

# INTEL® SOFTWARE ADRENALINE

ISSUE 2 | WINTER 2013

*Perceptual Computing  
Transforms the  
Human-Computer  
Interaction*

Wind River and Intel Revolutionize Embedded Computing

Multi-touch Technology Deepens Gaming  
Experiences on the Battlefield and Beyond

Augmented Reality is Here and Now  
On Tablets and Ultrabook™ Devices

The Intel Software logo, featuring the word "intel" in its signature font inside a circular swoosh, with the word "Software" positioned directly below it.



**D**riven by the ferocious pace of innovation in both hardware and software applications, our relationship with technology—and how we interact with it—is always growing. Today, this relationship is moving into one of the most significant evolutions in computing history. Mobile device and computer users have been shackled to keyboards and mice for decades while promises of machines controlled by thought alone languished in the pages of science fiction. But in recent years, touch control has crept slowly into the framework, permeating the digital world to a point where it's hard to imagine a day without it. But touch isn't done yet—there's more to come.

**ABOVE** Photograph by Bryan Derballa.

In this second issue of *Intel® Software Adrenaline* we get up-close and personal with touch. We explore how the mobile lifestyle and Ultrabook™ device are affecting the world of software and how touch control is fast becoming ubiquitous. We preview what's to come with Intel® processor-based phones, explore touch in PC gaming, and view the wider world of perceptual computing and user-interface revolutions happening now that will become tomorrow's norm. This issue also takes an inspiring look at the #CreatorsLive Project, which invites the public to interact with live art using all their senses. You'll also read about Telmap and the fascinating future of location-based services, take an immersive journey into the world of augmented reality, and enjoy a thoughtful discussion on

the current realities of security and our mobile lifestyles.

I hope you find the stories as interesting to read as they were for us to write. I'm eager to hear your feedback and suggestions for future issues. Please send me a note at [adrenaline@intel.com](mailto:adrenaline@intel.com) and stay in "touch." In the meantime, enjoy the read!

**TONYA DEGANCE**



## ***New Touch and Ultrabook™ Designs for 2013***

There is a confluence of both new computing designs and software experiences, thanks to the Ultrabook™ device revolution and the introduction of Microsoft's new operating system, Windows\* 8. This year you'll have more choice in feature, size, and shape than at any time since the PC was invented. Manufacturers around the world are designing a range of new devices that are more stylish, significantly thinner and lighter, last longer between charges, turn instantly on, and have built-in security features.

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See the new Ultrabook™ models on pages 2 and 3. For details on the Ultrabook device, go to: [www.intel.com/content/www/us/en/sponsors-of-tomorrow/ultrabook.html](http://www.intel.com/content/www/us/en/sponsors-of-tomorrow/ultrabook.html)

### *What's specifically new this year for the Ultrabook device?*

**The full Windows 8 experience.** Intel-inspired Ultrabooks and tablets deliver a full range of new, amazing experiences with all your existing apps and devices because Intel® architecture uniquely runs the full version of Windows 8. You'll have access to the new user interface, start screen, live tiles, and apps in the Windows Store. And—because it's running on Intel—you can use the applications you already own in the familiar desktop, such as your favorite Microsoft Office\* tool and applications for music, photos, and work.

**Touch.** Some of the latest Ultrabooks have touch-screens, and when combined with a touch-friendly redesign of Windows, you get more fingertip options. Our research shows people will find it faster, easier, intuitive, and fun. Touch transforms the computing experience from work to play.

**2-in-1 devices that convert from PC to tablet.** Thanks to touch capabilities, device makers have gotten very creative in their designs. Why not have a full computing experience when you need to be productive and creative, and convert to a tablet when you want to watch a movie?

Computers can now transform from clamshell to tablet mode via swivels, flips, Ferris wheel-like turns, slides, and more.

**Thinner and lighter.** The newest crop of Ultrabook devices are as slim as one-half inch and as light as 875 grams.

**Better battery life.** With the combination of 3rd generation Intel® Core™ processors and Windows 8 power management features, the latest Ultrabook devices provide stellar performance and great battery life—many systems lasting 8+ hours. With features like App Suspension, minimized applications will be suspended, preserving the device's most recent charge.

**Instant on.** When living life on-the-go, it's essential to have a device that is ready at a moment's notice. The latest Ultrabook devices are equipped with Intel® Rapid Start Technology so your computer wakes from hibernation in less than seven seconds.

### ASUS Taichi\* Ultrabook

With two screens that can operate independently and can be used simultaneously, it's the ultimate taskmaster in a lightweight, sleek design.



### Dell XPS Duo\* 12

With the innovative flip-hinge design, this sleek device transitions from an Ultrabook device to tablet mode without compromising performance or style.



### Lenovo IdeaPad\* Yoga\*

This flexible device features a 360-degree flip-and-fold design so that it can be used in either a laptop position or as a tablet.



### Toshiba Satellite\* U920T/U925T

This new touch-enabled device transforms from laptop to tablet mode with ease and features Gorilla\* Glass for a richer visual experience.



### Panasonic AX2\*

A rugged 11.6-inch notebook beautifully designed for the touchscreen-era, it easily converts to a tablet with a single fold.

### Lenovo Thinkpad\* Twist

This convertible has a twisting screen and can be used in four modes for easy collaboration, sharing, and everyday hard work.



### Sony VAIO\* T Series Ultrabook—Touch and Go

The 13-inch touch-screen option combines ultra-portability with the convenience of touch, wrapped in a beautiful brushed-aluminum design.

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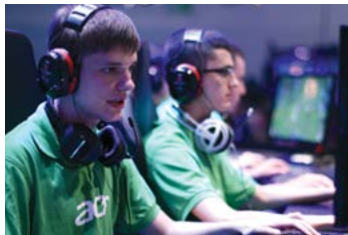
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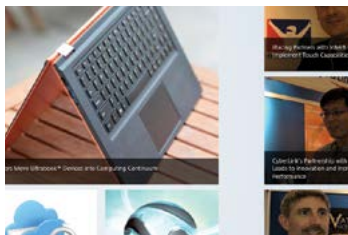
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# Touch-enabled PCs Fuel Talent on *Project Runway*

Star designers Mondo Guerra and Anya Ayoung Chee talk tech and creativity

BY **DOMINIC MILANO AND GEOFF ARNOLD**

**A**sk someone outside the industry to describe what a fashion designer looks like, and you might hear about a stylishly dressed young man or woman hunched over a sketchbook, pencil or charcoal stick in hand. But this image is more dated than last year's fashions. Designers today are just as likely to be creating on computers, be they all-in-one touch-enabled PCs or a sleek Intel-inspired Ultrabook™

device. And of course technology is indispensable to the other aspects of the job—building and managing a brand and nurturing direct relationships with customers and fans.

Though their tools for creating their designs may be changing, one thing isn't. Like the best up-and-coming artists in any medium, the most accomplished young designers are imbued with energy, passion, and innovation that are apparent both in the styles they dream into existence and in their exuberant personalities. Two prime examples: designers Mondo Guerra and Anya

Ayoung Chee, both of whom have experienced success and won the hearts of TV viewers by appearing on *Project Runway*, the reality show on Lifetime Television hosted by Heidi Klum.

For the past four seasons of *Project Runway*, HP and Intel technology have helped enable the designers' creativity, innovation, and passion, which are reflected in their pattern design and fashions. The technology is now an integral component of the show, and the HP+Intel Design Challenge is one of the most anticipated of the show's challenges.

**ABOVE** Anya Ayoung Chee and Mondo Guerra joined Nina Garcia, Tim Gunn, and Heidi Klum as judges for the Project Runway HP+Intel Design Challenge.



*“As creative people we can get stuck in our own ways and processes. It’s important to evolve, and this new technology gives us the opportunity to explore.”*

— Mondo Guerra, fashion designer

## Mondo Guerra: Exploring the Creative Process

Mondo Guerra gained worldwide attention in 2010 when he appeared on *Project Runway* Season 8. He returned to the show in 2012 for *Project Runway All Stars* and won the largest prize in the show’s history, which included a designer’s boutique in select Neiman Marcus stores and online. His bold, innovative designs belie his humble roots as a self-taught artist who came up through the ranks as a milliner’s apprentice, a designer at a junior-wear company in New York, and a costume designer in his hometown of Denver.

Like many designers, Guerra finds inspiration in the world around him. “I can be inspired by anything,” he said, “I’m currently finding inspiration in the creative process, looking at how I come up with ideas and apply them to a collection.”

Guerra hopes to expose his creative process to customers in creative ways, and technology is helping him achieve that goal. “I create databases—digital mood boards—filled with information and pictures that inspire my work,” Guerra said. “I’m a print-based designer,” he continued, “so I develop a lot of prints using software that’s similar to what we used on *Project Runway*.”

During Season 8, the HP+Intel Design Challenge was to create unique fabric patterns using HP TouchSmart\* PCs and HP TouchSmart tm2\* notebooks powered by Intel® Core™ processors, while gathering inspiration from family photos and personal stories. It was the first time Guerra used a computer in his craft, but the experience had an immense impact on his creative process.

“I’m not very tech-savvy,” Guerra admitted, “but I enjoy the process of exploring technology and discovering what works for me. Some artists find technology intimidating because they’re used to working with traditional tools—paper, pencil, tape measure, fabric, sewing machines.”

HP TouchSmart PCs and HP TouchSmart tm2 notebooks equipped with Intel® processors gave Guerra more than enough computing power to manipulate photographs, draw, and create patterns on the touch-enabled computers using a stylus or his fingertips, an incredibly smooth and intuitive process that encouraged him to embrace the technology.

For *Project Runway* Season 10, HP and Intel asked Guerra to design a pattern for the Ultrabook device bag. “That season’s theme was ‘Heritage,’” Guerra

told us, “so I designed a pattern that was about breaking away. As much as we are connected to our families, values, ideals, and traditions, at some point we must follow our dreams and do what’s best for us as individuals.” Guerra’s design was a hounds-tooth abstract that he described as “going in its own direction.”

How does his design relate to artists embracing powerful new technologies? “It’s about trying something new,” he said. “As creative people we can get stuck in our own ways and processes. It’s important to evolve, and this new technology gives us the opportunity to explore.”

Guerra is building his own brand and business in Denver. Intel and HP technology are powering his design process and helping him communicate directly with his customers, fans, and clients. “I’m always on the computer and having virtual meetings. Without technology, I couldn’t accomplish what I do in a day without traveling to New York or LA. It has made me more productive.”

For details on Mondo Guerra’s fashion line, see [www.mondoguerra.com](http://www.mondoguerra.com).

**ABOVE**  
Mondo Guerra with  
an HP TouchSmart\* PC.



# Anya Ayoung Chee: Redefining Caribbean Fashion

With a diverse background as a designer, stylist, model, and television host, Anya Ayoung Chee launched her own women's clothing line in 2009. She is a graduate of the prestigious Parsons School of Design, spent a year working as a designer in New York City, competed in the Miss Universe pageant in 2008, and won *Project Runway* Season 9 in 2011.

Her distinctive style reflects a diverse range of cultural influences. "I grew up in Trinidad, but traveled to Europe and Asia with my parents. I am naturally drawn to cultures and the way they dress," Anya Chee said. Her creative process usually starts with online research followed by drawing with pen and paper. She relies on her computer for creating patterns. "I love clean lines," she said. "I mostly use Adobe Illustrator\* and some Photoshop\*, but the program we used for the HP+Intel Design Challenge during Season 9 was fantastic. It allowed me to create patterns very easily. If I had that technology, I'd use it a lot."

Ayoung Chee found that using the HP TouchSmart PC and TouchSmart tm2 notebook was intuitive. HP and Intel worked with software developers to create a customized software program for the series. "The software let us create basic shapes or draw directly on the touch-screen using a pen and a brush. It takes a swatch of what we created and multiplies it, so you can print it onto fabric."

Because a lot of creative work takes place outside of her design studio, she hopes one day to use technology to capture images with her smartphone and immediately transfer them into a pattern-making program. "I've spoken with Intel and HP engineers about this. I travel a lot and find inspiration everywhere I go, so having technology that could do this would be very good."

Ayoung Chee sees technology giving designers the means to reach new audiences and to perhaps shorten the long path of apprenticeships and menial jobs that are prerequisites for those launching careers in fashion.

"Social media and online networking are fantastic ways to connect directly with customers," she said. "Social media such as Facebook\*, YouTube\*, and Twitter\* can be used to eliminate many steps—tradeshows and in-person meetings—to show your work. To work at a major fashion house, you still need to climb the ladder in traditional ways. But many new brands have become massively successful because they were able to market themselves with social media."

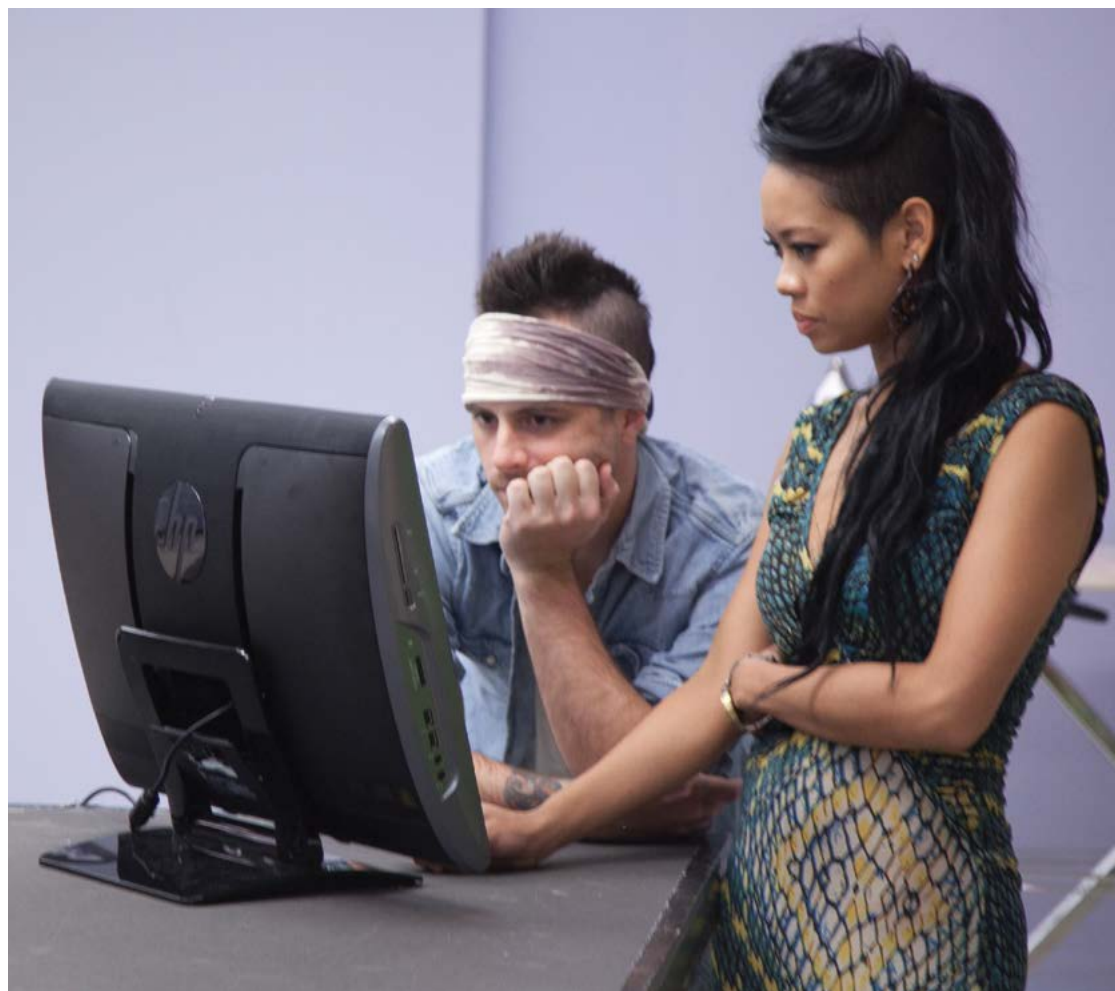
Ayoung Chee has hosted several Web-based fashion events and live shows, including her own fashion program, *Make It Yours*. "I'm working on a YouTube channel to talk about style and techniques. It's a new way of marketing," she said. "There are so many new avenues available through technology, so many opportunities—there's nothing stopping you."

Follow Anya Ayoung Chee's fashion business at [www.anyaayoungchee.com](http://www.anyaayoungchee.com)

**BELOW** Anya Ayoung Chee with Anthony designing on the HP TouchSmart\* PC.

*"There are so many new avenues available through technology, so many opportunities—there's nothing stopping you."*

— Anya Ayoung Chee, model and fashion designer



# The Intel® Processor-based Phone

Insights from Philippe Gaglione

BY EDWARD J. CORREIA



ABOVE Philippe Gaglione.

RIGHT AND FAR RIGHT  
Motorola RAZR™ i.



There's a special dynamic at work when two great things combine. Like a world-class surfer on an ocean wave, a perfectly balanced synergy exists

between Intel and Motorola Mobility.

But that partnership is just the most recent development. Intel's Mobile and Communications Group (MCG) proved it was serious about entering the smartphone race in 2008 when it recruited 20-year wireless industry veteran Philippe Gaglione to take on the definition, integration, and testing of their system software. Gaglione inherited MCG's software organization and is now directing their overall software execution for Intel processor-based Android\* smartphone and tablet platforms.

When Mike Bell joined Intel in 2010, Gaglione and Bell wasted no time building a phone team. In about one year's time, they had a design based on the Intel™ Atom® processor Z2460, and has since earned phone wins with Lava (India), Lenovo (People's Republic of China), Motorola Mobility (Europe and Latin America), Orange (France and United Kingdom), ZTE (Europe), and Megaphone (Russia). With Intel's resources and process technology savvy, the single-core Intel Atom processor with Intel® Hyper-Threading Technology is just the beginning.

MCG's first choice of operating systems was Android, which runs well on the Intel Atom processor and for which Intel offers great software development tools, including the Intel® Hardware Accelerated Execution Manager, Intel® Graphics Performance Analyzers for Android, and Intel® VTune™ Analyzer. To get an inside look at MCG, *Intel® Software Adrenaline* magazine sat down with Gaglione to talk about the goals of MCG and how he has achieved them.

## Intel Software Adrenaline (ISA): Describe your current role at Intel.

**Philippe Gaglione:** I drive a large organization with a global footprint. We build solutions for mobile phones and tablets using various semiconductor vendors. Our emphasis is on developing the Android experience for all Intel® architecture solutions.

## ISA: It's amazing to see what your team has accomplished in just one year. How did success come so quickly?

**Gaglione:** We established a forward-thinking path that led us through the initial setup: define the process, hire the people, lay down the strategy, and get things going. During the past year-and-a-half, we accelerated and honed our focus on the Android operating system and created very competitive products.

The team's pace and development process have evolved tremendously. What began as, "We don't know what we need to do to get to where we want to be," is now, "We know exactly where we are and what we want to do." We made it happen.

## ISA: Did you have to break any rules to get there?

**Gaglione:** As a matter of fact, we had to build *everything*. My team built the software solution, and we completely changed the methodology and streamlined our development processes. Deciding to focus on only one target was extremely important, and it was initially quite difficult to implement a year ago. There were multiple targets, multiple products, and different operating systems being used. To complement our team, we brought in industry experts to help us achieve that single-target focus.

## ISA: What changes were made to the development process specifically to help you move more quickly?

**Gaglione:** We first decided to build the overall software solutions top-down as opposed to bottom-up. Instead of taking the route, "...we have an integrated circuit—a system on a chip (SoC)—and we need to put software on top of it," we approached the problem differently. To serve customers with certain expectations on device usage, we needed to define use cases and then find the best way to implement them in our solution.

## ISA: What were some of those use cases?

**Gaglione:** Obviously making a call [is one], but also browsing the Internet and using the camera. It's everything that people do with their phones throughout the day. We took a top-down approach to streamline the execution and created

the best experience—across both power and performance—associated with each of those experiences. You build the solution based on something the user will contemplate as opposed to building a solution that's simply a layer of software on top of an SoC. That was the revolution.

**ISA: Intel received some impressive design wins in a year and made carrier contracts throughout the world. Was the top-down approach to interface design a big selling point?**

**Gaglione:** Without this approach we wouldn't be in business. I wouldn't say that this has been the differentiator or is what made us successful, but this was a minimum requirement for success.

**ISA: This was necessary just to be in the game?**

**Gaglione:** When I took over the software organization, engineers were using multiple software builds. We streamlined that completely so there's now just one main line of software that everybody references across the organization. This was development methodology 101 for systems. However, Intel was not really building a system back then, it was focused on building SoCs. That was the big change we instituted: Intel is now building systems.

**ISA: Even though some Intel® architecture-based phones use an Intel-developed Android overlay, it seems that the main thrust of your work has been to enable apps and overlays of third-parties to run well on Intel architecture. Is that right?**

**Gaglione:** Yes, that is true. Some customers have their own application layer or customization that they put on top of Android. With other customers, however, we provide the overall solution. Our team built and optimized some additions to what the Android framework is proposing on top of the Android UI.

**ISA: Will developers targeting this platform have to worry about which overlay is on the device?**

**Gaglione:** Not at all. Our goal for the solutions is that all applications developed today can run on our platform. In today's Android market, when you find an application, it's likely to run well on our platform.

**ISA: While pitching Intel architecture-based smartphones to device makers and carriers, did you meet any resistance?**

**Gaglione:** Of course there were questions and lots of discussion. However, reviews on the RAZR™ i (the phone we built with Motorola) show better power numbers than the competitors' phones because we put forth a huge engineering effort and spent a lot of time in optimization to ensure our solution was solid. For many years—on both the SoC side and the software side—we spent an enormous amount of time developing this very competitive solution. The complexity was putting that solution into a phone, and then comparing our solution to competitors' phones using real measurements.

**ISA: Turning back to the RAZR i, how important was the Motorola design win for the overall success of the project?**

**Gaglione:** This is a very important relationship. Working with Motorola demonstrates that Intel can work together with solid phone OEM brands, develop innovative solutions, and contribute to their hardware and software to bring a competitive product to market. This is a positive message for both the industry and its customers. Motorola and Intel worked together to build a phone that is at least as good, if not better, than the rest—and in a record time to market. It is a very strong message to other OEMs.

**ISA: What are Intel's plans for a device in the United States and other markets?**

**Gaglione:** We initially focused our smartphone plans on a number of high-growth markets outside of the United States. Motorola is planning activities in other markets, and they're working on solutions for China. Most U.S. operators ask for LTE solutions, and we are hard at work on a solution. Our goal with LTE is to deliver a comprehensive low power, global modem solution that works across multiple bands, modes, and regions. After validation is finished, we will have multiple variants of LTE in the market in 2013, beginning with data, followed by multi-mode data and voice.

**ISA: What can you tell readers about what they might expect from Intel's Mobile and Communications Group this year?**

**Gaglione:** We've shown the industry that Intel is capable and has the right technology and the right people to compete in the mobile space. In early 2013, we want to show what's coming next, that we can do it better, and that we intend to become a strong player in that space.


**ISA: What are the main ideas that you'd like readers to take away from this article?**

**Gaglione:** The big change is that we're developing software solutions from a system perspective. To approach vertically integrated markets, such as phones or tablets, you must bring a system approach and implement solutions top-down, starting with use-case definitions. You must then integrate the use cases and test them. By deploying this approach, we can get products to market faster, focus on customer differentiation, and create an improved experience for consumers.

