Freescale Technology Forum 2011
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BEYER: Good morning, everybody, and thank you very for joining us. Welcome the 2001 Freescale Technology Forum. We're very excited this week. This is a new venue, as you know, and we think this particular location is ideally suited for the next several days of excitement at the Freescale Technology Forum. I'm also very proud that this year we have record attendance. This is clearly an affirmation on your part that this is an important event, that this is an important time for you to interact with Freescale with other members of the ecosystem that provides the embedded processing solutions that we're trying to deliver in conjunction with you. So thank you very much, and welcome.

This event is going to encompass both technical demonstrations as well as technical training. We have more than 180 technical demonstrations this week, and we have over 350 hours of in-depth technical training on some of the most sophisticated Freescale products. It takes an awful lot of activity, an awful lot of investment to make an event like this happen. We could not do it without the strong participation of our ecosystem partners, and I would like to thank each and every one of them for helping us to put this even on. I'd like to thank each of our 57 Silver Sponsors for all of their energy and commitment. I'd like to thank our 6 Gold Sponsors that you can see here for their very strong dedication to this effort. And I'd like to give a special thanks to our Diamond Sponsors: AMIA, Green Hills, Mentor Graphics, QNX, and Wind River. All of our sponsors are an integral component to the success of this Freescale Technology Forum, and I thank them very much.

Prior to this particular FTF, Freescale marked a very important event in the transition and the evolution of our company. On May 26th we returned to being a publicly traded company when we conducted our IPO. We are using the proceeds of the IPO to pay down a portion of our debt, which in turn reduces our interest expense, which in turn enables us to increase the investments that we are making in new product development, customer support, sales activities, software, etc. We are also going to use the ability to take our equity to continue to invest in future innovation and potential acquisitions. It is also very important because we believe that becoming a public company again with new equity investors is a strong affirmation of the confidence that the equity markets have in Freescale's very bright future. So we're very, very excited about that event. So even though we've changed in a sense by becoming a public company, several things have not changed. We have not changed our vision nor our strategic focus. We continue to be committed to being the world's leader in embedded processing solutions in the areas that we target as a company. We are going to continue to build on our core strengths. We start with the solutions based upon embedded processors, apps processors, microcontrollers, and digital signal processors, and we integrate those central processing or controlling entities with RF capability, analogue, power, and sensors, and provide a significant amount of software that enables you based upon our solutions to bring your products to market more rapidly than you otherwise might be able to do.

Over the last several years we have been entering the era of connected intelligence. We believe that embedded processing is the fundamental driver of this new Internet of things. In the past in what might be referred to as the PC era, we depended upon a very central processor and very rigid software that was provided on that processor. We believe that model will not work in the future. We believe in the era of connected intelligence, data will be ubiquitous. We have a right to expect that the devices that we use will conform to us rather than we conforming to the

device. We expect the device to be cognizant of our surroundings, and that it needs to adapt to the context in which we're using the device. And these devices are always on, and they are always with us.

This morning we're going to explore a number of the trends that we believe are going to influence our lives over the next several years. First, we'll discuss the implications of the dramatic explosion in smart mobile devices. Next we'll look at the incredible demand, the insatiable requirement for bandwidth to support this explosion in devices as well as the new applications. Then we'll explore how mobility and connectivity are in essence just what the doctor ordered in the sense that there are enabling tele-help applications that we've never seen before. Then we'll look at how distributed intelligence will help us in the home environment of smart energy. And finally, we'll look at how the automotive industry is accelerating to zero—zero emissions and zero fatalities. We believe that all of these trends will be heavily influenced by this connected intelligence that we're talking about.

We feel that semiconductor innovation is at a very important inflection point. In the PC era, the world was all about performance: faster and faster processing performance alone. And that processing performance came unfortunately at the expense of power consumption. That is no longer acceptable. In the era of connected intelligence, performance and processing power need to be balanced. We need to have more and more capabilities, but at the same time we need to continuously reduce the power consumption. We need also to provide for a system approach to these devices. We need to ensure that not only the processor or controller is at the heart of the solution, but that we integrate RF, power analogue and sensors. We believe that connectivity will demand that we balance more performance, improve efficiency, and lower operating costs. We believe that this world will be driven by embedded processing solutions, and these solutions need to be delivered with a system level view by semiconductor companies in conjunction with our partners, but also with a deep application level knowledge that the semiconductor companies need to bring to bare.

So against that backdrop, we believe that we are continuing to drive that semiconductor innovation. We're announcing today a very powerful new family of products that demonstrates how Freescale is in fact continuing to lead this sc innovation. Today we're announcing our new QorIQ advanced multiprocessing series of multicore communications processors, or QorIQ AMP family. This family is based upon a new core E6500 64-bit power architecture, and it is based upon 28 nanometer technology. It provides new advanced multithreading and application-specific acceleration techniques, and it is expected to deliver 4x the performance of our current family of products at one-half the power consumption.

The network challenges over the next five years or so are very, very significant. Moore's Law alone will not keep up with the processing demands, the exponential increase in IP traffic. Multicore solutions are mandatory to delivering on the capabilities that these networks require, and these multicore solutions need to balance performance and power consumption. These systems need to be scaleable. These systems need to be able to go from very, very small environments to very large environments, and they need to do that with a common architecture to help lower the overall cost of ownership. And at the same time, we collectively need to reduce the complexity of the software development. We believe that the QorIQ AMP series expands on the industry leading portfolio based upon the power architecture. This started with our Power Quick products of a number of years ago, followed by our QorIQ multicore products that we delivered and announced at the FTF at 2008. It builds on our overall capabilities in the Converge product that we delivered earlier this year, and now we have the QorIQ AMP family. This family is continuing the tradition of carrying forward the software to make this a smooth

transition for us as a company. This family is based, as I said, on the E6500 core. This is an innovative technology that will deliver 2x the performance with multithreading, the leading edge 28 nanometer process technology increases processing frequency and reduces power, and we are adding virtualization capability to enhance software usability.

We're dealing with the issue of power in two ways. First of all, at the core level we are developing capabilities the power management enables us to control the power consumption down at the individual core level. But up at the system level, we're also delivering power reductions because of these application-optimized acceleration techniques that we've built into this processor. Combined, we expect to reduce the power consumption of these systems by 50%.

These products are scalable, as we said, completely compatible with the code that's been developed for previous generations of the QorIQ, and allows a network system developer to migrate from the very lowest of systems to the most powerful of systems carrying forward the code, which is obviously incredibly important in system development.

And we've also worked with our partners on the whole area of software development. So in addition to the improved performance of the hardware, we have improved productivity in software development with advanced system debug and trace technologies, and we believe together with our partners that we are going to enable you to bring your products to market at a much, much more rapid pace than in the past. Our ecosystem partners of course are essential in helping you to manage design complexities and accelerate your new product introductions.

So the Freescale Technology Forum is about bringing together what we consider to be the best in the industry to learn about the latest innovations in the business, to gain insights into the markets that you participate in, and hopefully learn from some of the other markets that we're talking about here that are outside your normal purview. Today we want to give you our view over the next hour or so of the many market forces that we believe are shaping the industry, and what we at Freescale together with our partners are doing to make our vision of embedded processing leadership a reality. So with that, let's get started.

