



Notes from the Edge



Insights into an Evolving Future

VOL 7 – ISSUE 1

JANUARY 2017

A Product of the **Futures Assessment Division**

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MARINE CORPS SCIENCE FICTION FUTURES

This month, we closed out our current Science-Fiction Futures project with the Atlantic Council at a roll-out event in Washington, D.C. Many thanks to our *Notes From The Edge* readers who participated in the project and attended the event. Links to the webcast, as well as some news articles, are below.

[Atlantic Council Webcast](#) [WIRED Article](#) [Military Times Article](#) [C4ISRNet Article](#)

FORECASTING

Isaac Asimov Asks, “How Do People Get New Ideas?” Presumably, the process of creativity, whatever it is, is essentially the same in all its branches and varieties, so that the evolution of a new art form, a new gadget, a new scientific principle, all involves common factors. We are most interested in the “creation” of a new scientific principle or a new application of an old one, but we can be general here. One way of investigating the problem is to consider the great ideas of the past and see just how they were generated. Unfortunately, the method of generation is never clear even to the “generators” themselves. [Azimov on New Ideas](#)

2017 Tech Projections. In previous January editions, *NFTE* presented articles which looked at the validity of past forecasts. This year, those articles didn’t seem to be prevalent in our research literature.

Instead, we found a series of articles with technology “predictions” for 2017. Big Data. Internet of Things. Virtual Reality. Industry 4.0. AI Integration. These were all prime fields of growth and innovation in 2016, and we can expect these trends to continue into next year and probably far beyond. In truth, 2017 is likely to be the year when many of these technologies hit the mainstream.

[Forbes Tech Predictions](#) [AI Predictions](#) [IoT Predictions](#) [IBM 5-in-5](#) [IBM Past 5-in-5](#)

MILITARY

Path Forward for Army’s Modernization Priorities Takes Shape. Recently, the Army took another step in articulating what types of investments it deems necessary to support operational ideas about future ground warfare. According to a set of slides presented at the Army’s Capabilities Information Exchange, the service has carved out solid modernization objectives and the resources needed to meet capabilities in the near-, mid-, and far-term (2017–2050). The Army will prioritize modernizing its aviation fleet, combat vehicles, cross domain fires, robotics and autonomous systems, advanced protection, and cyber and electromagnetic capabilities. [Army Modernization](#)

Five Giant Leaps for Robotkind: Expanding the Possible in Autonomous Weapons. The future of autonomous weapons is intimidating. We cannot allow our trepidation about that future to prevent us from shaping and controlling it. If we stand aside, others will take our place, and they may create the nightmarish world that we fear. [Autonomous Weapons](#)

The Coming Swarm. Continuing in the category of shameless self-promotion, the Marine Corps Warfighting Lab was recently featured on 60 Minutes. A few short years ago, the idea of cheap, disposable, swarming drones was out of reach. Today, it’s a reality.

[60 Minutes: The Coming Swarm](#)

ENVIRONMENTAL STRESS

Firefighting Blamed for 'Megafires' Ravaging U.S. Forests. They're known as "megafires", and they're becoming increasingly common and destructive in the wildlands of the western United States. Could overzealous firefighting itself be to blame? [Impact of Megafires](#)

China Begins Construction of Polar Icebreaker. According to local media reports, China kicked off construction of its first domestically-built icebreaking research vessel in Shanghai on December 20. The new icebreaker is expected to be completed by 2019, and will not operate under the PLAN, but as a civilian vessel under the Polar Research Institute of China (PRIC), under the Ministry of Land and Resources. Despite having no border in the Arctic, China’s presence there is nevertheless expanding along with its economic interests. China first showed a military presence in the Arctic in September 2016 when five PLAN warships were spotted in the Bering Sea, off the Aleutian Islands, where they reportedly entered U.S. territorial waters. It is fair to assess that China’s interest in the fast-thawing Arctic Ocean is bound to increase in the future.

[China's Icebreaker](#) [The Icebreaker Gap](#)

RESOURCE COMPETITION

When Will Our Meat-filled Diets go Post-animal? We can't sustain the number of animals it takes to feed the planet. But soon we will be able to grow as much meat as we want—without the animals involved at all. [Animal-free Meat](#)

The Cost of Plastic Packaging. The growing use of plastic food packaging benefits consumers, but critics say industry isn’t doing enough to minimize the negative environmental impact.

[Efficient Packaging](#)

TECHNOLOGY

Thin Film Nanocrystal from Australia Could Make Thin as Glass Night Vision Goggles That Do Not Need External Power. Scientists at The Australian National University (ANU) have designed a nano crystal around 500 times smaller than a human hair that turns darkness into visible light and can be used to create light-weight night-vision glasses. Professor Dragomir Neshev from ANU said the new night-vision glasses could replace the cumbersome and bulky night-vision binoculars currently in use. "The nano crystals are so small they could be fitted as an ultra-thin film to normal eye glasses to enable night vision," said Professor Neshev from the Nonlinear Physics Centre within the ANU Research School of Physics and Engineering. [Powerless NVG](#)