It is a new frontier for Intel, an SoC and silicon-centric company. We have moved to systems and are learning to master the method of putting those systems together. But I think we have caught up and we're now level with the competition. The next step is to become even more efficient in our software and system development processes.

Get the latest information on the RAZR i at: [newsroom.intel.com/docs/DOC-2993](http://newsroom.intel.com/docs/DOC-2993)





**MOTOROLA**

As Intel positions itself to compete in the smartphone market and battle with the iconic iPhone\*, it has been forging solid alliances. Perhaps none is more strategic than that with Motorola Mobility, the mobile arm of Google\*.

**ABOUT THE AUTHOR**

*Edward J. Correia has been a part of the computer industry since 1980, when he began selling (and occasionally hacking) computers from Atari and Commodore. In addition to writing for RH+MB, Correia currently serves as managing editor at the CRN Test Center, a computer and networking test lab that he helped establish in 1995. During a 10-year hiatus from CRN's parent company, United Business Media, Correia was editor of Software Test & Performance magazine and executive editor of SD Times.*

# From Outer Space to Your Space

Wind River and Intel power innovation everywhere you go

BY DOMINIC MILANO

Billions of connected devices—in cars and aircraft, consumer electronics, industrial process systems, medical devices, next-generation network technology, and beyond—are revolutionizing embedded and mobile computing. These intelligent systems give consumers and businesses the power to access information from nearly any device at any time, opening a world of incredible possibilities. Software developers need new techniques and technologies to manage their migration to these next-generation platforms. To that end, Intel (in 2009) demonstrated its commitment to aggressively expand outside its traditional footprint—into embedded and mobility markets—by acquiring Wind River, a leading provider

of embedded and mobile software. Now a wholly owned subsidiary of Intel, Wind River operates as part of Intel's Software and Services Group. Its mission is to deliver software and expertise that enable the rapid innovation and deployment of highly safe, secure, and reliable intelligent systems.

Wind River began as a consultancy 30 years ago. The company's founders saw a niche for systems that needed determinism and developed VxWorks\*, the first successful real-time operating system (RTOS), now the de facto standard in embedded development. Today, Wind River offers both proprietary and open-source standards-based development and runtime platforms, all optimized for Intel®

architecture, that make it possible to consolidate, integrate, and manage complexity while mitigating risk.

Together with Intel, Wind River supplies governments and businesses with the essential software and hardware building blocks that are driving innovation in computing that manages mission-critical systems on spacecraft, tele-robotic surgical systems, and commercial avionics, as well as in smartphones, in-vehicle infotainment (IVI) systems, cloud-connected wireless solutions, next-generation networks, and more.

"We have customers that do incredibly cool things and customers that do critically important things," said Jim Douglas, Wind River senior vice president. "For some, the cost of

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**ABOVE** Photo Credit:  
NASA, ESA, and the  
Hubble Heritage Team  
(STScI/AURA).



failure is measured not in lost data but in lost life or property. This imparts a deep sense of responsibility and urgency that makes Wind River's customer relationships unique." The fact that Wind River technology can be found in more than one billion devices on earth—and dozens in space—is a testament to the company's commitment to serving the needs of its customers.

### ADVANCES IN INTEL® PROCESSORS AND OPEN SOURCE FUEL EMBEDDED INNOVATION

It wasn't long ago that embedded devices were relatively simple—they

typically performed a single task and were powered by 8- and 16-bit microcontrollers with memory footprints that were measured in kilobytes. Developing software for them required highly efficient code that ran atop an RTOS such as Wind River VxWorks.

"In most cases, these devices weren't connected," Douglas said. "If they were, it was by proprietary means and the software controlling them was necessarily limited." Douglas attributes this to the available computing power of the time. "The silicon platforms—from an energy consumption and price standpoint—didn't allow you to run software that could drive more intelligence into the system."

## *Exploring Intelligence, Security, and Mobility*

Wind River teams, along with Intel, are studying the following key areas of interest with an eye on innovation:

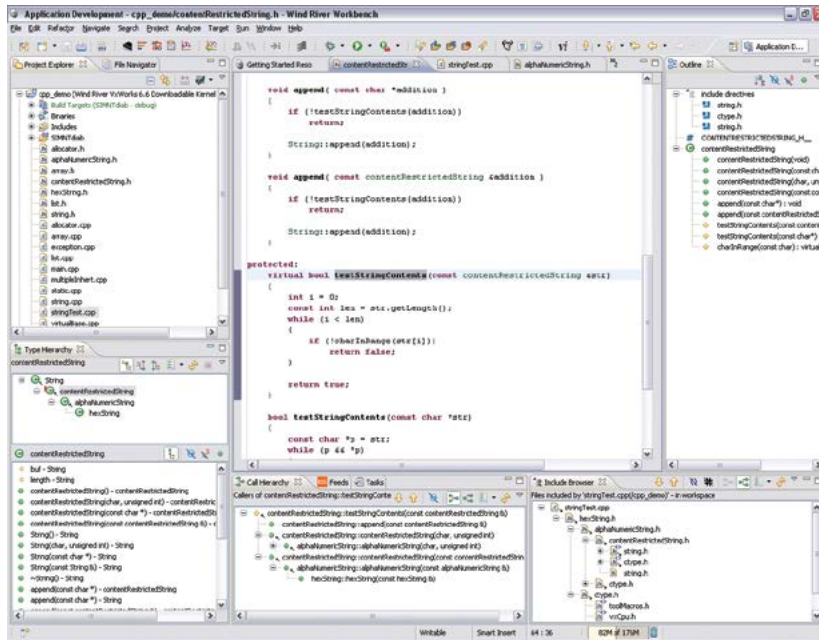
- **Intelligent networks.** Tasked with looking at current and next-generation network technology, serving the needs of network providers and software developers.
- **Intelligent devices.** Working to identify and define new classes of devices that are adding connectivity to the cloud and tying into more traditional embedded environments.
- **Safe-and-secure devices.** This team works on platforms for regulated environments such as industrial, defense, and transportation where certification and compliance are essential.
- **Mobility.** Although Wind River has had tremendous success serving the mobile market, the company is exploring with Intel the exciting new areas of mobility that go beyond traditional mobile devices to in-vehicle infotainment systems. Wind River and Intel envision mobility residing in the network nodes of the future, which could be anywhere or on anything that moves.

Windows						
DEBUG	i8254	pciEthernet0	pciIDEO	pciDE1	pciSAO	pciUnknown...
pciUSB0	pciSB1	pciVGA0	rtc	STAT_legacy	VGA_legacy	videobios_dev
Core 0						

vxWorks1	
com1	Hpet
pciEthernet1	tick
Core 2	

Wind River Hypervisor								
com1_sys	DEBUGv	Hpet_sys	i8254	pciEthernet...	pciEthernet...	pciIDEO_sys	pciDE1_sys	pciSAO_s
pciPCIO_sys	pciPC11_sys	pciPC12_sys	pciPC13_sys	pciUnknown...	pciUSBO_sys	pciUSB1_sys	pciVGA0_sys	rtc
	SATA_legac...	tick_sys	VGA_legacy...	videobios_d...	VirtualSwitc...			

Intel_Core i7								
Core 0				Core 2				
com1_dev	com2_dev	DEBUG_dev	Hpet_dev	i8254_dev	pciEthernet...	pciEthernet...	pciHostO_dev	pciIDEO_dev
pciDE1_dev	pciSAO_dev	pciPCIO_dev	pciPC11_dev	pciPC12_dev	pciPC13_dev	pciSerialO_d...	pciSMBus0_...	pciUnknown...
pciUnknown...	pciUSBO_dev	pciUSB1_dev	pciVGA0_dev	rtc_dev	SATA_legac...	tick_dev	VGA_legacy...	videobios_dev



## THE CONNECTED FUTURE

When that intelligence is combined with connectivity into the enterprise and into the cloud, incredible things are possible. “A perfect example is the connected car,” Douglas continued. “Today, IVI systems are able to connect to the cloud, allowing content—music, maps, movies, firmware updates, and so on—to be pushed to a car. The automotive industry wants to build an ecosystem that lets them create and monetize content.”

The same holds true for connected devices in the home. For example, cable and telephone companies, Internet service providers, and mobile operators are moving quickly to identify the connected devices that will enable them to deliver high-value, revenue-generating services. “Home gateways, tablet PCs, and hybrid devices such as the Intel-inspired Ultrabook™ device, IPTV set-top boxes, media phones, multi-function printers, cameras, smart meters, and monitoring systems will contribute to the growth in the digital living and consumer device market.”

In the manufacturing domain, “CTOs want to connect their factory processes with their supply chain and leverage business intelligence to optimize their

**ABOVE** Wind River Hypervisor is an embedded virtualization platform that facilitates next-generation, multi-core embedded device development.

In the past five years, open-source development models and the emergence of Linux\* with real-time attributes gave developers the ability to deploy small-footprint Embedded Linux, which lends itself to embedded Internet devices thanks to its microprocessor support and scalability. In addition, modern silicon such as multi-core Intel® Atom™ processors and the Intel® Core™

processor family opened a new world of possibilities. “We’re seeing greater intelligence—systems can perform more than a single task,” Douglas said. “In a lot of cases, they’re performing those tasks autonomously.”

## Securing the Connected World

**W**hen intelligent systems are connected to the enterprise or to the cloud, there is risk of security being compromised, which means you can no longer guarantee safe operation. “That sea change has enormous implications to our install base as it exists today, but when you consider all the new classes of connected devices that are expected in the future, the security challenges are huge,” said Jim Douglas, senior vice president of marketing at Wind River. “It’s a game changer.”

If you think about a car becoming just another network node, the need for security becomes even more pressing. In the short term, in-vehicle infotainment systems are the point of connection to the cloud and they are not linked with the control systems in the car. However, in the future there will be a push to consolidate systems in the vehicle to reduce size, weight, and power (SWaP). “We saw the same trend in military and civilian aircraft design,” Douglas explained. “Once you consolidate safety systems that are now separated (or federated) with systems that are connected to the cloud, they are suddenly vulnerable. Now a security intrusion doesn’t only mean potential loss of data, it means someone could potentially compromise critical safety systems. If the network node gets breached, people could be seriously injured.”

For software developers, guarding against these kinds of network breaches is essential. Wind River and Intel are working together to provide developers with the tools to create secure networks and to secure the embedded devices attached to those networks.

“Security is a function that must be addressed in multiple layers for each device,” Douglas said. “You have to consider the entirety of each device, any intermediate devices, the network, and the ecosystem around them. We’re constantly taking stock of our customer’s needs in every market we serve, looking at both current and future threats, and mapping out the most effective and efficient strategies for dealing with them.”

Douglas explained that some security measures are best implemented directly in silicon, while others can be left to software, either in the operating system or further up the solution stack. He explained that truly effective device security requires a defense-in-depth approach, creating a chain of trust consisting of multiple hardware and software security capabilities, and whose trust anchor is embedded in the hardware. Wind River runtime technologies include a wide range of security capabilities and technology.

Wind River works closely with Intel to develop embedded platforms equipped with virtualization hardware-assist and other features that safeguard devices from security threats. For example, 3rd generation Intel® Core™ processor architecture supports Intel® Trusted Execution Technology, which offers malware protection by validating component behavior at startup, and Intel® Virtualization Technology, which enables applications to run in secure partitions that prevent unintended software interactions. Combining these technologies creates a secure, virtualized platform that verifies the integrity of a virtual machine prior to launching an application.

entire operation,” Douglas added. “Within the next few years, the impact of connected devices will be felt in virtually every vertical market.”

Along with the incredible opportunities offered by connectivity come significant challenges. For example, factory-automation system builders need to get to market faster while creating devices that comply with strict safety codes. For car manufacturers, the challenge is matching the lightning-fast pace of development in the consumer electronics space while meeting regulatory requirements. As Douglas put it, “The key to survival is innovating faster, and the key to speeding the rate of innovation is integration.”

As founding members of the GENIVI\* Alliance, Wind River and Intel collaborated with other members to create a common software architecture platform that scales across current and future product lines. The open-source platform helps automakers deliver innovations at a faster pace, while enabling new business models such as connected services.

For factory-automation system makers, Wind River offers end-to-end development and runtime platforms based on open standards that make it

possible to consolidate, integrate, and manage complexity while mitigating risk.

### THE MULTI-CORE DEVICE REVOLUTION

Devices are getting more complex—phones double as cameras, MP3 players, game systems, movie players, GPS-based navigation systems, and email clients. Intel® multi-core processors are helping enable these capabilities. But while multi-core processors are ubiquitous in the IT and enterprise space, they’re new to embedded device developers. Key to growth of multi-core in embedded devices is the use of virtualization technology. “Virtualization lets you better leverage multi-core architectures to isolate critical safe and secure system partitions, and to build in necessary redundancy,” Douglas said. “Virtualization also helps extract the full performance potential of multi-core. But to get the most out of multi-core, in addition to virtualization technology, you need operating systems that can be configured in different ways, for example, SMP, AMP, and so on.”

Wind River Hypervisor lets developers tap directly into the virtualization technologies built into Intel architecture, and provides a virtualization layer that

*“We have customers that do incredibly cool things and customers that do critically important things. For some, the cost of failure is measured not in lost data but in lost life or property. This imparts a deep sense of responsibility and urgency that makes Wind River’s customer relationships unique.”*

**—Jim Douglas, Senior Vice President of Marketing, Wind River**

# Wind River Technology at a Glance

**Wind River VxWorks\***. A real-time operating system that powered dozens of NASA missions, including the Mars rover Curiosity, as well as Boeing's 787 Dreamliner, and much more.

**Wind River Linux\***. A commercial-grade Linux solution for embedded device development.

**Wind River Android Technologies**. A portfolio of software and testing products to support rapid and high-quality platform and application development and security for devices running the Android operating system.

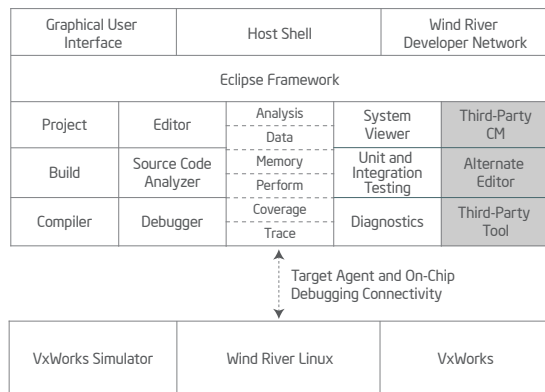
**Wind River Simics**. A high-performance simulation environment in which any electronic system—from a single board to complex, heterogeneous, multi-board, multi-processor, and multi-core systems—can be defined, developed, and deployed.

**Wind River Test Management**. A fully automated software-testing optimization framework that allows customers to identify high-risk areas of production code, prioritize quality assurance activities, and optimize engineering resources.

**Wind River Hypervisor**. A deterministic, event-driven Type 1 embedded virtualization solution developed with the demands of real-time and safety systems in mind. The hypervisor provides integration with Wind River Linux and VxWorks guests, and supports third-party unmodified operating systems. It also leverages virtualization technologies built into Intel® processors.

**Wind River Performance Studio**. Enables developers to tap the full power of their Intel® embedded platform of choice, including Intel platforms running the latest embedded Intel® Core™, Intel® Xeon®, or Intel® Atom™ processors.

**Wind River Workbench**. A collection of tools that accelerates time-to-market for developers building devices with VxWorks and Wind River Linux. It includes visual configuration and analysis tools that streamline design, development, debugging, testing, and management. (see graphic below).



**Wind River JTAG Workbench**. An on-chip debugging solution enables developers to quickly stabilize and optimize as well as assess the state of operating systems, device drivers, applications, and Unified Extensible Firmware Interface-compliant BIOS. Supports the latest platforms based on Intel Atom, Intel Core, and Intel Xeon processors.

**Wind River Middleware**. Technologies tested and integrated with Wind River operating systems that let developers take a modular approach to building fundamental technologies so they can better focus on adding differentiating features to their devices.

partitions a single or multi-core chip into multiple partitions with varying levels of protection and capabilities. The Hypervisor allows developers to consolidate by replacing multiple boards or CPUs with a single board or a single CPU. They can use multiple operating systems (such as a real-time operating system and a general-purpose operating system) cooperatively to provide innovative device functionality and adopt multi-core processors with improved scalability and reliability.

“You also need middleware optimized for multi-core and virtualization, such as a network stack that can take advantage of the offloading that multi-core provides,” Douglas said. “And finally, you need tools that allow debugging of the whole system simultaneously.”

## ENABLING STANDARDIZED CONNECTED-PLATFORM DEVELOPMENT

Future systems, such as the federated connected car, will benefit from Intel and Wind River efforts to standardize connected platform development. According to Douglas, virtualization will play a critical role. In other markets such as networking, Kernel-based Virtual Machine (KVM, an open-source component of Linux supported in Intel processors’ silicon through Intel® Virtualization Technology) will be key. “We’re working closely with the networking group at Intel on strategies for adding real-time capabilities to KVM, so it will map directly into the emerging market for network virtualization,” Douglas said. “Real-time requirements in networking will require virtualization that’s different and more robust than typically found in data centers.”

Such new developments also require new tools, because as Douglas explained, “Ultimately, people are custom building their operating environments for these kinds of devices, and they’re building applications on top of them.” Through close collaboration with Intel, Wind River provides a robust set of developer tools that span multiple parts of the product lifecycle.

For example, Wind River Performance Studio, which plugs into Wind River Workbench, an integrated development environment, provides tools for optimizing performance

on Intel architecture platforms and includes three powerful Intel software development tools:

- **Intel® C/C++ Compiler** boosts performance on Intel architectures.
- **Intel® Integrated Performance Primitives** provide platform-optimized algorithms, code samples, and APIs for high-bandwidth applications.
- **Intel® VTune™ Amplifier XE** delivers actionable analysis of code behavior and performance without having to instrument the source code.

All three tools are in a single-build system layer, allowing Wind River Linux users to easily install and use them. Integration with Wind River Workbench offers enhanced visibility into software at all stages of development.

Wind River offers software development platforms for an extensive range of industries and application purposes, including automotive, consumer electronics, networks, industrial devices, medical devices, and more. Each platform includes Wind River Workbench and a rich set of integrated runtime technologies, including extensive networking protocols, security, wireless, mobility, and graphics.

## LOOKING FORWARD

Intel and Wind River innovations are helping to reshape the face of computing. Intel, through its Wind River subsidiary, is committed to offering off-the-shelf solutions for embedded and mobile development that can be tailored to meet specific industry needs, helping save development time, reduce costs, and decrease risk, all while achieving the best possible performance on Intel architecture.

## ABOUT THE AUTHOR

*Before signing on as one of the writing muses for RH+M3, Dominic Milano spent many years in print, online, and event media production, working on DV magazine, Game Developer magazine and the Game Developer Conference, Keyboard magazine, Guitar Player magazine, and more.*





# Where the Action Is!

GoPro HD Cameras and CineForm Studio\* software on Intel® Core™ i7 processors redefine 3D moviemaking

BY **DOMINIC MILANO**

The GoPro HERO\* set a new standard in wearable, mountable HD cameras. Capable of producing professional quality still-shots and moving images, this tiny form-factor camera is light enough to mount on a helmet or strap on a wrist, and sturdy enough to suction-cup to the front of a speeding locomotive. Its fixed-focus lens and high-definition output makes it the choice of professional adrenaline junkies and action sports enthusiasts the world over.

The GoPro 3D HERO System builds on the original HERO concept, giving users the ability to mount two

HERO cameras side-by-side to shoot eye-popping stereo 3D footage. The included GoPro CineForm Studio\* software—optimized for the Intel® Core™ i7 processor—makes editing and sharing 3D footage a breeze.

## HIGH-IMPACT 3D SELF-FILMING

Pro Snowboarder Tim Humphreys is no stranger to GoPro cameras and GoPro CineForm Studio software. He's been self-filming his shredding since picking up a HERO in 2010. His first

GoPro footage, which you can watch at [www.youtube.com/watch?v=EaHswmKKW1w](http://www.youtube.com/watch?v=EaHswmKKW1w), is remarkable for a number of reasons: Throughout the run, Humphreys shot handheld, which gives the impression that he's

bolted onto the end of the camera, not the other way around; his skills as a snowboarder are jaw-dropping; and the edit, which is made up of straight cuts between forward- and backward-facing camera work, captures the spirit of the run perfectly.

Capturing the thrill of a moment and sharing it as quickly and easily as possible is what it's all about for Humphreys.

"Spending seconds instead of minutes on the video editing and production process gives me more time on my board and on the mountain," he said.

Shooting with a GoPro 3D HERO system gives Humphreys the ability to make high-impact 3D movies, and because HERO cameras are impossibly small, he can mount them to his helmet or snowboard, strap them on a glove, or wear them across his chest to get incredible point-of-view 3D footage.

## ACCELERATED EDITING, PLAYBACK, AND CONVERSION

Bringing two streams of 720p HD video into a computer and editing it, while



LEFT Editing in GoPro CineForm Studio.



Android\* on Intel® Architecture

Learn more  
[software.intel.com/android](http://software.intel.com/android)

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Booth 20124, South Hall 1

## 18 Years **ON THE AIR** at CES!

Once again broadcasting from CES, **Into Tomorrow with Dave Graveline**—now in its 18<sup>th</sup> year—is a three-hour radio program and online video reports called **ITTV (Into Tomorrow TV)**, **covering the latest in consumer electronics and technology** available today and into tomorrow. The show airs every weekend on 186 AM and FM radio stations around the United States, stations in Canada and several other sources including Mobile Broadcast Network, iTunes, BeOS Radio, Sprint Radio, TiVo, Stitcher, Podzilla and many others.

**Into Tomorrow** is also heard around the world on the Armed Forces Networks. In addition, they stream their audio and video via their website and provide free podcasts of show archives. If you have an iPhone®, iPod®, iPad® or any Android device, you can also listen to the stream via their **free app**, downloadable from the Apple App Store, Google Play Store, Amazon and the Intel AppUp® center for netbooks and notebooks.

 **into tomorrow**  
with Dave Graveline



[fb.com/IntoTomorrow](http://fb.com/IntoTomorrow)



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[MyITTV.com](http://MyITTV.com)



Covering Consumer Tech / [www.IntoTomorrow.com](http://www.IntoTomorrow.com)

getting smooth full frame-rate playback, requires a lot of processing muscle. GoPro cameras come with CineForm Studio, easy-to-use video editing software that can handle 2D and 3D footage. The software is compatible with Microsoft Windows\* and Mac OS\*, and CineForm recommends an Intel Core i7 processor to give it the power to tackle the processor-intensive demands of 3D footage.

Humphreys has used both Windows-based notebooks and a MacBook\* Pro, all equipped with Intel Core i7 processors to power CineForm Studio while he's still on the slopes. CineForm Studio in conjunction with the Intel Core i7 processor give Humphreys all he needs to work on his footage whenever and wherever he wants.

GoPro engineers tuned and optimized CineForm Studio for Intel Core i7 processors using the Intel® Media Software Development Kit (Intel® Media SDK), which let them tap into Intel® Quick Sync Video on-chip media processing and conversion. Intel Quick Sync Video greatly accelerates H.264 encoding and conversion, which means that Humphreys' 3D footage loads faster, converts to editing-friendly CineForm AVI or MOV files in a wink, and plays back smoothly during editing. "Intel Quick Sync Video offloads all the video transcoding with the GoPro software, freeing up my processor to do multiple tasks at once, allowing me to make better use of my time," Humphreys said.