[Video]

BEYER: So electronic devices have become an integral part of our lives. Thanks to embedded processing, we have fundamentally cut the cord to the desktop, and we believe as a result we have unleashed the imagination of millions of people. Every day we see more and more smart mobile connected devices appearing on the horizon. We believe that this is enabling the growth of social media and communication on an unprecedented scale. Smart mobile devices today give us instant access to the business information that we need, but also to music, to movies, to the social networking services that have become mainstream elements of many of our lives. By 2015 there will be ten billion smart mobile devices connected to the Internet. This is more than one device per every individual on the planet. This mobile Internet is driving massive IP traffic growth. By 2015, research studies indicate that IP traffic generated by wireless devices will surpass the traffic generated by wire line devices. And global mobile data traffic will increase 26 times between 2010 and 2015, and that rate of growth is three times faster than fixed IP traffic. Mobility is now the new norm. Internet users, for example, in China and India will double by 2015. And mobile devices are fundamentally the preferred means of accessing the Internet. In ten years we believe that half of the world's population will only access the Internet with mobile devices. And I think you can see that in our daily lives—many young people today just fundamentally never touch a telephone in the home. Many young people when they get out of

college and move into a place of their own don't bother to get a normal telephone installed in their house. It is simply an irrelevant device for them.

In mobile devices, we believe that the combination of sensors and processing is effectively helping us to create this environment that we refer to as augmented reality. Fundamentally, it is changing the way we interact with mobile devices. Within five years we expect that a new generation of super tablets will out-ship PCs. They will be optimized not for individual transactions but for content consumption. Mobility and continuous connectivity will enable access to personal content virtually anywhere. High resolution displays will make these devices even more appropriate for web browsing, watching videos, reading books, and so forth. Tablet optimized applications and services will enable features like augmented reality, environment sensing, mapping, and gaming. To enable all this, we fundamentally believe that a new breed of mobile processors is mandatory. These are going to be essential to deliver both improved performance at lower power consumption. We will need mobile operating system compatibility across many devices, design scalability to be able to provide these devices at a constantly increasing rate, and to lower the overall costs of these devices. Analysts predict that performance of mobile processors could already in 2012 surpass the performance of PC processors. To meet these demands, Freescale in January at the Consumer Electronics Show announced our new processor family, the i.MX 6 series, and six months later we are pleased to announce that we have working silicon ready for sampling to our customers. And we want to give our FTF attendees the first look at one of the industry's first ARM-based QorIQ multimedia apps processors. To help me do that, please join me in welcoming Freescale's product line manager for the i.MX, Rajeev Kumar. [Applause] Morning, Rajeev. Welcome. Thanks very much.

KUMAR: Hey Rich, great to see you.

BEYER: So what do we have today?

KUMAR: I'm thrilled to be here today and to be able to have the privilege to talk about our next generation i.MX products, specifically the i.MX 6. What I've actually got here is a wafer that I took out of the fab on the way out. It's interesting, I don't think my engineering manager was too happy with me taking this out, and it's got a few thousand die on here. I figure it's upwards of $60,000 plus. I'd actually feel a bit more comfortable if you'd hold onto it instead of me.

BEYER: Oh my gosh, I'm not sure I should be holding it either!

KUMAR: [Laughs] So as you mentioned, at CES this year we announced our i.MX 6 series of products, consisting of a QorIQ, dual core, and single core product portfolio. We also stated, as you mentioned, that we would be sampling first half of this year. I am pleased to announce that we have first samples, and on stage here behind us we have our first public live demonstration of i.MX 6. Want to check it out?

BEYER: Yes, please.

KUMAR: So i.MX 6 represents the industry's first SOC that combines four cores or ARM CPUs with a full 64-bit memory bus. And the reason that's important is because as you look at the breadth of applications that are being developed in the consumer, automotive, and industrial

market segments, what you find is a exponentially increasing demand for CPU horsepower and graphics horsepower. Now the massive improvement we've made in these areas on our chip is great, but it's not sufficient. So you want to make sure that as you add capability to the chip you don't bottleneck your chip with overall system performance. And a critical aspect of that is really memory bandwidth across the memory bus. So that's been the primary motivator for us to move to a full 64-bit memory channel, and what we've implemented on i.MX 6.

So what we have here is our reference design for i.MX 6. As you can tell, it's got a couple of HDMI cables coming out of it. The first one is connected up to the TV. What we have coming up on display on the TV will be a 3-D graphics game that will be generated from the reference design. The game some of you might recognize as being Quake, and it should come up here in just a moment. Here we go. Quake is a game that often is used to benchmark frame per second performance on early silicon, and as you can tell by the demonstration that we have up on here, we're getting quite good performance on our silicon on our graphics unit. The game here is actually running on what we call the triple-play graphics engine. What that is, is three physically separate graphic units that are incorporated within the chip. The first is a full 3-D graphics engine that's capable of up to 200 million triangles per second. That's a 6x improvement of where we were in the last generation of products. We also have a second graphics engine, which is a 2-D vector graphics engine. How you might use this would be for example digitizing the dial, or the needle if you will, within the speedometer or gas gauge of automobiles. We have a third engine in there, which is a 2-D blit engine, and that's primarily used by a lot of operating systems to do UY acceleration. So as the UYs continue to evolve over the next few years, becoming more and more interactive, more and more complex, we see that driving a very strong need to be able to accelerate on a dedicated blit engine. And having these three engines in place really allows you to optimize overall system performance for both power as well as latencies that are through the system, and you don't compete with a specific silicon resource when you're looking to do multiple things at once.

So next story that I'd like to talk about a little bit is video performance on this system, and the next demonstration we want to show is video running on the reference design. And so coming up here we have a video clip that will be playing in full 1080p resolution, and the clip, if you pay a little bit of attention to it, really talks about some of the innovative new use models that we see coming to market over the next few years, and ones that i.MX 6 will be able to drive. The video unit itself is capable of driving up to 1080p 60 frame per second resolution video. It can also drive dual stream 1080p full HD class video for 3D use models. So if you want to do 3D decoding on your device or 3D encoding, you have that capability now with this chip.

Now what's really cool about this, as you can tell from the device itself, we actually have two HDMI cables coming out of this, so we're driving both the video and the graphics simultaneously on the chip. The chip is only seven days old, and so the bring-up is going phenomenal. We had the video running within the first 24 hours of seeing silicon in our labs. We had the graphics unit up and running within 28 hours of seeing silicon. And just in the past week we've gone to Linux kernels, Windows CE kernels, and a full 2 O/S booting on the system. Again, bring-up has been going phenomenal.

Now very much related to video performance is display. And as you look at how display technology is evolving in the industry, what you're going to see over the next few years are devices in market that are at least 4x the amount of resolution over best-in-class screens that are in market today. In order to keep up with that pace, what we've done is we've completely rearchitected our display path, and within the i.MX 6 silicon what we have is the ability to support up to four simultaneous screens, two of which can be driven up to quad XGA resolution.

So if you do the math, that's roughly 4x the amount of pixels that you have versus a single 1080p HD screen.

Now the other aspect that is important is overall peripheral integration. The reason peripheral integration is important, really for two reasons. One, you want to have the flexibility to be able to interface to other things on your device. And two, you really want to be able to drive down overall system cost, and one of the best mechanisms to do that is by integrating more things onto the processor itself. So in support of that what we've done is we've integrated an industry-leading amount of peripherals onto the chip. We have interfaces such as MIPI, USB, SDIOs that are used in the consumer space. We have interfaces such as most bus and cam controllers which are critical for automotive application. We have interfaces that are traditionally compute oriented, things like PCI Express, serial ATA, and gigabit Ethernet, and all of those have been packed onto the single die within the i.MX 6 SOC.

