



Competitive Carriers Association
Rural • Regional • Nationwide®

Competitive Carriers Association

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July 6, 2015

Via ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: EX PARTE NOTICE

GN Docket No. 12-268: *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions;*

WT Docket No. 12-269: *Policies Regarding Mobile Spectrum Holdings;*

AU Docket No. 14-252: *Comment Sought on Competitive Bidding Procedures for Broadcast Incentive Auction 1000, Including Auctions 1001 and 1002*

Ms. Dortch:

On July 1, 2015, Steven K. Berry, Tim Donovan, Rebecca Murphy Thompson, and C. Sean Spivey of Competitive Carriers Association (“CCA”); Gardner Foster of Sprint Corporation (“Sprint”); Jeffrey Blum of DISH Network, Inc. (“DISH”); Josh Roland of T-Mobile USA, Inc. (“T-Mobile”); and Trey Hanbury and Deborah Broderson of Hogan Lovells US, LLP, representing CCA, met with Commissioner Michael O’Rielly and Erin McGrath, his Legal Advisor, to discuss matters surrounding the upcoming incentive auction. In a separate meeting on the same day, CCA and DISH representatives; Kathleen Ham of T-Mobile; Larry Krevor of Sprint; Donald (Dee) Herman, representing a coalition of rural telecommunications carriers; and Trey Hanbury met with Commissioner Jessica Rosenworcel and her Policy Advisor, Valery Galasso to discuss the same issues.

CCA and its member companies explained the importance of a robust spectrum reserve to providing a meaningful opportunity for multiple competitive providers to acquire the low-band spectrum essential for cost-effective, in-building service and rural deployment.¹ The spectrum reserve is the only competitive safeguard still under consideration to prevent AT&T and Verizon from using the 600 MHz auction to further consolidate their already considerable low-band spectrum holdings. In addition, AT&T or Verizon are reserve eligible in most of the country,

¹ The attached chart shows the considerable low-band spectrum holdings of AT&T and Verizon, especially when compared to the other two nationwide carriers. CCA additionally provided an article, also attached, discussing the use of wireless connectivity for livestock monitoring, which is driving increased demand in rural and remote areas.

including 74% of the nation's geography and 40% of the pops.² For this reason, CCA supports increasing the maximum size of the spectrum reserve to 40 megahertz or 50% of the auction spectrum, while limiting opportunities for inefficient and potentially harmful bidding practices that would frustrate the pro-competitive purpose of the reserve. If the Commission declines to expand the reserve across the board, CCA would endorse compromise proposals that would increase the reserve at higher initial clearing targets.³

While different members have different specific proposals regarding the spectrum reserve trigger, CCA would support any mechanism that would accelerate the trigger and avoid anticompetitive foreclosure.⁴ The currently proposed trigger for creating the spectrum reserve opens opportunities for gaming if the Commission pursues high clearing targets—with attendant high clearing costs—at the outset of the auction, but later falls back to a lower clearing target with lower clearing costs during a subsequent round. A reserve that is triggered only after competitive carriers have been foreclosed from participation would not achieve the goal of distributing spectrum licenses to a broad variety of applicants.⁵

To ensure a fully stocked reserve, CCA noted that the spectrum reserve should be comprised of the least impaired licenses in a market. Placing relatively unimpaired spectrum in the reserve will help ensure that competitive carriers, which need this low-band spectrum to compete, have an adequate opportunity to gain access to this limited resource.

While members have differing views on the specific mechanism, CCA also would support proposals that would adopt a non-monetary mechanism for assigning specific spectrum blocks during the forward auction assignment phase.⁶ Using an untested, single-round, monetary-based sealed bidding mechanism in the assignment phase of the auction would drain revenues from the clock phase of the auction and potentially prevent bidding in the forward auction from reaching levels capable of satisfying the highest clearing targets. Adopting a non-monetary mechanism to express license-assignment preferences would increase the funds available to purchase broadcast stations and potentially clear larger amounts of spectrum.

² AT&T and Verizon are reserve eligible in 249 and 104 Partial Economic Areas, respectively; the attached map shows the markets where either AT&T or Verizon (or both) are reserve eligible.

³ *See, e.g.*, Letter from Phillip Berenbroick, Counsel, Government Affairs, Public Knowledge and Todd O'Boyle, Program Director, Common Cause to Tom Wheeler, Chairman, Federal Communications Commission, AU Docket No. 14-252, GN Docket No. 12-268 (June 30, 2015).