Intel® Hyper-Threading Technology further boosts performance on Humphreys' computers by enabling each processor thread to handle a different task. This in turn lets CineForm Studio perform at its best, delivering faster transfer, load, and import speeds while other programs are running. "I can choose my settings and quickly convert the clips I want to work with," said Humphreys. "The GoPro CineForm Studio software lets you batch process everything with an intuitive step-by-step process."

GoPro CineForm Studio lets you make simple adjustments—such as trimming clips or creating slow-motion effects—or perform more advanced tasks such as color correction. It also gives you the ability to preview and monitor 3D clips on a 3D-enabled monitor or TV. If you want to dive into more advanced editing, CineForm Studio can export CineForm 422-format clips that can be imported

into more full-featured video-editing applications, such as Adobe Premiere Pro\*, Apple Final Cut Pro\*, Avid Media Composer\*, Sony Vegas\*, and more.

The Intel Core i7 processor with Intel Quick Sync Video also lets Humphreys quickly work with 3D images in the GoPro CineForm Studio software. "I have a wide range of 3D convergence settings to work with," Humphreys said, "And I have the option to choose from multiple types of 3D views for different viewing platforms. For me it's all about producing eye-popping 3D effects."

Watching Humphreys' GoPro footage, the stabilization is immediately evident—the movement is smooth, even though Humphreys is doing some crazy shredding, going airborne, spinning, and otherwise ripping up the slopes on his board, all while holding his HERO camera. Intel Quick Sync Video helped GoPro CineForm Studio enhance visual quality by capturing images at 60 frames-per-second, while eliminating camera shake. "The software gives me more frames to work with," Humphrey said. "I can slow it down to 30 frames-per-second, which allows me to capture all the action in a crisp, up-close and personal way. It makes my wildest ideas possible."

### **POWER TO SPARE, MORE TIME TO SHRED**

Nothing disrupts the creative flow like a dead battery in the middle of nowhere or on the slopes. "I spend a lot of time on the mountains where I can't recharge my notebook," Humphreys said. "I need a powerful notebook that has a long battery life." Luckily, his computers' Intel Core i7 processors take advantage of integrated Power Aware Interrupt Routing for increased power savings, resulting in lower idle power output that saves energy for more demanding applications—or for editing 3D video on a mountainside in the snow.

"I spend a lot of time chasing the snow, with an average day being at least a twelve-hour mission," Humphreys said. "Every minute I can shave off transcoding and rendering video in my timelines allows me to focus on my riding."

GoPro CineForm Studio gives him the ability to share completed video clips with friends, colleagues, and the world by exporting MP4/H.264 files that can be uploaded to social media sites

## *Tim Humphreys— Pro Snowboarder*

**A**fter turning pro in 2007, Tim Humphreys has finished in the top 10 of 13 international events, including three Winter X Games. For his best performance, he earned top honors in the Air & Style Games in Munich. At press time, he had just picked up a new GoPro HERO\* 3—the newest GoPro that's capable of shooting 120 frames per second 720p HD video as well as Ultra HD—4K-resolution HD video that was formerly the exclusive purview of digital cinema cameras such as the RED ONE\*, which costs 50 times more than a HERO 3.



*"Intel® Quick Sync Video offloads all the video transcoding with the GoPro software, freeing up my processor to do multiple tasks at once, allowing me to make better use of my time."*

— Tim Humphreys, pro snowboarder

such as YouTube and GoPro.com. And because the software takes advantage of media processing capabilities of Intel Quick Sync Video on Intel Core i7 processors, the export process takes seconds, giving Humphreys more time to do what he loves—hitting the slopes.

For details on CineForm Studio see: [gopro.com/3d-cineform-studio-how-it-works/](http://gopro.com/3d-cineform-studio-how-it-works/)

# Mobile Security: Seeking a Safe Harbor in the Dangerous Seas of the Mobile Web

*When the Web goes mobile,  
today's "digital omnivores" aren't  
the only ones with an appetite*

BY JOHN TYRRELL



Only a brave laggard would claim that the world of mobile communication isn't undergoing a paradigm shift. While marketers and researchers

are rushing to stay abreast of how consumers are using portable Internet-enabled devices to perform a growing range of tasks, large global communities of developers and users are already driving and living these changes every day. The convenience of a widely available broadband Internet connection combined with powerful portable devices has led to explosions in both the quantity and variety of online activities consumers engage in using their mobile phones, tablets, and laptops.

Digital research company comScore has branded this current generation of technology consumers "digital omnivores," those who leap effortlessly between devices to satiate their endless appetite for the fruits of the Internet. Ultrabook™ devices are taking powerful PC performance mobile in a big way. And the meteoric rise of tablet and smartphone penetration in global markets from the United States and Mexico to South America and Africa is bringing previously unconnected markets into the Internet ecosystem in huge numbers. According to Tata Communications, Africa has added a colossal 316 million new mobile phone subscribers since 2000, a trend which, along with a blossoming mobile broadband infrastructure, is contributing to an explosion of Internet connectivity in the region. Meanwhile, smartphone penetration exceeded 50 percent of the total U.S. mobile market for the first time in 2012.

Consumers are using an ever wider variety of hardware, with single activities being performed across multiple devices. In August 2012, a Google study<sup>1</sup> found that 90 percent of consumers are using multiple screens sequentially during browsing, with 67 percent doing so for shopping. Consumers are embracing seamless cross-platform e-commerce and other secure activities at a level that has

never been seen before. According to comScore, as of June 2011, 16 percent (nearly 37 million) of all U.S. mobile phone users were accessing online financial services, including banking and credit card services, using their smartphones. The use of mobile devices by U.S. consumers for online shopping grew by 87 percent from 2010 to 2011, reaching 28.5 million people, a trend that shows no sign of abating.

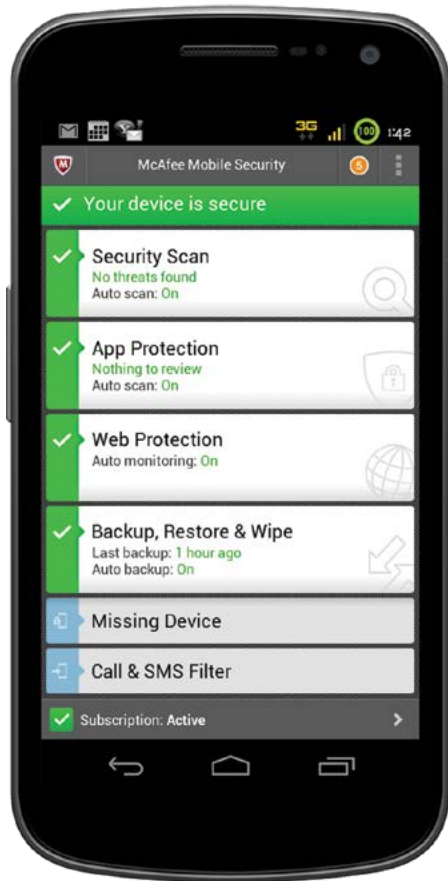
## PRECAUTIONARY SECURITY

But behind the big numbers and bold buzzwords, something else is going on that merits the attention of every mobile Internet user and which the security experts at McAfee are deeply concerned about. So far, the dark underbelly of illegal Internet activity—ID theft, phishing, hacking, and other nefarious deeds—has been primarily associated with the more classic face of computing: desktop PCs and laptops. However, times are changing. Only a few years ago the under-the-hood processing power and capabilities of the average mobile phone could just about manage to send a multimedia message. Today, for the majority of those using mainly apps and browsers, there's almost no noticeable performance difference between a current generation smartphone, tablet, or Ultrabook device and many considerably bulkier laptops and desktops, plus there is often even greater connectivity. This is leading to the use of portable devices for increasingly complex—and private—tasks, which in turn puts them in the cross-hairs for criminals.

"When people think about their smartphone, they think of it more as a phone than as a fully capable computer with four ways of accessing that device wirelessly," said Gary Davis, vice president of Global Consumer Marketing at McAfee. "The reality is that those devices are equally at risk, if not more at risk, because of the way people use them."

The inherent dangers in using multiple devices to perform activities such as banking and e-commerce are obvious, and yet often ignored. Each additional device into which a user has entered credit card or password

<sup>1</sup>The New Multi-screen World: Understanding Cross-Platform Consumer Behavior (August 2012)



*“When people think about their smartphone, they think of it more as a phone than as a fully capable computer with four ways of accessing that device wirelessly. The reality is that those devices are equally at risk, if not more at risk, because of the way you use them.”*

— Gary Davis, Vice President,  
Global Consumer Marketing, McAfee

information increases the danger of that information being stolen or misused by hackers or criminals. However, while most PC and laptop users don't think twice about ensuring their systems are equipped with anti-virus and malware protection at the very least, taking the same precautions is not yet universal when it comes to mobile devices.

Recent research<sup>2</sup> by the National Cyber Security Alliance and McAfee found that two-thirds of U.S. smartphone owners have never installed any kind of security software onto their phones. Paradoxically, users are demonstrating clear awareness of the security risks involved when connecting on the move, with almost two-thirds deciding not to download apps because of concerns relating to identity theft, privacy, data collection, and the reputation of the service provider. So while there is awareness of security issues, a disconnect exists between that and how users are actually securing their devices.

Despite their wariness, consumers generally feel that mobile devices are safer, a point of view for which there is valid justification. The current security threat level on mobile devices is nowhere near that for PCs, but that could be changing soon. “Today, hackers are spending a lot of their time going into devices, not because they're necessarily less secure but because there's more of them out there. It's the law of large numbers. Hackers tend to go where the volumes are.” And with emerging markets and growing penetration comes increasing volume, dangling ever more tempting carrots in front of the world's high-tech criminal elements.

## **DANGEROUSLY SOPHISTICATED**

As with any field of development, it takes time for malware and virus programmers to master their platform. “Right now we're still early in the development of malware targeting mobile devices so most

are quite rudimentary, but I think we'll see the level of sophistication increase,” said Davis. “They're going to get better at building and distributing malware, resulting in more sophisticated and more targeted attacks on mobile devices.”

A good example of how hackers have updated their tactics to take advantage of smartphone users is the recent story of a 20-year old programmer apprehended in northern France. He created a seemingly bona fide smartphone app that automatically sent text messages to a premium number he had created himself. Using this method he was able to collect small sums from an estimated 17,000 individuals, amassing approximately half a million euros in a little over a year. With literally hundreds of new apps released onto the world's app stores every day, it can be difficult for consumers to determine the difference between legitimate and malicious apps.

This is where anti-malware software, such as McAfee's cross-platform All Access\* security offering, can help, scanning the behavior of apps to notify users when they are about to do something that might be harmful and handing them back control.

“We have a capability called App Scanning,” explained Davis. “We know apps with malicious intent display certain characteristics. For example if you have a flashlight application, it doesn't need permission to look at your voice records, call logs, or location data. So if the app is looking for permissions that a flashlight app shouldn't have, App Scanning would notify the user when he downloads the app so that he may want to reconsider.”

In addition to the dangers presented by intentionally malicious apps, in October 2012, researchers at Leibniz University of Hanover and the computer science department at the Philipps University of Marburg tested the security of 13,500 of the most popular apps available on Google's play store and discovered serious vulnerabilities in eight percent of them.<sup>3</sup> They found that these

<sup>2</sup>The National Cyber Security Alliance conducted a study with McAfee to analyze the cyber security behaviors and perceptions of Americans. The study was conducted by JZ Analytics, which surveyed 1,000 adults nationwide from August 31, 2012 to September 3, 2012.

1,074 apps were exposed to “man-in-the-middle” attacks, allowing hackers to capture user data, including login details for anything from online banking and email to social media, and even making it possible to remotely remove apps, including a security application. The researchers also carried out a survey of 754 users and found that around half were unable to correctly judge the security of a browser session on their mobile device.

## FAST EDUCATION

Encouraging consumers to secure their devices and to develop awareness of safe usage is a large task, but the work has already begun. “Education is one of the things we’re working on with Intel,” said Davis. The hope is that the process can be well underway before the scale of the opportunity becomes so irresistible to hackers that the ticking time bomb of mobile security explodes.

“I think we’re headed for a wakeup call where there’s going to be a massive outbreak,” said Davis. “We saw this in the early days of computer viruses, where it takes a big outbreak that dramatically affects lots of users before consumers use proper safeguards. I would like to think that we can get ahead of that through education and ensure that people have the right security controls on devices, but I think it’s going to take a severe event for that reality to take hold.”

McAfee and Intel are doing their best to head off any such potential disaster with a broad-ranging communication campaign. “We’re working with industry media such as CNET, *PC Magazine*, and *PC World* to help people understand some of the risks associated with protecting devices other than PCs,” said Davis. “We’re also working with Intel on a consumer education awareness program, reaching out to bloggers and other social media, so it’s a multi-touch program. We’re trying to use every possible method to get the word out.”

Close relationships with other industry partners in the value chain are also vital to ensure the message reaches users. “We are working with the manufacturers who build the devices (such as Samsung, DELL, and Lenovo), those that make Ultrabook devices, and those that build the handsets,” said Davis. “We have to make sure that we’re engaging and having a dialogue. We also have to work with the carriers, those that provide devices to consumers. We’ve taken a multi-pronged approach, and we’re working with every provider in the mobile chain.”

## SECURITY EVOLVED

Another positive factor that will influence consumer perception of mobile security is the evolution of the Ultrabook device market. With the new generation of systems that blur the lines between powerful, highly portable laptops and tablet hybrids, it’s possible that good security habits will follow users from the land of traditional laptops into these smaller, portable form factors.

Pursuing hardware-based security measures is another key weapon in the two companies’ security arsenal. “Continuing to explore ways that we can use hardware to assist in the security function or, better yet, accelerate the security function, is going to be an important part of Intel’s and McAfee’s work,” said Davis. “The more we can rely on silicon to do some of the heavy lifting for security attributes, the better it’s going to be for users. For example, having products like anti-theft in Ultrabook devices provides a level of protection that I think is unrivalled in the industry.”

Ultimately, Intel and McAfee are focused on evolving their security offering to adapt to the changes in how consumers use connected devices, concentrating on the cross-platform experience rather than specific devices. “We need to transition from protecting what devices you *use* to protecting what you *do*,” said Davis. “I bank, I socialize, I network, I e-mail, I do all these things online. We need to work out what we can do to ensure that we’re providing the optimal level of protection that allows you to do those things in a safe way.”



<sup>3</sup>[www2.dcsec.uni-hannover.de/files/android/p50-fahl.pdf](http://www2.dcsec.uni-hannover.de/files/android/p50-fahl.pdf) and [www.bbc.co.uk/news/technology-20025973](http://www.bbc.co.uk/news/technology-20025973)



# Powering Creative, Social, and Emotional Experiences with Intel® Technology

The Creators Project pairs artists with Intel Labs researchers to design the interactive installation #CreatorsLive

BY JULIA  
KAGANSKIY

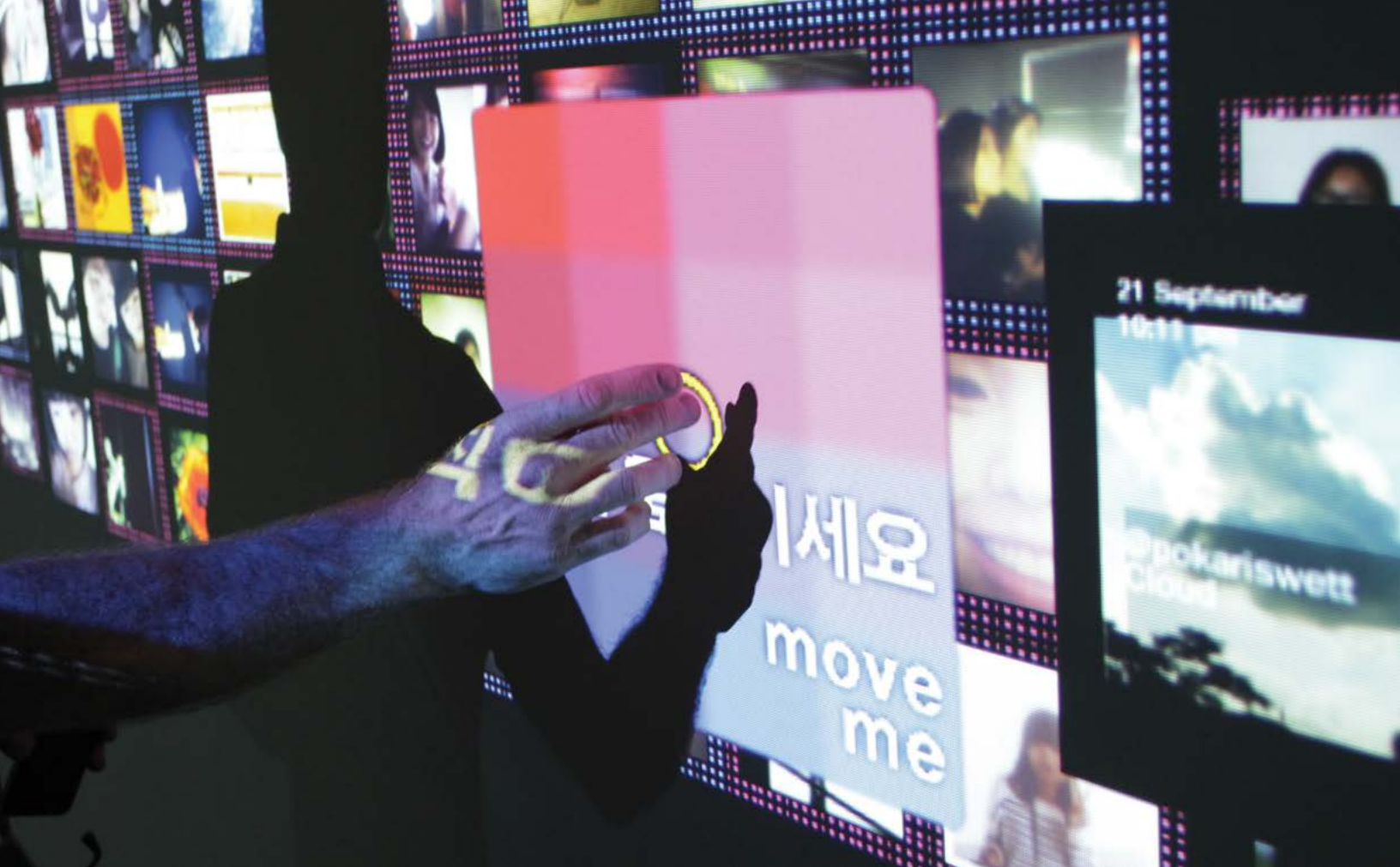
Typically, the researchers and engineers working at Intel's many lab facilities are thinking about the future of computer interfaces, how to design a more powerful processor chip, or how to simplify human-computer interaction. They're

analyzing the current technological landscape and anticipating the future needs of consumers and businesses alike, imagining solutions to problems as yet unforeseen. But rarely, if ever, are they making art based on their research.

Yet that's exactly what Doug Carmean, Intel Fellow and director of the Efficient Computing Lab at Intel Labs, has been doing for the past year.

Through a partnership facilitated by The Creators Project—Intel and Vice's global arts initiative—Carmean has been collaborating with Social Print Studios on an art installation that has been traveling the world as part of The Creators Project's cultural event series, visiting Beijing, Paris, San Francisco, São Paulo, and Seoul. The project, called #CreatorsLive, aggregates real-time





*“At Intel Labs we strive to reinvent the experiences people have with technology. We do this by studying people’s lifestyles—current use of technology, their aspirations and challenges—and creating new capabilities and interfaces that we expect will be transformative.”*

—Margaret Morris, Senior Researcher, Intel Labs

**ABOVE LEFT** Photograph by Pierre Emanuel Rastoin.

**ABOVE RIGHT** Photograph by After1201  
([www.after1201.com/art\\_main.html](http://www.after1201.com/art_main.html))

Instagram\* photos from the events and allows visitors to interact with them in two gesture-based ways. On a plain wall that was turned into a touch-sensitive surface, they used a Microsoft Kinect\* to track visitors’ movements through the installation space, and they shuffled the photo display based on users’ motions and gestures.

The result is a beautiful, intuitive, highly social installation that artfully integrates research exploring visual computing experiences and the continuous flow of geo-located social photos, which Carmean and his team at Intel Labs have been conducting for the past several years. #CreatorsLive made its debut at The Creators Project: San Francisco event at Fort Mason in March 2012 where it was experienced by thousands of visitors who were delighted to see their Instagram snapshots, tagged with the hashtag #Creators, become instantaneously integrated into an artwork in the main exhibition hall.

Since its debut, #CreatorsLive has continued to evolve, fueled by new

minds and new research from Intel Labs. In April 2012, Margaret Morris, a senior researcher with Intel Labs, joined the team. Morris, a clinical psychologist who studies emerging technologies and influences future product directions, saw an opportunity for the installation to promote interpersonal connectedness by adding an emotional layer.

“We wanted to get beyond thumbs up/thumbs down exchanges to emotionally rich dialogue and play,” explained Morris. “The emotional layer that we developed has a closed loop of emotional classification via sentiment analysis and self-expression. We capture the feelings people have when taking and posting photos and invite people to express how photos make them feel as they are viewing them in the installation.”

The emotional layer helps paint a picture of the collective mood and emotional experience of each respective stop on The Creators Project global tour. Morris and Carmean plan to continue developing the project further in 2013 by experimenting with the use of text,

color, and sound, as well as creating an online component that will live on TheCreatorsProject.com to complement the physical installation.

Doug Carmean and Margaret Morris took a break from their work to offer insights on “enlivening” technology during this recent interview.

**Intel® Software Adrenaline (ISA): What has it been like for you, as an engineer, to collaborate with artists on #CreatorsLive?**

**Doug Carmean:** It has been truly inspirational, providing philosophical direction for research and products that will influence Intel's future. This experience has pulled me well outside of the box, beyond my comfort zone and inspired me to think differently.

The specific project with Social Print Studios has turned out to be a nearly perfect marriage. Ben Lotan from Social Print Studios has a Masters in Fine Arts, and has a nice perspective for aesthetic and art quality. He's not as encumbered by technical details or by the way engineers typically approach development problems. Likewise, my team had the formal training in hardware and software development. We come from doing everything from building processors that are shipped to hundreds of millions of units to developing video games. We've got this really formal background of doing

product development, but not so much in artistic installations. Together we saw our complementary strengths and how we could bring those together. It was like a super complementary, highly-motivated collaboration, with Social Print providing good inspiration for the art side and my team with this strong technical foundation, wanting to collaborate and make it something useful.

**ISA: What were your design goals with #CreatorsLive?**

**Margaret Morris:** To break down the boundaries between people and computing and to “enliven” technology. We want to engage people while they are using the installation and to capture the collective vibe of the different Creators events over the world.

**ISA: What design challenges and opportunities did you encounter along the way? How did you address them?**

**Morris:** A key feature of this system is its ability to transform any surface into an interactive surface. The surfaces we used at Creators events were typically concrete walls in large warehouses. In many cases, the walls were neither flat, nor completely smooth, making interactivity challenging. To create a large interactive surface we used projectors and multiple depth cameras, specifically the Microsoft Kinect. Our

algorithms allowed the depth cameras to be positioned at any orientation without interference.

**ISA: Did you encounter any surprising design opportunities along the way? How did you address these when they presented themselves?**

**Morris:** This has been a process of constant design iteration. Early on we realized that we needed to integrate the technology with the applications people already love, such as Instagram. We've altered the interface over time based on how people were using it and pushing its limits. For example, we noticed people peeking behind the scenes at the computers that drove the installation, especially in Beijing, and so we decided to make this information (such as the infrared images of people approaching the projection) part of the installation. This made the installation more alive and more interactive. People like to see themselves in the art, as it is forming.

