



DANIEL BURRUS'

# TECHNO TRENDS

THE BIG IDEAS THAT ARE CHANGING EVERYTHING

## The Top 20 Technology-Driven Trends for 2012 (Part 2)

By Daniel Burrus, CEO of Burrus Research



Last month I shared 10 of my 20 Top Technology-Driven Trends for 2012. This month, I bring you 10 additional trends to complete the list. Remember, to stay competitive, your organization needs to anticipate the future technology trends that are shaping your business and then develop innovative ways to implement them in your organization. Use this list as a roadmap to be pre-active and determine how your company can profit from these trends now and in the future.

11) **Digital Identity Management** will become increasingly important to both organizations and individuals as new software allows users to better manage their multiple identities across business and personal networks. Next Generation Biometrics will play a key role in both identity management and security.

12) **Visual Communications** takes video conferencing to a new level with programs like SKYPE, FaceTime, and others giving us video communication on phones, tablets, and home televisions. Visual Communications will be integrated with current video conferencing systems, fueling this as a main relationship-building tool for businesses of all sizes.

13) **Enhanced Location Awareness** will accelerate the number of business-to-consumer apps for smart phones and tablets that will take geo-social marketing and sales to a new level of creative application, driving rapid growth.

*continued on page 2*

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- GROWING NEW LIVERS
- INVISIBLE AIRPLANES
- HYBRID SOLAR CELL
- INEXPENSIVE DNA SEQUENCING
- POWER HARVESTING
- BIO-BASED NYLON
- 3D SCANNER
- WORLD'S SMALLEST GENERATOR
- INTEGRATED SYSTEM-ON-A-CHIP

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## Trends for 2012 *(continued from page 1)*

- 14) **Geo-Spatial Visualization** combines geographic information systems (GIS) with location-aware data, RFID (radio frequency identification), and other location-aware sensors (including the current location of users from the use of their mobile devices) to create new insights and competitive advantage. Early applications include logistics and supply chain to name a few.
- 15) **Smart TV Using Apps** will get a major boost in the marketplace, fueling a major shift in home viewing. Ever wonder how you could have over 500 cable or satellite channels and nothing to watch? You didn't have apps on your TV allowing you to personalize the experience. This is the beginning of a major shift that will take place in living rooms globally. Look for Apple to introduce the iTV (living room size iPad).
- 16) **Multiple App Stores** for all smart phone, tablet, and television operating systems (Android, Blackberry, Windows, and others) will take off, creating an abundant distribution and sales ecosystem for all. This will cement the revolution versus evolution that apps software represents. We will see business app stores for the enterprise starting this year.
- 17) **3D Displays for Smart Phones and Tablets** will be the breakthrough that will drive wide-scale consumer acceptance of 3D computing. 3D Computing for the enterprise will grow rapidly for military, medicine, fashion, architecture, and entertainment applications.
- 18) **eBooks, eNewspapers, and eMagazines Pass the Tipping Point** due to the abundance of smartphones with readable displays, tablets that provide a full color experience, and publishers providing apps that give a better than paper experience by including cut, copy, paste, print, and multimedia capabilities. In addition, eBook readers will have high quality with a low enough price to bring in the masses.
- 19) **Interactive Multimedia eTextbooks** will finally take off thanks to Apple's iBook Author and other competing tools, freeing new publishers to create compelling and engaging content, and freeing students from a static, expensive, and literally heavy experience.
- 20) **Wireless Machine-to-Machine** applications such as two-way meter reading, surveillance, vending machine, and point-of-sale solutions take off thanks to faster wireless data networks.

### Spot Your Own Trends

Are these the only technology-driven trends for 2012 to be aware of? Of course not. As we all know from past experience, technology is always evolving, resulting in new trends emerging and new products appearing every day. That's why smart organizations stay ahead of the trends by anticipating them, adapting them to their unique environment before the competition does, and ultimately enabling the organization to profit from them. The more you're able to do that, the sooner your organizations will reach the next level of success.

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## TECHNOLOGY NEWS HIGHLIGHTS

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### Growing New Livers

Researchers may have discovered a way for patients with liver disease to grow their own new livers – and it's as easy as injecting healthy donor cells into their lymph nodes. A major roadblock to liver regeneration is the fact that diseased livers form scar tissue, which prevents them from healing, so attempts to inject healthy cells into the damaged organs have been unsuccessful. But the fact that liver cells have the ability to survive in other areas of the body led investigators to try injecting them into the bellies of mice. When they traced the paths of the cells, they found that they tended to migrate to the lymph nodes where they grew into multiple smaller nodes that function together just like a larger organ. As the central liver progressively fails, these secondary livers take over the task of filtering toxins from the blood. The technique could have profound implications for treating advanced liver disease, as the only current cure is a transplant. Unfortunately, each year only six percent of patients will receive a

donor organ. In addition, the risk of rejection may be reduced by utilizing induced pluripotent stem cells (iPSCs), allowing patients to be their own donors.

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## Invisible Airplanes

A new coating that takes advantage of one of the many exceptional properties of carbon nanotubes may someday make objects undetectable by radar. The long tubes of pure carbon are capable of absorbing a broad spectrum of electromagnetic waves, including radio waves, visible light and ultraviolet radiation, making them the “blackest” material known to man. When three-dimensional objects are coated with “forests” of nanotubes (positioned in a vertical orientation with some space between them), they neither reflect nor scatter light. In other words, the index of refraction is basically the same as the surrounding air, making them virtually disappear against a black background. Although it isn’t practical to grow nanotubes on large objects, it’s possible that they could be suspended in paint and applied to the surface of a larger structure (such as airplanes), making them invisible to radar.

