

GOVERNMENT TECHNOLOGY[®]

SOLUTIONS FOR STATE AND LOCAL GOVERNMENT

VOL27 ISSUE3 | APRIL 2014

PLUS:

BUILDING
SUSTAINABLE
COMMUNITIES

ROBOTICS
AND THE
UNCERTAIN
FUTURE
OF WORK.

MAN
VS.
MACHINE?



WHAT IS VISUAL HACKING AND WHY SHOULD YOU CARE?

It's probably happened to you.



Ever been on an airplane or in a coffee shop and caught someone looking at your laptop screen? That's visual hacking.

It could be your laptop, smartphone, or even paper documents. Somebody sneaks a look at something they shouldn't be seeing, and you've been visually hacked.

Visual hackers lurk everywhere.

67% of employees expose sensitive data outside the workplace.* It happens on planes and buses. In restaurants and cafés. At hotels and tradeshows. In waiting rooms and boardrooms. Anywhere sensitive information is exposed, you can bet it's seen by people who aren't supposed to. And with the boom in mobile devices, the problem will only get worse.

Here's why it matters.

Some may say, "So what?" But do you really want to find out what happens when your organization's private business becomes public knowledge? We're talking intellectual property, customer data, financial documents, personnel files, and more. Organizations spend millions on IT security but do little to prevent the display of sensitive, proprietary and confidential data in plain sight. Failing to address this vulnerability is too big a risk.



Without a visual privacy policy, your organization is exposed.

Go to StopVisualHacking.org for resources and information about establishing a visual privacy policy where you work. Do it today.



STOP VISUAL
HACKING.ORG

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Governments must consider — and address — how analytics, sustainability and robotics will impact their futures.



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DAVID KIDD



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COLUMNS

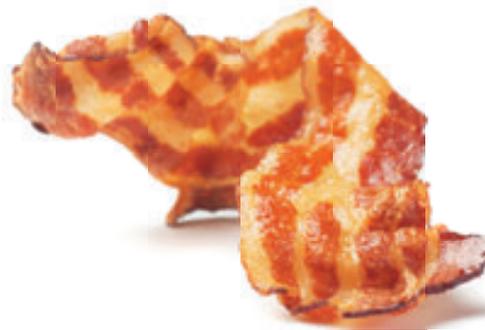
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Rethink Possible® 



A Step Toward Better Cloud Purchasing

In March, representatives from 10 states and localities sat down in Dallas with some of the industry's biggest service providers to start bringing government purchasing practices in line with an increasingly cloud-based world.

The meeting, hosted by e.Republic's Center for Digital Government, marked the halfway point for the group, which also met in New Jersey in January. Its goal is to clear up confusion between government and vendors by creating a standard set of terms and conditions for "as a service" contracts.

Government participants included Colorado, Delaware, Georgia, New Jersey, Pennsylvania, Texas and Washington, along with Austin, Texas; Oakland County, Mich.; and Fairfax County, Va. Companies involved are Amazon, AirWatch, Dell, Deloitte, EMC, General Dynamics, McAfee, NIC, Salesforce, Symantec, Unisys, Verizon Terremark and Workday.

Group members admit they won't eliminate all of the uncertainty around contracting for rapidly evolving cloud services, but they intend to reach substantial agreement on key issues — and that's a great start. In many cases, government customers and cloud vendors aren't even speaking the same language. And all too

often, that means agencies can't attract bidders they want, or they pay more than they should for the services they buy.

Much of the discussion in Dallas revolved around security — an important topic as agencies contemplate moving more data onto systems they don't own. One issue, for instance, was how quickly service providers must alert government customers of security incidents. Another crucial question is a vendor's level of liability in the case of an actual data loss. As a result of these talks, group members now are drafting notification standards and creating a formula for determining the potential cost of a data breach.

In addition, the group intends to develop practical data encryption standards for service providers, create guidelines for auditing government systems running in private data centers and come up with reasonable rules for how long vendors must retain government data after a contract is canceled.

Given the rapid rise of cloud providers and the public sector's pent-up demand for system modernization, it's vital to put government and industry on the same page when it comes to procuring cloud-based services. This sort of public-private collaboration is a big step toward faster, easier and more effective cloud procurements. **GT**

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Silver Falco: Editorial Excellence Award



ENERGY STAR LOW CARBON IT CHAMPION: The RagingWire Critical Facilities Team.

SAVES ENERGY BY: Installing numerous energy-efficiency measures at its Sacramento facility—*one of the first colocation data centers to earn the EPA ENERGY STAR Building designation.*

SAVINGS: \$900,000 or 8 million kWh per year—enough electricity to light 4,000 homes annually.

CARBON REDUCED: 6,000 tons of CO₂ per year, equivalent to annual emissions of over 1,000 cars.

NEXT GOAL: Optimize and operate world-class energy delivery systems across RagingWire's data centers coast to coast.



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RagingWire is cutting costs in one of the fastest growing energy uses in the country – information technology. To learn more about what you can do, visit www.energystar.gov/lowcarbonit.



ENERGY STAR

Bright Idea

North America has more than 1 billion street lights. Because of energy and maintenance costs, cities have begun turning to LED lighting technology, which can do more than just cut costs. LEDs also can be a platform for a host of technologies that can monitor what's going on in the light pole's vicinity. Link

these so-called intelligent street lights into a network, and you have the makings of a smart city, say experts.

The Port Authority of New York and New Jersey recently announced a pilot project that's testing 171 smart LEDs that will act as sophisticated lighting controls and security cameras in Newark's Liberty

International Airport. The cameras are intended to monitor foot traffic in certain areas, as well as keep an eye on unattended baggage. They are also expected to be used for security purposes. Las Vegas, for example, is installing intelligent LED lights that can not only broadcast music, but also record nearby sounds.



SHUTTERSTOCK/MIKROPICT

WHO SAYS?

"Collecting information just for the sake of collecting information isn't useful."

www.govtech.com/quote-April14

6.5 Mbps

The average 4G LTE connection speed in the United States



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New App Calls 911 and Notifies Family in Two Taps **182 SHARES**

Innovative New Span to Replace Iconic Los Angeles Bridge **149 SHARES**

Securing Everything

The emerging **Internet of Things** is poised to change everything for cybersecurity. That was the message from a pair of Cisco executives at the 2014 RSA Conference in late February. The network administrators of tomorrow can't approach the ever-changing landscape of networked objects and programs the way they do today. Instead, they'll need to adopt a two-step approach that monitors device users through traditional means like authentication and validation, but also monitors the characteristics and state of the devices in use.



“While migrating toward the First-Net system, it is imperative to maintain the existing public safety state radio communications infrastructure which our state's first responders rely on to safeguard not only the public safety, but their own lives in the performance of their often extremely hazardous jobs. Kudos to Secretary [Darryl] Ackley and his team for their technological and business acumen in working closely with their providers and most importantly their customers, the public safety agencies, the 'boots.'

iRWendel in response to New Mexico CIO Shares Views on Enterprise Services

“We have the same issues here in the UK public sector where the procurement process is so documented and rigid, it leaves little scope for innovation. The EU rules have recently been revised to 'promote' innovation in the tender responses, although how this is done is not clarified, which means it won't be done.

marketdojo in response to Philadelphia Innovates Public Procurement

“It's likely that many agencies will move in this direction. It's necessary to protect public safety employees. If social media posts aren't verified, it can cause information to be released that shouldn't be.

Steve Conrad in response to D.C. Public Safety Agencies Unite Under One Social Media Policy

“It looks like you are heading in the right direction. Good job in making timely and forward decisions.

John Frederick in response to Connecticut Digitizing State Regulatory Process

“This is probably the dumbest idea [Sen. Ed] Marke has ever had. ... Any criminal with 10 minutes and a pair of wire cutters will be able to defeat the 'smarts' in any design. It's also a way to make sure that no one except the rich can afford a gun for their own protection.

spencer60 in response to Can Smart Guns End the Gun Control Stalemate?

/ Envision the Future Happening Today



In the past, technology limitations have hindered public safety first responders from obtaining the information they need when they need it.

/ The Spark of Innovation

Throughout history, the spark of innovation has often boiled down to solving the problem of better connecting people and improving their communication. Radio. The telephone. The Internet. Mobile phones. Social media. Each iteration of innovation in the last century has shaved down the time it takes to communicate, with present technology delivering lightning-fast, instantaneous results.