⁴ *See, e.g.*, Letter from Trey Hanbury, Counsel, T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, AU Docket No. 14-252 (June 30, 2015).

⁵ *See* 47 U.S.C. § 309(j).

⁶ *See, e.g.*, Letter from Trey Hanbury, Counsel, T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 12-268, AU Docket No. 14-252 (June 16, 2015).

Finally, CCA noted the urgent need for additional low-band spectrum and urged the Commission to hold the auction in early 2016. Any delay of the auction could have long-lasting anticompetitive repercussions and could result in tens or hundreds of billions of dollars in lost opportunity for consumers.

This *ex parte* notification is being filed electronically with your office pursuant to Section 1.1206 of the Commission's Rules.

Regards,

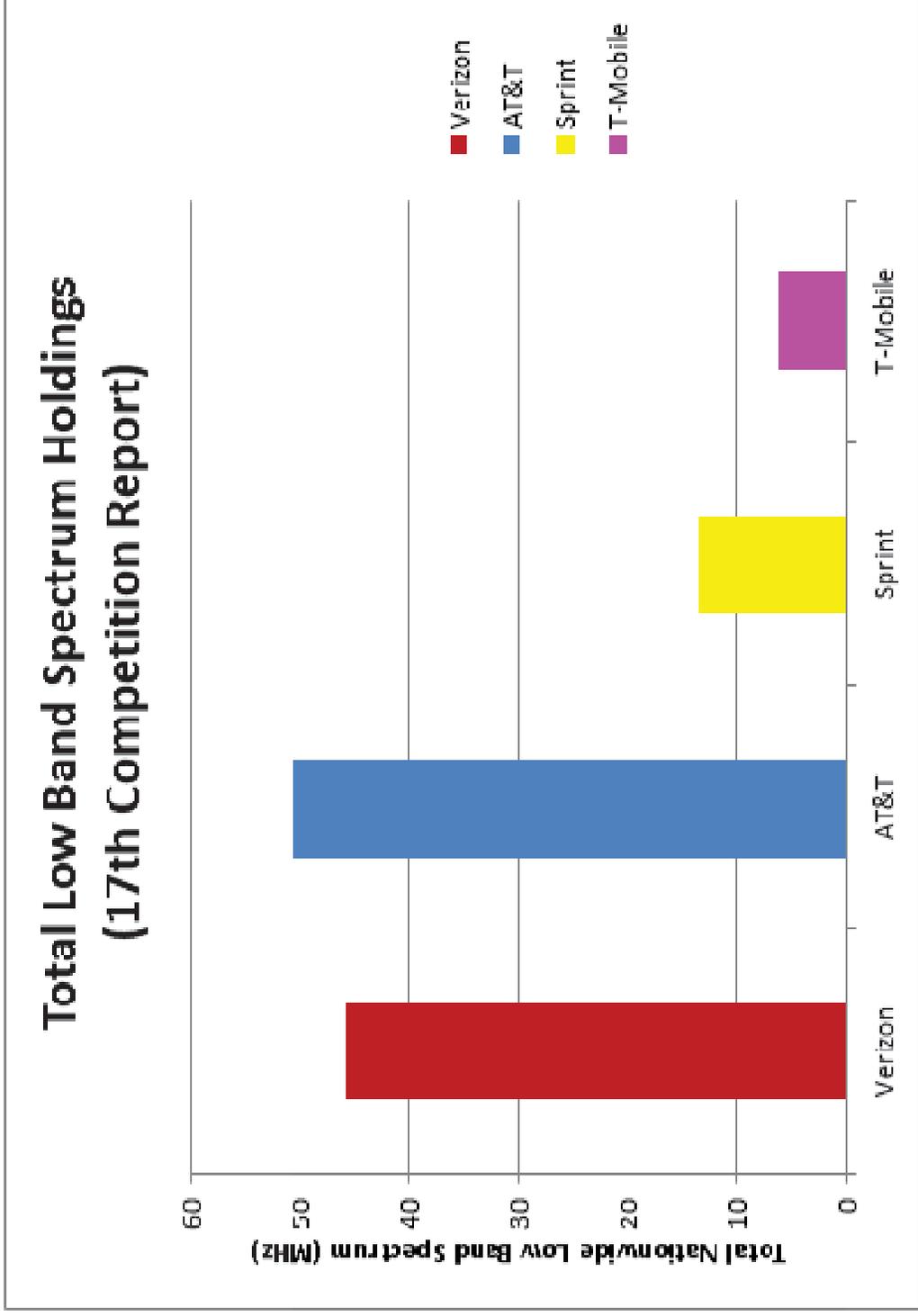
/s/ Rebecca Murphy Thompson

Rebecca Murphy Thompson
General Counsel, CCA

cc: Erin McGrath
Valerie Galasso

Attachments (3)