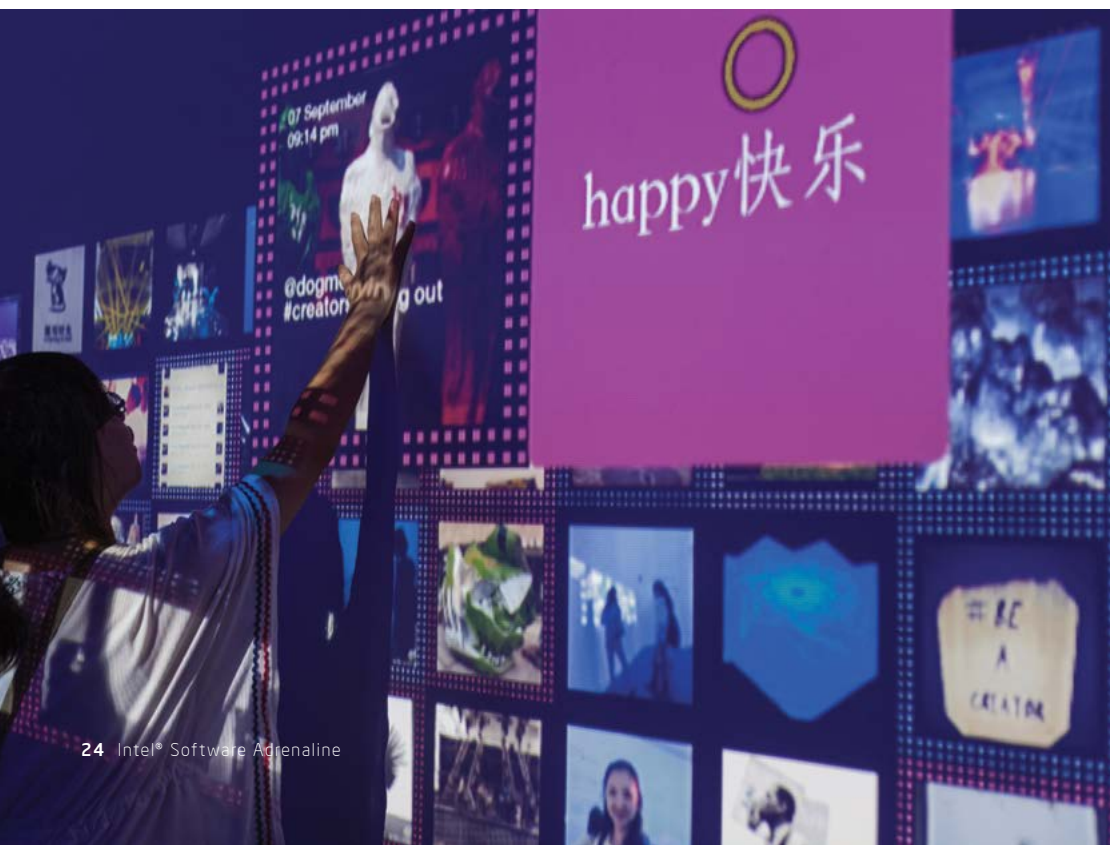
**ISA: How does this project integrate or build on research that you're doing in Intel Labs?**

**Morris:** At Intel Labs we strive to reinvent technology and the experiences people have with technology. We do this by studying people's lifestyles—current use of technology, their aspirations, and challenges—and by creating new capabilities and interfaces that we expect will be transformative. In my research, I explore how emerging technologies can promote emotional expression and connection. #Creators Live has shown us a variety of ways that people express themselves, relate to others, and participate in art. By sharing their own images and responding to other images in the installation, a huge number of people became creators, shaping the recording of these events.

**ISA: How did adding the emotional component alter the user experience? What new design challenges did this present?**

**Morris:** The collection of photos in #CreatorsLive now embodies the emotional experience of Creators events around the world. Participants have been extremely creative in how they use these tools to represent mixed feelings and complicated situations, to visualize

**BELOW** Photograph by Zhuang yan.



emotional associations among photos, and to represent themselves as part of the social experience.

One of the major design challenges is creating an intuitive, playful interface for emotional expression. We want to invite emotional expression without using instruction. We are using a spatial model of emotion, and exploring color, text, and music as ways of representing emotional states in this model. So far it seems that most people, even young kids, seem to get into this mode of self-expression. We've been collaborating closely with visual artists as well as composer Mira Calix, who developed Sacred Heart for the Creators' San Francisco event. The ability to express emotional responses to photos with sound as well as color has made the installation far more intuitive and engaging.

Our next steps include bringing this capture of collective emotional events online and using these emotional responses to help people discover new art and people. We are working with The Creators Project on these and a variety of other exciting directions.

**ISA: What do you think engineers have to gain from collaborating with artists?**

**Carmean:** The artists get engineers to think differently as they approach the world from a creative perspective that is largely absent of technical constraints. They force us to think of design in a simplified, natural way.

Every time we do an interface, I have a tendency from my technical background to include buttons, menus, drop-downs, words, and instructions. I think the way [artists approach design] is based on the notion that you should be able to do this without any instructions or words. If you look at what we attempted to do with #Creators Live, the only thing we put on the display was just the #Creators, and the words "Instagram" and "Twitter," and from that, it was amazing. We had thousands of people pick up on what that was all about.

**ISA: How important is this exchange between artists and engineers?**

**Carmean:** I think it's super important because it's rethinking the way technology gets integrated into our lives and culture in general. Computer architects and engineers tend to



think about computers and devices as supercomputers that are organized in very specific ways. The integration of the artist into the mix makes it so that computers and devices fit well culturally, have an aesthetic that's pleasing, and have an entertainment value. I think that is socially rewarding, because using a computer is an experience people enjoy. My mother and my wife enjoy using computers that we build. From a business point of view, it makes sense because now we're opening up these areas where technology previously wasn't relevant—the arts, for example. We can have an impact culturally, and pull that back to something that is good for the business as well. It's incredibly important because it has a high social benefit as well as a tremendous business opportunity. It's exciting for those prospects.

**ISA: Do you feel like you pushed the "edge" of computing?**

**Morris:** Yes, we pushed social computing to be truly social and affective computing to stretch from emotional recognition to emotional expression. We saw people using the installation to express themselves with

an emotional complexity that isn't possible in today's devices and social media platforms.

**ISA: What are the implications for other developers trying to do the same thing?**

**Morris:** Developers need to integrate artists into their design teams very early in the design process. The artists will influence all aspects of development, from obvious design tradeoffs to the essential approach. The process needs to be agile with rapid iterations that allow artists to inject ideas at many points.

**ABOUT THE AUTHOR**

*Julia Kaganskiy is global editor at The Creators Project, an arts and technology initiative founded by Intel and Vice. The Creators Project supports visionary artists across multiple disciplines who are using technology to push the boundaries of creative expression and features an international event series, a web documentary series, an arts production studio, and an editorial hub on TheCreatorsProject.com.*

**ABOVE** Photograph by Jason Hernandez.

# Perceptual Computing and the Future of UI

## *Designing for intuitive human-computer interaction . . . naturally*

The availability of touch devices and simple communications protocols are shifting the way we interact with our computing devices. At the same time, the introduction of faster hardware running at lower power levels is improving and easing the interface hurdles of modern computing tasks. Perceptual computing—the next big wave of technology—is about to hit, bringing with it the promise of very engaging computing experiences. The Intel® Perceptual Computing Software Development Kit (SDK) and Intel's work with Nuance and other companies are helping to turn this promise into a reality.

Reaching beyond the use of a touch-enabled screen, mouse, and keyboard, perceptual computing steps into the sensory world of voice commands, gesture control, and facial recognition where, for example, computers can understand our voices—not only from a set of specific commands—but also through our tone and phraseology. It also means 3D-object recognition, and hand and finger tracking at close range. The technologies that enable such interpretation will transform the human-computer interaction.

### ENGINEERING CHALLENGES FOR A NEW WORLD

Today, most users communicate with their computers using the familiar keyboard and mouse, which offer a direct and recognizable collection of input for computers and present simple data points for the software environment to evaluate. When a user presses a key or clicks a mouse button, little about those actions can be misconstrued or misinterpreted. However, these actions limit users to a single interface.

Developers are now working to make computers as cognitive about their surroundings as we are (or at least as aware as we should be) so they can process much of the information around them and arrive at a logical conclusion based on a user's intent. Extracting information from the environment will include data points



BY RYAN SHROUT

such as the directionality of the voice (for example, is the user talking to the computer or to a friend nearby?), the ambient background noise, facial recognition for automatic user selection (and security), 3D maps of the environment for object and gesture recognition, and more.

To reach that goal, many important engineering tasks must be addressed, starting with the integration of new and improved sensors on PCs, Ultrabook™ devices, tablets, and smartphones. Cameras that can evaluate depth, microphones that understand directional audio, and touchpads with pressure sensitivity need to be standardized, miniaturized, and implemented across the ecosystem. For perceptual computing to take a firm hold, devices must be equipped with the next level of intelligence and capabilities.

Advances in environment awareness are becoming enabled by higher performance computing platforms, including the 3rd generation Intel® Core™ processor family found in Ultrabook devices. Intel engineers have developed improved process technology and CPUs that can maintain a real-time connection with different communication interfaces and can provide a high level of user experience. Although many hardware challenges

PCs any time soon. Perceptual computing aims instead to create new modalities that redefine computing interactions.

## THE INTEL® PERCEPTUAL COMPUTING SDK

In October 2012 Intel introduced a comprehensive SDK that focuses on several aspects of perceptual computing, including facial recognition, voice commands, and gestures. The SDK, which includes manuals, code samples, algorithms, example applications, and tutorials, helps developers integrate perceptual computing interfaces in as simple a way as possible. Intel has always been a proponent of improved software development; in this case, they found that a combination of sensor technology and hardware computing capability created the perfect opportunity to promote perceptual computing.

The Intel Perceptual Computing SDK supports several of the most popular human-to-computer communication modalities and focuses on those that interact with a user in the 6-inch to 3-foot range of the device. While the SDK will work with many platforms, it targets Ultrabook devices, clamshell notebooks, and tablets with the use of embedded microphones and add-on gesture

Computing SDK supports a wide range of interaction types and will facilitate other software developers' many integration methods. Close-range tracking of fingers will allow developers to define usages based on a person's hand for augmented reality (grasping an object in 3D space) or for recognizing static and dynamic hand signals. Object tracking will allow developers to combine images from the camera in real-time with depth data so that "markerless" real-world objects can be used in virtual experiences. (See the "Now See This" article on augmented reality in this magazine.)

To handle face recognition and analysis, the SDK includes seven-point landmark detection and "attribution" detection including smiles, blinks, and even a user's age. Finally, the SDK's speech-recognition capabilities permit voice command and controls, as well as dictation and text-to-speech analysis.

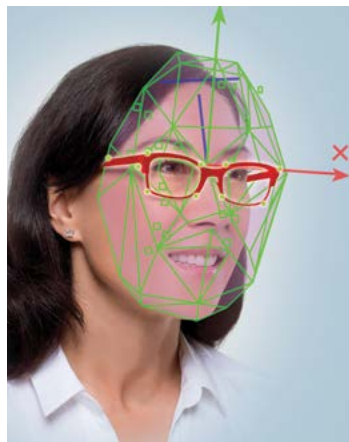
Anil Nanduri, director of products and solutions in the Perceptual Computing Group at Intel, sees the company's development and support of the Intel Perceptual Computing SDK pushing the industry forward. "We are about driving the natural user-interaction computing capabilities and working with the ecosystem for continued advancement. We believe the SDK will drive the ecosystem in helping bring up new human-computer interface experiences."

The SDK is unique and is the first to address and combine several perceptual computing technologies, the result of Intel's collaboration with other industry leaders. Total Immersion built the computer-vision tools, Nuance provided the speech and voice components, and SoftKinetic developed the depth-tracking component. Intel combined these tools into the SDK and linked them in such a way that developers can use them easily and use them simultaneously when their applications require it. The SDK additionally includes a program for putting Creative Interactive Gesture\* cameras into the hands of developers.

The gaming industry was an early adopter of motion tracking and gesture control. Today, the SDK helps PC developers learn how to use and integrate these new interface technologies in a simple and straightforward way. Developers will be able to develop applications in the

*"We believe the SDK will drive the ecosystem in helping bring up new human-computer interface experiences."*

— Anil Nanduri, Director of Products and Solutions in the Intel Perceptual Computing Group



remain—including how to address enormous data sets and further miniaturize sensors—Moore's Law and Intel will continue to unlock the power of perceptual computing.

Perceptual computing is not about changing and remapping current interfaces, so don't expect the keyboard and mouse to vanish from the world of

recognizing cameras. (Systems with high-quality microphones and webcams with depth perception will soon be universally adopted; however, they're not yet at the miniaturized level required for small device implementation.)

Combining the efforts of Intel's internal software teams and the work of industry leaders, the Intel Perceptual

world of education, business, 3D modeling, 3D printing, and more.

For more information on the SDK, please visit: [intel.com/software/perceptual](http://intel.com/software/perceptual)

## NUANCE DRAGON ASSISTANT\*: A CASE STUDY IN PERCEPTUAL COMPUTING

Voice-control technology is one aspect of perceptual computing that is already experiencing significant progress. Nuance, famous for its Dragon Naturally Speaking voice-recognition software, helped guide and facilitate implementation of the SDK in the speech and voice capacities for Dragon Assistant. Nuance Dragon Assistant software will integrate with Ultrabook devices to enable voice commands spanning several applications, including Media Player\*, Facebook\*, Twitter\*, and Web browsers. This early implementation allows users to speak a command to the computer. For example, after a user says, "Search Amazon for lawn chairs," the Web browser opens, locates the Amazon.com site, and searches on the phrase "lawn chairs." Sharing that result or a specific URL with Facebook friends or Twitter followers is also a simple phrase away: "Share this page on Facebook."

Peter Mahoney, chief marketing officer at Nuance, explained to *Intel® Software Adrenaline* that, "Voice recognition is an extremely complex task—you must handle many different things, from audio, to voice models, to integrating with apps. We tried to make the tasks available at fairly high-level chunks to help make the developer's job of integration easier." With more power available, Nuance has greatly improved both the speed and accuracy of voice recognition by using multiple cores for better efficiency. That efficiency is becoming more important for Nuance and the Intel Perceptual Computing SDK as users increasingly expect longer battery life from their mobile devices.

As part of the SDK, Nuance's technology will be made available to developers. They can use it to add and expand on the number of voice-controlled applications on Microsoft Windows\* and Intel® platforms. Software developers can pass nearly all of the audio processing and handling

to the development platform, providing Nuance an audio file and getting a basic text file result of the recognized terms. The application can then parse the result, using it in several ways. The goal is to make the use of voice-control technology simple and intuitive for developers to use.

As both Nuance's technology and the Intel Perceptual Computing SDK evolve, expect voice recognition to expand and become more refined, too. The next big push will come in the form of natural-language processing and its requirement for more processing horsepower and much larger, cloud-based databases. Natural-language analysis will allow computers to not only understand commands but also to understand a speaker's intent, an intensely more complex problem. Instead of being restricted to specific commands, natural language will allow users to, for example, say, "I need to find a new lawn chair," and then see a search result in their favorite shopping application.

## MULTI-MODAL INTERACTION AND THE FUTURE OF PERCEPTUAL COMPUTING

The modalities of voice, facial recognition, and gesture are important. But the true power and potential for perceptual computing reside in the ability to combine these interfaces and sensors, and to increase the amount of data accessible to the computer (from the user); and to increase the amount of information the computer can receive at one time. Imagine a computer that can "see" if you are looking away from the screen while talking to determine whether it should interpret your voice as a command or as ambient noise.

A natural interface will allow an understanding of true intent, which can be acted upon in a fluid manner. Many visionaries believe that extensive perceptual computing is an attainable goal in the near future, and the Intel Perceptual Computing SDK will help developers push forward toward that goal. Much like the way touch technology on mobile devices quickly gained momentum, wide-scale multi-modal perceptual computing is likely to be available soon. The ecosystem has evolved rapidly over the last 10 years,

## Innovation and Perceptual Computing Contest

Intel created a USD 1 million innovation contest to feature the best examples of what's possible with the Intel® Perceptual Computing Software Development Kit. This contest invites developers to be wildly creative with human-computer interaction designs. The ecosystem has many creative ideas for new interface technologies, and Intel is hoping to channel them into a public forum of collaboration. As with any new computing technology, Intel is looking for the handful of applications that will pop out of the screen, impress new consumers, and draw them into the scaling benefits of perceptual computing. To learn more about the contest, see: [www.intel.com/software/perceptual](http://www.intel.com/software/perceptual)

thanks to a surge of tools and computing power, dubbed by Nanduri as, "an innovation hockey stick."

Intel's support and creation of the Intel Perceptual Computing SDK shows a dedication to the expansion of computing technology. Because Intel, and companies such as Nuance, Total Immersion, and SoftKinect, created the SDK to be powerful and easy to use, application developers in all areas of expertise will be able to integrate and experiment with voice and gesture technology.

The combination of voice, facial recognition, and gesture will truly revolutionize the human-computer interface and help remove many of the computing boundaries today. Users of all skill types and knowledge levels will be able to effectively and efficiently interact with their devices to extract information and transparently get the results they want. The power and potential of perceptual computing are now beginning to take hold. In the coming years, watch for exciting developments that will transform the way we interact and use our computers and mobile devices.

### ABOUT THE AUTHOR

A contributing writer, roving reporter, podcast host, and blogger for the popular technology site *PC Perspective*, Ryan Shroud researches and writes product reviews for today's leading-edge hardware and software products. When he's not tracking down the pending changes to the various CPU and compute architectures, Ryan is on tap to assist the RH+M3 group when the need for a hardcore computer-geek writer arises.



# *Game Developers Get in Touch with Ultrabook™ Devices*

BY JOHN GAUDIOSI

**T**he PC gaming space is rapidly evolving. With an influx of new free-to-play gaming experiences attracting more mainstream gaming audiences and crowd-funding sites such as Kickstarter, new opportunities are opening up for game developers. The PC has never been a hotter game system. And Intel-inspired Ultrabook™ devices are leading the way in delivering powerful and portable processing power.

According to GBI Research,<sup>1</sup> Ultrabook device sales are set to explode in the next five years, making up 47 percent of annual notebook sales by 2016. According to the firm's latest research, 1.3 million Ultrabook devices

<sup>1</sup>[www.gbiresearch.com/Report.aspx?ID=Ultrabooks-Market-to-2016-Financial-and-Technological-Support-from-Intel-Corporation-Coupled-with-Demand-from-Business-Users-Segment-Will-Drive-Growth&companyID=jpr](http://www.gbiresearch.com/Report.aspx?ID=Ultrabooks-Market-to-2016-Financial-and-Technological-Support-from-Intel-Corporation-Coupled-with-Demand-from-Business-Users-Segment-Will-Drive-Growth&companyID=jpr)



*“A lot of gamers have multiple PCs and devices. If they want the best experience, they’ll go for a desktop PC with high-end processor and a big monitor. But if they want to travel and play mobile, the Ultrabook™ device is really one of the best approaches to mobile game playing.”*

— Cedric Le Dressay, Co-founder, Eugen Systems

were sold last year, but thanks to technological advances and a drop in component prices, this number is expected to reach 148.7 million by 2016, at a compound annual growth rate of 109 percent.

That’s good news for game developers, who are already taking advantage of the latest technology built into these lightweight, portable gaming machines. Game studios such as iRacing, Firaxis Games, and Eugen Systems are already creating new

iterations of key franchises to take advantage of the new capabilities that the Ultrabook device introduces to interactivity, including touch-screen.

“The touch controllers in the Ultrabook reference design were light years ahead of any touch screens we could find on the market,” said Steve Myers, executive vice president and executive producer at iRacing. “Intel enabled us to take full advantage of the touch interface without compromising for the sake of hardware that is not Microsoft Windows\* 8 ready.”

“Touch-enabled screens let game developers connect better with users in a more direct way,” said Marc Meyer, user-interface lead of *Civilization V\*<sup>®</sup>: Gods & Kings* at Firaxis Games. “By changing how you scroll the map in *Civilization V*, dragging the world around in-screen becomes very visceral for the user. We’re always looking for opportunities to help gamers connect with the game, and we get more of these opportunities with touch.”



Cedric Le Dressay, co-founder of Eugen Systems, has also seen the multi-touch functionality of the Ultrabook device impact the real-time strategy (RTS) game genre. The developer of *Wargame\*: European Escalation* explained that multi-touch helps improve the user interface. He believes multi-touch will ultimately open up the creativity of many game makers, resulting in games that are easier to interact with and ultimately more fun to play.

With new Ultrabook devices featuring this touch functionality now flooding the market, Intel is working closely with key developers to ensure that gamers have the most immersive experience possible when exploring these virtual worlds. iRacing, Firaxis Games, and Eugen Systems in particular have spent months of development time working in collaboration with Intel to bring touch to new iterations of the TBS game expansion *Civilization V: Gods & Kings*, the ultra-realistic racing simulation *iRacing.com*, and the Cold War RTS *Wargame: European Escalation*.

## IRACING: FEEL THE SPEED

iRacing was founded in 2004 with the goal of creating an exceptionally realistic online racing simulation service that racers and race fans alike could join and enjoy on their home PCs. The iRacing founders entered the market with a long history in the racing simulation space. Co-founder Dave Kaemmer was also the co-founder of Papyrus Design Group,

which made racing simulations for almost 20 years, including the bestselling *NASCAR Racing\** PC games and *Grand Prix Legends\**. Today, races are happening 24/7 in over 100 countries with a robust subscriber base of racing enthusiasts.

The members of the core development team at iRacing all worked at Papyrus, which has built up a decade-plus development rhythm with its 40 employees. In addition, many studio members have raced in the real world, which can only help heighten the virtual experience that gamers can engage in through the online games. That's also likely a reason that many of NASCAR's top drivers, including Dale Earnhardt, Jr.; Tony Stewart; and Travis Pastrana, spend some of their free time playing the game (see [www.iracing.com/testimonials](http://www.iracing.com/testimonials)).

"Having developers interested in auto racing has been a big advantage to our development cycle," said Myers. "When you are passionate about something, you naturally put the extra effort into what you are doing so it is done right. In this space, we have a unique development model; we have four targeted release dates per year in which we plan major service and software updates. This focuses our development team on 12-week windows to get features and updates ready to deploy to our members. Certain projects can take longer than 12 weeks to develop, but we try to strike a balance on short- and long-term projects spread among the developers so we have compelling releases every three months."

While racing is an international sport, it's divided among different audiences and countries. For example, NASCAR has a huge North American fan base, but the international customer base is more interested in Formula 1 (F1). Because international customers wanted to race an authentic F1 car, iRacing partnered with the Williams F1 Team and signed Interlagos (Brazil), Spa (Belgium), Silverstone (UK), and Montreal (Canada) F1 tracks. American gamers will be able to race on every NASCAR Cup track by 2013 (iRacing is currently building the final two virtual tracks). The game maker is also incrementally launching a new team mode that will allow customers to link up, where one is driving the car and the other is serving as the live spotter. Subscribers will soon be able to race in the legendary Lotus 49 F1 car and take to additional tracks such as Oran Park in Australia.