Now in addition to that, as Rich talked about earlier, it's very important that you be very mindful of power and total systems solution. So when you look at the video that's being played back on this chip, full 1080p video runs at less than 400 milliwatts within the SOC. We also have taken care from a board level and a software level to tightly couple other Freescale products within our solution, such as the Freescale sensor products as well as the Freescale system power management products.

So all of those will be delivered to customers. We're engaged with many customers today. Rich, just to wrap up, I fully expect to see devices in market in 2012 really spanning a wide gamut of products, so things from smart phones to web tablets to smart books, automotive infotainment clusters, and literally hundreds of applications in the industrial space.

BEYER: So we're sampling at the moment, and when do you think we're going to see a broad range of products coming out?

KUMAR: We'll start to see products come out starting in 2012, next year.

BEYER: Very impressive. Very cool. Thanks very much. Appreciate it. Tell the team we did a really, really fine job.

KUMAR: I will. One more thing, I just got the signal that we have to package up a few more parts, so I'll need the wafer back.

BEYER: Okay! Rajeev, thanks very much. [Applause]

[Video]

BEYER: So we've talked about the dramatic growth in the devices that are changing our lives. Obviously that is going to have a dramatic effect on the underlying network that needs to support all of these devices. Mobile data traffic is projected to double every year through 2015. Mobile data is growing 4x faster than fixed broadband data. This poses an enormous challenge for the network service providers. They are seeing a dramatic shift from a voice-centric world to a data-centric model. Growth in mobile data traffic usage is 2-5 times faster than the growth of the number of users. This is placing enormous strain on the mobile networks all around the globe. The challenge for the service providers is to continue to provide for this explosive growth while

reducing their total cost of ownership, and they also need to find a way to provide differentiation from their competitors.

The infrastructure trends are very, very significant. Today's base stations as opposed to years ago need to support multiple modulation standards, constantly increase signal bandwidth, and we need to find ways of reducing these form factors from these massive base stations that you see here to something very, very small and unobtrusive. The goal is to add cost-effective capacity while expanding network coverage, at the same time we need to create future-proof portfolio of systems to deliver this increased performance at smaller cell sizes. It is simply not acceptable to keep putting in huge base stations that simply support one technology. That is not any longer a cost-effective way for the network service providers to operate. We are going to have to create heterogeneous networks that will span all the way from the smallest base stations, called Femto Base Stations, through pico, metro and macro base stations, and at the same time the user experience has to be completely oblivious to this changing network topology.

By 2015, two-thirds of the global mobile data traffic will be video. This is driving significant demand for higher connection speeds to deliver high-quality video. The average connection speed by 2015 needs to increase by 10x from where it's currently at to deliver this very high-quality video. It will exceed 2.2 megabits per second by that time. Interestingly, consumers will use their mobile devices in the home more than any other location, and because of that, consumers are growing to expect that the connection for their mobile device is every bit as powerful as the speeds that they get from their home wired broadband connectivity. Adding larger cells, like we saw in the picture a moment ago, is simply not the solution. The huge capital investment costs as well as the operational costs for network providers is just to significant. And equally importantly, many home owners around the world simply object strenuously to those types of towers and those base stations being put in their neighborhood.

So the mobile operators absolutely need to shift their thinking and the topology of the networks they provide. We need to move to a world of smaller base stations, specifically to Femto Base Stations. These small base stations can be located in your home, they can be located in your place of business, they will reduce the distance between your mobile device and the base station. The back-hall activity will go through a broadband wired connection to take the traffic back to the central processing area, the central transmission area. We will at the same time offload a significant amount of traffic off of those macro base stations that are in place today. But as the user moves from the femto cell environment to outside to other areas, the transfer of the calls or the connection needs to be absolutely seamless and transparent to the user.

So these small cells are critical to the solution for the future. They will also help in terms of the devices. The battery life of the devices will be extended by virtue of the fact that the communications is now measured in feet, not in miles between the device and the base stations. So this will have a very, very positive affect, lower transmit power, and therefore extend the battery life. femto cells, while still at the very earliest stage of the evolution of the network, doubled in 2010. Shipments are projected to reach as high as 60 million units by 2015. The majority of deployments of these femto cells will be in the home. However, interestingly, these are also going to be deployed in businesses. In urban environments they'll be deployed because it's so difficult to get large base stations installed, and so this will be an effective way to increase the capacity of the network; and in rural areas we'll put in these femto stations where larger base stations were simply uneconomic. So these femto cell base stations will spread initially into homes, but then more broadly into business environments as well.

So we talk about the fact that the cellular network is evolving from a voice-centric to a mixed voice and data network, but at the same time new standards are evolving. We had an

analogue network for many, many years, then we had the first instantiation of digital network with GSM, and it lasted about ten years. Subsequently over the last ten years we've moved from 2.0, 2.5, 3.0, 4.0, YMAX, LTE, and so forth, and these are happening at such a fast pace that the network operators can't simply add new equipment to support a new standard. Because it makes some of the existing equipment redundant, it means they have numerous systems in operation to deliver these capabilities, which drives up their operating costs as well as power efficiency goes out the window. So this model simply doesn't work. Fortunately, thanks to the development in our industry of multicore digital signal processors and multicore communications processors, we have begun to provide the capability to offer these multimode base stations that can support multiple modulation standards. And they can as a result provide increasing signal bandwidth but at lower operating costs.

We really believe that we're entering a new era in mobility. These increasing cell site costs, these huge cell sites, are simply unsustainable. And these arguments about "not in my backyard" or "not in my neighborhood" are not going away. So large-scale build-outs is simply less feasible in highly populated areas where we need more of this bandwidth all the time. The wireless service providers need to depend on innovation. They need to improve capacity, network coverage, and performance, and at the same time they need to reduce power consumption and base station size.

That was the challenge that Alcatel-Lucent presented to Freescale about a year ago. They wanted a completely novel concept. They wanted a base station that would allow for a highly distributed architecture. So these devices could be used in very small locations, but the combination of these devices could grow and provide service over a much broader range. The solution that Freescale was uniquely positioned to respond with was what has become our QorIQ converged product family. This is the industry's first multimode wireless base station on a chip that blends our multicore DSP and our multicore communications processor into a single device. So in collaboration with Freescale and Hewlett Packard, Alcatel-Lucent has recently announced their light radio. This is the device. It's sitting in my hand. It is a revolutionary step forward in the world of mobility. This takes base station control and management capabilities and builds it into a device that is this size. This light radio has a single, remotely configured antenna. It can deliver 2G, 3G, and LTE flexibility. The wide-band active array antenna can provide 30% more capacity, and it will cut the cost per bit in half. It will lower site costs, energy consumption, operating costs, and maintenance costs. This cube holds less than two watts and can deliver high-speed 3G connectivity for over a two-block radius. In an 8x2 configuration, or 16 of these cubes in a common array, will be able to deliver the coverage that now requires a 3G macro cell base station. This is revolutionary, and is going to change the world.

The light radio is designed for deployment flexibility. It can be installed virtually anywhere. It's completely unobtrusive. You could put it on signposts, you could put it on traffic lights, you could put it on the side of a building—anywhere that has power and a broadband connection. We believe fundamentally this will replace the traditional monolithic radio access network architecture that has supported mobility for the last 25 years. It is a distributed approach. The antennas and the base station intelligence is small, can be placed throughout the network. The network effectively becomes cloud-like with connected intelligence everywhere.