The Dominant Carriers Control the Majority of Low-Band Spectrum



POLITICO



A cow wearing a MooMonitor+, a heat-sensing device that monitors fertility cycles. | Dairymaster

Introducing the wireless cow

From farming to warfare, an expert tour of what to expect in the networked, disruptive and surprisingly close future.

By DAVID EVANS

With a technological leap as ambitious, sprawling and hyped as the Internet of Things, it can be difficult to get a bead on just what it is — and to imagine how it's going to affect you, if you're not the type of person to rush out and buy a smart thermostat and a networked toothbrush.

We asked David Evans, former chief futurist at Cisco — and currently CTO and co-founder of Stringify, an IOT startup — to draw a map of where the technology stands today, where it's going and how it will affect the nation.

A DECADE AGO, it was easy to describe what the Internet was and how you connected to it. PCs and laptops could log on and access the global computing network. Soon, smartphones were added to the mix, as well as industrial sensors and other electronic devices. It was still easy to tell what was connected to the Internet and what wasn't.

Today, that's changing. Every second, according to my calculations, an average 127 new things are connected to the Internet. At this rate, 328 million things are being connected every month, approximately one for each person in the U.S. By the time you finish reading this article, more than 100,000 new things will have been added to the Internet.

And the "things" are no longer just computers and phones. Today, literally anything can be connected, including tennis rackets, diapers, clothing, vehicles and, of course, homes. And although people may find this unsettling, the network is also starting to include biological things: Today, pets, crops, livestock, and the clothing on your body can be connected. We're not far from an Internet link you can actually swallow as a pill.

As soon as a thing is connected, it becomes "intelligent," able to tap into computing power from the cloud as well as the collective information from other things. Suddenly, a shirt doesn't just provide protection from the elements; it generates data that allow people to measure temperature, perspiration, heart rate, movement and more. A connected shirt on an athlete can improve performance. A connected shirt on a soldier could save his or her life.

These innovations might seem trivial, but they're not. Take for example, Vessyl. Vessyl is a "connected cup" from Mark One that can identify, measure and track what you drink. Today, it can even tell the difference between a Coke and a Pepsi. The device has been met with skepticism — one editor called Vessyl "the most ridiculous, unnecessary gadget I've seen demoed in all my years as a tech journalist."

He may be missing the bigger picture. It's not too difficult to envision Vessyl or

similar devices being used in health care to provide immediate blood or urine analysis, or by a chemical company to determine and measure elements in a new compound. It could prevent someone from consuming a liquid they might be allergic to, or help a person with diabetes consume just the right amount and type of sugar.

Here's what policymakers need to understand: Each individual device hooked up to the Internet is a kind of experiment, and any given product might succeed or fail. But in aggregate, this is an advance so large it's hard to grasp as a single thing.

Government itself will have broad use for these technologies; leaders will have a growing responsibility to protect consumers while also fostering a key American industry. To help leaders understand its full implications, I've put together a broad survey of the areas where I believe IOT will have the biggest impact on policy and governance in the next four to five years.

CAN YOU REALLY DIGITIZE FOOD?

It's hard to imagine a more analog industry than food — from planting seeds in the dirt to cooking and eating dinner. But that's exactly why networking and sensors are likely to be so transformative.

Start with the farm. Farming is an extremely unpredictable business, thanks to everything from weather to commodity prices. Equipment is expensive; land and water are scarce. Millions of dollars can be lost each growing season simply by making a wrong decision.

Farmers are already addressing these risks using sensors, GPS, tablets and cloud servers to map yields, time plantings and know just how much fertilizer to apply. FieldView from The Climate Corporation is a cylindrical device that fits in the palm of your hand, connects to a tractor and allows the driver to view real-time images of their acreage through their iPads, for example, to see just where fertilizer needs to be applied to achieve yield targets.