Just like the finely tuned vehicles on real race tracks, racing simulations rely on fast processing power to realistically replicate that experience and to allow virtual drivers to live vicariously through the game. Myers said the Intel® HD Graphics engine allows the team to provide desktop performance on an ultra-light platform. The new low-latency touch sensor technology removes the barrier to touch-enabled driving. He said Intel has worked closely with the studio to help optimize its application and validate it on a broad range of Intel® hardware. Intel also has provided detailed support for their touch hardware interface. While Myers used Intel power throughout the development of this touch functionality, he said the biggest benefit was having access to the Intel-inspired Ultrabook device reference hardware. Without that, he said this project would never have gotten off the ground.

"Any user with a touch-enabled device can enjoy the iRacing experience without any additional investment in hardware," said Myers. "Touch also provides an intuitive interface to our simulation, without forcing the users to familiarize themselves with new hardware. Touch easily replaces the traditional steering wheel and pedal set and allows you to rapidly make pit stop adjustments to your car without reaching for the keyboard."



The new touch experience for iRacing is just the beginning of how new technology will add to the realism of the simulation. In the future, Myers believes gamers will be able to manipulate their world merely by touching objects and applying gestures to them. Of course, the challenge is designing a small subset of actions that represent the core of what the game is about, without overwhelming the user with a myriad of touch gestures and interfaces. Tilt sensor technology would be a natural second step in this process. This would allow players to steer a car simply by rotating their laptop or tablet device as if holding a steering wheel. Integrated facial-tracking cameras would also open up a new dimension, allowing players to check out their world simply by moving their head. Additionally, secondary displays built into the track-pad or keyboard would allow developers to provide even more information back to the users.

“Tilt and touch reduce the barriers to entry,” said Myers, “both by reducing the need for additional hardware, and by simplifying the interfaces so that new customers don’t have as much to learn in order to enjoy the simulation. In addition, they both provide a fun alternative to a more traditional control interface. Younger generations who are growing up in a touch-enabled world will also find themselves at home more quickly in iRacing.”

## FIRAXIS: PLAYING GOD

Firaxis Games was founded by Sid Meier back in 1996 with the mission statement to “build games that stand the test of time.” The studio has made many TBS and RTS games over the years, including *Alpha Centauri\**, *Pirates!\**, *Gettysburg\**, *Railroads!\**, and *SimGolf\**. But the developers are best known for what has become one of the longest-running and bestselling TBS franchises in the world today—*Civilization*. Now owned by 2K Games, the studio most recently released *Civilization V: Gods & Kings* to PC gamers. The expansion pack was designed from the ground up to take full advantage of the latest Ultrabook technology, including touch.

While a larger team worked on the base game and expansion pack across all platforms, a smaller team of four

*“Any user with a touch-enabled device can enjoy the iRacing experience without any additional investment in hardware. Touch also provides an intuitive interface to our simulation, without forcing the users to familiarize themselves with a lot of new hardware. Touch easily replaces the traditional steering wheel and pedal set and allows you to rapidly make pit stop adjustments to your car without reaching for the keyboard.”*

— Steve Myers, Executive Vice President and Executive Producer, iRacing

engineers worked on the touch project. The expansion pack introduces nine new civilizations, each ruled by a new leader; nine new wonders; three original scenarios involving religion in the medieval period, the fall of Rome, and a Victorian steampunk story; and dozens of new units, buildings, technologies, and resources. Religion plays a big role; players can use missionaries or Great Prophets to spread custom religions. Naval battles are divided into two choices: melee and ranged attacks, which changes up the strategy involved in global domination. There’s also an enhanced diplomacy and espionage level of gameplay, which kicks into high gear during the Renaissance with clandestine operations. And two new city-state types, Mercantile and Religious, have been incorporated into the expanded quest system to further the narrative of the game.

“Every advance in technology expands the possibilities within the market. This in turn enables us to execute on new and unique ideas which were not previously possible,” said Tim Kipp, systems lead on *Civilization V* at Firaxis. “The Ultrabook is giving us a strong unified platform full of new potential that is allowing us to explore technical and gameplay experiences we would otherwise not have considered.”

Marc Meyer, user-interface lead on *Civilization V* at Firaxis, believes the increase in power-per-watt is extremely important because it allows more detailed graphics to grace the screen. The team worked with tools such as the Intel® Threading Building Blocks as its job scheduler system, Intel® VTune™ Amplifier, and Intel® Graphics Performance Analyzers to help increase the game’s speed from 7 frames-per-second (fps) to 27 fps. In addition, as more input options are opened up through the Ultrabook device, developers have more options to change the interaction the user has with the gameplay. Meyer added that touch lets gamers immediately interact with onscreen characters without the need to lug around a gaming mouse.

During the development process, as Firaxis worked closely with Intel engineers, they knew they were on to something great in QA. Testers who played the Ultrabook device touch version of the game preferred it to all other versions of the game. Touch also made *Civilization V* an even better travel game because of the intuitive gameplay interaction. The Ultrabook device also brings the TBS genre, which is typically a more hardcore game, to a more mainstream audience that can play the touch version on the sofa or on a plane.



*“The more features Intel can give us, the more creative we can be with these games. Having sensor technology built into the environment opens things up creatively. Having that breadth of capabilities loosens the constraints on the designer, and you can work on implementing new capabilities like voice recognition, multi-touch, and utilizing the accelerometer.”*

—Tim Kipp, System Lead on *Civilization V*, Firaxis Games

“Working with Intel was like having an offsite team,” said Kipp. “The Intel engineers were easy to work with, and Intel was very open about providing the information we needed. Intel had a driver team onsite to help us get through the optimization passes. We couldn’t have done this game without their help. The great thing about this process was that we optimized the game for all platforms, not just Ultrabook devices, so all users ultimately benefited from our development on the Ultrabook. It’s now directly integrated into our process moving forward.”

Firaxis was also able to benefit from other advances in Intel® technology. Meyer said the difference between

integrated graphics five years ago versus where things are today is amazing. This evolution of new technology goes hand-in-hand with increased customer expectations. Meyer said people who own an Ultrabook device expect a game platform with the latest integrated chips, as well as the power of solid-state drives (SSDs), to help deliver on this promise.

“Touch changes the way you scroll the map; dragging the world around on the screen becomes very visceral for the user,” said Kipp. “The more features Intel can give us, the more creative we can be with these games. Having sensor technology built into the environment opens things up creatively. Having that breadth of capabilities loosens the

constraints on the designer, and you can work on implementing new capabilities such as voice recognition, multi-touch, and utilizing the accelerometer.”

“*Civilization V* is a very information-heavy game, and we rely on tool-tips to convey a lot of information to the user,” added Meyer. “The challenge was finding a way to keep tool-tips working while still providing the drag features people expect from a touch interface. We began by running through all of the possibilities, trying different input mechanisms and learning how they each felt. In the end, we found that the two-finger drag worked the best. We then found a big win with the three-finger Escape-key shortcut and the tear-off unit movement... that’s when things started coming together.”

## EUGEN SYSTEMS: MAKING THE COLD WAR HOT

Eugen Systems was founded by brothers Alexis and Cedric Le Dressay in 1998, specializing in strategy from the start. A team of 50 has spent the past few years creating *Wargame: European Escalation*, which launched in February 2012. The team uses an improved version of the R.U.S.E. IRISZOOM\* engine, which it developed a few years ago for the Ubisoft strategy game. With this technology, gamers can explore the real-time strategy (RTS) with huge maps up to 150 square kilometers in size. Within these maps, up to 100 million scenery objects can be displayed, breathing life into a realistic playing field on which to relive the Cold War. Gameplay allows players to zoom in and out, in an instant, going from a large commander’s view to an on-the-ground view in the thick of the battle. Players can also lock a camera onto any one of the 361 ground-based historical units in the game using the Track Cam, which offers a unique perspective in the midst of combat.

*Wargame* allows players to take control of Warsaw Pact members (Czechoslovakia, East Germany, France, NATO countries, Poland, Soviet Union, United Kingdom, United States, and West Germany). Cedric Le Dressay said that his team worked closely with Intel to enhance the experience for players engaged in battle on Ultrabook devices.

"To render strategy units and zoom in and out, having the ability to teleport what you see every second requires a lot of optimization," said Le Dressay. "We've been working on our own engine since 1998, and that's why we have such a strong technology background. Our players want to feel like they're in charge of a battlefield as a commander and they're asking for more realism. They want larger, more realistic maps. They want military forces that look like what we see in movies. To satisfy these expectations, we worked with Intel to bring the best gaming experience possible to Ultrabook devices."

When Eugen was developing *R.U.S.E.* for the PC, Xbox\* 360, and PlayStation\* 3, Le Dressay knew that multi-core programming was the key to success. The team has been improving its engine to best take advantage of the Intel® multi-core processors that are hitting the market with the Ultrabook and other devices.

"We've been working closely with Intel engineers to improve performance on *Wargame*," said Le Dressay. "We've been able to improve the game on Intel® HD Graphics and across all platforms. The game is now running faster six months after release than it did at launch. We're very happy with our collaboration with Intel because it has improved the user experience."

Eugen has spent the past few months working with Intel to optimize *Wargame* for Ultrabook devices, using the latest touch-screen enabled capabilities. The studio actually began working on multi-touch two years ago, when the technology was limited by two cameras. With the introduction of touch to the mainstream through sensor technology on Ultrabook devices, Le Dressay believes the time is right to enhance gameplay experiences with quicker RTS interactions that incorporate multiple-finger simultaneous controls.

"Today's touch technology enhances the gameplay experience by allowing players to live the dream of being a battlefield commander," said Le Dressay. "A lot of gamers have multiple PCs and devices. If they want the best experience, they'll go for a desktop PC with a high-end processor and a large monitor. But if they want to travel and play mobile, the Ultrabook device is really one of the best approaches to mobile game playing. The Ultrabook has a great processor, which



helps developers create a great user experience, leading to excellent games. The graphical chipset has more power when compared to that of previous generations; and when coupled with touch, RTS game controls are literally at your fingertips."

## SUMMARY

The work being done by these three game studios presents a sampling of what's happening behind the scenes to ensure that the Ultrabook device gaming platform delivers unique experiences not possible on other platforms. While touch is a key focal point in this new generation of specially-optimized games, this sensor technology is only a small part of what will be possible in high-powered mobile gaming moving forward. These games give consumers, especially gamers, another reason to invest in an Ultrabook device.

## ABOUT THE AUTHOR

*John Gaudiosi has been covering video games for nearly 20 years for media outlets such as The Washington Post, CNET, Wired magazine, and CBS.com. He has focused on the convergence of entertainment and video games for various publications, including Video Business, Home Media magazine, The Hollywood Reporter and Variety. He currently serves as editor-in-chief of Gamerlive.tv and is a freelance game columnist for Reuters and RH+M3, in addition to writing for print and online publications, such as GamePro magazine, Official PlayStation magazine, Entertainment Weekly, DasGamer.com, AOL Games, and FaceoffGames.com.*

# Touch Technology Rocks the Computing Continuum

Look to the future to make today's killer app

BY GARRET  
ROMAINE

There's no "chicken and egg" dilemma in technology—the rule has always been for hardware to come first, then watch as software engineers connect the dots. That paradigm is on full display with touch-enabled Ultrabook™ devices hitting the shelves in ever-increasing numbers. App developers around the globe are rushing to optimize their products for the rich sensor technology now available in all shapes and flavors.

Two products show vividly how Intel's latest PC form factor is attracting the

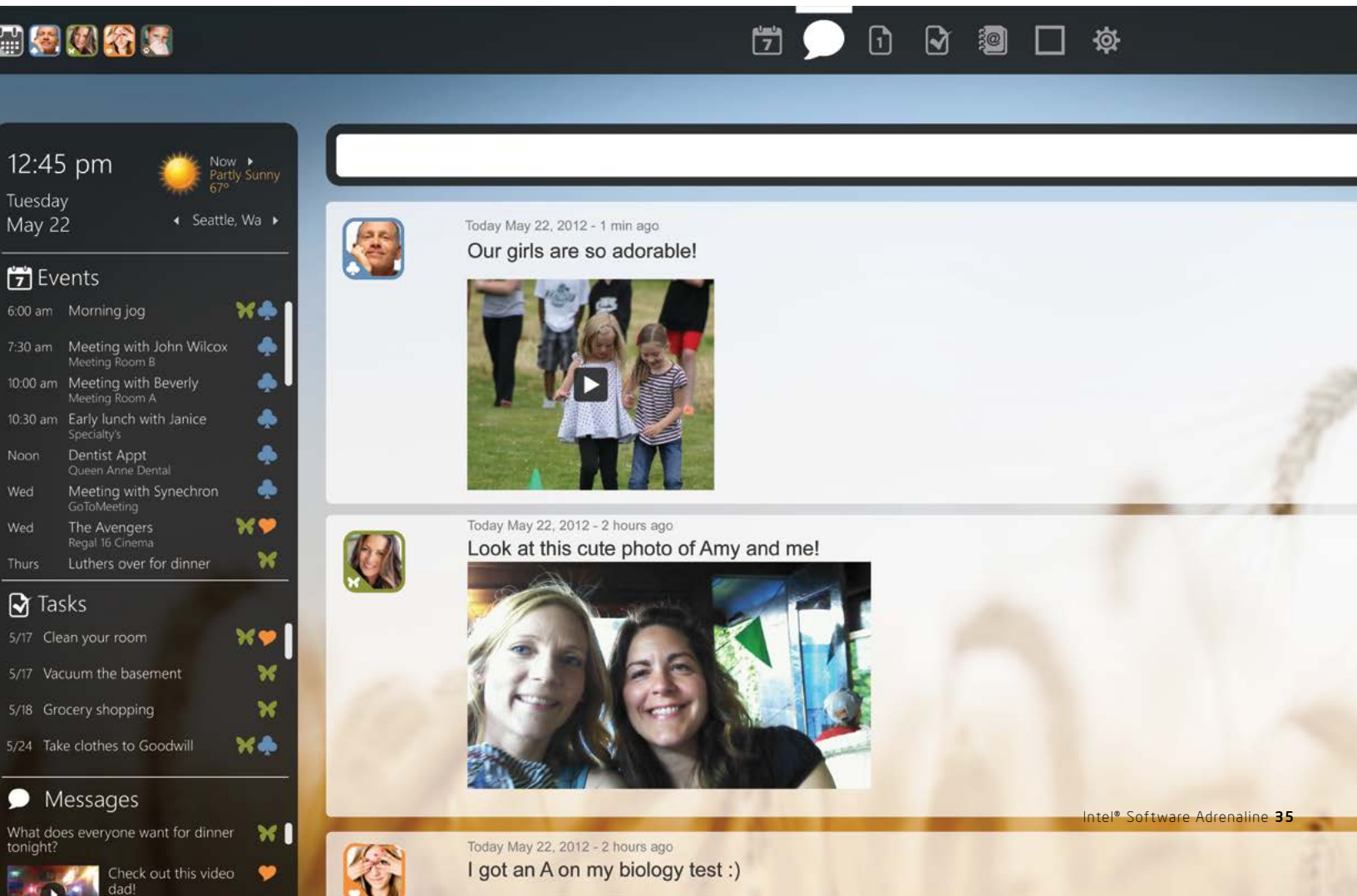
best minds from across the spectrum of software programming:

- Nest\* is a family productivity tool that gives parents and children the ability to synch calendars, share lists, and develop a family message board that everyone can access remotely.
- Krita\* is an open-source drawing and painting app that will soon have touch capability to make it even easier to use.

Together, these two products provide a glimpse into the growing effort to create

touch-based apps that are easy to use and enjoy, regardless of the form factor they're found on. They demonstrate how developers can take their products in new and exciting directions by adapting to the rapidly-changing PC environment.

Touch-screen-enabled Ultrabook devices and the new All-in-One devices are adding richness and depth to the entire compute continuum, and both Nest and Krita are shining examples of just how revolutionary these new technologies could become.



## NEST: THE NEW FAMILY BULLETIN BOARD

Nest is a touch-enabled application for busy families that helps simplify and enhance daily life. Sitting at the hub of family interactions, Nest enables activities such as grocery shopping and list syncing on the go, coordination of calendars and activities while traveling, and remote video messaging into the family message board. It's perfect for a new All-in-One PC set up in the kitchen as an old-fashioned whiteboard on steroids, or for a tablet or Ultrabook device in the home or on the go.

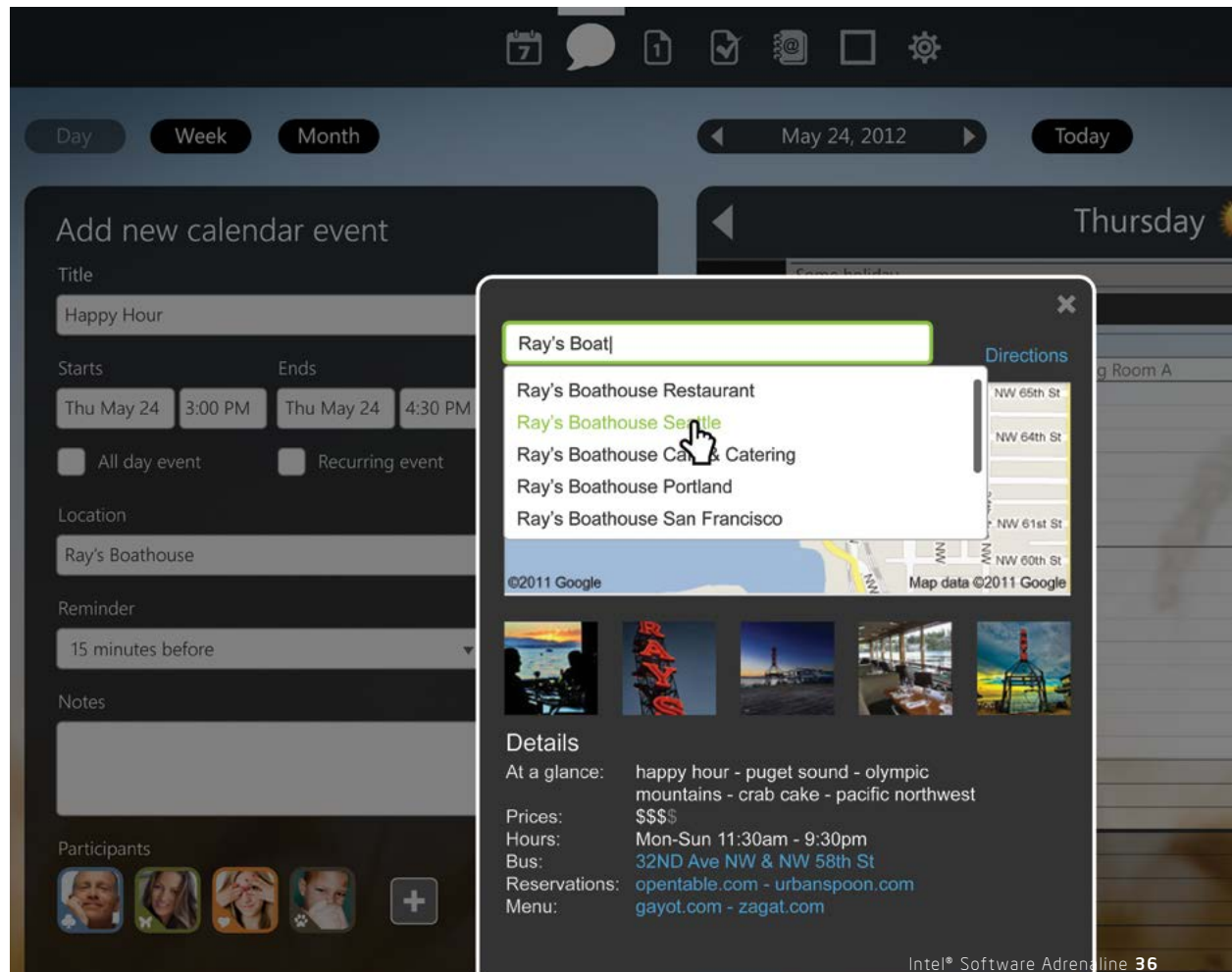
Jonathan Rosoff is the CEO and co-founder of Current, which is the developer of the Nest Organizer. He has over 20 years of experience with digital marketing at companies such as Digitas

and Razorfish, while his co-founder, Steve McPherson, is an expert in cloud computing and big data. Together they have a solid background in both front-end conceiving, design, and prototype development that enable elegant user experiences, and in the back-end systems, data, and analytics that enable scalable services and capabilities such as contextual recommendations for families. The team had long talked about product ideas and kept coming back to family collaboration and activity planning.

"I have school-age kids, and most of my friends are in the same stage of life. Like us, they run around trying to coordinate their families' schedules, meet up with friends, and stay in touch with the people that matter most to them. So this has long been an area we wanted to explore. We wanted to make a family

collaboration platform for today's busy families. When the All-in-One team came to us and asked for software that took advantage of embedded sensors and high-definition screens, we were excited. The idea of a family collaboration tool on the All-in-One that made lives better was a great combination and the perfect starting point to showcase broader, mobile scenarios."

The All-in-One design has been popular with consumers because it has its own unique place and functionality—especially with a touch-enabled screen. Rosoff said his team of developers and Intel colleagues were instantly enthusiastic about the way the device could bring families together and help keep them more connected. "There's been a tremendous amount of buzz on our team. People immediately



took a look at possible use cases and experiences, and they loved it. We got lots of enthusiastic feedback, such as ‘It feels like the kitchen calendar, but with more functionality and the ability to access it from anywhere.’”

When it comes to assistance, Rosoff pointed to starter code, white papers, and SDKs in the Intel® Developer Zone. “It’s a great resource, and it’s easy to find key topics,” he said. He believes that the entire app development process has gotten better, from top to bottom. His team also worked with Intel in areas where they needed to package Nest for the Windows\* desktop environment and make it ready for the Intel AppUp® center. “We’re very pleased with our Intel relationship,” Rosoff said, mentioning responsive engineers, eager to assist with SDKs, and ready to help integrate Nest into various Intel® platforms. “It has been a great collaboration to date, and we look forward to working with them in the future,” he said.

Nest is built in HTML5 for extensibility to multiple platforms and devices, so it can seamlessly integrate calendaring, list management, messaging, and more. Rosoff said that there was initially a steep learning curve to scale the team on such an ambitious HTML5 development effort, but now it’s paying off, especially with better code re-use. “We’re able to work seamlessly across platforms now,” he said. “Our initial

build was done in HTML5 and Sencha Touch\*, which gave us elegant touch controls and styling without having to interact with the Windows touch framework.” This meant that learning and integrating touch controls didn’t require much special training. One challenge came in trying to make sure Nest was user-friendly in a hybrid world of touch and non-touch (mouse and keyboard) devices.

“We initially built Nest in Sencha Touch, which works great in a pure touch-enabled environment,” Rosoff said. “As we learned from our AiO experience and moved to a world of Ultrabooks and other form factors where there are hybrid use models, it became more challenging to use the framework. Most people like touch, but when inputting a lot of text, tabbing through fields, or scrolling through calendar dates, we found that they were more comfortable with the traditional mouse and keyboard interface. So we switched from Sencha Touch to Ext js, and we’re now modifying some of the Ext js controls to enhance touch capabilities. Users can still tab and scroll using a mouse, but we have a great experience for touch users, too.”

Rosoff’s team has an extensive background in user-centric design. They strive to create a compelling user experience, and they test frequently in the design process. In the early stages, they relied on old-school paper-and-

pencil prototyping. They began by measuring an All-in-One device with a 24-inch screen, duplicating it on a whiteboard, and placing paper cutouts and sticky notes onto the design to zero in on something that people really liked. “Our first prototype was a piece of paper,” Rosoff confirmed. “From there, we moved to wireframes and design comps, and we tested those with people. We’re very iterative, and we created multiple working prototypes. As people walked through our designs, they gave us great feedback. We also used contextual interviews and focus groups to hone our design throughout the development process.” The result has been extremely positive—users say the interface feels natural and logical.