The ability to connect and communicate internally and with citizens at the height of efficiency is a goal to which effective government leaders aspire — and with SunGard technologies, leaders can envision the future happening today.

SunGard uses its experience and passion for the public sector to help government successfully innovate. That includes harnessing

technology to improve people's lives — whether that means ensuring their safety, providing them with easier access to services or using tax dollars to more efficiently build infrastructure. More than 150 million citizens live in communities utilizing SunGard solutions and services today.

/ Finding Freedom

In the past, technology limitations have hindered public safety first responders from obtaining the information they need when they need it. For example, police officers responding to an incident would not have the records available to know if they were entering a potentially dangerous situation. A routine traffic stop could become a much more serious situation if the driver of the car in question had a violent criminal record. A call regarding a neighborhood dispute would be approached differently if the houses in question had a history of gang or drug activity.

SunGard has helped solve these issues with Freedom, a public safety mobile app that delivers the power of SunGard's ONESolution computer-aided dispatch (CAD) and record management system (RMS) into the palm of an officer's hand. With Freedom, officers can send and receive secure text messages within the platform-independent app. Dispatch automatically updates officers with digital audio alerts when incident data is modified. Supervisors have information regarding the location of units, including their assigned incidents. Officers no longer have to contact dispatch regarding their location and they have instant access to information about the incident they are investigating, including location, nature of the incident, call history, notes and more.

Freedom takes the power of ONESolution — a public safety and justice software suite with robust functionality and intuitive user experience — and puts it in the palm of a user's hand.

SunGard's ONESolution suite for public safety and justice was designed to communicate real-time data, provide multi-jurisdictional support for stronger information sharing, integrate with additional systems through interoperable modules and increase officer safety with critical information delivered at the moment they need it. Powerful mapping technology provides GIS data for location information that is critical for public safety.

Davidson County, N.C., uses ONESolution precisely for this reason. Terry Bailey, director of Davidson County 911, says of the software, "Google mapping allows us to follow a chase as it leaves our county into surrounding counties. Before ONESolution, we were at the mercy of the audio back and

forth, but now we can follow with Google maps as it goes into another jurisdiction."

/ Digital, End to End

While communicating quickly is important, for the public sector it's also critical that communication be efficient and organized. Government agencies that are financially strapped with overburdened employees don't have time to waste on cumbersome, manual workflow processes. For them, innovation means easy automation of everyday business activities — a way to complete tedious tasks quickly and move on to higher-value activities.

For these employees, SunGard delivers Electronic Plan Review, a tool that enables agencies to digitally manage plan review processes. SunGard technology enhances collaboration as plans by multiple departments, including building departments, police and fire, are contained in an online repository, allowing stakeholders to upload and access files anytime and anywhere — even from the field.

For even greater efficiency, the solution can be integrated into other SunGard Public Sector applications to enable an end-to-end electronic review process with highly structured workflows and e-forms that allows for easy resubmissions, notes and comments from multiple departments.

/ Innovation, Continued

SunGard aims to keep the spark of innovation lit with continually evolving solutions and support for the public sector. ONESolution, Freedom and Electronic Plan Review are only a sample of the tools SunGard offers to help the public sector achieve its mission by better connecting, communicating and innovating.

SUNGARD[®] PUBLIC SECTOR

For more solutions, check out the SunGard Public Sector page at www.sungardps.com/, follow us on Twitter at twitter.com/sungardps or like our Facebook page at www.facebook.com/sungardpublicsector.



The True Costs of Blight

A data-rich understanding of properties in distress informs a better plan of attack.

When cities lose population, there's often a knee-jerk reaction to do something, anything, and do it as fast as possible. The resulting blight is seen as an epidemic that must be stopped, and the faster, the cheaper, the better. Yet a fast but blunt response can do more harm than good, only treating the symptoms without dealing with the root causes, and intervening at the wrong points of the divestment cycle. Cities are now coping with their blight problems by taking pause to build and leverage comprehensive data and technology to help them better deal with blight itself.

Understanding the impacts of blight using data is a great start for cities. The Federal Reserve Bank of Cleveland reports that the cost of vacancy, delinquency and foreclosure is much greater than one might expect. Home prices vary depending on the level of homes that are vacant, delinquent in property tax payments for at least one half-year, and/or foreclosed. In high-poverty areas, vacant homes can reduce the price of houses within a 500-foot radius by up to 3.6 percent, while

delinquent properties have an impact of up to 12.3 percent. These are major impacts, especially for cities such as Detroit and Baltimore that have experienced major decline over the last decade.

Detroit, possibly the city hit hardest by blight and vacancies, is leading the way in attacking the problem in a data-driven method. Detroit's Blight Removal Task Force, deploying more than 200 people over 14 weeks, has successfully surveyed more than 99 percent of the city's 380,217 properties. Information collected onsite, including photographs, lot characteristics, condition of structures and the owner, is sent wirelessly to the operations center, where it is checked while the team is still at the property. This information has helped identify candidates for demolition and areas of elevated safety concern.

In Baltimore, Mayor Stephanie Rawlings-Blake is addressing the city's blight issue with the Vacants to Value program, a multi-pronged initiative that seeks whole-block outcomes through strategic application of

a variety of tools. The program focuses on streamlining processes to dispose of vacancies and targeted code enforcement to keep transitional blocks afloat — using a citywide GIS-enabled codification system.

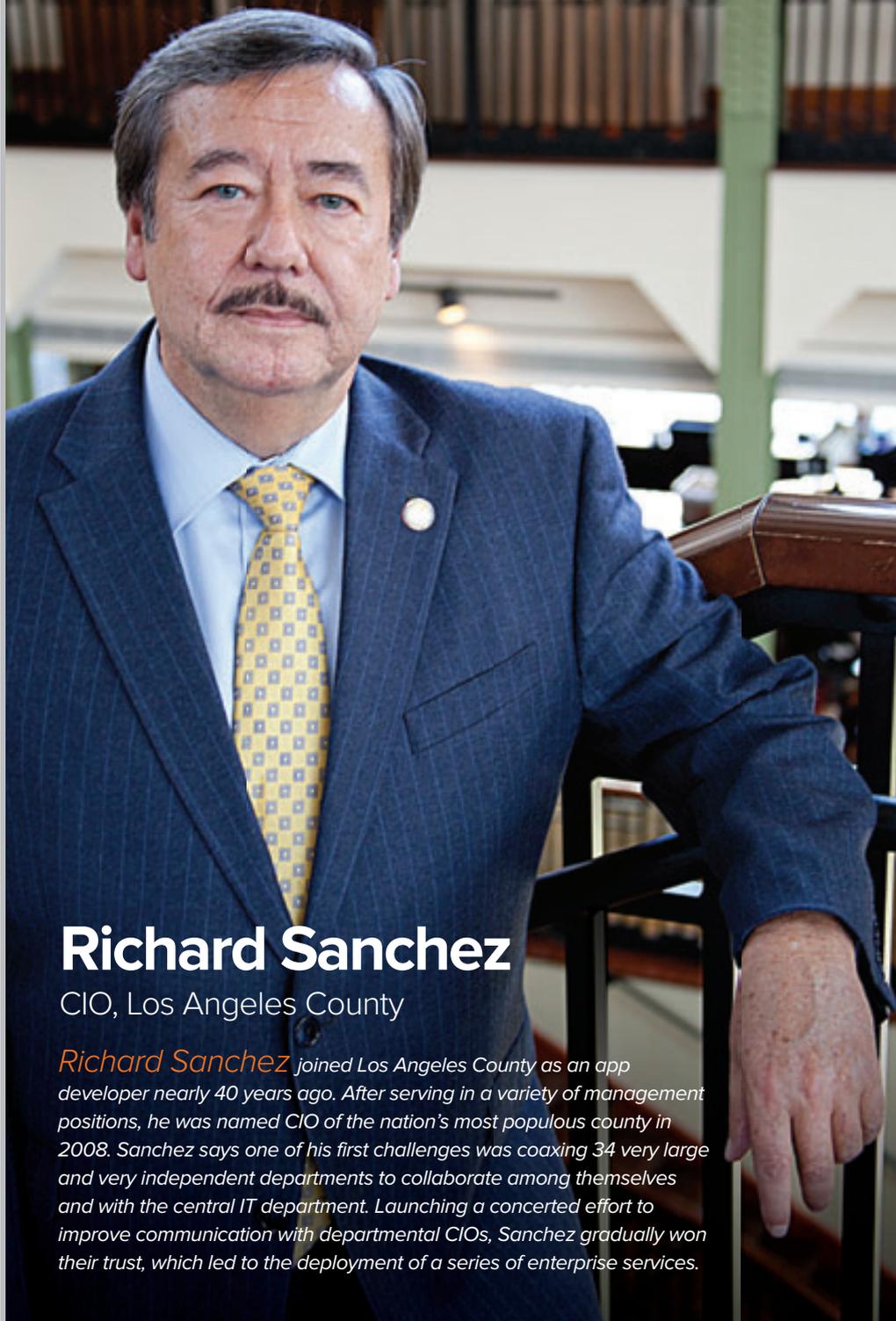
Utilizing data housed in various agencies, the city has cataloged and mapped 3,500 vacant buildings plus 900 buildings interspersed on row-house blocks that require occupants to relocate to allow for whole-block demolition — at a price tag of \$165 million. Albeit expensive, this work would eliminate 35 percent of Baltimore's unmarketable vacant buildings. Focusing on whole-block outcomes, the city developed a pilot deconstruction program in conjunction with the Office of Sustainability to encourage reinvestment in public infrastructure, and focus policing and homebuyer incentives in a targeted approach, block by block. In one neighborhood, the city has reduced vacancies from 308 to 225 in two years and homes are beginning to sell for more than \$200,000 — a significant increase from previous prices.