With innovations like the light radio, we believe that the whole concept of cloud-like mobile networks will become the next step in the evolution of the era of connected intelligence. Central processing hubs will perform the base band and higher-level signal processing, but the distributed antennas will provide the connectivity in different configurations as the users require. This implementation of cloud networking promises to reduce capital expenditures for the

network providers by over 20%, potentially cut their operating expenses by up to 60%. And over the next four years, as the world expects that about $197 billion will be spent on providing for the network infrastructure necessary to support this exploding network traffic, the savings that we're talking about with this light radio obviously could be very, very significant.

As we're developing all of these capabilities and these applications, small businesses are now trying to capitalize on the increased connectivity and the ability to use these applications that are becoming available. But as they do, the issue of security is starting to be a real problem. They are experiencing very, very significant security threats, and these need to be dealt with. Our QorIQ entry-level processors are enabling unified threat management designs. These will deliver hardware accelerated security and intrusion prevention at price points that typically could only be hit with very low-quality type of solutions that really didn't provide the security protection that was mandatory. So to tell us about the growing need for network security and how Freescale is working to power these innovations, please welcome Watchguard's Director of Engineering Steve Huberty. [Applause] Steve, good morning and welcome to the Freescale Technology Forum.

HUBERTY: Thank you, Rich. I'm really excited to be part of the Freescale Technology Forum this year.

BEYER: Okay, what do you have to tell us about this security issue?

HUBERTY: Well I want to say I love the vision of being always connected, and having all of my devices have access to all my data all the time, but you need to stop for a second and think about security. Now the Internet of a few years ago, back when there were lots of IPv4 addresses, back then viruses were a nuisance and the consequences of opening and email with an attachment might be letting everybody in your address book know that you loved them. It's not that kind of Internet anymore. Now it's about theft, and I'm here today to talk about some of the examples that we've seen. Consider RSA Security. This is a security company. They know malware, they know the impact of malware, yet old-school social engineering penetrated their network. An email that looked like it came from HR that had a Excel attachment that took advantage of a previously unknown vulnerability got into the network. Old-school. What's new is once it got into the network, it looked for specific information, captured that data, sent it off the network. That's new.

Or another example, consider TJX. They run a large network of retail stores across the country. Outside of one of those stores a guy sat with a highly directional antenna, sniffed the wireless traffic, cracked the web password, and that gave him access to the network. Once they got into the network the found a kiosk that was used to accept employment applications. That kiosk had a direct line to the corporate network. 45 million credit card records were stolen over 18 months.

And the cost—the cost of these security breaches is huge. Consider the recent break-in at Sony that shut down their Playstation network. Cost estimates of that break-in range from $20 million to $24 billion. Now when I see the finance guys with a range that big, I no longer feel back about the accuracy of a lot of engineering development schedules that I've been part of! [Laughter]

Now Rich, I'd like to say it's getting better; I don't think it is. Last year Semantic identified 286 million new threats—just one year. That's nine per second. And the code and the groups that produce this code are becoming far more complex. Consider two examples. We saw

the Google Aurora virus—most complicated code we've ever seen. Layers of obfuscation hiding what it does. When it got into the Google network, it collected information about specific users. And then not long after that came the Stuxnet virus. Now this virus was designed to damage specific industrial equipment. This is not the work of kids sitting in a hallway or kids in the closet. These are professional organizations, and they know what they're doing.

Oftentimes what we see is the technology outpaces security. Consider Facebook. Everybody here probably uses Facebook; you're familiar with it. How secure is your data on Facebook? How secure are the applications? Let me give you an example. Go out here to any coffee shop or anyplace that gives you unencrypted wireless access, you can load a simple plug-in through Firefox and you can sit back and eavesdrop on anybody that's updating their Facebook page. It's called HTTP session stealing, and it shows that you have to think about security from the beginning of these new devices. Similarly, in VoIP systems—VoIP systems are great, and they're very cost effective. But sometimes they're not deployed with security in mind. We've seen a big uptick in attacks on VoIP systems.

So what do you do? At Watchguard, we employ what we call a layered security solution. We apply multiple different technologies to examine the traffic that comes through and make sure it's okay. We use the power of the cloud to look at the source of the traffic that comes and say is this coming from someplace that we know does bad things? We look at all the emails, we look at the web pages, and we say are there links there that are going to places that we have seen do bad things in the past? Or also, where every attachment that comes across, we have to decrypt the traffic and look at it and look to see if there's malware that we know about attached to that. And that takes a lot of power, and I don't have to tell you that customers get really cranky when the network slows down.

This is where Freescale comes in. We believe that the QorIQ is a great processor for the UTM market. It allows me to offload my basic Ethernet packet processing with a built-in Ethernet controller. It allows me to offload the crypto for the IPsec and the SSL because it has built-in crypto. It allows me to offload using the regular expression pattern matching engine to look for viruses. All of this offload gives more CPU cycles available to our code so that we can do our processing with minimal impact on the customer network.

So finally, I wanted to relay this story. I was up in Seattle and we were discussing the price performance that we think is possible to achieve using the QorIQ. And when I put the chart up on the screen, Bill Smith, our VP of Sales, did one of these. He looked at it, looked back like that. And that's where we coined the term "neck-snapping" performance. And that's what we think we're going to be able to achieve using the QorIQ family of processors.

BEYER: Steve, that's really exciting. We really appreciate you joining us to share that with us. Thanks very much, Steve.

HUBERTY: Thank you much, Rich. [Applause]

[Video]

BEYER: So economic development and urbanization has shifted the focus of public health agenda towards chronic diseases like hypertension, cardiac failure, diabetes, and cancer. The medical industry is shifting from high-cost treatments to more preventative disciplines. We believe semiconductor technology is going to be the fundamental underlying reason why we're going to be able to deal with these issues. It's going to play a critical role in bringing the new

technologies necessary to provide medical monitoring of patients, to provide diagnostics of patients' conditions, as well as therapy and imaging. In the era of connected intelligence, we believe that smart medical devices are really converging in many respects with smart mobile devices. They share a very common set of requirements: small, portable, easy to use, highly reliable, and connected. We believe smart sensors in conjunction with processors and controllers will play a significant role in assisting in diagnosis and care. Interestingly, even in the automotive industry our customers are starting to integrate health-oriented applications into their driver information systems. Ford, for example, is developing a wireless connectivity portfolio with its sync system, which is based upon Freescale technology as you know, for the in-car technology. For example, if a driver has diabetes, that driver could experience low glucose, become somewhat lightheaded, and that could create a dangerous environment and ultimately unfortunately maybe an accident. A monitoring system in the car could detect that glucose level is too low, notify the driver so that the driver could take action to avoid any kind of problem.

At Freescale we take great pride in developing semiconductor products and solutions that make the world a smarter place. But it's really special to be involved in delivering technologies that not only improve the quality of our lives but can actually save lives. To share some of the latest advancements from this important part of our business, please welcome Freescale's Medical Products Marketing Manager David Niewolny. [Applause] David, good morning.

NIEWOLNY: Rich, good to see you again.

BEYER: Thanks very much for joining us this year again. David, tell us what's going on in the world of medical products.