“We see a world where Nest is a virtual hub of family activity,” Rosoff said. “Some of it may happen around an All-in-One computer in the kitchen. Some of it may happen using an Ultrabook device in the family room, and some of it may happen remotely by cell phone or tablet. Tomorrow it might be an Intel-powered refrigerator glass unit or a very thin slate that hangs on the wall. Whatever the device, Nest is poised to become a central point where everyone coordinates and works on chores, lists, and appointments. We see great value in having Nest accessible across the compute continuum.”

Even more interesting ways of inputting information in Nest may appear over time, such as voice recognition and natural language integration. “We are exploring several options with Intel now, and they’re excited about embedding these technologies,” Rosoff said. “Some will require tweaking to make them workable in the context of an Ultrabook. For example, there’s still work to do to enable robust voice recognition when your mouth isn’t directly next to the microphone and there’s ambient noise. But it’s something we think we can work through with Intel and their technology ecosystem partners.”

The team released the Web version of Nest in October 2012 and is developing phone-based apps so users can access Nest from anywhere, with any device. That’s key and cloud computing is enabling the same app to work across many different devices,

*“We see a world where Nest is a virtual hub of family activity. Some of it may happen around an All-in-One computer in the kitchen. Some of it may happen using an Ultrabook™ device in the family room, and some of it may happen remotely by cell phone or tablet. Tomorrow it might be an Intel-powered refrigerator glass unit or a very thin slate that hangs on the wall.”*

—Jonathan Rosoff, CEO, Current



sharing the same data. No longer is it enough to just develop an app for a single platform. The Nest development team is also collaborating with Intel on a joint roadmap and feature integrations. “We’re working with Intel product groups and engineers to figure out the technologies we can embed for future iterations,” Rosoff said. “We’ve talked about facial recognition and ways of surfacing ‘smart’ recommendations in Nest using Intel® APIs. There are many exciting things for us to consider in the future.”

## KRITA BRINGS TOUCH-BASED ART TO LIFE

Boudewijn Rempt is CTO of KO GmbH, an international software company headquartered in Magdeburg, Germany. His background is in linguistics, where he specialized in the Sino-Tibetan languages of Eastern Nepal. He’s also a sculptor in his limited spare time, and he greatly enjoys sketching and painting as well. And despite no formal education in computer science, he found himself dabbling in programming, and now he is a key player in the open-source community.

When he found there was no application that suited his needs for

painting on the computer, Rempt co-founded a company that gathered open-source devotees across the planet to build something he liked: Krita, a popular design and painting tool. “I love working with people from all over the world,” he said recently. “We created the company because we believe in open, accessible data of every kind. I get an enormous rush whenever I see the artists create cool art with Krita.”

The legion of Krita users is growing rapidly. For example, illustrator and art director David Revoy ([www.davidrevoy.com](http://www.davidrevoy.com)) has used Krita for his concept art for two Blender Open Movies, *Sintel* and *Tears of Steel*. “That really was a huge push for us,” Rempt said fondly. “I remember staying up until the wee hours of the morning, busily coding everything David needed to reach his production targets. Great fun!”

Moving the Krita app from mouse to touch was part of Rempt’s constant search for more input devices and a better user experience. For example, artists can now use the Sketch app on their touch-enabled device for a quick image, which can then be worked on with the desktop app to add a higher level of detail. “Touch is rather special,” he said. “It makes sense for some operations, but is less useful elsewhere.

Painting with your fingers sounds cool, but I’d advise everyone to get a stylus or, even better, one of those conductive brushes. Screens have too much resistance to make finger painting work well. But for transforming stuff, for pressing buttons and selecting items, it’s great, especially for zooming, panning, and rotating. So we couldn’t just replace the mouse and keyboard—we added to the experience.”

Rempt pays close attention to the workflows of Krita users. At one point, they recorded hours of videotape as artists worked with Krita. “In the open-source community, you’re very close to your users,” he explained. “I knew a couple of artists, and they had good comments. We sat with them for a week, watching quietly. We took notes and then started fixing things. For example, we learned right away that we had to make features more discoverable.”

Rempt said he was pleasantly surprised by the capabilities of a touch-based Ultrabook device. “With touch, we can easily put things where we want...you just give it a flick. Sometimes when you’re painting, you’ll





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*"[W]hen painting a finished piece, artists need dependable colors. That's why we give them layers, blending modes, sketch brushes, paint brushes, and a color picker. They create the art; Krita only facilitates the process."*

— Boudewijn Rempt, CTO, KO GmbH,

get your dimensions or proportions wrong, like create a big head on a small body. We have a transform tool to fix it quickly. Having touch available gives you an enormous boost because it's more tactile. After seeing artists be productive, we learned that trying to mimic traditional media is a mistake. It's bringing the difficulties of painting in the real world to the computer screen! But the computer can do so much more."

Krita is part of the Calligra project, which has been present on Nokia phones such as the N900\* and N9\*, used on MeeGo\* tablets, and has been ported to operating systems such as Android\*, Windows, and Linux\*. Rempt said that moving the core application from device type to device type is always interesting, forcing software developers to cleanly separate modules, for example. With all those different platforms, Krita brings the ability to create artwork in more and more environments. "If you go to the park and sketch, your laptop and Wacom tablet won't work," Rempt said. "The screen is wrong, the wires are wrong, and it's just no fun. But if you take the Ultrabook device with you, it's nicer than pencil and paper. You can get started, pack up, and take your device home, then load the images onto your workstation and finish them up. It opens possibilities that are genuinely new."

Rempt said that some of his users have experimented with different input devices, such as game-pads, separate number pads, and even foot pedals. "We are always looking for ways to make the interaction easier. Panning, zooming, rotating, brush resizing—there are lots of ways to enable all that and more. When artists tell me they feel hampered, we try to fix stuff. Originally,

we were really interested in moving the state-of-the-art for generating computer art forward. For example, we were the first open-source project to have real-world color mixing. But it turns out that artists don't want that. They know what color they want. We tried watercolor simulations, with the image changing as it dried. Bzzt! Wrong! Artists don't want that. They make a stroke, and that's the stroke they want. Artists need to be productive. It's not the technology that creates the art, it's the artist. Serendipity has its place, but it's the artist who decides where it's useful, often in the early stages of sketching and generating ideas. But when painting a finished piece, artists need dependable colors. That's why we give them layers, blending modes, sketch brushes, paint brushes, and a color picker. They create the art; Krita only facilitates the process."

Krita worked closely with Intel throughout their project. They have continuously interacted with engineers, documentation, and other resources, and constantly sought new information to make their job of bringing killer apps to the touch-enabled Ultrabook device easier. "We have a great relationship with Intel," he said. "It's not our first project together with this team, and they're super helpful every time."

## SUMMARY

The Nest and Krita development stories are just two examples of how agile teams around the world are expanding the reach of Intel® architecture. The future of personal computers continues to evolve in exciting new directions,

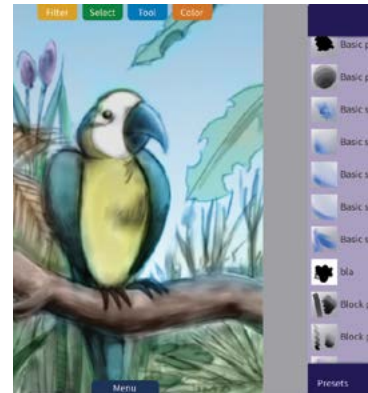
keeping up with advances in mobility and human-computer interaction at every turn.

Developers who have their own great ideas for new products can learn a lot from how the Krita and Nest teams succeeded. Both groups helped themselves with extensive research and training, and they took full advantage of the Intel Developer Zone. In both cases, no single thing has led to success. Both groups conquered multiple technologies to bring their pet projects to life, including learning about HTML5, handling the trade-offs between touch and the mouse and keyboard frameworks, and zeroing in on the user experience, to make both of them ready for the next wave of input devices and user requests.

Meanwhile, Intel support engineers are constantly developing helpful SDKs, lines of sample code, interesting case studies, and other resources that enable budding entrepreneurs to get in on the action. Whether engineers want to bring touch capabilities to digital paint programs, such as Krita on an Ultrabook device or create easier interfaces for the Nest family organizer on an All-in-One device, the story is the same—Intel is here to help.

Learn more about Krita at:  
[kogmbh.com/krita/](http://kogmbh.com/krita/)

Download Krita Sketch through the Intel AppUp® center at: [www.appup.com/app-details/krita-sketch](http://www.appup.com/app-details/krita-sketch)



# Now See This



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## TOTAL IMMERSION BRINGS AUGMENTED REALITY TO PCs AND THE ULTRABOOK™ DEVICE

BY GEOFF ARNOLD

**C**onsider the changes in the world of computing since 1999, the year Bruno Uzzan co-founded Total Immersion, the global leader in augmented reality, and the well-reviewed IBM ThinkPad\* T20 boasted a top-of-the-line 700-MHz Intel® Pentium® III processor.

Devices that define the cutting edge of mobility have gone from five-pound laptops, priced at several thousand U.S. dollars, to five-ounce smartphones that cost just a few hundred U.S. dollars. While price and size have gone down, performance has gone up. The Motorola RAZR™ i is powered by the Intel® Atom™ processor Z2460, which runs at up to 2 GHz. It's hardly news that Moore's Law continues to produce laptops and



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*“Our algorithms, particularly those supporting recognition and tracking, rely heavily on CPU power. So each time Intel launches a new CPU, we are automatically leveraging the technology; that is, our recognition and tracking tools automatically get better.”*

— Bruno Uzzan, Co-founder, Total Immersion

devices that are more powerful and yet less expensive, notably the Ultrabook™ device, which has received a raft of good reviews. (The September 2012 Engadget declared the HP Envy Spectre XT\* to be “...a sleek and speedy Ultrabook with a killer keyboard.”)

But in the case of Bruno Uzzan, what is novel is how he and Total Immersion co-founder Valentin Lefevre made a prescient bet on how augmented reality (AR) might fit into this faster-better-cheaper future.

## AUGMENTED REALITY IN SCI-FI AND FIGHTER PLANES

AR is technology that takes a live, real-world view of the environment and augments it with computer-generated sensory input, such as video or graphics. In the 1990s, at least in terms of pop culture awareness, AR was usually relegated to science-fiction novels or films depicting dystopic futures. You might remember a nude Arnold Schwarzenegger wandering through a bar in *Terminator 2* sizing up the patrons with his built-in data processing prowess as he searched for clothes to “borrow.” (For those who don’t remember, he doesn’t say ‘please,’ but gets the boots, jeans, and leather jacket anyway—and a motorcycle, too.<sup>1</sup>) But even then, long before Schwarzenegger became the Governor, bona fide AR research

was alive and well. A 1997 paper<sup>2</sup> by Ronald T. Azuma, then at Hughes Research Laboratories, included a list of potential applications that universities and tech companies were exploring for use in medicine, manufacturing and repair, and robotics and entertainment. Azuma now works as a researcher at Intel Labs in Santa Clara, California.

AR technology even had a small handful of real-world uses in the 1990s, most prominently in military aircraft, where pilots used heads-up displays and helmet-mounted sights to superimpose vector graphics on the view outside the cockpit window. Lefevre, in fact, was working in the military aerospace industry on simulation software when he approached Uzzan about the idea for Total Immersion.

“At that time, most simulation software, 3D software, and immersive software required high-end computers, like Silicon Graphics workstations, which sold for as much as USD 40,000,” said Uzzan. “Valentin’s vision was that one day, and relatively soon, all this software would run on a normal computer, even a phone, thanks to more and more powerful CPUs and GPUs.”

That day has arrived.

## MOVING TO THE MAINSTREAM

Total Immersion’s technology, the most widely used commercial AR platform in the world, allows you to virtually try on

eyeglasses and sunglasses while shopping on eBay;<sup>3</sup> explore the Volkswagen Golf features on your mobile device;<sup>4</sup> bring 3D avatars to life from old-fashioned Topps baseball cards<sup>5</sup> where avatars can engage with you in virtual pitching, batting, and catching games; and more.

TryLive™, a brand of Total Immersion, is the next generation of product visualization and virtual try-on solutions for retail, e-commerce, mobile commerce and brand marketing. TryLive enables enhanced and social shopping experiences at home, in the store, and on the go. (See [www.trylive.com](http://www.trylive.com) to learn more.)

Coverage of AR technology is soaring in the mainstream press. Mentions of “augmented reality” in *The New York Times* soared more than 2,000 percent in 2012 compared to the previous year. In August 2012, Juniper Research released a report<sup>6</sup> projecting that by 2017, more than 2.5 billion mobile AR apps will be downloaded to smartphones and tablets each year, more than 3.5 times the number of downloads of the smash hit *Angry Birds*\* in 2011.

Total Immersion seems well positioned to have its core technology, D’Fusion® software, in a fair number of these downloads. D’Fusion, used by more than 17,000 developers today, provides coders with a real-time loop for building AR applications. Various algorithms power millisecond-level responsiveness in the three capabilities on which AR depends: recognition of objects in the real-world environment, tracking a user’s movement relative to these objects, and rendering a 3D object or animation.

“If it takes more than a few milliseconds for the AR application to kick in, there’s no way to offer the kind of immersive experience that is the key characteristic of the whole technology,” said Uzzan. “Our algorithms, particularly those supporting recognition and tracking, rely heavily on CPU power. So each time Intel launches a new CPU,

<sup>1</sup>[www.youtube.be/RITE-FW5Gg](http://www.youtube.be/RITE-FW5Gg)

<sup>2</sup><http://bit.ly/QLXhVX>

<sup>3</sup>[www.youtube.be/FmYZ1YImWlw](http://www.youtube.be/FmYZ1YImWlw)

<sup>4</sup><http://tinyurl.com/a9js3cs>

<sup>5</sup>[youtu.be/17jm-AsY0I](http://youtu.be/17jm-AsY0I)

<sup>6</sup>[www.juniperresearch.com/viewpressrelease.php?pr=334](http://www.juniperresearch.com/viewpressrelease.php?pr=334)

we are automatically leveraging the technology; that is, our recognition and tracking tools automatically get better.”

## WORKING WITH INTEL

Uzzan and his engineers do more than just wait around for cheaper MIPS and FLOPS in next-generation processors from Intel, which led to a USD 5.5 million round of funding<sup>7</sup> for Total Immersion in March 2011. Total Immersion's D'Fusion Computer Vision module, which includes both recognition and tracking algorithms, is included in the Intel® Perceptual Computing SDK, which was announced in September 2012 at the Intel Developer Forum and released as a free download on October 22, 2012. The SDK, initially focused on developers writing applications for laptops and Ultrabook devices, combines a handful of tools that targets Intel® processor-based devices and complements AR, including speech and gesture recognition. (See the “Perceptual Computing and the Future of UI” article in this magazine.)

“This SDK is potentially extremely powerful,” said Uzzan. “We regularly get questions from our clients: ‘Can we also do speech recognition?’ ‘Can we do gesture recognition, too?’ Now, with the SDK, the answer will be ‘yes.’”

One of the ongoing debates in the tech world centers on what drives innovation in computing. Chip vendors claim that advances in CPU architecture spur new, better software. Software companies, in turn, claim that their most advanced code eventually pushes chip designers back to the drawing boards.

This so-called software spiral, which has been discussed since the days when Andy Grove ran Intel® is alive and well in the case of AR. Uzzan said that after years of work on D'Fusion, his team is reaching the limits of what can be delivered by algorithms working 100 percent in the software realm.

“Without a doubt, the next stage in AR quality advancement is to work with the chipmakers,” he said. “That’s why we’re so excited to work with Intel, because we can discuss with their engineers how some of these calculations might be done in a different way to unlock new AR applications in the future.”

## TRADING HYPE FOR A FOCUS ON HELPING CUSTOMERS

Uzzan was raised and educated in France. He ran Total Immersion from Paris until 2007, when he moved to the company's Los Angeles office, located just off the Hollywood Freeway and about four miles from the Hollywood Walk of Fame. It's a perfect spot from which to forge deals with some of the world's largest entertainment companies and movie studios. For example, Uzzan helped convince Paramount Pictures to add an AR experience to the promotion of the 2010 film *Ironman 2*. Along with PPC Interactive, Total Immersion developed an application, eventually downloaded hundreds of thousands of times, which allowed fans to sit at their computer, turn on their webcam, and see themselves on the screen in Ironman's iconic helmet.<sup>8</sup>

However, Hollywood offers no shortage of cautionary tales about the dangers of excessive hype and the fickle nature of taste. A few years ago, when smartphone adoption was soaring and the iPad\* launched with much fanfare, every digital marketing company wanted to experiment with AR. Unfortunately, this usually meant the creation of brochures that came to life when seen through the lens of a smartphone or tablet camera.

Uzzan said that many of the campaigns were gimmicky and failed to translate into increased sales for the companies doing the advertising. Sure,

a customer might download an app and aim it once at a printed ad. But would he do it again? And how quickly does the novelty wear off?

“We were focusing too much on creating on-off ‘wow’ experiences, and we weren't alone,” says Uzzan. “I think all these early efforts hurt the AR industry. People said, ‘That’s it? I’m going to use my phone to watch videos on a brochure?’ The experience was pretty poor.”

For now, Uzzan is focusing on solving ordinary problems for everyday consumers, and the businesses that serve these people and ultimately pay for his technology. And the strategy seems to be working.

For example, one of the most anticipated AR-related products on the horizon is Google's Project Glass (Google doesn't prefer the term “glasses” because there aren't any lenses). When asked about Google's project, Uzzan said he'd be thrilled to try a pair himself, but warns gently against sky-high expectations and about an experience that's intrusive and not intuitive. Engineering challenges remain to be solved, including incorporating



**LEFT** The magazine cover is tracked by a phone's camera, featuring Ironman in augmented reality. (LG/Verizon campaign, 2010).

<sup>7</sup>techcrunch.com/2011/03/24/total-immersion-raises-5-5m-from-intel-others-for-augmented-reality-platform/

<sup>8</sup>money.cnn.com/magazines/fortune/fortune\_archive/1993/02/22/77534/index.htm

<sup>9</sup>youtu.be/8wQLZ9GGbqU

## Total Immersion's Augmented Reality Apps

Total Immersion created two unique augmented reality (AR) apps for the Intel AppUp<sup>®</sup> center (appup.com). Both run on any PC with a webcam, and they've been optimized for the Ultrabook<sup>™</sup> device architecture.

### AR Magic Mirror

The user's face is instantly recognized and tracked in the mirror where he can see his reflection, disguised as a sombrero-wearing mouse, a pirate cat, and other fun characters. Users can snap a picture of their best look and share it on Facebook\*.



Screenshot from AR Magic Mirror.

### AR Game Center

The Game Center offers four mini-games, and each game shows a different natural human-to-machine interaction allowed by AR.

- **Catch the Fruits** is based on gesture recognition. Move your hands to catch the fruit—don't get bitten by a spider.



Screenshot from Catch the Fruits.

- **Formula 1 Race** uses head/face tracking technology. Pilot the car using the keyboard and control the view by moving your head. Look for your reflection in the car mirror!
- **Snowball Fight** is also based on face tracking. Move your head to avoid getting hit by the snowballs, and throw snowballs using the keyboard spacebar.
- **Snowboard Race** is a thrilling ride that lets you control your trajectory with head movements.

Be sure to share your scores and pictures on Facebook!

Wi-Fi\* receptors, and the USD 1,500 price tag means that the glasses aren't bound for a big swath of the population, at least not at first.

The Total Immersion application that allows people to virtually try on eyewear? People who use it are 41 percent more likely to buy the product and proceed to their online checkout with baskets worth 12.5 percent more, compared to those who shop using just a browser, according to French retailer Direct Optic, which offers the TryLive application on its Web site.

Another potential AR application is using a tablet with AR technology to virtually arrange furniture around a living space. The demo video is compelling, which shows a woman holding up an iPad and using the tablet's camera to capture a picture of a spare room that could benefit from a redesign. (See [youtu.be/vIBFyxF69U8](http://youtu.be/vIBFyxF69U8).) Various chairs, tables, and a TV appear as she moves them about on iPad's touch-screen.

### ON DEMONSTRATING AR— THEN AND NOW

Like any CEO of a small but growing tech company, Uzzan spends a good deal of time on the road evangelizing his firm's technology. In September 2012, he was at Intel's booth at the IBC tradeshow in Amsterdam inviting attendees to try out a virtual shopping room powered by nothing more than a camera, an HD television, and a set-top box running the Intel® Atom™ processor CE5300. It was among the first demos of its kind and hints at a future where brick-and-mortar retailers transform into limited showrooms as more of the actual shopping happens online at home.

Uzzan admitted that the actual mechanics of showing off Total Immersion software only gets easier, mostly for the same reasons that computers continue to get smaller, cheaper, and more powerful. As Uzzan remembers it, a decade ago, running the software meant spending



**ABOVE** Augmented reality on stage—a unique and impressive presentation tool.

45 minutes setting up at least two heavy-duty desktop systems with various special video-capture and 3D graphics boards, connecting a tangle of cables, and then sweating through a presentation in front of a client.

"Today, the same demonstration, exactly the same, is working on a smartphone, tablet, or Ultrabook device," he said. "AR has grown from a very complex technology, not reaching most consumers, to one you can carry in your pocket, backpack, or purse, and that might, I think, eventually reach every connected consumer on the planet."

To learn more about Total Immersion and their latest projects, go to: [www.t-immersion.com/projects](http://www.t-immersion.com/projects)

To download a free copy of D'Fusion, go to: [community.t-immersion.com](http://community.t-immersion.com)

### ABOUT THE AUTHOR

Geoff Arnold has more than 10 years of experience writing about science and technology. He has written for The Dallas Morning News, Physics Today, Physics World, and AAAS Science Careers. In addition to working in media relations at Michigan State University and Stanford, he worked as a correspondent, columnist, and freelancer for the SD Times and Software Test & Performance. Geoff lives in Portland, Oregon.



of technological innovation, Telmap has become a world leader in mobile location-based services. The company, purchased in 2011 by Intel, specializes in connecting consumers to the information and the businesses they need where and when they need them.

Today Telmap is continuing to provide white-label, location-based platforms for mobile providers such as Orange and Vodafone while simultaneously developing its own offering, M8\*, your local mate. Currently available in the UK and Spain, and launching soon in the United States, M8 (pronounced "mate") is a free mobile app for iOS\* and Android\* devices that delivers a wealth of optimized location-based information and services. From turn-by-turn navigation and live traffic updates, to restaurant and retail information, M8 aims to put the full power of the local Web in the palm of your hand.

# Mapping La Vida Local

How Telmap gets people to where they need to be

BY **JOHN TYRRELL**

Thinking about the Internet can conjure up images of a vast network of interconnected digital devices spanning the globe, with huge data centers under mountains and thousands of miles of fiber-optic cables on the seabed sending volumes of data from one side of the planet to the other at the speed of light. As the world's Internet population hurtles toward a staggering 2.5 billion people, the scale of the digital network that wraps the planet we call home in its web of fiber and Wi-Fi\* is mind-blowing. But today's most exciting Internet developments are not taking place on any huge, incalculable global level. They're on the street where you live.

According to U.S. local marketing agency Baliho,<sup>1</sup> 73 percent of all online

activity is related to local content, and 85 percent of all purchases happen within 15 miles of the home or workplace. The company adds that half of all local searches are carried out on a mobile device, and 61 percent of smartphone users search for local information while on the move. Combine these figures with comScore's prediction that by 2014 mobile devices will overtake desktop computers as the number one way to connect to the Internet globally,<sup>2</sup> and the importance of the local Internet experience to the future of our connected world becomes clear.