Solving blight problems requires speed, but also high levels of coordination across departments; data creation, collection and analysis; and a re-examination of traditional tools and approaches. Digital tools and data analysis like those I've mentioned should allow cities to act more efficiently, solve more goals simultaneously and turn neighborhoods around faster than before. 

Stephen Goldsmith is the Daniel Paul Professor of the Practice of Government at Harvard Kennedy School and directs the Innovations in Government Program and Data-Smart City Solutions. He previously served as mayor of Indianapolis and deputy mayor of New York City.



A task force in Detroit surveys vacant properties to help the city determine its next move.



Richard Sanchez

CIO, Los Angeles County

Richard Sanchez joined Los Angeles County as an app developer nearly 40 years ago. After serving in a variety of management positions, he was named CIO of the nation's most populous county in 2008. Sanchez says one of his first challenges was coaxing 34 very large and very independent departments to collaborate among themselves and with the central IT department. Launching a concerted effort to improve communication with departmental CIOs, Sanchez gradually won their trust, which led to the deployment of a series of enterprise services.

1 How long did it take for departments to trust you? It was a good couple of years that we worked with these departments. Having been with the county for a number of years gave me an edge, because I knew a lot of the people in the CIO positions. But we had to let them know that we wanted to work with them.

We established a framework for sharing information with each other and identifying some of the pitfalls they were dealing with. We listened to their issues and attempted to address them before we ever implemented a system. That built trust and greater communications and gave us a better ability to work together as an organization.

Now we have a CIO Council that meets regularly to develop strategies for moving forward. Every departmental CIO is a member. We get their input and ensure that no one gets hurt in the effort.

2 What systems have you deployed? We've developed a central infrastructure for a lot of systems that departments ordinarily would want to build on their own. Some examples are business intelligence, GIS and our own cloud service.

3 What's next? One of the big things we'll be looking at is how we deal with our data. Just our sheer size and magnitude requires that we do a much better job of collaboration. We also need to be able to share our data with our constituents — so open data is important.

We'll also be looking at analytics. I think our business executives want that kind of a breakthrough. They want to be able to do something predictive, as well as spot where we might have fraud and where we might be able to save the county some money.

4 What are the challenges to implementing analytics? Part of the issue is that a lot of the data we have has been around for a long time. So the validity of that data is always suspect. We have to go through a major cleaning process to make sure that the data we have is indeed good data.

Within the past few years, vendors have come up with some really good tools that we didn't have in the past. But building the skill set so our folks can do something with that data is critical. I don't think we're 100 percent there yet, but we see the writing on the wall. We need data scientists within county organizations to take a look at this data and see how we do better analysis with it. **GT**

— Steve Towns, Editor



GETTING AHEAD WITH GRANTS

The federal government alone offers billions of dollars each year in IT grants that are often targeted to local governments.

But how can government agencies take advantage of these grants to fund technology initiatives?

To answer this question, *Government Technology*, in partnership with CDW•G, created a comprehensive, interactive grants guide and held a complementary webinar. Download both for:

- ▶ A list of technology grants by vertical
- ▶ Tips on how to maximize your chances of being awarded grants
- ▶ Best practices to managing grant funding for successful outcomes

Download the webinar archive at www.govtech.com/webinars/Winning-Programs-A-Guide-to-Grants-for-Government.html

For a free download of the interactive grants guide, visit http://govtech.com/CDWG_Grants_Guide



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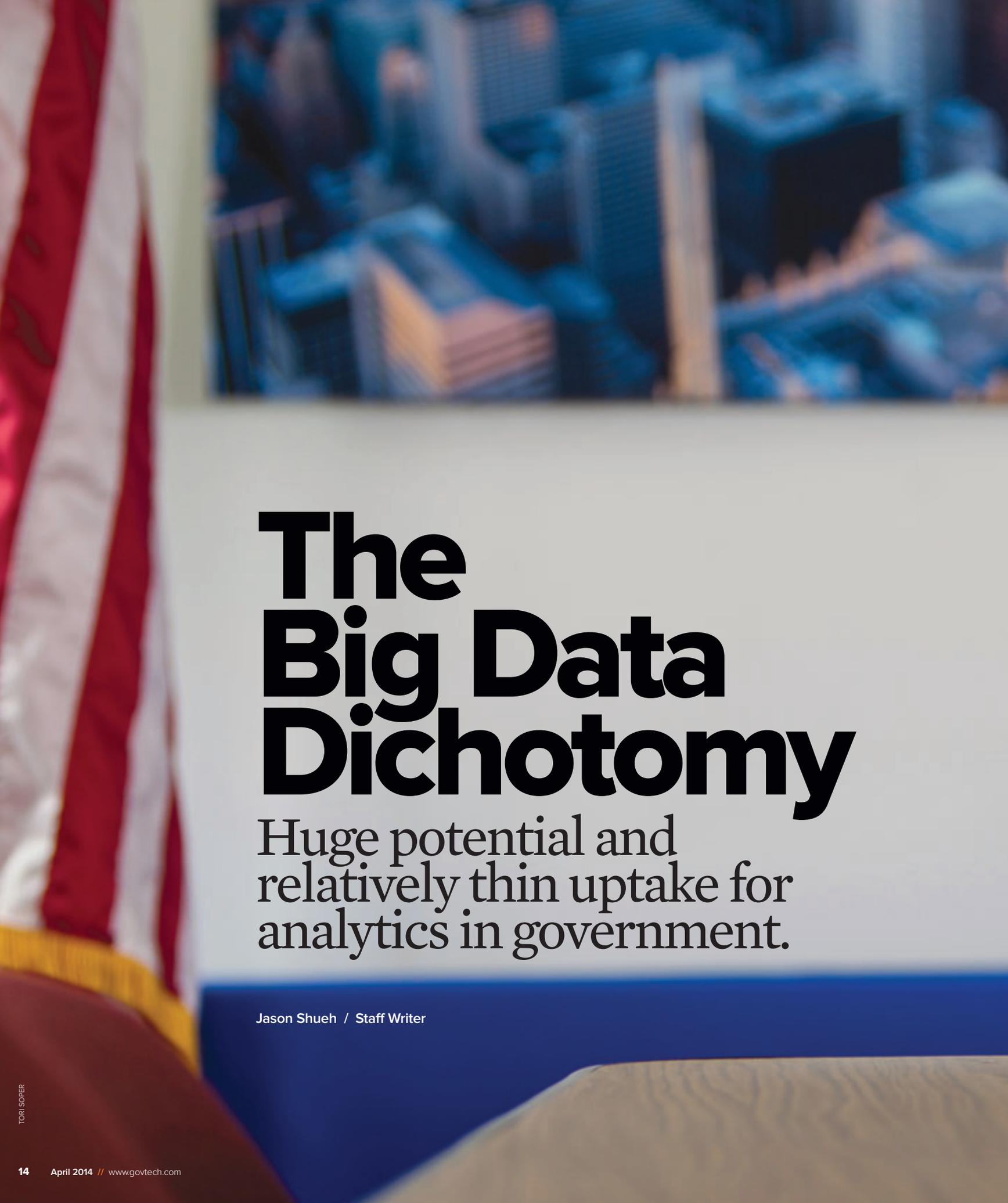


A Friendlier Footprint

The 86,000-square-foot **Grand River Center in Dubuque**, Iowa, located on the Mississippi River, hosts an annual sustainable communities conference, aimed at connecting local governments with populations of less than 200,000 with best practices in sustainable development.

