

Notes from the Edge

Insights into an Evolving Future



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CYBER

The Dark Side of Wearables: How They're Secretly Jeopardizing Your Security and Privacy.

According to ABI Research, an estimated 200 million wearable devices will be on the market by the end of 2015. By end-2018, there will be 780 million wearable devices on the market. This emerging market gives hackers plenty of opportunities to steal sensitive data and benefit financially from it. As more consumers purchase wearable tech, they unknowingly expose themselves to both potential security breaches without ever knowing. The author proposes that part of the problem with the security of these devices is due to market competition between wearable makers, which cause them to place greater emphasis on convenience than security.

Dark Side of Wearables

GOVERNANCE

Why Estonia is a Country for the Future. When it comes to the Internet and related technologies, the small republic of Estonia is arguably the most advanced country in the world, and this despite only

having gained independence in 1991. And from a former Soviet backwater state in the Baltic, it has grown into a prosperous, developed country, and a member of both the EU and NATO. Estonians moved to e-government to eliminate bribery and it has worked so well that 90% of the population have taken up an electronic ID card and moved to e-Estonia. In late 2014, Estonia became the first country in the world to offer digital residency to non-Estonians living anywhere in the world. Non-residents obtaining the Estonian smart ID card are given access to many electronic services available to Estonian citizens, including the ability to create and operate an Estonian company. The non-citizen e-card, however, does not give the right of non-Estonians to enter the country or to use it as a travel document. Estonia has done all this in a small space, with a population of just 1.3 million.

[e-Estonia](#)

Sweden Descends into Anarchy. Once upon a time, there was a safe welfare state called Sweden, where people rarely locked their doors. Now, this country is a night-watchman state -- each man is on his own. When the Minister of Justice, Morgan Johansson, encourages breaking the law, it means opening the gates to anarchy. Mr. and Mrs. Swede have every reason to be worried, with the influx of 190,000 unskilled and unemployed migrants expected this year -- equivalent to 2% of Sweden's current population. The number is as if 6.4 million penniless migrants who did not speak English arrived in U.S. in one year. Read about the significant cultural ramifications in the linked article below.

[Sweden's Changes](#)

URBANIZATION

How Africa Can Build Inclusive, Safe and Sustainable Cities. Africa is experiencing rapid urbanization. In Ghana alone, the urban population has grown from four to 14 million over the last two decades. While urbanization in Africa has proven to increase productivity and reduce poverty, development plans in Africa tend to be targeted towards rural areas. Affordable housing is lacking in cities and this leads to the creation of slums. Architects, city planners and the government need to help by supporting endeavors to build spaces where people can connect. The unstable political landscape in Africa has not helped. Politicians work on short-term projects to win votes in a multi-party system than take on longer-term city and infrastructure development plans. As more people move to urban Africa, politicians and citizens need to work together to achieve livable and sustainable cities for everyone.

[Africa's Cities](#)

TECHNOLOGY

Future Batteries. The energy sector faces an enormous challenge: developing a battery that is long-lasting, low-cost, compact, and safe. Researchers at the University of Cambridge have developed a new lithium-air battery with more than 90 percent efficiency and capable of more than 2,000 recharge cycles. While this new battery is ten times more powerful than current lithium ion batteries, the required technology is at least a decade away. Researchers at Prieto Battery are also working on possible batteries of the future. The startup has produced a 3-D battery that is cheaper to make, faster to charge, safer, smaller, and less environmentally toxic than conventional batteries. Three-dimensional batteries tend to have porous, sponge-like structures that can be made lightweight, flexible, and made in to numerous shapes. Prieto Battery uses copper foam that is so porous it is mostly air, can store up to twice as much energy per unit of volume as current batteries, and is not prone to overheat. These new technologies may be initially applied to small, wearable devices but can certainly work in vehicle or even grid-scale storage systems.

[Lithium-Air Batteries](#)

[Foam Batteries](#)

New Glass Almost as Tough as steel. Back in May we presented an article on transparent spinel. This month we present an article about a team of researchers with The University of Tokyo and Japan Synchrotron Radiation Research Institute that has created a type of glass that is stronger than many metals. The glass has been imbued with extra amounts of an oxide of aluminum, using a process they call aerodynamic levitation. The new process involves causing the mix to be held in the air while it is forming, by pushing it from below with oxygen gas and then using a laser as a spatula to mix the materials together. The end result is a glass with more alumina in it than any other produced to date—a glass that the team reports is transparent, colorless, and extremely hard. Testing showed it to be stronger than most metals, and almost as strong as steel.

Tough as Steele

Facebook’s Vision for the Future: Drones With Lasers, All-Seeing AI, VR for Real.

The satellite is the simple part of Facebook’s technological vision for its next 10 years. After that? It’s complicated. In a talk Tuesday morning at the Web Summit, Facebook chief technology officer Mike Schroepfer gave a quick overview of the social network’s efforts on three tech frontiers: bringing Internet access to the rest of the world; teaching machines to “see” the present and predict the future; and making virtual reality an everyday, hands-on reality.

The Facebook and The Future

TRANSPORTATION

Five Big Tests that Driverless Cars Will Have to Pass. While driverless cars would bring about benefits such as a revolution in productivity, a near-zero level of road fatalities, faster travel and a huge improvement in energy efficiency, their integration into the mainstream would be challenging. The author highlights some tests that they would have to pass before they take over the roads.