NIEWOLNY: Well, Rich, it's been a big year for Freescale in the world of medical products. A year ago I was here talking about how Freescale was really one of the first semiconductor companies to identify the trend of convergence of technology and healthcare. Over the past year, Freescale has added systems and applications resources for specific medical solutions, as well as staffed up in other areas. We've just recently announced our Kinetis K50 product line based on the Cortex M4 ARM core, and that's really focused specifically for home-portable healthcare. So really there have been a lot of good things, and a lot of these good things are really having us become a more trusted partner for our healthcare customer base. So Freescale has long been a provider to the medical customer base, but for the most part we've provided essentially hardware, and now we're getting better at providing complete solutions for our medical customers.

So one trend that's really driving this focus, as I mentioned, is the convergence of healthcare and technology. You really can't open up a newspaper or turn on a TV without seeing the cost and complexities in the entire world with regard to healthcare. So obviously there's a huge pressure for change.

BEYER: But how does that equate to opportunities for us at Freescale?

NIEWOLNY: So really one of the biggest opportunities is the increased use of technology. So the world population is growing, you have the baby-boomers, they're now basically getting at an age where you're having an increase in the need for medical care. Right now the supply of doctors, nurses, and technicians are not keeping pace with that overall need. The cost of equipment, supplies, facilities—also driving up the cost of healthcare.

BEYER: So where do you think these trends are going to take us, David?

NIEWOLNY: Well they do take us to the point where we need to be integrating more and more technology into our healthcare system. So currently we focus on essentially treating expensive, serious conditions, when what we really need to be focusing on more is preventative medicine. The way we currently treat medicine, costs will simply crush the system. So the convergence of healthcare, technology, and using technology as an enabler to really lower the overall cost of healthcare by moving towards more of a preventative medicine.

So technology is key, but the bigger change is, as I mentioned, preventative medicine. So looking at preventative medicine, I think there's going to be a massive transformation moving forward, treating life-threatening symptoms versus actually treating a critical condition like diabetes, cardiac disease, actually preventing them would be much more important. Actually as I was looking for some material for this particular talk, looking back at some journals, and actually someone brought to me a journal from the late 1800s that actually mentions, "Eat an apple upon going to bed, and you'll keep a doctor from earning his bread."

BEYER: Interesting. That must be the derivative of "An apple a day keeps the doctor away."

NIEWOLNY: Exactly. I didn't realize that came from as early as the late 1800s. So the idea of prevention is really nothing new.

So moving away from more of a critical care model, moving to a more preventative model, the real key here is overcoming the obstacle of human nature. Humans generally like to be reactive; they're not going to be proactive. So how do we do that? I think there are some countries that have actually moved to a more proactive approach, but it really identifies a lot of red tape, paperwork—it makes it actually more difficult to go out and see a doctor and get critical care. One of the things in the way I see it and I think the way a lot of society sees it in terms of technology is it becomes an enabler and it makes things much more convenient. So convenience is the key. Millions of Americans don't like going to the doctor. It's expensive, not very convenient. And then also in terms of remote monitoring, there are people around the world that don't have access to healthcare.

BEYER: So what can you tell us about what Freescale is doing to provide some of the solutions to these issues?

NIEWOLNY: So we have a demo here today that really identifies more with mHealth, tele-health, remote monitoring type solutions. So what we have here is an integrated solution created by Freescale along with some of our key partners. So meet with us today, Kevin. Kevin is our typical American male. In this case Kevin is no spring chicken.

BEYER: Sleeping mid-day, yeah, typical American male, yeah. [Laughter]

NIEWOLNY: We caught him at a bad time. So the fact is Kevin's best days may be behind him. Kids are grown. His job, obviously very demanding—he's sleeping as late as he is. And his joints aren't quite as limber as they used to be. So like a lot of men, Kevin really doesn't like going to see the doctor. Thanks to his age, typical American lifestyle, Kevin now has type 2 diabetes as well as high blood pressure. Both of these are very manageable conditions, but they

do require some pretty diligent monitoring. So Kevin here is actually resting on a bed, but under this bed is a solution by one of our partners, BAM Labs. It's a biometric sensor that's actually measuring his heart rate right now as well as his breathing rate. It's actually a solution developed by CEO Richard Rifredi, and it was developed really for monitoring his premature baby's breathing overnight.

BEYER: And what kind of technologies from Freescale are in use here, David?

NIEWOLNY: We'll get through it piece by piece, but right now in the BAM Lab solution, which as I mentioned is under this mattress, it has Freescale pressure sensing technology along with an ultra-low power microcontroller. That actually connects via USB to the chumby alarm clock that Kevin is now viewing, and that's powered by one of our i.MX 6 solutions.

So with that, we'll kind of join Kevin for his typical morning routine. So first thing, you can see he checks his breathing and checks his heart rate overnight. He'll then pick up a smart mobile device, in this case a tablet, and it's a tablet powered by our i.MX 6 technology. And then with that he's going to complete a blood pressure measurement, and then also a blood glucose measurement. So really, this is a completely automated solution. So as I mentioned, the BAM Labs has the i.MX 6, the pressure sensor.

So the types of things that he's going to be moving though right now, he's going to be taking a blood pressure measurement. In the blood pressure monitor Freescale has solutions for very ultra-low power microcontrollers, actual pressure sensors that can be mounted actually in the cuff to make sure that that cuff is set up properly. And then obviously a pressure sensor within that monitor.

So right now, you can see Kevin actually engaging with the tablet PC, so another partner created this user interface for the PC, UI Centric. So the UI Centric interface is going. Kevin is now taking his blood pressure. That blood pressure data is being communicated to a Freescale-designed home health hub. So this is really a wireless gateway specifically for medical devices, has all the medical specific protocols for things like ZigBee, Bluetooth, Bluetooth low energy, USB, as well as wi-fi. So all of these connections are really being able to send the data up to the cloud where Kevin can now access it both on his tablet PC as well as his healthcare provider or a loved one.

BEYER: All very, very automated it sounds like.

NIEWOLNY: It is. It's a very automated solution, as you can see. Kevin takes the measurements, checks in with his PC, and all this data integrated through the home health hub, again created by Freescale, gets transmitted up to the cloud where his actual medical professional can get all this data real time. So the same time Kevin is seeing it is the exact same time his doctor is seeing it. So we can see he just took a blood glucose measurement, and with that, sending that data real time, basically one of his measurements, looking by Kevin's face, it looks like it may be out of his normal range. So with that, Kevin's doctor is now seeing that that data is out of range, and with that this is where the technology really gets kind of space age.

So coming from our left here, you see the Vigo robot. The Vigo connects anyone anywhere. It has many use cases. In this particular use case, Vigo is actually acting as a surrogate to Kevin's doctor. So joining us is Dr. Jose Fernandez, one of our medical segment technology leads, and he'll be talking a little bit with Kevin about his condition.

FERNANDEZ: Good morning, Kevin. How are you doing today?

KEVIN: You know, I'm feeling pretty good physically, but that blood glucose reading didn't look quite right.

FERNANDEZ: Yeah, your glucose levels are a little bit high. But the good news is that I saw your other metrics, and everything seems to be okay. So did you have something before bed last night to eat?

KEVIN: Yeah, you got me, doc. I was up late watching TV and had a piece of cake.

FERNANDEZ: Well, a little piece of cake once in a while isn't going to kill you, but an insulin dose right now, it might.

KEVIN: Seriously? Why?

FERNANDEZ: Well, you're dealing with the dawn effect, which is the hormones that are released during the night to your bloodstream trigger certain responses from your body that elevate the glucose. But it load go to normal during the day, so you should not worry about this.

KEVIN: Okay. Well, that's good to know. I'm glad you Vigoed.