Part of the America's River redevelopment project at the Port of Dubuque, the center boasts several sustainable features of its own. The 10-year-old building uses natural light to minimize energy needs, and features permanent recycling bins and automatically controlled restroom facilities. The center continues to add sustainable features as new technologies become available, including smart meters that track utility usage trends. Located on a trolley route with plenty of bike racks, center visitors are encouraged to leave their cars at home.

DAVID KIDD



The Big Data Dichotomy

Huge potential and
relatively thin uptake for
analytics in government.

Jason Shueh / Staff Writer



BRENNA BERMAN,
CHICAGO CIO

THE PHRASE “BIG DATA ANALYTICS” CONJURES IMAGES OF VOLUMINOUS SERVER ROOMS,

vast labyrinths of data-manipulating algorithms and a kind of Orwellian pervasiveness only a true technophile could embrace. The high-tech and high-spun image of big-time analytics, promoted both by its corporate advocates and true believers, promises ingenuity, efficiency, accuracy, prediction and a previously unheard-of frontier in quick data-driven decisions.

Sure, state and local governments have used analytics to relieve traffic congestion, monitor public utilities, evaluate and predict crime, follow education trends, and keep tabs on public resources. And the bigness of analytics seems to be getting bigger too, if private-sector Goliaths like Amazon are any indication. Amazon’s patented algorithms, for example, allege to predict shopping habits before orders are placed. Other private companies are also using analytics to create statistical treasure maps in market trends.

But for all of its potential, big data’s impact in government remains relatively small. Behind closed doors, government insiders are hopeful of possibilities but skeptical toward first steps. In a study of 150 federal IT professionals, the government IT networking group MeriTalk estimated that federal agencies could save 14 percent with analytics programs, or nearly \$500 billion. However, the study also found that only 31 percent of those that had launched an analytics project believed their data strategies would deliver.

A recent IBM report, *Realizing the Promise of Big Data: Implementing Big Data Projects*, found similar skepticism. The study drew on interviews from 28 federal, state and city CIOs, the majority of whom confessed to fighting a perception of big data as a passing fad. Another CIO admission was a fear to even mention “big data,” dreading a blowback from staff who don’t always understand its potential.

And yet, the technology research firm Gartner says analytics are on their way, reporting that by 2015, the demand for data and analytics jobs will reach 4.4 million

globally, but only one-third will be filled.

Despite the conflicting signals, governments are gradually adopting big data tools and strategies, led by pioneering jurisdictions that are piecing together the standards, policy frameworks and leadership structures fundamental to effective analytics use. They give an enticing glimpse of the technology’s potential and a sense of the challenges that stand in the way.

It’s difficult to put a ruler to analytics and its predictions. Perhaps that’s why Anthony Townsend, a senior research scientist at New York University’s Rudin Center for Transportation Policy and Management, finds the word so nebulous. As he points out, “big data analytics” is just another way to describe taking heaps of information and funneling out a conclusion, a process that’s been happening for decades, and arguably, since the first U.S. Census in 1790.

Townsend made a name for himself on the topic by his research, an effort to pin down the moving definition of a smart city and plumb the depths of technology’s impact on urban life. As an

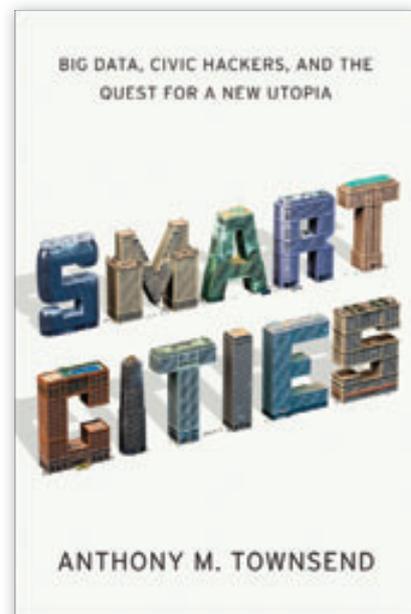
economic and technology adviser, his work has carried him from San Francisco to New York and across the globe. Today, however, his name is most visible on the jacket of his new book, *Smart Cities*, that examines the underpinnings of data-driven cities. On the issue of government analytics’ stature, Townsend is clear.

“I think the biggest misconception is that it’s widely used, because it isn’t,” he said. “I think most government agencies still operate on rote bureaucratic procedures that don’t use a lot of data mining or analytics to prioritize how government employees do their work and when they do what they do.”

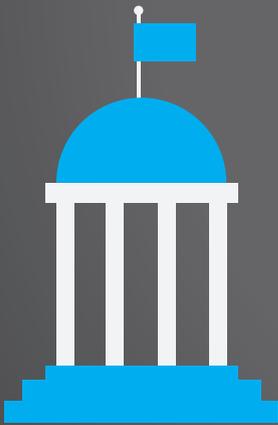
Government’s grip on analytics, Townsend said, is nowhere near as tight as that of private industry, which has taken the tool and yoked it to an ever-greater amount of decision-making. The front runners in government resemble more of a hodgepodge group of cities and one-off projects. It differs town to town, city to city, and in some places there’s nothing at all. Costs are prohibitive, analytics skill sets are obscure, and most leaders, though open-minded, are still sitting on fences.

“The places to look are the places that are starting to comprehensively

THE BIGGEST MISCONCEPTION IS THAT ANALYTICS IS WIDELY USED IN GOVERNMENT, ACCORDING TO AUTHOR AND RESEARCH SCIENTIST ANTHONY TOWNSEND.



YOUR TECHNOLOGY KEEPS RUNNING, NO MATTER WHAT ELSE STOPS



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look at how all these [technological] tools should be integrated with the rest of government,” Townsend said.

In the U.S. these include cities like Chicago, New York, Philadelphia and San Francisco. Globally, he said examples are London, Singapore and Dublin. The cities have bolstered analytics by attaching its development to an overall technology architecture, master plans that construct a latticework of tangible problems for it to solve, people to champion it and firm leadership to clear the way.

Slow uptake of analytics in government stems partly from the fact that putting big data to work demands a culture shift for public agencies.