1. Handling the first driverless death
2. Ethical choices (see second article below)
3. How secure is a driverless car?
4. Regulating cars off the road
5. Changing human habits

Driverless Car Obstacles

Why Self-Driving Cars Must Be Programmed to Kill. The author of this article questions how autonomous vehicles should act in the case of an unavoidable accident. Should they be programmed to minimize the loss of lives even if it may mean killing the owner or passengers? Should it be allowed to randomly choose between extremes? The simple answer may be to minimize the overall loss of lives. However, would people buy cars that are programmed to sacrifice occupants? For example, is the buyer to blame if he chooses a vehicle programmed to save children at all cost or crash the car to avoid a motorcyclist since the former is likelier to survive? These moral dilemmas are urgent and need to be ironed out.

The Moral Dilemma

Toyota Maps Out Decline of Conventionally Fueled Cars. Toyota Motor Corporation is plotting a road to near-extinction for its conventionally fueled cars. They predict that by 2050, gas-electric hybrids, plug-in hybrids, fuel-cell cars, and electric vehicles will account for most of its global vehicle sales. This means gasoline and diesel-engine powered cars, currently accounting for roughly 85% of Toyota global vehicle sales, would be near-zero. To reach their goals, Toyota plans to sell roughly 7 million gas-electric hybrid vehicles and at least 30,000 fuel-cell vehicles a year world-wide by around 2020.

[Do a Google search of the above title to bypass WSJ log-in requirements]

The End of the Fossil Fuel Car

ENVIRONMENTAL STRESS

New Test Detects All Viruses that Infect People, Animals. A new test detects virtually any virus that infects people and animals, according to research at Washington University School of Medicine in St. Louis, where the technology was developed. The test, known as ViroCap, examines two million sequences of genetic data from viruses in humans and animals, ranging from common viruses to the more exotic ones. It is so sensitive that it can even detect variant strains of viruses, as well as multiple viruses at the same time – something no other current diagnostic test is capable of. Alongside this, ViroCap is 52% more accurate than polymerase chain reaction (PCR) tests, which are currently used for diagnoses.

[Virus Detector](#)

RESOURCE SCARCITY

Nanopores Could Take the Salt Out of Seawater. University of Illinois engineers have found an energy-efficient material for removing salt from seawater that could provide a rebuttal to poet Samuel Taylor Coleridge's lament, "Water, water, everywhere, Nor any drop to drink." The material, a nanometer-thick sheet of molybdenum disulfide (MoS₂) riddled with tiny holes called nanopores, is specially designed to let high volumes of water through but keep salt and other contaminants out. "Even though we have a lot of water on this planet, there is very little that is drinkable," said study leader Narayana Aluru, a U. of I. professor of mechanical science and engineering. "If we could find a low-cost, efficient way to purify sea water, we would be making good strides in solving the water crisis."

[Water Water Everywhere](#)

FUTUROLOGY

Back to the Future Day. As many of you know, "Back to the Future Day" was last month, shortly after we published the October *Notes from the Edge*. Two articles linked below discuss what futurologists think the world will look like in 30 years, from advanced transportation and telecommunications, to robots and Cloud Data Centers.

[Back to the Future 1](#)

[Back to the Future 2](#)

FUTURE WARFARE

Battlefield 2050: How Today's Cutting-Edge Technologies Are Shaping the Future of Warfare. It's an exciting time to be a consumer or producer of technology, but for the United States military, charged with predicting and defending against strategic surprise, the rate of technological advancement heralds both promise and danger. In this eBook volume, Defense One looks at how today's cutting-edge technologies are shaping the future of warfare.

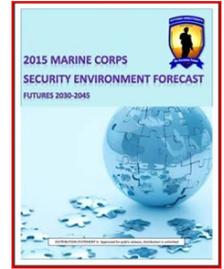
[*Webpage link below, document embedded to the right*]

[Battlefield 2050](#)

MARINE CORPS SECURITY ENVIRONMENT FORECAST

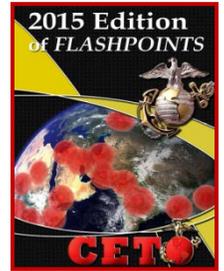
The 2015 *Marine Corps Security Environment Forecast: Futures 2030-2045* as announced in [MARADMIN 387/15](#) is open for public release and is available for download at the FAD website below:

[Futures Assessment Division](#)



FLASHPOINTS 2015

The 2015 edition of Flashpoints provides the results of our most recent analysis of factors associated with a nation's risk for conflict. It also provides an updated ranking for the 159 nations included in the study based on each nation's potential to experience future conflict or instability. This effort included extensive research, review, and analysis of several global patterns and trends related to the potential for instability and armed conflict. This work was conducted through a prism defined by rapidly occurring actions, events, and decisions with potentially significant regional and global implications, challenges, and opportunities. This is the tenth annual edition.



[Futures Assessment Division - Flashpoints 2015](#)

This newsletter is intended to highlight issues and ideas which may prove significant in the evolving future. In keeping with our focus on both alternative futures and analysis, items in this bulletin will generally be of an alternative nature, or drawn from atypical sources.