In addition to crops, IOT is affecting the livestock industry. Radio frequency ID tags, similar to those implanted in pets in case they get lost, have been used for years to make cows easier to track. But uptake has been slow. An estimated 30 million cattle worldwide have been tagged in the past 15 years. That number is small, however,

given that there are about 98 million head of cattle in the U.S. alone, and 1 billion worldwide.

This may change as concerns over rapidly spreading diseases such as mad cow and bird flu mount. Already, the worst bird flu in U.S. history has resulted in more than 46 million chickens and turkeys being destroyed in an attempt to prevent the disease from spreading. And mad cow disease has not gone away. The latest case was discovered just this year in Alberta, Canada.

What can be done to limit or even prevent epidemics from happening in the future? Consider how fitness trackers for people are evolving. Companies are already moving to apply the technology to animals. An ear tag sensor developed by Agis Automatisering in the Netherlands has been validated for heat detection and health monitoring in the dairy industry. It also shows promise as a tool for early detection of respiratory disease in feedlot cattle. The CowManager SensOor tag clips onto an Allflex RFID tag to detect ear movement when cows are feeding; when an animal's eating patterns suddenly shift, an alert is sent to farmers via an app on their mobile devices. Changes in feeding behavior can indicate illness as early as seven days before cattle show symptoms, so the alerts can help farmers head off problems early.

Further into the future, many foresee innovations such as “vertical farming” transforming agriculture entirely, and here the IOT will be central. A vertical farm is the practice, now mostly experimental, of cultivating plant life skyscraper-style, which allows farms to be located in or near cities, shortening the time for growing, transporting and distributing food.

Vertical farms would be networked two ways — internally and externally. Internally, small sensors in the soil or connected to the plants themselves will tell a system exactly how much light, water and nutrients are required to grow the healthiest, most productive crops. Sensors will also tell farmers when crops are at their peak for harvesting. The entire thing would essentially be a responsive machine for growing crops.

Externally, vertical farms will be connected to other networks and information systems, including potential databases that track local demand. For example, local restaurants could input when they need to replenish their fresh food supplies. This

information could be aggregated to help vertical farmers know which crops to grow and in what quantities. Vertical farms would also be connected to the power grid, using their windows as solar panels to supply the system — creating a tight feedback loop involving the food supply, the power grid and consumers that would have been unimaginable a generation ago.

HEALTH CARE: A COMPLICATED ICEBERG

The Apple Watch is a tiny thing that evokes the huge potential of the IOT. The average American adult sits seven to nine hours a day — more than most people sleep each night, a lifestyle that is increasingly believed to harm our health. It's easy to read advice about walking more, and just as easy to ignore it. But the fact that the watch is *attached* to you — that it's monitoring your movements and can physically remind you to stand up and walk around — makes a huge difference in how much it affects your behavior. Similarly, the FitBit, and even the iPhone's step-counting feature, offer an entirely new kind of encouragement to keep people active.

This is just the tip of an iceberg, and the opportunities and challenges here are increasingly complex. Inside the medical system, hospitals and doctors' offices are already being transformed by Internet of Things technologies, as testing and record-keeping become increasingly electronic. Some shut-in patients have begun to get their regular daily care via “telemedicine,” a networked suite of home-care devices that can be monitored remotely by doctors and nurses.

As technology improves, these two distinct-sounding things — consumer products and specialized medical devices — will begin to converge. For example, a company called Cyrcadia Health is developing a connected bra to improve breast-cancer detection and reduce the number of unnecessary screenings. An ingestible sensor called the Proteus pill, which has received FDA clearance, though still in the experimental phase, can communicate real-time information about your body to doctors through a wireless connection.

Individually, they might sound like novelties, but taken together they represent what might be the most important structural change in health care in our lifetime: turning a check-up into an ongoing process, not an annual event. And as wearable devices improve, and more sensors are added to measure blood pressure, pulse rate and

glucose levels, the benefits will only increase — and consumer health and the medical realm will increasingly intersect.

This raises a host of opportunities and also challenges that reach to the top level of government. Our payment system, from Medicare on down, is built around doctor visits, and it's not always clear how it will fund the new connected-health industry. Hospitals are already struggling with technical “interoperability” questions, as devices made by different companies don't always sync well — an annoyance in an office, but a life-threatening problem in an ER. And the vast amounts of patient data suddenly traveling through new channels raise red flags for health-data privacy regulators.