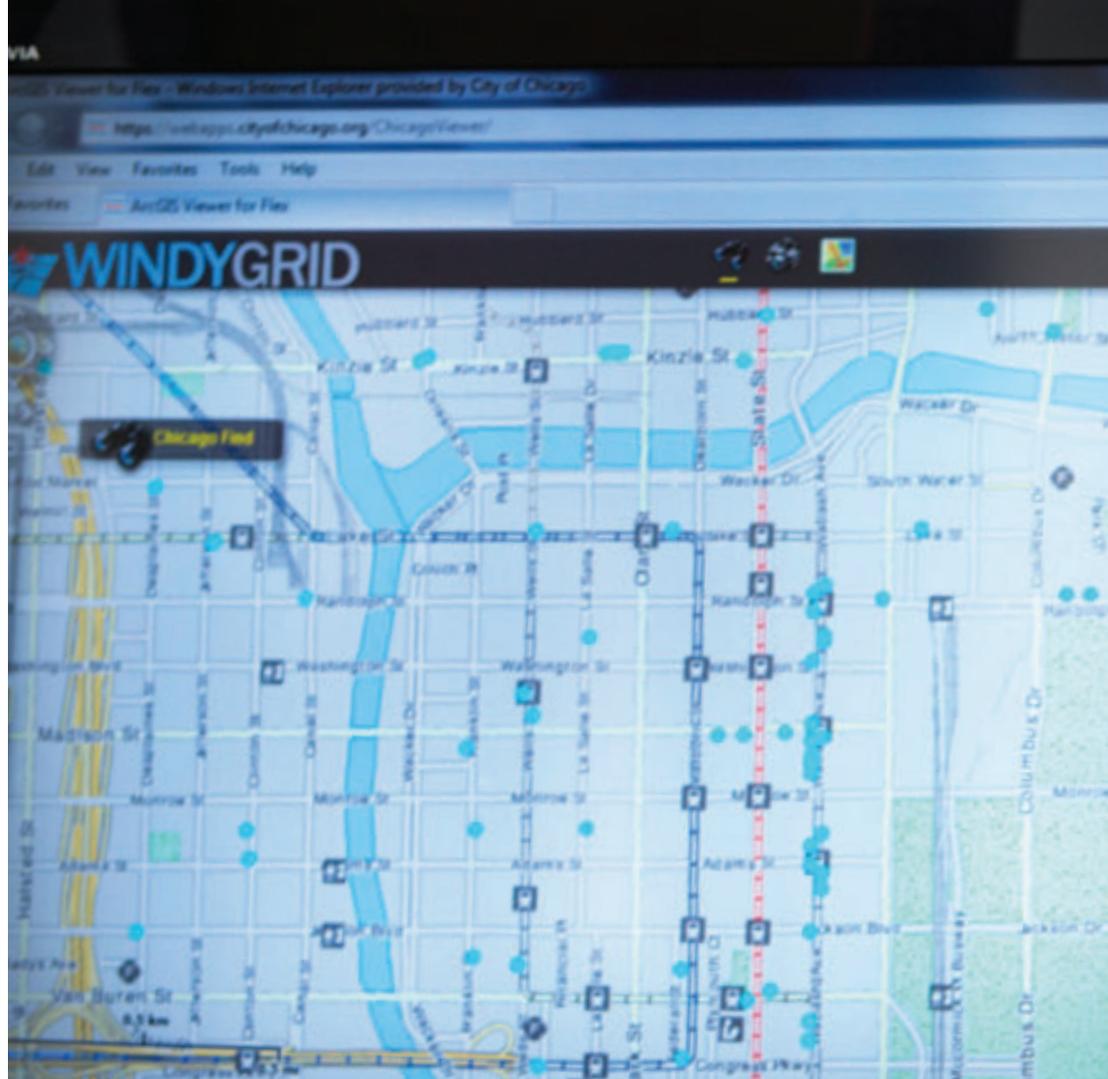
“In government you get a lot of barriers where people feel that they’ll be undermined or lose power if they share their data,” Townsend said. “And that’s something that can only be overcome through very strong leadership and demonstrated success. I think we’re still getting up that curve.”

Desire to unleash the power of analytics and other tools has spawned a series of new job titles — chief innovation officer, chief data officer, etc. — that work for or alongside traditional CIOs. In addition, leading jurisdictions are experimenting with new procurement models and policy frameworks designed to backstop innovative new job titles.

“They tend to be most effective when they’re not just innovation drivers but setting technology policy for the entire government,” Townsend said, as in the case of New York, San Francisco and others that have created open data policies and injected data standards as a part of the city’s vision.

“These people are all agents of change to some degree or another in organizations that are explicitly designed to not change and to resist change,” Townsend said. “And it’s always a thing that frustrates them and makes it difficult for them to be effective, but thank god they keep persevering.”

In Chicago, CIO Brenna Berman leads the effort to create a predictive analytics platform that will process more than 7 million rows of data collected each day by the city. Chicago’s SmartData project



will analyze and aggregate data, identify trends and offer problem-solving predictions. City data already is connected to WindyGrid, Chicago’s live analytics dashboard accessible across all departments.

While the project scope alone is enough to draw stares, what’s really interesting is SmartData’s open source build, a design free to any city willing to install it and one that may be the building block for local governments in the future.

“That’s really why we feel this is an important project, and frankly, why Bloomberg Philanthropies was so interested in partnering with us on this,” Berman said. The philanthropy kicked in \$1 million — a grant from its Mayors Challenge city improvement competition — to help build the SmartData platform, in hopes of toppling the first domino in a city-by-city chain reaction.

“While several municipalities are working to harness the power of big data, Chicago will be the first city to do so open source, making it possible for this great

idea to spread and empower other cities,” Bloomberg’s Jim Anderson said in January.

Now that the data faucet is flowing, Berman and her team of data engineers, project analysts and project managers are wading through department workflows. Alongside department staff, the team is hunting for key performance areas where predictive analytics offers the greatest value.

Pilot analytics programs are to follow in the next year or two, ideally one to three for each city department. Afterward, Berman said more pilots will be added until Chicago’s data is all interwoven and easily interpreted through WindyGrid. Ultimately the city wants to use SmartData to respond to real-world problems by integrating analytics into its daily workflows.

“I think this city has the ability of putting predictive analytics into the hands of every department in the city and unlocking the value of predictive analytics regardless of the number of data engineers we have,” Berman said, referring to the platform’s user-friendly dashboard.



CHICAGO CIO
BRENNA BERMAN
ENVISIONS A FUTURE
IN WHICH ALL CITY
DATA IS EASILY
ACCESSIBLE THROUGH
THE WINDYGRID
ANALYTICS
DASHBOARD.

TORI SOPER

Analytics platforms, even in their infancy, have been aimed — and perhaps lovingly cajoled — to be systems that send, receive and interpret information from all parts of an organization. It’s a system that can be harnessed to monitor and coordinate a jurisdiction’s various functions. It’s a system that responds to inputs from a jurisdiction’s interactions with its environment. And if this observation rings dry and textbookish, in full disclosure, that’s likely because it is. Only it doesn’t stem from a book about technology. In fact, it’s biology. Replace the word “jurisdiction” with “human body” and this is the definition of the human central nervous system.

It’s one possible vision for the future. But admittedly, we’re far away. The central nervous system, however, is an apt metaphor for “smart city” ambitions. On the forefront of these ambitions, IBM has been working to pioneer municipal analytics for years. It’s predicted traffic jam locations 30 minutes ahead of time in Singapore, reduced electricity and water usage

in Dubuque, Iowa, and forecast weather patterns for agriculture in Borneo.

Katharine Frase, IBM’s Global Public Sector CTO, has been coordinating the company’s city analytics efforts across the globe. When asked about the future for analytics, Frase sees tomorrow in terms of today.

“It’s important to start from where the city is,” she said. “More data would

“I think this city has the ability of putting predictive analytics into the hands of every department in the city.”

always be better, but we should start with the data the city already has.”

Often, city leaders are convinced that implementing an analytics program is too costly and requires massive changes, Frase said. That is not always the case. “Start small, don’t think of this as you’ve got to rip everything up and start all over, but start something,” she said.

To date, IBM’s most requested uses for analytics in government are in highly visible areas. Traffic management is most popular, followed by water management, she said. After those, the top contenders are emergency response, energy consumption in buildings and public safety.

The ultimate success of analytics may be proportionate to how readily governments embrace the new data-driven mindset. Beth Blauer, director of Socrata’s GovStat performance monitoring platform, said much of the movement in analytics will depend on factors that are more human than technical.

“Most of our users are just now starting this work, they’re just now turning the corner from understanding it’s not just about publishing data but internalizing the use of data and transforming their decision-making from gut and instinct into real [data-driven] context.”

Blauer, who was director of Baltimore’s groundbreaking CitiStat performance management program before joining Socrata, said the emerging use of analytics is compelling states and cities to define what data is worth measuring, and more importantly, what data is worth acting upon.

“What we’re realizing now, is this is about creating best practices across the board,” Blauer said. “We’re going to see a lot more dialog at every level of governance on what those standards are.”

The hardest part about implementing any of these programs or making a change, she said, is actually having strong leadership. Leaders must consistently confirm

that data-based workflows are the way tasks will be done and how decisions will be made. It’s a common ground Blauer shares with Townsend, Berman and Frase who all pointed at

leadership as the cornerstone for future progress in analytics.

“There is this whole internal work that needs to be done,” Blauer said. “It’s more of a culture change, it’s not even about technology.” **GT**

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DAVID KIDD

BUILDING 21ST-CENTURY CITIES

An aerial photograph of a city, likely Dubuque, Iowa, showing various buildings, a prominent church with a golden dome, and a green lawn. In the foreground, a green-painted metal railing is visible, suggesting the photo was taken from an elevated position. The text is overlaid on the right side of the image.

BY COLIN WOOD

THINKING BIG ON SUSTAINABILITY

Cori Burbach,
sustainability
community
coordinator,
Dubuque, Iowa

MEANS TAKING THE LONG VIEW.