Finally—a Safe Way to Carry Hydrogen Fuel in Your Pocket. Hydrogen has great potential as a future clean energy source, but safe storage for hydrogen gas remains a key challenge. The intensity with which it burns may have made liquid hydrogen the fuel source of choice for the space industry, but it can only be liquefied at extremely low temperatures. A Japanese research team from Waseda University has invented a compact, flexible polymer that could be used to create a plastic container for hydrogen that's safe to carry in your pocket. Other possible uses could be to create hydrogen carrying and releasing cartridges as a fuel source for vehicles and other devices and to create on-site hydrogen supply systems for homes, businesses, and remote research bases on the Moon or Mars. [Pocket Hydrogen](#)

MEDICAL FUTURES

Zombies Would Wipe Out Humans in Less than 100 Days. Using algorithms that calculate the spread of disease (pandemic influenza, for example), a new article in a peer-reviewed student journal finds that the zombie hordes would take Earth's population down to a mere 273 survivors in 100 days. [100 Days of the Zombies](#)

What Does the Future Hold for Pharmaceuticals? Consider the two articles offered below. In the first, the author opines that "big pharma" has reached the end of its road and will be unable to bring new drugs to market. The second offers a possible solution to the antibiotic crisis facing mankind today. [Big Pharma - Dead End](#) [CRISPR-Cas3 Solution](#)

Eggs from Skin Cells? Here's Why the Next Fertility Technology Will Open Pandora's Box. Three medical researchers have chosen to alert the public to the social risks of in vitro gametogenesis, a technique they say could allow any type of cell to be reprogrammed into a sperm or egg. The technology's promise is that it could be used to create inexhaustible supplies of eggs for a given woman and could also open the door to high-tech eugenics. For instance, it's possible that the technology could someday allow IVF clinics to manufacture hundreds of embryos and then choose those with the most desirable qualities, like 20/20 vision or a chance of a high IQ. The technique "may raise the specter of 'embryo farming' on a scale currently unimagined," write the authors. [Eggs from Skin Cells](#)

ECONOMICS

Blame Displacement of Jobs on Automation, Not Offshoring and Immigration. Technology is traditionally viewed as a tool that drives human progress forward. Some have called autonomy a threat to society and to the employment and job security of millions. Others argue that the situation isn't nearly as dire as imagined. Elon Musk, who believes that rising automation will lead to the implementation of universal basic income, sees it as an opportunity, leading to more leisure time for people. It is also likely that as industries begin to assimilate technology into their business models, new jobs will be created. While automation can serve to complement human skills, experts think this industrial revolution is different. Beyond supplanting repetitive, formulaic jobs, knowledge-based, creative, and service-oriented

jobs could eventually be overtaken as well. The author ends the article on a positive note, remarking that our species' most remarkable trait is its adaptability—with any luck, we'll weather this storm as we've weathered so many before, and doubtless the people of 2117 will marvel at and even long for our quaint, unsophisticated age and our uncomplicated lives. [Automation and Jobs](#)

URBANIZATION

We Need Good Cities, Not Just Smart Cities. The author writes that there is a mistaken belief that simply building IoT-based applications for a city is sufficient to improve a citizen's quality of life. She challenges that, in our drive towards hyper-connected and ultra-efficient cities, there's a real need to make sure that rather than just building IoT into a community for the sake of it, we should be working towards each component of a smart city having real and measurable citizen outcomes. More than anything else, the idea of a Good City is that the barriers between the community and government services can be broken down, without introducing additional inefficiency in the ability for government to execute on its services. [Good Cities, Not Smart Cities](#)

What If Uber Kills Off Public Transport Rather Than Cars? Traditional thinking would suggest that UberPool will always be inferior to public transport, because although it may be more comfortable than standing on a crowded bus or train, carpooling can't substitute for mass transit at rush hours without massively increasing congestion. However, Uber has begun [offering shared rides](#) for as little as \$1.00, introduced optimized pickup points that algorithmically recreate bus stops, and started testing semi-autonomous vehicles it hopes will solve its increasingly contentious labor issues. The author thinks that simply banning Uber won't work, and neither will battling its labor practices in court. Staving off disruption will require leveraging every tool at cities' disposal, including lane access, parking regulations, and incentives to shift the peak of rush hours commutes, to create communities that are at their best when served by mass transit—and could never be built around a million Ubers.

[Uberization of Public Transport](#)

FORESIGHT NEWS

NIC Global Trends Report: The Paradox of Progress. The National Intelligence Council's (NIC) latest edition of the report (the 6th in the series), *Global Trends "Paradox of Progress"* was released recently, exploring trends and scenarios over the next 20 years. *Global Trends* is the U.S. Intelligence Community's major assessment of the forces—and choices—shaping the world over the next two decades.

[NIC: Global Trends Home](#)



Science-Fiction Futures. Futures Assessment Division is proud to announce the release of the *Science Fiction Futures*, a supplement to the 2015 *MCSEF*. The project began earlier this year in coordination with the Atlantic Council [Art of the Future Project](#). The *Science Fiction Futures* anthology, the *MCSEF*, and previous editions of *Notes from the Edge* can be found at the link: [Futures Assessment Division](#)



"The man who has anticipated the coming of troubles takes away their power when they arrive."
— Seneca

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.