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## Hybrid Solar Cell

A new type of solar cell combines organic and inorganic materials to increase efficiency by up to 25 percent. While traditional solar cells are only capable of capturing about 34 percent of the total light spectrum, the new design can extract a significantly broader range of wavelengths, including those from the blue section of the spectrum. The key is the addition of an organic semi-conducting material called pentacene, which is coupled to lead sulfide nanoparticles in a process called singlet exciton fission. The result is that, for each photon of light from the blue spectrum, the new cells generate two electrons as opposed to a single electron that is typical of today’s solar technology.

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## Inexpensive DNA Sequencing

It took \$3 billion and 13 years to sequence the first human genome. Today, the same process costs about \$5,000 and takes a few weeks. But as computer chips continue to become faster and more powerful, DNA sequencing is becoming faster and cheaper than ever (another manifestation of Moore’s Law). Sequencing machines perform millions of chemical reactions on chips containing fiber optic arrays. In current systems, the number of microwells on a single chip is around 1.2 million. But a new approach has been developed (known as Ion Proton I) that increases the number of microwells available for processing to 165 million. And a newer chip (the Proton II) is expected to be released later this year that will quadruple that number, making it possible to fully sequence the human genome in two hours at a cost of about \$1,000. The widespread availability of low-cost genetic testing will undoubtedly bring about a whole new set of questions, not the least of which will be: What should we do with all of that information?

*For information: Jonathan Rothberg, Ion Torrent, Life Technologies, 3175 Staley Road, Grand Island, NY 14072; phone: 800-955-6288; fax: 800-331-2281; Web site: [www.invitrogen.com](http://www.invitrogen.com)*

## Power Harvesting

Researchers have developed a system that utilizes the “waste” energy of ambient radio waves to run low-power, battery-operated devices such as mobile devices, clocks and remote controls. The technology has the potential to drastically reduce the number of batteries that end up in landfill sites. A patent application has been filed for the device, which is designed to “harvest” RF energy present in many forms all around us and convert it

into power. In addition to radio waves, the concept is also applicable to television, WiFi and radar waves. The commercial market potential is estimated to reach several billion dollars per year by 2020.

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## Bio-Based Nylon

In a joint development effort, two Japanese companies have developed a way to produce nylon from plant-based material. The resulting fabric has the same strength, stretch and heat resistance as the traditional petroleum-based derivative, but absorbs moisture, nearly as well as cotton. The process begins with plant materials to which micro-organisms are added to trigger fermentation. This produces an amino acid called L-lysine, which is decarbonated through an enzyme reaction to form 1,5-pentanediamine (1,5-PD). The next step is to polymerize the 1,5-PD with dicarboxylic acid so that it can be processed into fibers for use in garments, upholstery, and eventually, automotive parts. The developers hope to begin mass-producing the material as early as 2013.

*For information: Ajinomoto Co., Inc., 15-1 Kyobashi 1-chome, Chuo-ku, Tokyo, Japan; phone: +81-(3)5250-8111; Web site: [www.ajinomoto.com](http://www.ajinomoto.com) or Toray Industries Inc., 1-1 Nihonbashi-Muromachi 2-chome, Chuo-ku, Tokyo, Japan; Web site: [www.toray.com](http://www.toray.com)*

## 3D Scanner

England's Department for Transport recently approved the expenditure of 2.7 million pounds (\$4.2 million US) to purchase 3D laser scanning technology for police departments across the country. The technology will allow accident scenes to be scanned quickly and analyzed remotely, so that roadways can be reopened as soon as possible. It has been estimated that congestion and road closures cost the British economy upwards of one billion pounds per year. The new devices are expected to reduce incident clear-up times by as much as 39 minutes. They will also enable investigators to standardize their approach to surveying accident sites.

*For information: Department for Transport, Great Minster House, 33 Horseferry Road, London SW1P 4DR, United Kingdom; phone: +44-0300-330-3000; Web site: [www.dft.gov.uk](http://www.dft.gov.uk)*

## World's Smallest Generator

In a collaborative development project, a new gas turbine generator was recently unveiled that measures only 8 cm (3.2 inches) in diameter, 12 cm (5 inches) long and weighs a mere 1.2 kilograms (less than 3 pounds). The system can operate continuously for three hours off of propane, kerosene or diesel fuel and produces an output of 400 watts (double that of a fuel cell). The company aims to market the device by 2015 at a retail price of 2 million yen (About \$25,000US). In addition to its use as a backup emergency power source, the developers plan to reduce the size and weight further in anticipation of using it to power robots in the future.

*For information: IHI Corporation, Toyosu IHI Building, Toyosu 3-chome, Koto-ku, Tokyo 135-8710, Japan; phone: +81-(3)6204-7800; fax: +81-(3)6204-8800; Web site: [www.ihico.jp/en/index.html](http://www.ihico.jp/en/index.html)*

## Integrated System-on-a-Chip

Intel recently announced that they've combined their Atom processor with 2.4GHz digital WiFi on a single chip, creating a smaller form factor that is more power efficient and costs less to manufacture. The 32nm system-on-chip (SoC) design also contains new noise cancelling and radiation shielding technologies to eliminate interference between the radio and processor, which can corrupt data. It will likely be another three years before the new chip hits the market in mobile computing devices.

*For information: Intel, 2200 Mission College Blvd., Santa Clara, CA 95054; phone: 408-765-8080; Web site: <http://techresearch.intel.com>*

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