FERNANDEZ: Yeah. So please check again your glucose in daily hour until it's stable, and go back to your normal routine day. Have a healthy breakfast and do your exercise.

KEVIN: Okay, sounds good to me.

FERNANDEZ: Okay. See you.

KEVIN: Well one of these days I need to program these things to bring me breakfast.

BEYER: Well, that's really, really a great solution, David.

NIEWOLNY: Yeah. It's great to be a part of something that really has the ability to really reduce chronic conditions, reduce office visits, shorten hospital stays, and reduce mortality. It's really the type of stuff that we're doing here at Freescale.

BEYER: So in other words, connected intelligence supported in many ways by Freescale actually can contribute to saving lives in the future.

NIEWOLNY: It definitely can. The solutions we're providing here, along with great partners like BAM Labs and Vigo Technologies, is really at the core of what we do.

BEYER: This is really great. Thanks very much. Really a pleasure.

NIEWOLNY: Thanks, Rich. [Applause]

[Video]

BEYER: Energy management issues are becoming a primary consideration in virtually every purchase of an electronic device. One of the primary challenges of the engineering community is to deal with this increased performance while reducing energy consumption. Interestingly, electric motors consume about 45% of the world's electrical energy. By utilizing more efficient motors, we believe that we could cut the global electricity used by these motors by over 25%.

To help in this effort, Freescale is announcing this week our new generation of high performance digital signal controllers. These controllers provide precise digital control for electric motors and for power supplies. Our new digital signal controllers provide the fastest signal processing in the microcontroller industry. They are based upon our 32-bit core architecture together with on-chip peripherals that provide a smarter way for the use of energy by these motors.

In the era of connectivity, there is a constantly expanding requirement for networking data centers. Data centers today are consuming about 2.5% of the U.S. electricity supply, and the EPA projects that these data centers will consume double that amount of power by 2015. Half of that energy is used simply to cool down those centers. These digital center power supplies can use our new digital signal controllers. They will generate significantly less heat and require less energy obviously for cooling. These digital signal controllers can also help reduce circuit board design and overall system size, further contributing to the reduction in power consumption.

Everybody is speaking around the world about the need for Smart Grid and Smart Metering. The deployment of Smart Grid technologies over the next 20 years has the potential to deliver $2 trillion of savings in energy consumption. That is why this topic is so important. It is why so many companies, including Freescale, are working diligently in this area. We need to continue to enhance the efficiency of the network in order to help close the information gap between us as consumers of this electricity and the utilities that provide it. By using advanced metering infrastructure and data management technologies, we are absolutely going to address this issue over the next several years. Freescale is working with leaders across the industry in this domain. We are working with them to deliver smart meters as well as home energy management systems. We are trying to enable consumers to be more responsible and to address the issue of conserving energy. We are collaborating with Fujitsu to develop a Smart Meter and sensor network that will enable Smart Grid technology for customers around the world.

To tell us more about the latest development in Smart Grid technology, please welcome the president of Fujitsu's Intelligent Society Business Unit, Nakasu Son. [Applause] Thank you very much for joining us and good morning.

NAKASU: Good morning, everyone. My name is Yuji Nakasu of Fujitsu, and I am in charge of Intelligent Society Business Unit within Fujitsu, which provides solutions based on the technology that Fujitsu developed. I flew from Japan yesterday and I'm a bit nervous about my presentation because of a huge audience. Please allow me to use this cheating paper just in case I completely lose myself. [Laughter. Applause.] Okay.

I would like to thank Mr. Beyer for giving me the chance to introduce our partnership with Freescale and our state-of-the-art network technology called Wiz Read [?]. Before I introduce our technology, I'd like to briefly touch on the situation in Japan. This is a picture of Metro Tokyo, and there is no neon light on the street of Tokyo. As you know, Japan has had severe damage of course by earthquake and tsunami which occurred on March 11 this year. It

would take many years to restore the country. However, people in Japan are making all efforts to do this, and I hope our country will recover very quickly. One of the issues Japan is facing is severe shortage of power supply because the tsunami hit the Fukushima Nuclear Power Plant. The Japanese government has ordered for power saving and planned outage in order to prevent a major blackout. People are working on that. One of the biggest concerns is whether people in Japan can survive with the very hot and humid summer season without any power shortage. Under such circumstances, the need for Smart Grid is very critical and mandatory and to raise the efficiency of the power usage.

This is a picture of Smart Grid. It has been very hot agenda for a couple of years all over the world, and I think you already know this situation. Utility companies and vendors in Japan have performed various activities for our Smart Grid development long before the earthquake. There will be various Smart Grid implementation products for the regions and to require to completely rebuild its electric infrastructure. This is where our technology is needed and state-of-the-art network technology in order to help realize the power saving.

Let me introduce some of the technical features of our Wiz Read technology. Wiz Read is innovative, ad hoc mesh routing protocol. There are two major characteristics that Wiz Read have. The first one is that Wiz Read can perform very large scale networks while other networks can only scale up 100 nodes on gateway. However, Wiz Read can construct over 10,000 nodes power gateway. This is one of the characteristics. And the second characteristic is the quick self-restoration. We embedded artificial intelligence technology into Wiz Read, and each note has the learning mechanism come down the node link quality, and then Wiz Read can easily find the alternative route with sub-second in case of failure. With those characteristics, Wiz Read can achieve 100,000 person data reach ability in harsh outdoor wireless network environments and higher link speed, up to several tens mega BPS with millisecond data intensity.

Let me introduce some of the Wiz Read implementation in Japan. There are only two utility companies in Japan, and they are vertically implemented and they are also divided by regions. There are 75 million households in Japan, and Tokyo and Konsai Electric has more than 50% of the share in Japan. We are conducting some prototype demo products with those two utility companies, and they already decided that they will use our Wiz Read technology for their network. I think we are approaching promoting our Wiz Read technology to other utility companies, and I think they will follow the same path that two giant utility companies have already taken. In Japan, Wiz Read is becoming de facto standard communication method in Japanese AMI market.

So other applications. I think we can apply our technology, and AMI is one area, but not only AMI. Wiz Read can be implemented to other applications such as structural monitoring and facility management and disaster prevention, and so on. I think with Wiz Read's high technical potential, Wiz Read can be implemented in many, many areas. So we very much look forward in realizing these new solutions with trusted partners like Freescale and the distinguished audience we have here today. [Applause] Thank you. Fujitsu and Freescale are working on the partnership, and Freescale and the Fujitsu will form a marketing collaboration to jointly pursue since our network market and opportunities for Fujitsu Wiz Read network technology. Thank you very much for your attention. [Applause]

[Video]

BEYER: So the automobile is the ultimate smart mobile device. It embodies all of the trends that we've talked about this morning: connectivity, safety, energy efficiency, and it does still

retain its original purpose and that is to get us from one place to another. Freescale, as you know, has been a leader in automotive technology since we provided the processor that powered the industry's first electronic fuel injection system back in the late 1970s. Vehicles today have become as much an electronic machine as a mechanical one. With the dramatic growth in automotive electronics, we're trying to solve numerous simultaneous issues. One is to deliver innovative products that have zero defects. Two, we're trying to deliver products that enable us to continue to work on energy efficiency and lowering emissions. Three, we're trying to make these automobiles safer and safer. As we've said, the automotive industry has a very noble goal, and that is to eliminate all fatalities and ultimately all injuries associated with a vehicle in any way, shape, or form, either people inside the vehicle or people outside the vehicle. We need to work as an industry on all of those issues.