Riding at full gallop into this perfect storm of local Internet opportunity is Telmap. Founded in 2000 in Israel, a country which in recent years has earned a reputation as a major hotbed

## CONNECTING THE DOTS

The mobile world is not short of location-based services, from specialized navigation apps and the mapping services of Google, Apple, and others, to the public-powered local business reviews on TripAdvisor\* and Yelp\*. Location is also seeing its role grow on social media, with Facebook, Foursquare, and others geo-tagging their users at every opportunity. M8's strength is not in replacing these types of apps and services, but rather in pulling all their threads together to weave a comprehensive and coherent fabric of local information accessible through a single portal.

As Telmap CEO Oren Nissim explained, "We're trying to bring together everything that has a geo context into the same app." To do

<sup>1</sup> [www.youtube.com/watch?v=uyLMqO\\_yWog](http://www.youtube.com/watch?v=uyLMqO_yWog)

<sup>2</sup> [www.businessinsider.com/mobile-will-eclipse-desktop-by-2014-2012-6](http://www.businessinsider.com/mobile-will-eclipse-desktop-by-2014-2012-6)



*"It's not just about maps and points of interest, it's also about how to utilize location information within my experience, whether I'm doing a game, creating an enterprise app, or putting together a local tourist guide. All of those things utilize location in many different ways."*

— Oren Nissim, CEO, Telmap

this effectively, M8 works with several specialist content providers, many of whom are experts in their specific geographical area. Over the years, Telmap has developed many valuable partnerships with the Web's leading information aggregators and services, from TripAdvisor, Yelp, and Facebook to more locally focused solutions. In the UK, for example, M8 lets users access information from the hotel booking service HRS, the London-based cycle rental network Barclays Cycle Hire, and will soon be connected to the entire TfL London public transport network. But as anyone who has visited the UK knows, it's often not the journey across town that counts, but rather the destination. "We work with the Good Pub Guide for pub information, very important in the UK!" said Nissim.

For the U.S. launch of M8, Telmap is targeting a similar number of partners to that offered to its European users. "We currently have about 50 to 60 content partners on our list for countries in Europe, and we're looking to add

about the same number in the United States." As with the UK, local specialists are key. "Some of the brands are mega-brands, and they cover the entire United States. But to deliver high value to somebody who lives in the Pacific Northwest, for example, you have to work with content providers from that area on top of those mega-brands," said Nissim. "This is really where we want to go."

## LOCATION POWERS LIFE

Telmap's ultimate goal is for M8 to empower its users to solve the complex logistical problems of modern daily life simply and easily. "We want M8 to be your location companion," said Nissim, "which means it needs to deliver the experience of what it means to be local."

"M8 effectively helps you make geo decisions and filters that through your daily calendar so you can make those decisions easier and quicker," said Nissim. The empowerment manifests in a variety of ways that can ease the complexity of busy daily agendas. For example, M8 can provide turn-by-turn navigation and proactive information to avoiding traffic hold ups, or it can find useful local businesses and let users log in to their location on social networks. And all of this happens within the single unified M8 ecosystem.

"Today, if I want to find a place on Facebook Places, get there, and check in using Foursquare, I need to run three different apps on my phone," said Nissim. "We're aggregating all this information together so with one easy click you search Facebook Places, the results come back, along with other results from, for example, Yelp and Trip Advisor, and you'll be able to get there and check in using Foursquare."

## MONETIZING M8

M8 is a free app based on a business model of in-app monetization to achieve profitability, to which Telmap is applying their considerable experience and local marketing insight. "We're doing two things. Number one is that we sell digital goods on top of the app, so mechanisms

within the app allow you to consume more and better content, such as better traffic services."

Another opportunity for monetization springs from the sale of voices for the M8 navigation system. "We're selling a lot of funny voices now, which is another interesting segment," said Nissim. "People want to download the voice of their choice to tell them how to get from point A to point B, so we're recording a lot of talent throughout the world."

For the UK version of M8, Telmap recently announced that British comedy icon and writer Stephen Fry, and Aardman animated favorites Wallace & Gromit, will be joining the ranks of available navigation voices. The idea of being guided to a destination by a cheese-loving clay animation Yorkshireman and his silent canine sidekick is certainly an intriguing one.

The second way that M8 monetizes is by showing its worth as an invaluable local marketing tool for businesses, helping them reach audiences in their immediate area with compelling offers. "We're also doing what we refer to as *local commerce*," continued Nissim. "We try to provide retailers and advertisers a way to come through the app with offers that are local. We offer several tools to utilize that in the best way—such as banners, sponsored search results, and branded widgets—all of which are very local, very targeted."

Search results served up by M8 to the user are highly targeted based on the search terms used and their current location. Searching for an Italian restaurant, for example, will bring up primarily results in the immediate area. Branded widgets can bring even more prominence for local businesses by featuring a logo that appears on the map in response to a relevant search.

## LOCAL LOYALTY

The opportunities for local businesses to effectively target their audience and grow loyalty is what Nissim is most excited about. "Many businesses are trying to go digital and find a platform that ultimately delivers for local people. These businesses are creating profiles so people can find them online, and we see them going

to couponing Web sites and launching campaigns to build loyalty," said Nissim.

"I see a new trend evolving around everything that has to do with customer loyalty programs. If you launch a fantastic couponing campaign you will definitely get traction, but then they don't come back," said Nissim. "Customer loyalty has a lot to do with location, and this is where I see at least one of the golden nuggets. I think we are really at the tip of the iceberg."

The importance of delivering relevant local advertising to local people is core to the M8 user experience and to the offer for businesses. "Location for these retailers is all about, 'how do I make sure that I grab the attention of that person when they're nearby?' Or, 'if I know that the person is going to be nearby I want to be able to offer them something.'"

"Using context within location apps, which ultimately creates the mash-up between where I am right now and what my intentions are going forward, allows customer loyalty targeting, encouraging customers to come back. Location is going to become huge when it comes to targeted advertising, targeted marketing, customer loyalty...all of these schemes."

## GETTING IN ON THE LOCATION GAME

The power of Telmap's technology and partnerships are not restricted to the M8 product. In addition to the white-label services it provides to mobile operators, Telmap also offers a number of APIs that app developers can use to integrate location-based services in their apps. The first phase of APIs launched give developers access to the maps (Ordnance Survey for the UK and NAVTEQ elsewhere), routing, and place finding that Telmap uses, with the addition of as-it-happens traffic data. "We think we have something really interesting for software developers who want to incorporate real-time traffic events into their experiences," said Nissim.

The second phase of APIs allows developers to gain access to data from a number of Telmap's local content partners, which will be followed later by APIs that deliver context information, the aim being to make the potential of

location-based mobile app experiences available to app creators worldwide.

"We want to take location APIs to the next level," said Nissim. "It's not just about maps and points of interest, it's also about how to utilize location information within my experience, whether I'm doing a game, creating an enterprise app, or putting together a local tourist guide. All of those things utilize location in many different ways."

## LOCATION, LOCATION, LOCATION

Intel and Telmap share a common vision of the importance of location for the future of connected devices. "I think location is a critical component for computing going forward," said Nissim. "If you think about it, almost any app that you download on your phone today requires your location. The same thing will be true for Ultrabook™ devices and tablets. I think location is a core piece of identity and a core piece of context."

"Location is what defines how I move from using one device to another. I'm in the office using my computer, and then I'm disconnecting and getting into my car. I'm using an in-vehicle infotainment system, and then I'm disconnecting and going on foot and using my cell," said Nissim. "Throughout that experience I utilize content and I'm contextually doing different things, but they all have to do with where I am now and the context of how I'm using my equipment."

"Location is critically important for all those tasks. I think that Telmap and Intel share a vision of coming together not only on great customer experiences, which is what Telmap is working on right now, but also on how to extend those to the development community to create a great ubiquitous location experience on top of an Intel® product."

To learn more about Telmap, go to: [global.telmap.com](http://global.telmap.com)

## ABOUT THE AUTHOR

*John Tyrrell's career in the games industry began with the launch of Nintendo's Pokemon on an unsuspecting British public in 1999. After a decade of international PR campaigns and freelance writing, he left the position of Worldwide PR Director at Atari in 2009 to establish Hot Socket, a communications consultancy based in Lyon, France. He is also currently head of marketing at social game developer oOki, creative director at games marketing and PR agency Cosmocover, and contributing technology writer for RH+M3.*





# Pro Gamers Laud Ultrabook™ Device Connectivity Strengths

Some of the most demanding PC users in the world rely on Ultrabook devices

BY GARRET  
ROMAINE

It's hard to imagine tech-savvy, battle-hardened PC gaming pros showing much enthusiasm for anything but a high-end, tricked-out, spec-maxed tower. Yet in a series of interviews with three of the most demanding PC users on the planet, *Intel® Software Adrenaline* found they are learning to rely on the mobility, form factor, and PC power of the Ultrabook™ device.

Pro gaming athletes practice constantly, travel continually, and stay connected no matter what. The administrators, executives, and team managers that track the athletes work even harder. For example, to carry the current 65 pro gaming athletes on Intel-sponsored Team Dignitas, about 500 players have rotated through the ranks in the last four years. Managing that much manpower takes more than many tablets have to offer—at a minimum, it requires Microsoft Office\*, the “gold standard” for corporate warriors. While

the athletes themselves were busy practicing and playing, we interviewed people from the administrative, support, and management side of pro gaming to get their thoughts on the new Ultrabook device. We quickly found they all had one thing in common, and their mottos boiled down to this: “always working, always sharing, always connected.”

## HOW TO HERD THE GAMERS

Michael O'Dell, or “ODEE” when he's gaming, is a former soccer star who saw his career on the pitch cut short by injury and turned his competitive juices to gaming instead. “After I got hurt, I picked up *Quake\** and *Counter-Strike\** and loved it, and that's how it all started. I read online that people were entering tournaments, and I heard about a guy who quit a job on Wall Street to start a career in pro gaming, and that inspired me.”

Starting with local LAN events, O'Dell next gravitated to small, nearby tournaments, and as his win totals mounted, so did his confidence. He tried his luck with one of the first big LAN tournaments, Multiplay UK, and never looked back. “I was absolutely hooked,” he said. “Once you play in a LAN tournament, that's the best. After my injury, I wondered how I could still be competitive, and then found this great, growing niche.”

O'Dell initially struck out on his own and then later joined the clan LCD. They engaged in some frantic 10-on-10 tournaments playing *Battlefield 1942\**, which led to forming Team Dignitas. Soon his team was landing top honors regularly. Because a 10-man team was too large to get picked up by mainstream sponsors, they added *Counter-Strike*, *Call of Duty\**, and *Enemy Territory\** to their portfolio of squads.

When Intel began to sponsor the team, it fell to O'Dell to keep on top of

ABOVE Gamescom 2012 in  
Cologne, Germany.

their sponsor relationship, which took up a lot of his time—to the detriment of team tactics and planning. After reaching the finals in the European Cup and realizing that the paperwork was interfering with keeping up with the game—which they won—O'Dell retired and took on the role of team manager. He has been running Team Dignitas full-time for the past five years.

"We have 65 players, and it is non-stop," he said. "It's 18 hours a day of herding mainly teenage boys, if you can imagine. Fortunately, all the Dignitas staff are ex-players, and we know what the gamers need and what they're thinking. Some of them try to pull a fast one, but we know what they're about."

Recently, pro gaming has seen a resurgence, and O'Dell says it is getting really hectic. "To stay connected, I have an iPhone\*, and I use a desktop PC when I'm at my desk. I used to rely on a powerful laptop when I was away from the office, but lately, my Ultrabook has become my 'runaround' device. When I wake up, it's the first thing I turn on. It's always there. While we're traveling all over the world it's very easy to take along. In the last month I was in Los Angeles, Seattle, and Spain, so having the Ultrabook device available on the plane and in airports has been essential. It has a great battery."

What O'Dell really likes is that it's not an under-powered tablet with alternative software—it has real Windows\*-based Microsoft Office applications. "It's got the everyday business stuff I need. It's got access to email and Excel\* and docs and PDFs. All that stuff is crucial. I need to have it."

The ability to use his Ultrabook device for social networking has been especially important. "I tweet a lot because our Team Dignitas Twitter is very popular—'DignitasODEE' is my handle. I use my phone and my Ultrabook almost exclusively. Twitter is the quickest way we communicate with our fans, and we like it."

During the past several years, O'Dell's job of managing all the names, faces, schedules, and talents has become quite complex. "They come and go," he said. "Only a few have longevity. When they're 18 to 20 years old, it's hard to make a full-time career out of pro gaming. After college, they have to decide on a job and a career. So we're always looking for new players. The big

multi-play events are our game research arenas. It's like the *X Factor*, only we're running a *StarCraft*\* tournament and we'll pick a person to become part of our squad and win a laptop and chance to become part of the team."

O'Dell says the game of the moment is *League of Legends*\*, with about 40 million people playing; about 8 million viewers watched the recent World Championships online. "I'm addicted as well," he admitted. "I play it on the Ultrabook device all the time, and it looks great. In fact, I've been suggesting to Intel that we do an Ultrabook-only tournament here in England!"

To learn more about Team Dignitas, see their Web site at: [www.team-dignitas.net](http://www.team-dignitas.net)

### TWITTER\* AND FACEBOOK\* AND YOUTUBE\*—OH MY!

Alexander Holtz Shedden has been working as a full-time editor in the eSports business for almost four years. He travels around the world to attend all the Intel Extreme Masters events, delivering interviews, impressions, and anything else that might be of interest for the fans at home. His work life revolves around mobility, video editing, production, and speed. "I have to produce and edit the videos directly at the venue to put them online as soon as possible. When that's done, I provide insights through Twitter and Facebook. Mobility is really important to me." Lately, he's been using an Ultrabook device and enjoying the results.

"In addition to Intel Extreme Masters, I also work for other eSports series, including the ESL Pro Series," he said. "The size and weight of the Ultrabook help me a lot. It's a quiet and comfortable device to carry around, especially when you have a lot of other baggage to drag with you."

Before he started as an editor, Shedden was a passionate gamer aiming at becoming one of the best in Germany. When he realized that he would never become as good as the top players, he decided to switch to managing players, teams, and clans. That led to networking with other talents in eSports media, and when they discovered his talent for creating videos, they hooked him up with some volunteer opportunities as a tryout.



## Intel Extreme Masters Rule the World

After six seasons of gaming mastery, Intel Extreme Masters is now one of the premier global eSports leagues in the world. The tour has given out over 2.8M USD in prize money at 37 live events on four different continents. The 2011-12 season of the Intel Extreme Masters featured *Counter-Strike*\*, *StarCraft II*\*, and *League of Legends*\* as the main titles and USD 643,000 seasonal prize money—the most lucrative prize purse globally.

Check out Intel Extreme Masters at: [www.esl-world.net/masters](http://www.esl-world.net/masters)

"Ultimately, it was only a matter of time before I was asked to join ESL TV," he said.

Shedden said the most important thing now is to get to the next gaming venue as early as possible so he doesn't miss anything. He gets to know players before their matches, and he tries to schedule as many interviews as possible before the action gets too hot and heavy. "Players aren't available for interviews most of the time, due to their busy schedules," he said. And even with careful up-front planning, the workflow differs from day to day. "You have to follow the tournament, record the players during the hottest matchups, get crowd scenes of the cheering audiences, and so on. I always have to be ready to record because I want to capture those unexpected situations. Then, when I'm not recording, I have to cut the daily impressions on-the-fly to make sure the video is ready when the day ends."

At the Intel Extreme Masters stop in São Paulo, Brazil, in 2012, one of the tournament's participants, viOlet, won the hearts of the audience, "Just

### ABOVE

Intel Extreme Masters  
World Championship  
CeBIT 2012.



**ABOVE** Gamescom 2012  
in Cologne, Germany

**BELOW**  
Intel Extreme Masters  
World Championship  
CeBIT 2012..

by being friendly and positive about the country," as he put it. "The crowd was so amazing; they cheered for every successful action played in those games and went crazy again and again. It was fun to capture all that." (See [www.youtube.com/watch?v=RyiuXrU9HbM](http://www.youtube.com/watch?v=RyiuXrU9HbM).)

Mobility has become a huge factor in his personal and professional life. He uses three key devices during the day to get online—his mobile phone, his tablet, and his Ultrabook device, which joined the party most recently. "I spend a lot of time using social networks to inform fans about what's going on. It is not only about the videos, but also about the insights such as backstage pictures or interesting quotes the players give. And of course I interact a lot with the fans. They know I am at the venue so they reach me through Twitter. I prefer to use my Ultrabook device in that case to deliver the best pictures made with my Reflex\* camera. I can quickly turn on the Ultrabook, choose the picture, and upload it in the easiest way. The Ultrabook fits my style perfectly. What I really love is the power in that device.

I can work as comfortably as I do on my PC, with just a small piece of space."

See the latest gaming action at: [www.esl.tv/iem](http://www.esl.tv/iem) and [www.facebook.com/ESLTV](http://www.facebook.com/ESLTV)

## EXECUTIVE ON THE GO

Ralf Reichert is a 30-something former professional gamer hailing from Germany with a degree in economics and a solid skill for team strategy and kill shots. A former professional gamer, he is now the chief executive officer of Turtle Entertainment GmbH, a global leader in eSports located in Cologne. In the mid-1990s, when the first wave of Internet gaming ricocheted through European universities, he climbed onboard and has never looked back. He fell in love with *Quake*—the first multi-player first-person shooter with solid, built-in Internet support—and soon found himself hooked. Looking back, he calls the day that game was released, "the birthdate of eSports."

Reichert quickly formed a team, called SK Gaming, enrolling his two brothers and some friends. Within a short time he found himself launched into an active career involving overseas tournaments, wide acclaim, and considerable success. He finished his university degree, but because his team was winning national tournaments and placing in the top five around the world, he had a decision to make.

It wasn't all that hard, "In 2000, I finished my degree and had to decide what to do for living. I was already old for a pro-gamer, and at the time, it was tough to make a living in the game circuit. So my friends and I thought about a business. Believing that eSports would be big and would continue to grow, we went into the organizer role."

Early on, Reichert and his partners knew that cheap, fast Internet access was extremely important. So was PC reliability and mobility. Strikingly, those attributes are still important today, and Reichert said he was an early adopter of the new Ultrabook device for just that reason. "I have a first-generation Ultrabook device," he said. "It's an Acer S3\*, which was a big step up for me because of its mobility. I still travel a lot, and I need to have the full PC experience with me at all times. I've used tablets, but going from consuming content to producing content is a big step. The Ultrabook device enabled me to do the things I needed without carrying five kilos of luggage."

Reichert said that all of the tablets he's used to date have had one common flaw—they were under-powered. "I prefer the Ultrabook device over any tablet I've ever had," he said. "I spend four to six hours in front of my PC every day productively working. One of my past problems was coordinating the process of using a laptop and a desktop—two devices—with traveling; my data was in different places. I don't have that problem anymore. I use the Ultrabook all day at work, and when I'm done I pack it up and travel with it. Of course, I still have a powerful desktop system at home for gaming. I am a huge fan of the 3rd generation Intel® Core™ i7 processor!"

Reichert spends a lot of time communicating through email and Skype\*, and he also uses Twitter\*. He's currently using Yammer\* as his corporate social network. He posts notes, photos, and links to his recent videos there, which have become hugely important.

"Our vision was always to grow this as a spectator sport, and from the beginning, I always video streamed



tournaments to the Internet. We have always had a video production team, but today they are more professional. We get 300K concurrent live spectators now. In Gamescom there were 4 million unique live views throughout the event. We've changed from a niche to a big spectator sport."

Reichert still plays competitively, although not at the level he once achieved. "I play regularly," he said. "Not on a professional level, but I am competitive. I actually still play with the same old crew from my early days—we're a band of brothers. I'm happy to be in the top ten percent now in a tournament, although years ago it was one percent. I play *League of Legends* and *Starcraft*, and if I'm in the top 10K, I'm happy with the placement. The air gets thin on top and you need to practice. I have a business to run, but I still play 10 to 20 hours each week."

And business is good. Turtle Entertainment does six big, global events each year with Intel. In 2006, they expanded from a national league in Germany to the international stage. Reichert has had a solid relationship with Intel over the years, and he's excited about the future. "I am interested in the new Ultrabook devices, which will be touch-enabled! The convertible will be great, and for me and my business it will be extremely interesting."

Get the latest on Turtle Entertainment at: [www.turtle-entertainment.com/?&lang=en](http://www.turtle-entertainment.com/?&lang=en)

## SUMMARY

If you need to combine mobility and power into a single elegant form factor, check out the Ultrabook device. Your life



may not involve as much hectic travel as these pro gaming luminaries experience, but you'll appreciate its lightweight and mobile design. And you'll enjoy having true PC power at your fingertips. Although you might play more *Angry Birds\** than *League of Legends*, you'll still feel like you're at the cutting edge of the PC universe.

For more information about the Intel-inspired Ultrabook, go to: [www.intel.com/content/www/us/en/sponsors-of-tomorrow/ultrabook.html](http://www.intel.com/content/www/us/en/sponsors-of-tomorrow/ultrabook.html)

## ABOUT THE AUTHOR

Garret Romaine is a senior writer, working for *RH+M3* from Hillsboro, Oregon. He started in gaming as a beta tester for Epic Megagames and has been a columnist, editor, and reviewer ever since. Garret is a Fellow in the Society for Technical Communication, and he teaches technical communication at Portland State University.

**ABOVE** Alexander Holtz Sheden between tournaments.



# Houston, We Have Cleared the Tower

Microsoft Windows\* 8 development is rocket science

**M**icrosoft Windows\*8 is the new OS in town, and it's something of a radical departure from the familiar Windows environment that countless developers and consumers the world over have grown used to. Microsoft is putting its full weight behind the platform's roll out on PCs, tablets, and, importantly, mobile phones, a relatively new battleground for Windows. The new OS is expected to make a major impact, with its penetration on phones and tablets tipped to grow significantly, bringing it firmly into the race with iOS\* and Android\*. The explosion of portable Windows 8 devices brings a new set of challenges to app developers as they strive to master the programming environment and ensure the optimum consumer experience across every device, from desktops and laptops, to tablets, Ultrabooks™ devices, and mobile phones.

In 2012, Intel engaged Chaotic Moon, a mobile application development studio based in Austin, Texas, to create a new app for Intel®

Software Adrenaline to run on Microsoft Windows 8 devices. Optimized primarily for Intel® architecture and Ultrabook devices, the app lets users access and read *Intel® Software Adrenaline* magazine content on any Windows\* 8 device, and took the team of David Jacobson, Jim Mischel,

Mike Walls, and Philip Wheat a total of three months to complete. The resulting application was written (in significant part) in a completely new language for

Microsoft Windows client developers, founded on a new runtime, and giving users a completely new way of interacting with their devices.

There are numerous resources available to help developers of apps for Android and iOS, but so far first-person advice for creators of Windows Store apps is more difficult to find. With the aim of making the journey easier for Windows Store app developers, *Intel Software Adrenaline* magazine caught up with Philip Wheat, Manager of Chaotic Moon's Lab Division, to find out what lies in store.