Sustainability is like dieting. It's not something you do once and then forget about — it's a lifestyle change. Like a healthy diet, sustainability is also something that's good for everyone. The environmental movement is rooted in hippie culture of the 1960s and 1970s and still suffers today from an image that confuses some and stratifies adoption along political lines. But in recent years, government leaders have begun to create programs and institute concrete changes that go beyond rhetoric and align not necessarily with any one political interest, but with universally human ones.

Sustainability seems a nebulous concept because it entails so much at once, and to each community it means something slightly different. Leaders in Vietnam found sustainability in learning to live with nature. Dubuque, Iowa, found sustainability in the human capital of its citizenry. And the inhabitants of rural, tornado-ravaged Greensburg, Kan., found that sustainability was the hope they needed to rebuild and not to give up.

The position of chief innovation officer is a recognition by government that IT is no longer peripheral, but an integral tool meant to assist all business needs. That idea is now giving way to new titles. Governments are hiring officers of performance, innovation and sustainability. Technology remains crucial, but leaders are setting their sights on broader goals and taking a more holistic approach.



Pittsburgh Innovation and Performance Officer Debra Lam says sustainability aligns with government's goal to enhance citizens' quality of life.

Pittsburgh is among the cities undergoing such a change. When Mayor Bill Peduto took office in January, he brought in new cabinet members like Chief Innovation and Performance Officer Debra Lam. Though Pittsburgh is still at the earliest stages of sustainable thinking, it's starting with people who have experience and know what it takes to position a community for a sustainable future.

Working for consulting and design firm Arup, Lam has managed projects and consulted with communities around the

world to show them what sustainability means, how it can enhance lives, and help ensure that life will continue to be enjoyable as the environment presents new challenges.

Sustainability is a controversial word, Lam said, but the one thing that most everyone agrees on is that government should continually strive to improve everyone's quality of life, and that's what a sustainable approach does.

And sustainability is not just intended to mitigate climate change, Lam said. Even if civilization meets its most ambitious goals, the effects of climate change will continue to manifest in ways that

can't always be anticipated. Sustainability is also about finding ways to be resilient and live alongside the environment. "It's really understanding what the risks are climate-wise, and then putting up the necessary measurements to be prepared for that," she said. "We can't predict and prevent everything. There's an inherent underlying unpredictability. But that doesn't mean we can't be prepared."

Lam managed a project in Ho Chi Minh City, Vietnam, where leaders sought guidance on how to handle their water management problems. Alongside the Mekong Delta, Ho Chi Minh City has seen centuries of flooding, but today there are new factors to consider. The growing population and rising affluence means a new class of people will draw more resources, depleting groundwater supplies and increasing soil salinity. Furthermore, climate change and rising sea levels are expected to cause even more soil salinity, not to mention flooding. Some researchers predict that many provinces in the delta region will be flooded as soon as 2030.

After studying the area, Arup issued a report to Ho Chi Minh City that recommended the city work to reduce water leakage and theft, and adopt more effective irrigation methods. The company also recommended infrastructure upgrades to improve water logistics, and encouraged



leaders to think about how their infrastructure will need to adapt as conditions in the environment change. Getting all the stakeholders talking with one another, Lam explained, was key to making the other recommendations attainable.

When faced with a specific problem like flooding in Vietnam, the prevailing pragmatic mentality can fall short, Lam said. Typical solutions proposed are walls, ducts or dams. “That only goes so far,” Lam said. “It’s very costly, it’s very resource-intensive, very time-intensive, and it’s not necessarily the most effective way. If you’re assuming a sea level rise of 5 feet, but then sea level rise comes to 6 feet, it’s not going to work.”

Instead, she said, they should be looking at solutions that let the water in, and use green architecture and infrastructure to filter and absorb it. That’s sustainability. “It’s the realization that man can’t just block out or control nature,” Lam said. “There are a lot of good things working with nature.”

After Hurricane Katrina damaged or destroyed more than 200,000 New Orleans homes in 2005, people began rebuilding, although they understood that a similar situation could and probably would happen again. Sustainable architecture has become important in the region, but the concept is

far from perfected. While the enthusiasm is there, sufficient knowledge and competent project management doesn’t necessarily follow. Dozens of homes built by actor Brad Pitt’s award-winning charity, the Make It Right Foundation, began rotting soon after construction in 2007 because of faulty wood products. Cities interested in sustainability need competent role models and reliable information.

Dubuque, Iowa, is a city that people look to when they want things done right. For sustainability initiatives to be impactful,

crucial to make such initiatives work.

“That’s not just because there are more hands at the table, but because we’re all sharing data,” Burbach explained. “So often, even the way we collect data is siloed, and so we’re not getting the whole picture. We’re looking at, for instance, literacy scores, not understanding how family, economic status, health, activity, or access to services impacts those literacy scores.” Being a sustainable city means considering data on a communitywide basis so that decisions are based on all the available

“We can’t predict and prevent everything. There’s an inherent underlying unpredictability. But that doesn’t mean we can’t be prepared.”

they need grass-roots support from the people and leadership from government, said Cori Burbach, sustainability community coordinator for the city.

Dubuque has received awards and acclaim for its sustainability initiatives, including Smarter Sustainable Dubuque, a private-public research partnership with the IBM Watson Research Center. The city’s work is viewed as a model of sustainability for similarly sized local governments.

Dubuque partnered with private utility companies to help educate the public and boost energy conservation. The city encourages businesses to go green, while also searching for ways to spur local economic growth. In 2012, Dubuque was identified by the Martin Prosperity Institute as having the fourth largest average annual salary increase in the nation among metropolitan regions. Much of the region’s economic growth is thought to come from programs like Green and Healthy Homes, savings gained by smart metering and the use of data analytics to optimize the city’s bus schedule.

You can’t become sustainable by directive, Burbach said. Success requires support from the people and guidance from the top down, both of which Dubuque has had. Stakeholders in the community decided together to make sustainability a priority, and that sort of cooperation is

information, she said. “It’s really addressing the needs that are unique to Dubuque in a very coordinated, collaborative way.”

When people hear “sustainability,” they think it only means environmentalism, but that’s not the case, Burbach said — sustainability is environmental integrity, economic prosperity, and social and cultural vibrancy. It’s hard to make a business case for sustainability if all the plan consists of is changing a few light bulbs or installing a solar panel. When people realize that it’s about making communities resilient on all levels and building toward a better future, they start to see the value in it.

Through initiatives like Bridges Out of Poverty and Circles, community leaders in Dubuque are looking to forge a sustainable populace. Rather than just giving people money to pay the rent, the city wants to empower families and reduce dependence on the government, because everyone in society has something to contribute.

“It’s recognizing those assets in those families that have come out of our programs and connecting them to nonprofits, church groups or neighborhood associations so they can then be engaged in the community as well,” she said. “When you look at what our communities are going through in terms of changing economies, in terms of a changing federal funding world, all of the things that are impacting commu-



Dubuque, Iowa, is renowned for its holistic outlook on sustainability, which goes far beyond environmental programs.

nities, I think it's challenging us to think differently about the way we provide services. Sustainability, to me, gives us the framework to analyze what's truly a priority and then to revise those services."

On the evening of May 4, 2007, a tornado nearly two miles wide brushed through the small rural city of Greensburg, Kan. The tornado was later rated an EF5, the most powerful tornado on the scale, with wind speeds up to 240 mph. The tornado killed 13 people, hurt another 60 and leveled the city, destroying 95 percent of the buildings. Immediately, about half of the city's 1,500 residents relocated, and the rest stood by, not sure what to do next.

The city was declared a disaster area, and the Federal Emergency Management Agency (FEMA) stepped in with food, water, shelter and supplies. FEMA and design firm BNIM also helped the city create a plan to rebuild. Eight months later, the Greensburg City Council adopted a resolution committing it to sustainability. All buildings larger than 4,000 square feet were to meet LEED-platinum standards, and all energy was to come from renewable sources.

Over the next four years, the city rebuilt. It built a new courthouse, school, medical center, arts building, city hall and energy-efficient homes. It built wind and solar farms, and geo-thermal wells. Many thought the tornado was going to be the end of Greensburg, but today the city is revered as a living laboratory of advanced building materials and sustainable living. Other cities hit with tornadoes visit Greensburg to attend peer-to-peer workshops to learn how to rebuild and how not to despair.

Starting from scratch allowed Greensburg an opportunity to build things right, and fix some of the problems it had before, Mayor Bob Dixon said. "We were able to consolidate school buildings all on one campus instead of several centers all across town," he said. "That maximized resources available and allowed us to have a lot more shared spaces."