So today we want to show you some of the very interesting things that are evolving in this industry, some of the trends that are taking place in communications and safety. To help me with that, please welcome Freescale's Director of Marketing for the Americas Region, Steve Nelson. [Applause] Good morning, and welcome back!

NELSON: Good morning. Thank you very much. Thank you very much. You know Rich, as you said, Freescale really has been involved in every automotive innovation really over the past 30 years, and we could even go back further than that. You know, we're here in Texas, and they say everything's bigger in Texas. So what I've got for you, I've got the next generation of electric vehicles. I've got the next generation of connected vehicles. And the third one, you're just going to have to wait and it's going to be really incredible. So let's get into that.

You know, we're very pleased to be involved with General Motors in the development of the Volt. Many of you saw it out there today—the next generation of electric vehicles. Freescale hasn't been involved in this product, and we have 18 different devices that are involved in that product. We have things like we have the power management. We have engine control. We have all of those types of things that are in the Volt that's out there today.

So what I brought with me today-- I'm sorry, Rich.

BEYER: What makes the Volt special besides the things that we've talked about in the past?

NELSON: Absolutely. Well you know, the Volt is the next generation extended range electrical vehicle. So with the Volt, you're able to run for about 40 miles on batteries, and then you have a gasoline engine that will run for an extended range beyond that. So it takes away some of that range anxiety that people talk about. So in the Volt, you can run again about 40 miles, and then beyond that you can run on gasoline.

So what I'm going to do today is I have this i.MX 6 51 tablet, and I'm going to show how we are going to connect with the Volt. And with the Volt, it is about communicating with it in the next generation way. I mean we talk about automotive. What does that mean? Well, we want to connect with cars and we want to do things in the automotive way. That means safer, cleaner, fewer steps. So what I'm going to do is I'm actually going to connect to that car. I'm going to pull up this application. I have it running right here, and I can connect. I'm going to log on; I'm connecting up to that Volt. And the first thing I can do is I can go to the home screen. When I do that, I can see I've got a certain amount of range. I can see what's going on with the car. I can see here's how far I can go on the batteries. We don't have a lot of fuel in the car obviously, so I can go somewhere beyond that. And I can look at all number of things within

the car. I can look at tire pressure, all number of things. So I can kind of do that. I can see what's going on.

The next thing I can do here is I can hit the remote screen. Now it's a little bit harder nowadays to lock your keys in your car. It's not impossible, you can do it, and we've seen that. So what you can do, you can unlock, you can lock, you can do a remote start. I'll talk about that here in a minute. I can also honk the horns and lights. Right? So I can do that to show I'm connected. So I'm going to hit this button right here and I think the door might be open. [Horn honks.] Oh, there we go, connected to the car. All right, that's good. Thank you. Thank you, got it. Appreciate that. Crowd understood that very quickly. So this is about connecting with a vehicle in the next generation way.

So I'm going to talk about an application that I think is really exciting. I think it's really innovative, and I can see myself doing this. Let's say that you're in San Antonio; maybe you're here just hypothetically—just saying. And you want to go out and see something like the Alamo. Let's say you want to go do these things. Well, instead of making it a multi-step process, we all do this. We pull up our tablet. We pull up our PC. We find the location and then we go to our car—voice, some way—we put that destination in the car. Well, let's eliminate those steps. So we're going to do a little bit of navigation push here today. So what I'm going to do is I'm going to close this application. I'm going to go back to the home screen, and then I'm going to pull up Google Maps and I'm going to look for the Alamo. People want to go see the Alamo. There it is. We can see. I have the destination. It already knows it's in San Antonio. I can now pull up that location, click on that, and it will show me, yeah you're kind of up north of town there. But there's the Alamo right downtown right there on the Riverwalk. Well now what I want to do is I want to push that destination out to that car. I can pull up the next menu, send it to my car. We can see the information that I'm doing here. We can see that. And then I can hit send and then that destination goes out to the nav system that's out in the car. Now we have a camera out there and we can see it. There it is. Pretty clean. It's a fairly basic application, but I think it's something that we've all done at one point or the other and it just saves another step. That's what it does.

BEYER: That's a really cool application, Steve. Thanks very much for showing that.

NELSON: Absolutely. Absolutely.

BEYER: Thanks again to General Motors for sending the car and allowing us to demonstrate these capabilities on the next generation.

NELSON: Absolutely.

BEYER: What else do we have going?

NELSON: Well, let's talk about the next step. So again, we're going to kind of raise the bar a little bit here. I think in *Back to the Future*, you know greatest geek movie of all time, Dr. Brown was asked, "Well, if you're going to build a time machine, why did you build it out of a DeLorean?" Well, if you're going to build a demo and if there are any marketing people in the audience, if you're going to build a demo, a Corvette convertible makes a really nice demo platform as long-- I'm sure there are no budget issues anybody has with this car. So our partner QNX has provided this car with us today. This car has the absolute latest in cockpit

instrumentation, in cluster and high speed video in and out. This thing has everything. Everybody's going to be able to see this. I do not have the keys. I don't want to hear anybody asking me anymore about if I have the keys.

So what I'm going to do is I'm going to switch tablets here. I have a RIM PlayBook, and I'm going to talk about an application that's called Cabin Preconditioning. Cabin Preconditioning is actually an application that really applies to electric vehicles. What that means is in an electric vehicle-- Let's say hypothetically you're in San Antonio. It's about 107 today, something like that. Or you're in Detroit in February; it's maybe 5 below. You need the capability to precondition the cabin before you get in the car while it is still connected to electric power. The reason is because once you get in the car and are driving, all of the electricity that drives the HVAC system comes out of the same batteries that are driving the car. It's a range extender. So this cabin preconditioning is very, very important. It can be upwards of 40% of the battery and the range of the car can go through the HVAC system.

So what I have is I have the RIM PlayBook—you can see it here—and I actually have the capability to interact with the center stack and the HVAC. So it's kind of warm up here in the lights. It's probably not going to help, but I'm going to turn the temperature down here. And as I do this, you'll be able to see it working on the car. Now I'm standing next to the car. I could be in Austin; I could be in Detroit for that matter. This is a demonstration of a very basic capability, the way that I'm communicating with this car with the basic body functions. So let's say that this information is going to the cloud, so the applications can really start coming in your mind. Let's say that I want to share that information with other drivers. I'm on a road trip. I want to be able to see what their fuel gage. I want to see if a warning light goes off. I want to see what radio station they're listening to. Maybe I send canned messages. This is the start of vehicle-to-vehicle communications that I think really is interesting and very exciting and we're just starting to see that coming. Okay?

BEYER: Very cool. Cool.

NELSON: So okay, Rich, I've got one more. So let's talk about video. When we talk about 4G connectivity to the car, usually it's about video. We want video to come in and out of the car. Well, in Novi office, which a lot of you have been there, we all see this. We see cars today that have backup cameras, rearview mirrors, we're talking about reducing those, bird-view cameras—all of these things that are coming into it. So we've equipped our concept vehicle in Novi office with cameras. While I've been standing here, I've kind of got a notice, and a lot of our Novi staff is here and I think we're having a break-in in the office. I think that's what we're doing. And maybe we can go to that and I can see it here on the tablet and we can see. Yeah, that's not good. That looks…it's not the Hamburglar, but it's somebody that looks like him. So this is a good example where if I have a tablet, I want to see what's going on around my car. Well now maybe my car is in a parking lot or maybe it's somewhere else, or maybe somebody has bumped into me and therefore the sensor says, "Hey, somebody bumped into you. I want to see what's going on around my car." So this is an example then of video that's coming in. So let's take one more step and you can use your imagination a little bit here. So we're going to turn this into a police car. It's going to happen really fast so everybody could probably catch it pretty quick here. We have the hat; we have the blue lights. So now this is the Corvette convertible police cruiser. So there we go, transition is full. That's great. That was quick.