TRANSPORT: WILL HUMAN DRIVERS BE OUTLAWED?

Several years ago, I predicted that human driving would become illegal in many scenarios. It struck people as crazy at the time, especially car enthusiasts. But I still believe it could happen, and to understand why is to get a sense of just how much networked transportation is going to change our world.

Google's self-driving car, ignored for years as just one of the company's pet projects, has garnered a lot of attention with its ability to safely navigate test environments. Google admits that fully autonomous cars are years away from replacing human-driven vehicles, given the enormous complexities involved. But self-driving technology is already starting to show up on the road. Tesla is about to enable its fully electric cars with a driverless mode via a wireless software upgrade. Luxury carmakers such as Mercedes and Infiniti are competing to introduce features that automatically slow your car in traffic or avoid dangerous lane changes.

But individual cars aren't likely to be the first place where networked vehicles make their impact felt. That's likely to be the trucking industry, which delivers nearly 70 percent of all freight transported annually in the U.S. and uses huge amounts of fuel and road capacity. The Internet of Things has tremendous potential to make the industry safer and more efficient. Just recently, Daimler received approval from Nevada to test its driverless trucks on the state's highways. The truck uses cameras, sensors and radar to scan the area all around it and determine its position on the road and in relation to nearby cars and trucks.

Connected trucks are aiming to improve safety by taking much human error out of the equation. Currently, the top three causes of trucking accidents — drug use, speeding and unfamiliarity with local roads — all involve human judgment error.



A dark gray rectangular button with the text "thinglink.." in white, lowercase letters.

M. Scott Mahaskey/POLITICO and Handout images

Connected trucks can slow fuel usage, lower emissions and reduce maintenance costs. For example, connected trucks can calculate and suggest the most efficient route given road and weather conditions. They can also monitor and automatically adjust tire pressure in real time. In the future, “self-shaping” trucks will be able to change their profile on the fly based on wind direction, lowering themselves by a couple of inches to greatly improve fuel efficiency and wear and tear on the engine and transmission.

It’s not unreasonable to expect that trucking will soon be a collaborative effort between the truck and the driver. (The term “driverless” is really a misnomer today.) Drivers will still be present in the truck to monitor and control the truck on its journey. You can think of today’s autonomous trucks as autopilot for drivers. Clearly, this poses a challenge for regulation and liability, since our current legal system is built entirely around the driver.

And even before we get to self-driving and autonomous vehicles, a more fully networked transit system will change the experience of getting from one place to another, or even finding a place to park. Today, several cities, including Amsterdam and Barcelona, have installed parking sensors that can detect and signal when a space is occupied or vacant, informing drivers via a mobile app. Further into the future, as transportation becomes more connected, vehicles involved in a crash could send a signal that alerts all other drivers, enabling them to slow down or take an alternate route, dramatically reducing travel delays and speeding the progress of emergency vehicles. According to a report by Morgan Stanley about the impact of autonomous cars, when fully functional, the full suite of networked car capabilities could save approximately 30,000 lives and avoid 2.12 million injuries each year.

The prospect of a more intelligent transit system raises some important questions for planners and regulators. How do you integrate the new automated infrastructure with the legacy analog one? And if networking produces the huge safety gains that are predicted, at what point does the law begin to acknowledge and even enforce the use of new, safer technologies?

So will driving be outlawed? The time might be coming closer. During a technology company conference, Tesla founder Elon Musk said, "In the distant future, I think people may outlaw driving cars because it's too dangerous. You can't have a person driving a two-ton death machine." He later clarified his comments by tweeting, "When self-driving cars become safer than human-driven cars, the public may outlaw the latter. Hopefully not." It might be too radical for even Elon Musk to say now, but the fact is that humans are very error-prone drivers, and the connected future will force us to confront that reality.

DEFENSE: NETWORKING THE BATTLEFIELD

The true cost of war is its human toll, and nowhere does the Internet of Things have the potential to save American lives more directly than it has in the realm of defense.

Drones, often called unmanned aerial vehicles (UAVs), have already become a central tool of American force projection, conducting surveillance and attacking enemy targets from great distances without putting pilots' lives at risk. But they've also triggered ethical debates so profound they've reached the Senate floor, which are only

likely to become sharper as drones become smarter, opening up the question of how much of a "kill" decision can be delegated to a machine.