**Intel Software Adrenaline (ISA): Please tell us about your team's background in developing mobile apps.**

**Wheat:** Chaotic Moon studios was founded in March 2010 by three great guys hoping to be at the forefront of the adoption of mobile apps and technology. Now, building mobile apps is hardly innovative, but our company is good at it. Three years ago, we were focused specifically on phone apps because at that time, mobile meant Apple iPhone\* apps, Microsoft Windows Mobile apps, or a desktop application on a laptop. Today, that world has expanded dramatically, with Microsoft Windows Phone 8, Microsoft Windows 8, Apple iOS, and Android all clamoring for attention in the minds and toolboxes of mobile app developers. We keep our focus on the ever-evolving market and technology, so developing Windows Store applications was the next logical step.

**ISA: Can you discuss the terms used in the new environment for developing Windows Store apps?**

**Wheat:** During the development of Microsoft Windows 8, Microsoft used the code name Metro for this new environment. As you might expect, this

term caught on with developers, but as release grew nearer the code name was replaced with the final Windows Store app name for the overall environment, both for app developers and end users. While we technical people love code names, app users needed a simple way to differentiate this development runtime from the Win32\*/Windows Presentation Foundation (WPF) applications they are used to. And the simplest solution to this question was to describe it as a function of where they will find these types of apps.

I find it easier to think of Windows Store apps as apps that are based around the latest foundational shift in the Windows world. To date there have been basically four shifts (I'm speaking loosely here, I know there are many ways to break out the generations)—DOS, Win32, .Net, and the new Windows runtime. DOS brought us hardware independence (coupled with standard BIOS), Win32 brought the GUI development environment to the forefront, .Net helped free us from buffer overruns and lost memory pointers; and now Windows runtime steps us forward into the world of asynchronous methods, concurrency management, and stateless local applications.

In the current world of networked devices, it is no longer safe for developers to assume they have local access to resources they need, and Windows runtime assists development by ensuring that developers can call on the required data and processing power without worrying about blocking local resources and creating unresponsive applications for the end users. Another benefit of Windows runtime is the ability to write code (and any subsequent edits) once and roll it out on any hardware platform. Windows runtime is not to be confused with Windows RT, the



The Chaotic Moon executive team.

new OS for a limited market of portable devices based on non-Intel® architecture.

**ISA: What programming language developments are you seeing, and how do they impact on the creation of Windows Store apps?**

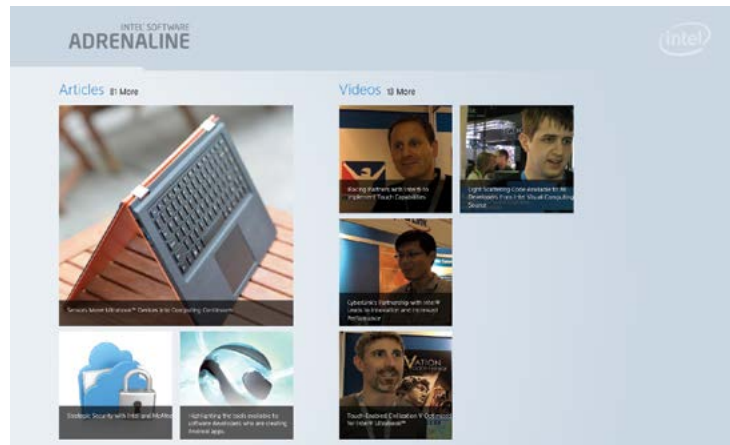
**Wheat:** JavaScript\* is now a first-class language for client development. Industry trends show that JavaScript use has been increasing on servers to provide a common development metaphor between the browser and server, but the Windows Store app environment and Windows runtime

extends that commonality to the desktop itself. And with the ability for Windows 8 to provide hardware acceleration for the language, developers will see performance benefits that were previously unattainable for the language. For example, the Intel Software Adrenaline Windows Store app was written almost entirely in JavaScript and XAML. When working with the Windows 8 application development environment, developers who have JavaScript experience should consider making it their primary programming language.

That being said, C++ has returned to mainstream application development. In the past, the language's perceived complexity and the additional work needed to create a user application steered many Windows client developers away. But now the Windows runtime environment assists the C++ syntax to manage and simplify complexity, enabling developers to be as comfortable with the language as they have previously been with Visual Basic\* and C#. For Windows Store apps that have extensive or complex algorithm needs or that require high-







The Intel® Software Adrenaline Application home page.

environment. But, by design, a browser environment is limited for security reasons and to ensure the safety of the generic OS underneath it. Because of the tight integration between the Windows kernel and security system with the Windows runtime/XAML environment, those security checks can be much stronger, allowing the Windows Store app end users more resources and access.

This means that access to localization resources, user data, local caching, and so forth become easier and more secure to use with XAML, while the model remains close enough to HTML5 to ensure cross-utilization of code and the ability to provide light, lower-functionality versions of Windows Store apps that can be run inside of browser environments. This provides the best balance between optimized desktop applications and cross-platform standardized functionality.

**ISA: Can you explain “app contracts” in the context of Windows Store apps?**

**Wheat:** App contracts, one of the most interesting features of the new runtime, are interfaces that the Windows Store app registers with Windows 8 to allow easy integration with the operating system. The simplest and most common app contract is “search,” which enables the app to register its search capability with the operating system itself. Then when the app user wants to find an item of data, instead of having to open each application and perform a search, the user simply activates the Windows 8 search charm on the user interface and selects the applications and data types that he or she wants to include in the search. Because the applications themselves have exposed their search interface, the operating system knows how to query each dataset and quickly return the desired results.

**ISA: What resources are available to support the development and testing of Windows Store apps?**

**Wheat:** One useful place to go to is the online Intel® Developer Zone (intel.ly/dev4ultrabook), which has an area dedicated to Windows 8 development for Ultrabook devices. You’ll find info, guides, tool downloads, and test code samples to get you started. You can also ask questions directly to the

efficiency back-end processing, C++ may be the language of choice. C/C++ offers more options for taking advantage of the underlying hardware power than any other programming language (with the exception of assembly language, of course).

However, experienced Visual Basic, C#, or F# developers aren’t being left out. Not only can Windows Store apps be developed in different languages, but they can also be developed in different languages inside the same applications. For example, although the Intel Software Adrenaline Windows Store app was written almost entirely in JavaScript, we also used a bit of code that had previously been developed in C#.

**ISA: What is important for developers to know about the presentation layers when creating Windows Store apps?**

**Wheat:** On top of Windows runtime is

the presentation layer. In Windows Store apps, the user experience is encoded in XAML. Though developers may recognize the term of “XAML” from WPF or Silverlight\*, the format itself has changed somewhat—consider it as simple (or as vast) as the transition happening between HTML4 and HTML5. The encoding and formatting remain the same, but the keywords, elements, attributes, and so forth have changed.

Why didn’t Microsoft stick with WPF or Silverlight since those presentation layers have been well optimized over time? The reason is simple—as both XAML and HTML continue to evolve, the idea of an XML presentation layer continued to converge into a standard. And that standard falls very close (if not on top of) the pending HTML5 standard.

In many cases developers can use HTML5 directly, doing many of the same things they do in a browser in their Windows Store app development

guys at Intel in the forums, which are always welcome.

With regard to testing, in addition to the traditional unit, application, and user experience testing, Microsoft has included a certification test to validate a new Windows Store app before it is submitted to the Windows Store. This certification test ensures that not only does the Windows Store app pass for standard functionality—such as starting up, shutting down, and responding to user input—but that it is also categorized correctly and does not impose unnecessary resource demands. The tests evaluate everything from startup speed, to splash-screen validation, to suspend and resume functionality. About the only things that the automated test can't check at the moment—although this may change—are exception rollbacks and step-back functionality that might be used with IntelliTrace\*.

**ISA: What were the primary considerations and challenges encountered when creating the user experience design for the ISA Windows Store app?**

**Wheat:** The user experience of a Windows Store app is a blend of WPF and HTML5. This is a natural merging of the two presentation layers, but it also requires extra effort to blend the two user experience models into a seamless whole. The resulting application must merge both modal desktop interfaces with modeless Web interfaces to ensure the best of both worlds in the final application.

**ISA: What challenges arose during the coding of the Windows Store app for Intel, and how did you resolve them?**

**Wheat:** The biggest coding challenge was to ensure that the proper security models and modes were adhered to. With Web applications, almost none

of the local resources are available to the developer—everything happens on the server which means things can be slow. With desktop applications, all the local resources are available so applications have access to critical systems components. With the Windows Store app development process, developers must be prepared to walk a careful path between requesting resources for optimum performance and user concerns about excessive security authorization for desktop resources.



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# Comic Director

Create, edit, view, and share with touch

BY JOHN HEDTKE

Comic Director is a Microsoft Windows\* 8 UI Touch app (formerly known as Metro app) developed for Intel by Ratio Interactive that makes it easy to create, edit, view, and share great-looking comics. You can use your own photos and video from files (or from an onboard camera) to create a one-, two-, or four-panel comic strip that illustrates a life event or story. With touch or keyboard and mouse, you can enter text, make a freestyle drawing, use a wide range of effects—such as sepia and half-toning—and add from a library of clip art, stickers, and monsters. One of the best features is being able to edit your comic's video clips directly in Comic Director.

Both fun and educational, the first release of Comic Director is primarily a content creation app aimed at 14- to 20-year olds. They'll learn how to create and curate content and to work in a cloud-based environment. Finished comic strips can be uploaded to the cloud portal and shared on Facebook\* with the entire world. Users can also browse other comics in the cloud portal (check them out at [ComicDirector.com](http://ComicDirector.com)) or the mirrored Facebook site and vote for their favorites.

## GETTING IT RIGHT FROM THE START

The development of this application began with the creation of user personas and a complete picture of the typical product users. The entire product was wireframed, and the UI was completely designed and polished before coding began. And because the app was designed and developed in an iterative, agile way, the team was able to more effectively plan each step in the building process. As a result, Comic Director is intuitive and easy to use.

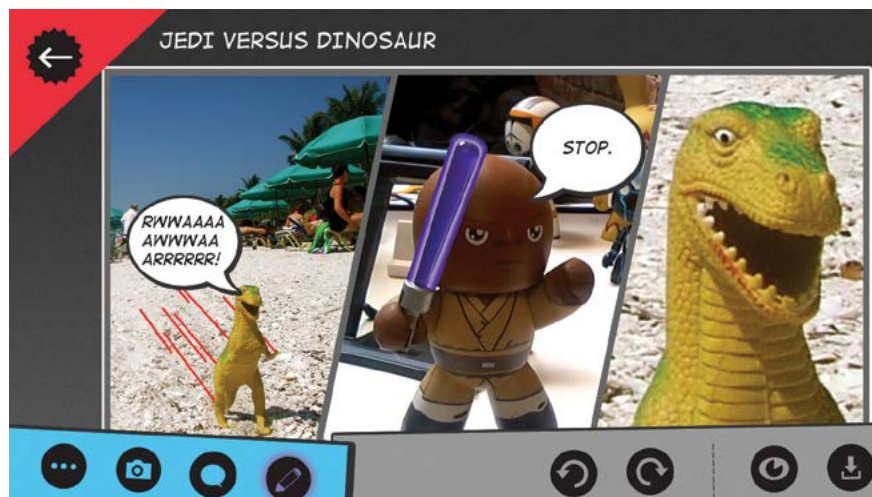
Comic Director is a hybrid app with a front end that uses HTML5, JavaScript\*, and C#. The back end is cloud-based, so users can publish and display the comic strips they create. According to Cody Cushing, senior software development engineer and Windows 8 development manager at Ratio Interactive, "As a connected content creation app, we leverage many capabilities of the Windows 8 platform. We get content from the cloud, content from the file picker, and there's content baked into the app. Comic Director has a lot of moving parts and integration points. In addition to the rich Windows 8 client app, we have cloud services where users publish their comics. A Web app allows users to view their creations from any

browser or with our Facebook app. Our best people worked on Comic Director and it's been a fun challenge."

Comic Director was optimized for Windows 8 right from the start. Because the app was developed on the Intel® Atom™ processor (made to run on Windows 8 tablets) and the Ultrabook™ device, the developers were able to quickly see how it performed on Intel® architecture. Cushing added, "We collaborated with Intel to build a cleanly-designed user interface. All the forces came together: business, creative, marketing, and technical. We knew the app would be running on robust Intel systems with powerful chipsets, so we were able to tailor high-end features that took full advantage of the hardware."

## UPLOADING FASTER WITH H.264

Because Comic Director is optimized with the H.264 audio/video codec, the ability to add video clips to the comic strip is a major advantage that sets Comic Director apart from similar apps. (H.264 is a popular codec that's been incorporated on Intel® processors as Intel® Quick Sync Video. It's also part of the HTML5 standard for the <video> and <audio> tags.)



Apart from its ease-of-use, H.264 is a scalable video codec that provides strong video compression, dramatically reducing the size of video clips for storage and uploading. Users can quickly move content from the native application in the device to the Comic Director.com server portal. The codec compresses the video and digital images, reducing the file size; when the file returns to the server, the codec re-opens the file for publishing. As Jason Powell, Microsoft alliance marketing manager at Intel and founder of the Comic Director app said, "The responsiveness is unique, and it's a great thing we want other ISVs to follow and use. We hope this app shows the ISV community that the Intel-based codec optimized for Intel architecture will result in a great user experience."

Each comic that users export is actually a multimedia package in one file, with edited video, pictures, graphics, and text. This makes H.264 a good choice for devices that may have limited connectivity or storage. "For H.264, we knew Comic Director would be used on mobile devices, so being able to optimize the video on a device was an important requirement," said Anchal Kumar, a senior project manager for Ratio Interactive. "Instead of uploading a 50-MB file to the server, it can be on the device itself. You can grab from the video only what you want to use."

### ADDING TO THE FLAIR

Another one of Comic Director's major advantages, which is helping to build its social media potential, is that users can suggest features for new versions. "We're producing a lot of art for users to include in comics," Cushing said, "and we optimized the touch-enabled interface to make comic creation easy. Users get a pre-existing library of fun art, overlays, and more. We focused on producing these assets to make comic creation really fun."

[Download the free Comic Director app today at the Microsoft Windows store:   
www.windowsstore.com](#)

### ABOUT THE AUTHOR

*John Hedtke is an award-winning author who is closing in on 8 million published words in 26 books and hundreds of manuals, articles, online help systems, and white papers. In addition to writing for RH+M3, John teaches writing classes remotely with the University of California, Riverside, and is a Fellow of the Society for Technical Communication. On the rare occasions John isn't working, he is catching up on sleep or playing banjo or guitar. John lives in Portland and Eugene, Oregon.*

Ratio Interactive

**ratio**  
INTERACTIVE

**F**ounded in 2005 Ratio Interactive has a track record of designing and creating leading-edge mobile and content management apps. Some of their past successes include the Mindbloom Life Game\*, which helps people improve and balance their lives while they play; TruView\*, Visible Technologies' program for controlling and managing one's reputation in major search engines; and Pirq\*, an iOS\* and Android\* app, which guides users in locating the best deals on purchases. More recently, Ratio Interactive has been working with Microsoft on developing Windows 8 versions of iOS apps such as iCookbook\* and Naturespace\*.

### Today's Windows . . .

**I**n addition to desktop and laptop support, Windows\* 8 has a touch-interface built in, which supports both touch and keyboard and mouse input. It includes many other features that support mobile devices, such as cloud integration, a Windows Store, Windows 8 Search, and the new Charms bar.

### . . . and HTML5.

**D**esigned with mobile devices in mind, HTML5 has many new elements, such as <canvas>, <video>, and <audio>, as well as support for scalable vector graphics and other multimedia content. It also includes extended elements for document formatting and manipulation. This means that an Android\* phone can access ComicDirector.com and view and comment on comics.

EXPLORE TOPICS FROM THIS ISSUE OF *INTEL® SOFTWARE ADRENALINE* FURTHER:



### 5 Touch-enabled PCs Fuel Talent on *Project Runway*

See Anya Ayoung Chee's 2012 Spring Collection here: [www.youtube.com/watch?v=zfE1skS\\_yOU](http://www.youtube.com/watch?v=zfE1skS_yOU)

See Mondo Guerra's work in the *Project Runway* HP+Intel Challenge (Season 8): [www.youtube.com/watch?v=3JywFOqDFyw&feature=relmfu](http://www.youtube.com/watch?v=3JywFOqDFyw&feature=relmfu)

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### 8 The Intel® Processor-based Phone

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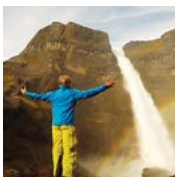


### 10 From Outer Space to Your Space

Get more information on Wind River at: [www.windriver.com](http://www.windriver.com)

For details on Wind River Runtime Technologies for security see: [www.windriver.com/products/runtime\\_technologies/Security/](http://www.windriver.com/products/runtime_technologies/Security/)

Find Wind River support for Intel Data Plane Development Kit details: [www.windriver.com/announces/intel-data-plane-development-kit/](http://www.windriver.com/announces/intel-data-plane-development-kit/)



### 15 Where the Action Is!

Watch amazing Tim Humphreys footage: [gopro.com/videos/snow/tim-humphreys-snow-season-gopro-hd-hero2/](http://gopro.com/videos/snow/tim-humphreys-snow-season-gopro-hd-hero2/)

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Intel® Core i7 processors: [www.intel.com/content/www/us/en/processors/core/core-i7-processor.html](http://www.intel.com/content/www/us/en/processors/core/core-i7-processor.html)



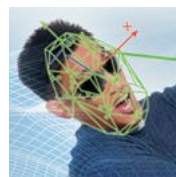
### 18 Mobile Security

Learn about computer and mobile device security protection at: [www.mcafee.com/us](http://www.mcafee.com/us)



### 22 Powering Creative, Social, and Emotional Experiences with Intel Technology

To learn more about the Creators Project and upcoming events, visit: [thecreatorsproject.com](http://thecreatorsproject.com)



### 26 Perceptual Computing and the Future of UI

Read about the Intel Perceptual Computing SDK at: [software.intel.com/en-us/articles/perc-faq](http://software.intel.com/en-us/articles/perc-faq)

See more about Nuance and voice-control technology at: [www.nuance.com/company/index.htm](http://www.nuance.com/company/index.htm)

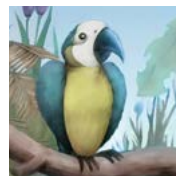


### 29 Game Developers Get in Touch with Ultrabook™ Devices

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### 35 Touch Technology Rocks the Computing Continuum

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### 41 Now See This!

For information on Total Immersion and their latest projects, go to: [www.t-immersion.com/projects](http://www.t-immersion.com/projects)

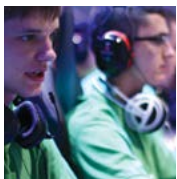
Check out Google's Project Glass at: [plus.google.com/+projectglass/posts](http://plus.google.com/+projectglass/posts)

To see Direct Optic's TryLive application, go to: [www.t-immersion.com/blog/oct-02-2012/direct-optic-sells-more-glasses-online-trylive](http://www.t-immersion.com/blog/oct-02-2012/direct-optic-sells-more-glasses-online-trylive)



### 46 Mapping La Vida Local

For the latest on Telmap, check out: [global.telmap.com/](http://global.telmap.com/)



### 49 Pro Gamers Laud Ultrabook™ Device Connectivity Strengths

Check out the Ultrabook™ device at: [www.intel.com/content/www/us/en/sponsors-of-tomorrow/ultrabook.html](http://www.intel.com/content/www/us/en/sponsors-of-tomorrow/ultrabook.html)

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### 53 Houston, We Have Cleared the Tower

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### 57 Comic Director: Create, Edit, View, and Share with Touch

Download the free Comic Director app at: [www.windowsstore.com](http://www.windowsstore.com)

Learn more about Ratio Interactive at: [www.ratiointeractive.com](http://www.ratiointeractive.com)

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*Voted by betanews as "Best Windows 8 App of the Week (Nov 2012)," the ISA app is a must-have companion for your trek into the mobile revolution.*

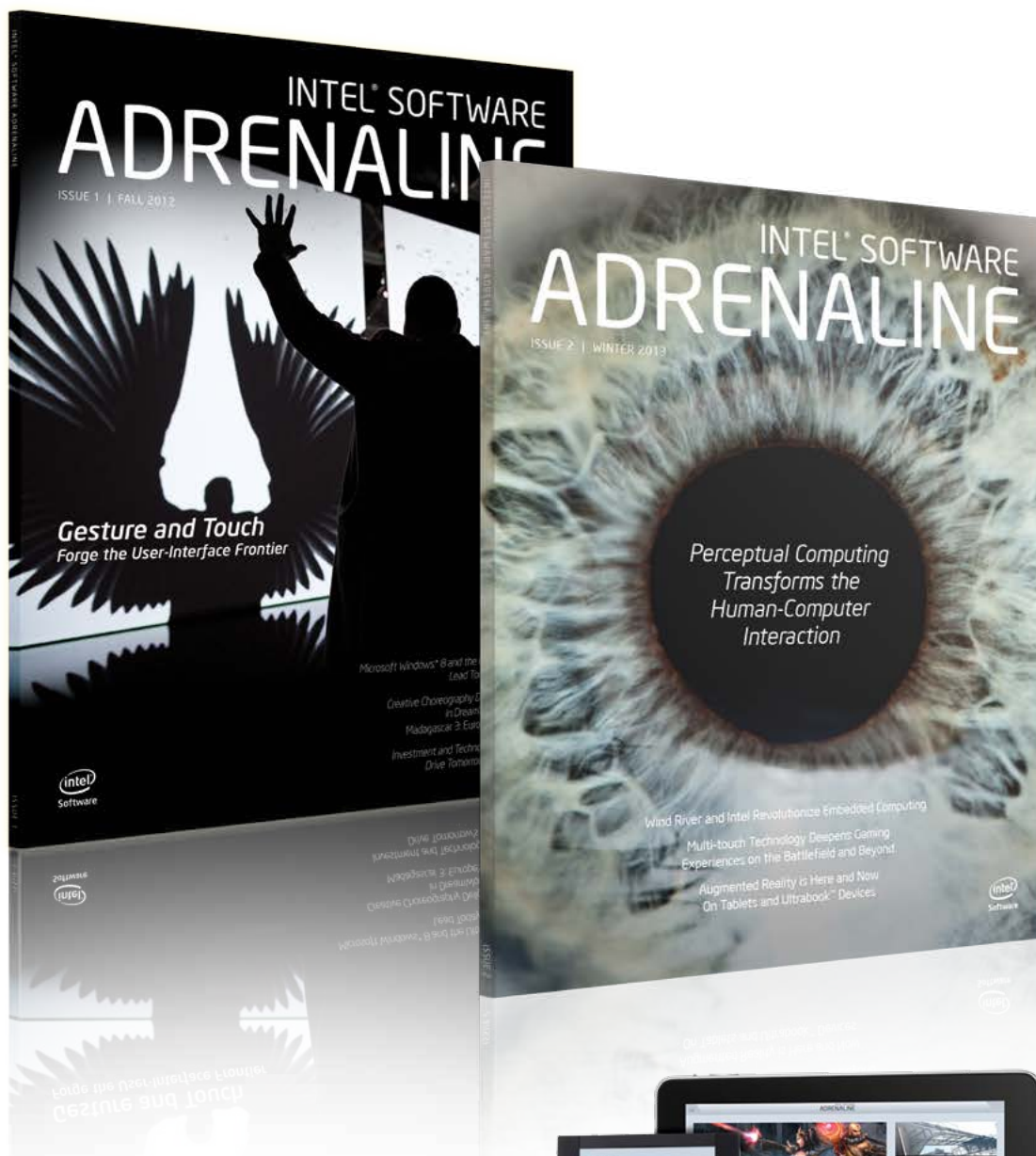
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