So the next application, we say, "Well, why would they want to do that for safety?" Well obviously security applications, you want to see that video. Police, security, everybody wants to

see what's going on at the crime scene coming into the car. Now we're routing other video that he can see once the police show up, and yeah, it's bad. He got arrested and there he goes. There he is, and she's in the car. So she can see that streaming in real time into the car.

BEYER: Very good. So great stuff. Where does this take us from here, Steve?

NELSON: Well you know, Rich, as you mentioned earlier, as an automotive supplier, one of the great things in being involved in automotive is what we call Mission Zero, and it's about zero defects, zero emissions, and zero fatalities. Obviously zero defects—I mean a lot of us in the audience can remember when a car only had five digits on the odometer. If it went to 100,000 miles, that was an amazing accomplishment. Now 100,000, that's kind of like a birthday. It's good but it's not anything incredible. So the reliability and obviously working with the industry we're so proud to be there. Next, zero emissions. We see the Volt; we see the next generation in electric vehicles. Automotive technology, electronics are in the middle of that, and we're very proud to be part of that as well. Lastly, and this part I think is almost most important, it's about zero fatalities. You know, that is about a passion for an industry, and being involved in an industry that we save people's lives, we save family members. People walk away from car crashes today that they clearly would have died from in the past, and that is just really a noble cause and something I think we at Freescale are very proud to be part of.

BEYER: Great. Steve, thanks so much for sharing this with the audience.

NELSON: Thank you. [Applause]

BEYER: Now we'd like to talk for a moment about some of the latest advancements that are going to be impacting very, very high performance automobiles in the future. To help us with this, it's my pleasure to introduce the Managing Director of McLaren Electronic Systems, Peter Van Manen. [Applause] Peter, nice to see you, and thanks very much for joining us. Good morning.

VAN MANEN: Good morning.

BEYER: Tell us a little bit about what McLaren is doing in conjunction with Freescale.

VAN MANEN: Okay. Well let me first tell you a bit about motor sport. Motor racing is tough on electronics. The cars are fast. Accelerations are extreme. It gets very hot. The vibration is terrible. There's electrical noise everywhere. And the electronics have to operate 100% reliably and perform in that environment. That's our world. Now we started working with Freescale back in 2000. It was Motorola at the time, and we were one of the first adopters of the 32-bit power PC. We introduced that into one of our racing systems and we've used that ever since then. We've also over the years introduced the ColdFire into some of our mid-range equipment, and in our latest mobility systems we started to use the ARM processor. So that's the motor sport side of things.

Just for completeness, we also use the processes in our automotive equipment. So this is for controlling power trains in sports cars and our latest developments in hybrid technologies. Just to show that we are also very greedy in what we do, we're also building the Freescale processors into aircraft control.

So why Freescale? Well, it's always been reliable. It performs. The processors are bulletproof—they never fail, whether it be a two-hour race, a four-hour race or a 24-hour endurance race. And the support we've got has just been superb.

So in 2007, we introduced the ECUs for Indy Car, and so they run all of the cars in the Indy 500 and the Indy Car Series. From 2008, we've been the official ECU supplier for the FIA Formula I World Championship.

ARMSTRONG: Rich, Peter, I appreciate you guys talking about motor sports, but we're in the United States here. Let's talk about real racing. Let's talk about NASCAR! [Race video]

BEYER: So ladies and gentlemen, allow me to introduce the Managing Director for NASCAR Automotive Group, Todd Armstrong. [Applause]

ARMSTRONG: Thank you, Rich. Freescale is now an official supplier to NASCAR, but to us they're much more than that. Freescale is joining a very short list of companies that provide products that are required for use by our NASCAR Sprint Cup Series teams. That list is currently highlighted by Goodyear Tires and Sunoco E15 racing fuel. So beginning next year in February with the 2012 NASCAR season, Freescale semiconductors will be in every single NASCAR Sprint Cup Series car.

So you might ask why would Freescale get involved with NASCAR? There are many reasons, but just to name a few, we're the number one spectator sport in the U.S. with an average of 110,000 fans attending each of our events, and some events attracting as many as 200,000 to 250,000 fans. We're the number two rated regular season sport on television behind only the NFL. We have over 75 million fans. We're broadcast in more than 150 countries around the world. We have the most brand-loyal fans in sports, which is really a key reason why we have more Fortune 500 companies involved in NASCAR than any other sport. And then we're not just the Sprint Cup Series, which many of you have probably heard of. We're also the nationwide series and camping world truck series, which are both national in scope. We've got four regional series. We've got a local grassroots racing series. We've got two international series, one in Canada and one in Mexico. And then we also have Grand Am Road Racing, which is part of the NASCAR umbrella as well.

VAN MANEN: So from February in 2012, 50 years of carbureted engines come to an end in Sprint Car, and we see fuel injection and ignition control of 43 cars relying on an ECU which comes from McLaren and Freescale. So Freescale is under the hood from 2012.

BEYER: Very impressive. Thanks, gentlemen. Thanks. [Applause] So we usually give something out to somebody lucky who attends, and this year we want to let one of the attendees in the room share in this NASCAR excitement. So we're going to use the smart mobile devices that we provided to each of you. We're going to select the winner for an expense-paid trip to one of a selected set of NASCAR races over the course of the remainder of this year. So let's see who is going to be the winner. [Roll wheel] All right, it's Jeff Schultz. Come on up, Jeff, please! [Applause] Jeff is not in the room, but Jeff is the winner nevertheless.

So all right gentlemen thanks very much. Todd, really a pleasure. Peter, thank you so much. [Music; Applause]

So FTF is all about providing a hands-on experience to basically deal with the numerous technologies in the numerous markets that we've got. We want you to have an opportunity to

actually use the technologies that we've talked about today and are available in the tech lab. So in this spirit, we are again sponsoring a challenge. We call it the Make It Challenge to test your development skills. We have two tracts this year. The first is our power system design challenge, and the second is our mechatronics robot challenge. You get to choose the tool that you want for your application. Our guest judges this year are Joe Grand, the president of Grand Idea Studios. Joe did a great job of leading this effort last year. Secondly, Heather Knight, who is the founder of Marilyn Monrobot Labs. Heather is one of our keynote speakers tomorrow, and she's going to help us in the selection process. And then Anton Olsen, self-defined master geek at Innovation First.

So, powering innovation is the theme of this conference. This technology forum is all about powering innovation—your innovation. We want to help you make it connected, help you make it healthy, help you make it safe, help you make it more efficient, and help you make it smarter.

So as we come to a close, I want to thank all of you. I hope you've enjoyed the demos and the underlying technologies that you've seen today. All of these demos are in the technology lab that will be open today and for the next several days, and I highly encourage each of you to go down and take a look and interact with the various partners who have helped us to put these pieces together.

I want to thank all of you for attending this year's Freescale Technology Forum. We are confident that this is a great event and you're going to have a very valuable time over the next couple of days. If there is anything that you need that you don't see, please contact one of the Freescale people; we will do everything in our power to provide it. Thank you again. Enjoy the rest of the Freescale Technology Forum. Thank you. [Applause]