At first, the remaining population of Greensburg was not sold on the idea of

sustainability, Dixon said, but they've since come around. People now see that the "crunchy" connotation of the word is just a distraction from the value it truly represents. "For us here on the high plains of the western Kansas rural area, it's about those conservation values that our parents and grandparents and past generations taught us — to just take care of what you've got. If you take care of the land, it will take care of you."

better results," Dixon said. "The other thing that is highly critical, especially in rural communities, and it is true in major metropolitan areas, too, is that in order to be long-term sustainable as a community, you have to have a vibrant economy."

Sustainability means a holistic approach, Dixon said. Each community's specific goals and industries will vary, but when it's time to plan, he said, communities should look carefully at their resources and decide how



Following a devastating tornado in 2007, rural Greensburg, Kan., seized the opportunity to not just rebuild infrastructure, but improve it, making the city an example for many other communities that have endured similar disasters.



In April and May of 2011, a string of tornadoes passed through the Midwest and the South, killing about 500 people and causing billions in damages. Community leaders from Alabama, Mississippi, Missouri and others came to Greensburg to learn from people who had already been there.

"The one thing we shared with other communities is: Don't make life decisions rapidly, because you're in a very emotional state of mind anyway. Not only are you trying to rebuild your homes, and your lives, you're trying to rebuild a city. So take time to make sure you think through the processes and involve the community and you get a whole lot

they're going to rebuild not just their structures, but their economy and their lives. "The economic infrastructure can't take a back seat," he said. "It all has to come together."

"Sustainability to me means have we learned from our past? Our heritage and our ancestors taught us how to survive and how to thrive," Dixon said, adding that communities should take advantage of today's technologies and advanced materials to build on that foundation. "Each one of us is just trying to make our communities a better place for us to live and work. And if you're really striving for that, then you're a true sustainable community." **CT**

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Q&A: Your Citizens Have Left the Building. They Are on the Phone.

iCity enables government to deliver true civic engagement with mobile apps.



Rod Massey, CEO, iCity Corporation, & former CIO of Clark County, Nev., & Palo Alto, Calif.

Q: What is iCity and how does it work?

Rod Massey: iCity Corporation offers citizen-facing, uniquely branded native mobile applications for state and local governments, and we are expanding to K-12 schools and universities. The mobile apps, available on iOS and Android devices, are designed to go beyond the typical government mobile service request application functionality and focus on true civic engagement. Our platform allows city governments to share news, events and social media content; push notifications with time-sensitive news; and promote local businesses and attractions.

Q: In what ways does iCity help government better communicate with constituents?

Rod Massey: The simple answer is that we go beyond service requests to deliver the information that citizens really want and need. The best way to explain is to give examples of how our customers use the features within the application. For example:

- The township of Millburn, N.J., and the city of Tega Cay, S.C., use the push notifications feature through their uniquely branded iCity app to update citizens on accident and traffic information, weather alerts and even school closings.
- West Jordan, Utah, uses the calendar feature to keep citizens informed on upcoming community events.

- Eagle Mountain, Utah, aggregates Twitter feeds of multiple elected officials — from local officials all the way up to the White House — in one easy-to-consume location within its application.
- Our newest customer, the city of Ridgeland, Miss., partnered with its Chamber of Commerce and Office of Tourism to purchase and implement our newest product, iCity+, so they could blend each other's information and provide maximum content value for citizens.

Q: How is iCity more effective and engaging than a city website?

Rod Massey: The rate of mobile adoption is groundbreaking. Some interesting statistics:

- About 87 percent of American adults own a cellphone; 56 percent are smartphone users.
- The average age a person first owns a cellphone is 13.
- Twenty-nine percent of Americans say the phone is the first and last thing they look at every day.
- Forty-four percent of cellphone users have slept with their phone by their side so they didn't miss a notification.

If you aren't focused on a robust and comprehensive mobile solution for your citizens, you're presenting to an empty room. The audience has left the building. If state and local government wants to make life easier for their citizens, websites — even a mobile version — aren't enough anymore. Mobile is the Web of the future and it crosses all demographics.

Q: How is iCity a good economical solution for smaller municipalities or jurisdictions that are strapped for resources?

Rod Massey: Smaller jurisdictions tend to have limited resources and small IT departments. Our iCity solution is a hosted, software-as-a-service (SaaS) model where we provide updates to the application so government agencies don't need to have the resources and infrastructure to maintain it themselves. In this way, a smaller city with limited to no IT resources can still have access.

Q: What makes iCity different from other mobile applications?

Rod Massey: The user experience for citizens is paramount. In addition to our native app design, we put citizens at the center of the solution and help local governments organize and deliver the kind of high-value, dynamic city content that maximizes citizen loyalty and use of the app. We are providing the type of information that citizens really care about — the things they want and need — while also enabling governments to improve engagement with citizens. The types of mobile apps that maximize loyalty — the ones that keep citizens or users coming back time and time again — focus on three key areas: news, communications and social networking. We provide all of those capabilities in our mobile application in addition to more traditional service requests.



With iCity, governments can connect citizens like never before, communicating with them in new ways that engender high levels of civic engagement. For more information, visit www.iCity.us.



THE COLIN WOOD / CONTRIBUTING WRITER UNCERTAIN FUTURE OF WORK

AS SOFTWARE EATS TODAY'S JOBS, WHAT WILL REPLACE THEM?

At the pinnacle of technological progress, man becomes a god. New machines and software are continually forged in man's image and taught to do things that once only people could do. A day will come when man's machines surpass their creators in their capacity to do and to think, and it will be at that technological singularity that the economy will double on a weekly basis and mankind will become peripheral to a new reality and consciousness beyond human comprehension. Conservative estimates place that date at about 100 years from now, but in the meantime, there are smaller fish to fry.



[Kiva Systems' robots have transformed Amazon's warehouses — and employees' roles in them.]

The American middle class is shrinking and it's technology that's causing it. It's not all bad. The gains in efficiency begotten by automation have been great for productivity. And productivity means progress. It always has. Since the Industrial Revolution began around 1760, new technologies have been stealing jobs, and since 1760, people have responded by finding or inventing new jobs that contemporary technologies couldn't do.

It's a good system — in the long term, everyone benefits from technological progress, and while the workers losing their jobs in the interim might feel a bit miffed, people have always found a way to bounce back into an ever-adapting economy. Besides, if machines can do something better than people can, it would be senseless to ignore such utility and hold back progress for fear of a few temporarily lost jobs.

Unfortunately for today's average worker, finding or inventing a new job is harder than it once was. When economists look back, they see that it was around 1999 when something changed. Productivity kept going up, but where in the past median household income and employment per capita would have also hitched along, they instead diverged. Median household income is on a steep decline, employment isn't bouncing back strongly after the Great Recession, and a greater percentage of Americans now identify themselves as "lower class" than at any point in history.

Andrew McAfee and Erik Brynjolfsson, director and professor, respectively, at the MIT Sloan School of Management, named this divergence of productivity and employment "the great decoupling." Technology is a broad term: It can be equally applied to a stick being used by a chimpanzee to extract insects from the Earth and to a rocket launching a chimpanzee into suborbital flight above the Earth. Today's technologies are more scalable and complex than the machines people needed to outsmart in the past, which is a big reason for the decoupling.

Surveying a county road in 1998 meant that a team of workers needed to get into a pickup truck with a government seal on the side of it, drive, take photos and measurements of the area, return to the office and assess the information that was



Professor Erik Brynjolfsson:
"There's no economic law that says everyone is going to benefit from technological progress."

gathered. Researchers at the Michigan Tech Research Institute found in 2013 that it's much easier to just send a drone. They also developed software that takes the sensory data gathered by the drone and generates a fully characterized 3-D model. People are still needed in the process to make high-level decisions and babysit the technology when things go wrong, but not as many people are needed. And even fewer will be necessary if the researchers' concept is honed and commercialized.

The trouble is that the guy who once rode along in the pickup truck is now unemployed and he doesn't know how to design drones or code 3-D modeling software. The average American is looking more and more like that guy. A study by two researchers at the Oxford Martin School concludes that within the next 20 years or so, approximately 47 percent of all jobs could be replaced by automation.

"Technology is racing ahead, but our skills, our organizations, our institutions

aren't keeping up," Brynjolfsson said. "As they adjust, we will see more of the benefit show up in the economics, but right now there are a lot of technologies with more potential than has been fully realized." This trend is just getting started.