As the technology improves, the Pentagon is developing smaller drones to use in whole new ways, for instance to act as the eyes and ears of combatants. Recently, the Navy put out a request for information for both a nano and a small vertical takeoff and landing unmanned aircraft system. The request stated the nano system should weigh between 5 and 20 pounds and be capable of providing intelligence, surveillance and reconnaissance during day and night operations and in all environmental conditions. This approach builds on the use of larger, long-distance drones by becoming an integral part of military teams on the ground, essentially extending and augmenting the human senses of seeing and hearing.

This is all part of a larger development in warfighting that is often called the "connected battlefield" — an orchestrated scenario in which literally everything involved in a battle, including air and ground vehicles, weapons, ammunition, and even soldiers themselves, is networked and monitored from a command and control system. The Defense Advanced Research Projects Agency even has a program to control and track individual bullets. This clearly opens the door to dramatically better on-the-ground planning, potentially cutting through the "fog of war" as never before, but also clearly creates huge new needs for data management, security and reliability.

Drones, in particular, have raised significant legal, moral and ethical questions that the U.S. government is still working through. And those are likely to become only more complex as armed, unmanned vehicles enter more types of combat and become smarter and more autonomous.

But many of the networked technologies are more benign, helping to save money and eliminate waste. And considering the dangers caused by the simple unpredictability of war, connectedness that increases the amount of information available allows for better decisions, saving both civilian and combatant lives.

HOME: YOUR STUFF COMES TO LIFE

When people bring up the topic of the Internet of Things, one bit of shorthand they often use is the "connected refrigerator." (Or the networked toaster, or the smart toothbrush.) It's often easiest to understand a technology by starting with the things

most familiar to us. Some of the most prevalent “networked home” technologies today are security systems, thermostats, light bulbs, appliances and locks.

While these innovations are interesting and make life more convenient, they really just scratch the surface of what’s possible. In the future, almost any object or surface could be connected to the Internet, where it has access to intelligence and information from the cloud. Soon, your door may have a camera with facial recognition that sends alerts to your mobile device about who visited while you were away. Cameras on other doors and windows could automatically alert the police and immediately notify you when a criminal tries to enter your home. There is even an oven in development — the June Intelligent Oven — that recognizes what you cook and makes recommendations based on your dietary requirements.

Of course, this all assumes that the “things” we network more or less stay where they are, becoming a smarter version of the domestic landscape we know. But with computing, that’s not what happened — computers moved from their original homes in separate buildings and rooms, to your desktop, pocket and now wrist. It’s reasonable to expect that networked things themselves are going to become an even more integrated part of our active lives.

The clearest current example is drones, whose civilian use has generated every bit as many headlines as their military use. Amazon’s experiments with drones are a well-known attempt to radically change how packages are delivered. (In Europe, Amazon is testing a nondrone delivery scheme in which DHL delivers packages directly to the trunks of Audi owners’ remote-unlockable cars.) All of these are raising new questions about what constitutes commercial aircraft, who should regulate and supervise their activities, and what the world might look like with a new kind of traffic flying overhead.

NOW WHAT?

As Washington wakes up to the importance of this new tech wave, I’d suggest a few things:

- *Don’t look at your world in the same way again.* The Internet of Things is quickly turning inanimate objects into intelligent devices, and it’s happening now. In the next decade, 50 billion things will be connected to the Internet. Consider something as

trivial as the front door of your home. Now consider how it transforms via a low cost sensor and an Internet connection. The door now grabs a snapshot of your face, sends it to the cloud for processing, and via facial recognition determines whether or not to let you in. A simple object just became a very powerful entity, controlling access to your home, thanks to a connection.

