Electronics had a very clear vision of the future, the technologies and business strategies of the IT industry of the future. Trends include the urban millennium, with mega cities increasing, and shifting demographics, in which developing nations are aging rapidly, with 25% of their population being 65 and over, and then there is global sustainability. Energy and

environment technologies will enable sustainability. Asia will become the largest economic bloc in the world, $48.75 billion by 2020, and working with Asia will become more and more important. The paradigm is shifting in IT, with nanotechnology being one of the drivers, and Samsung will expand into new domains, with the fusion of IT, Bio, Energy & Nano. These will include IT, which will make for smarter living with ultra-high performance computing and pro-active networking; healthier living with molecular-level diagnosis and tissue-like sensors; and a cleaner environment with energy harvesting technologies at all levels, and the next generation of batteries.

IT - There will be 50 billion internet connected devices by 2020, an average of 6 devices per person, with a world population of 7.6 billion. Cloud computing will allow the seamless transfer of massive amounts of data to any device anywhere.

Medical - Bio sensors are such that a simple patch on the skin can detect all manner of diseases within 10 minutes. There will be the molecular diagnostic imaging of cancer.

Energy Harvesting – piezoelectric, converting mechanical energy into electricity. The QD solar cell will operate at 60% efficiency, versus the present 20%.

There will be flexible batteries with flexible displays. There will be Lithium air batteries powering cars capable of running 500kms on a single charge, and the design rules for SoCs will change with below 10nm by 2020. Chips under 10nm. There will be killer software apps, a seamless Cloud service, & HW-SW optimisation will create new user experience and maximise total end-user value. Finally, he urged everyone to think about business collaboration – that word again – to collaborate on SCM, exploit alliance opportunities, collaborate on standardisation, and collaborate on joint R&D. Standardisation removes barriers to trade, promote R&D collaboration, save resource and efforts and increase value to customers.

Mr. Daniel Donoval introduced the conference to The Slovak University of Technology in Bratislava, where he heads up the Institute of Electronics and Photonics. In the Shanghai Rating of Universities, they are No. 101 in the world and No. 26 in Europe, and working in many fields - Bio-sensors, optoelectronics, surface and interface analysis, design of new structures, 1,2,3D modelling and simulation, applied to signal processing, smart sensors, medical electronics, health, organic electronics, carbon nanotubes, graphene, photovoltaic and photonics. They have a leading position in organic electronics, Organic FET, Organic LED, and in Smart electronic systems for illumination. They are working on Wireless bio sensing with implications for health monitoring, and energy harvesting, within a huge area of cooperation with other universities throughout Europe, including Bath and Bournemouth in the UK.

The British Ambassador, **Her Excellency Susanna Montgomery**, came to give the closing address to the conference. She said that it's a great place to do business, given the present problems in Europe, the forecast growth here is 3%, and it growing all the time. The automotive industry is strong here, they produce more cars per capita than any other country. It is a multi-lingual country, an excellent hub for central Europe, with productivity up to 12%, the highest in Europe, and she recommends the employees here. 33% of Slovaks work for foreign companies. She was glad we came, and wished everyone success.

Future Horizons are past masters at organising excellent conferences, and have that particular knack of looking after their delegates that works extremely well. The top players in the chip industry would only attend such an event if they felt that it was to be of value to them. It is, and it always has been, and if anything came out of this event it was that the need for collaboration was paramount. The SC industry has one of the most sophisticated supply chains one can imagine, and here was one occasion when the networking of the various component companies was seen to be working well under one roof. The location and level of hospitality had a lot to do with that, and Future Horizons have firmly established themselves as the leading industry centre point, to which all should gravitate.

IEF 2013 will be held on October 2nd-4th 2013, at a venue to be announced later.

John Ling,
Editor – EIPC Speednews.

FutureHorizons
The Global Semiconductor Industry Analysis

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Established in April 1989, Future Horizons provides market research and business support services for use in opportunity analysis, business planning and new market development. Its industry information seminars and forums are widely considered to be the best of their kind. Emphasis is placed on the world-wide semiconductor and electronics industry and associated markets. Emphasis is placed on the worldwide microelectronics and electronics industry, and European market environment.

5th Decade
Of Semiconductor
Experience

Malcolm Penn is the founder and CEO of Future Horizons, with over 45 years experience in the electronics and semiconductor industry. He has worked extensively throughout Europe as well as in the United States, the former USSR, Japan and Korea, and was an early pioneer of pan-European research and product development collaboration in the 1970s during his tenure with ITT Europe. His industrial experience has involved him with all aspects of the management, manufacturing, marketing and use of electronic components, particularly semiconductor devices.

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