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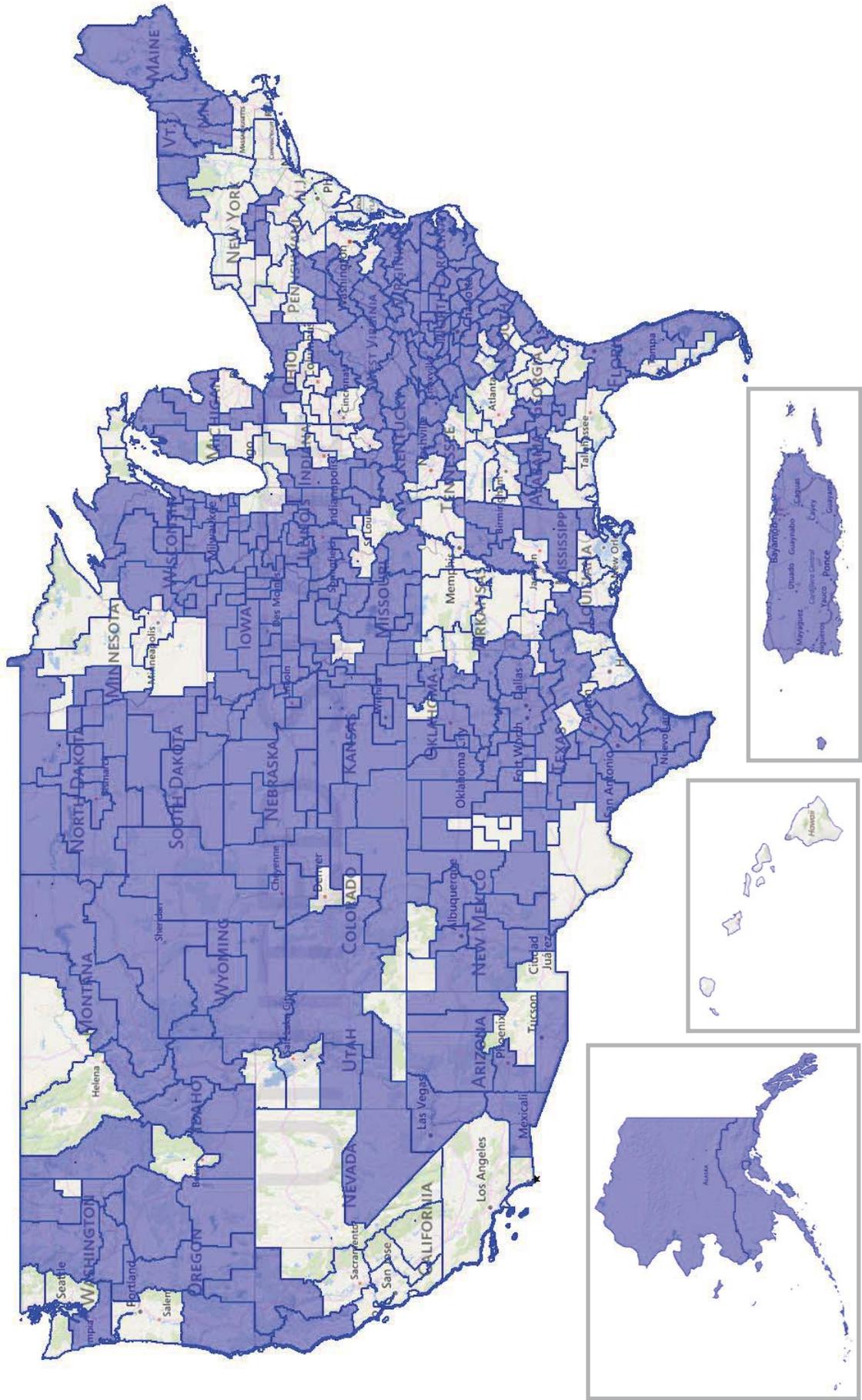
Don't do nothing. I know this is a double negative, but I want to make a point. Doing nothing is the worst possible course of action. Change is happening fast with or without you. Because it's the early days, you have a tremendous opportunity to shape the future. Action today — or inaction — will be greatly amplified in the future.

- *Don't be too much of a skeptic.* It's far too easy to assume that this is all overblown, or that risks such as privacy and security will outweigh the rewards. While healthy skepticism is important, fear will result only in stifling innovation. Overall, the human race has done pretty well in using its advances to help people live longer and improve their standard of living. Even if you discount this advice as coming from someone in the technology industry, think of it this way: This is already happening. Skepticism, at this point, is just a form of pretending things won't change.

It is rare that a technology comes along that is so pervasive, so transformational and so accessible by so many. Over the coming years, and as our population continues to grow, we are about to face some big challenges. IOT has the potential to change how we manage our planet, how we manage our precious resources, how we communicate, how we manage our health, how we educate and ultimately how we live. Your ability to shape the world has never been greater than it is today. Let's get this right.

David Evans is co-founder and CTO of Stringify, a startup company focused on transforming the Internet of Everything.

PEAs in Which AT&T and/or Verizon are Reserve Eligible



Alaska, Hawaii and Puerto Rico are not to scale