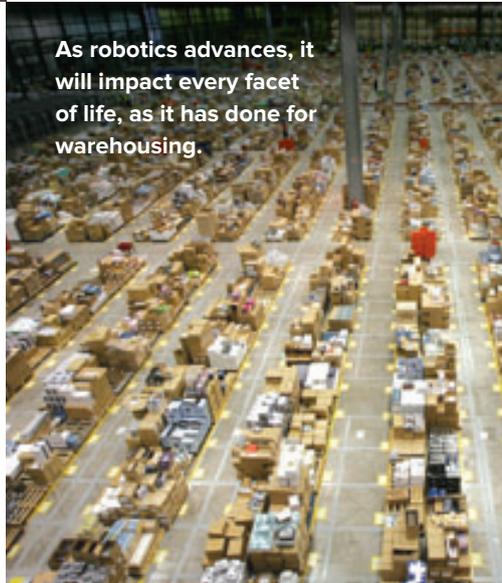
A lot of economists, technologists and policymakers agree with McAfee and Brynjolfsson, but some say today's technologies aren't special — people will find new jobs just as they always have and no intervention is needed. It's just the recession, they say. To understand why that's not the case, people need to look closely at today's technology, Brynjolfsson said.

For example, there are prototypes of autonomous vehicles on the roads. Legislators in Nevada, California, Florida and Michigan have penned laws allowing the vehicles limited public use, and some estimate that almost all vehicular traffic will be autonomous by 2050.

In a recent span of two months, Google purchased eight robotics and machine



As robotics advances, it will impact every facet of life, as it has done for warehousing.



are 17 percent fewer tax preparers than there were a few years ago — you can see it in airline reservations. In more and more categories, software is eating the world.”

Software can give legal advice, analyze data and automate data entry, and robots like IBM’s Watson can even diagnose and recommend accurate cancer treatments much better than humans can. One study showed that Watson can diagnose lung cancer accurately 90 percent of the time, compared to a measly 50 percent rate for human doctors. “There’s no economic law that says everyone is going to benefit from technological progress, even if it does make the pie a lot bigger,” Brynjolfsson said. “So both in terms of theory and evidence, I think there’s a potential to be concerned, and I am concerned.”

Amazon spent \$775 million buying out Kiva Systems in 2012, the maker of a disc-shaped robot used in warehousing. Today Amazon uses the robots to fetch pallets of goods, saving workers the time and energy of running around to find products themselves. The purchase came soon after a report showing that some Amazon warehouse workers were walking 10 to 15 miles per shift. Most workers are probably grateful that their job is now to pack goods and do various administrative tasks rather than play fetch all day, but on the other hand, Amazon doesn’t need as many human employees now. If technology gets automatic and simple enough, it will eventually

learning companies, not just because the technology will make cars drive themselves, but because smart robots can improve productivity across almost all of the company’s businesses. The problem with this extremely fast progress is that people are relatively slow. Although it won’t happen overnight, today’s 233,000 taxi drivers and 1.7 million truck drivers aren’t ready to become an anachronism.

In addition, decoupling means the upper 1 percent gets a bigger piece of a growing pie, Brynjolfsson said, which also accounts for the shrinking middle class. “A lot of these digital technologies have winner-take-all or winner-take-most economics, where you can get a small group of people producing a better piece of software or insight, and once they’ve digitized that, they can replicate it 10 times or a hundred million times, and dominate the market for that,” he said. “You can see it in checkout counter software, you can see it in tax preparation software — there

just be one guy in the Bahamas running the company from his smartphone. That might seem far-fetched, but it was in living memory that the idea of autonomous vehicles and talking robots were science fiction. Now those technologies border on passé.

Researchers from MIT’s Computer Science and Artificial Intelligence Laboratory are developing a theoretical model and algorithms that would let robots like the ones used by Amazon communicate more intelligently with one another so they can solve logistical problems on the fly and also communicate with other sensory agents in the environment, human and otherwise. Once robots can talk to each other and solve problems on their own, even fewer people will be needed in those warehouses. When robots like Baxter, a \$25,000 production line worker with a calm demeanor, get cheap enough, even sweatshop workers will be out of a job.

What the Industrial Revolution did for muscle power, Brynjolfsson said, the second machine age is doing for brain power, and especially so in government. “As you automate and augment a lot of mental tasks, it’s a little less clear whether those technologies will be complements or maybe substitutes for human labor, and that’s one of the things we’re working through now as a society,” Brynjolfsson said. “Government jobs on average tend to include more information processing, and on average the workers in that sector are more educated and doing more knowledge work than in a lot of other parts of the economy. So they, in some ways, are likely to be more affected.”

Today’s robots are very poor at doing some things, such as folding laundry (as one YouTube video confirms), and even worse at others, like offering compassion to a young student, or making a sound moral decision as a police officer. Those traditionally human skills are expected to gradually improve in robots, but in the meantime, data analytics and the Internet of Things provide a waypoint



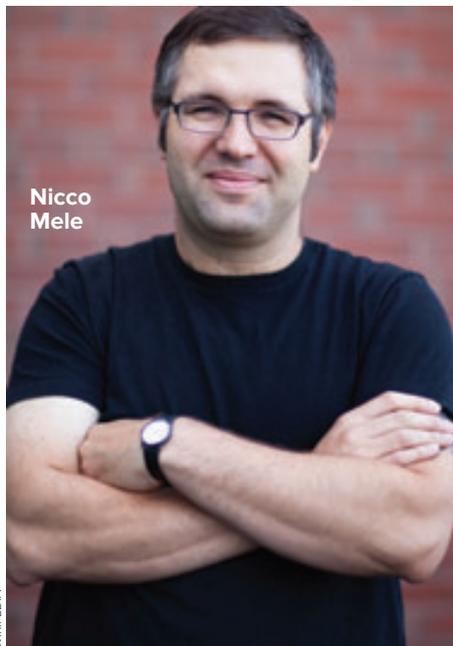
Will autonomous vehicles replace the traditional taxi cab?

for progress. Facilities like the Domain Awareness Center now being constructed in Oakland, Calif., will make monitoring cities for crime and dispatching help a more efficient process. Likewise, predictive crime software is a rising trend in law enforcement in many cities. Making better use of data and distributed sensor networks means that fewer officers will be needed to cover a given geographic area because officers are better informed and more efficient. Even if it's not the extreme scenario of Robocop taking over for human police officers, technology finds gains in efficiency everywhere and the cost is usually displacing human jobs.

Some are optimistic about what all this means for the world, and others less so, but to take either position is to accept that technological progress has a foregone conclusion, Brynjolfsson said, and it doesn't. "It's been said that the best idea America ever had was mass public education," he said. "That helped us make the transition from an agricultural economy to one based on industry and services. It didn't happen by accident; it happened through public policy. We're going to have to reinvent what education is and focus more on creativity and interpersonal skills — things that machines are not very good at — and less on having people sit quietly in rows, listen to instructions and carry out those instructions."

Nicco Mele agreed that education and government policy need to be revolutionized and that's why he teaches future policymakers at the Harvard Kennedy School of Government. Mele is a consultant to the Fortune 1000 and was named by *Esquire* as one of America's "best and brightest."

Modern technology, Mele said, compels us to rethink the assumptions of every discipline. "Look at our health-care policy, look at our retirement policy," he said. "Those policies are built on this assumption that people have 9-to-5 jobs and stay with one employer their whole lives. That's profoundly not true for the American workforce and hasn't been true for well over a decade. A third of American workers are



Nicco Mele

WIKIPEDIA

self-employed and another third are contingently employed, which means only about a third of the workforce has a traditional 9-to-5 job. Yet our policymakers and our politicians are building all the policy on the assumption that this is a good way to do it."

American policymakers are on average older and richer, but they also tend to know less about technology, care less about technology and delegate technological responsibilities to others, Mele said, and this is unacceptable in a world where tech influences everything.

"Imagine a state legislator saying, 'I don't think about money. I don't worry about money, I don't worry about the tax rate, I don't worry about the budget. I just let accountants deal with it.' We'd kick them out of office, right? That's not an acceptable answer, and we need that same kind of expectation technologically," he said.

The idea that tech is separate from the rest of the world is rooted in a past era where digital technology was less prevalent. Today, there are remnants everywhere of that

old way of thinking that reinforce technological illiteracy in some of government's most critical positions, Mele said.

"One of the things I hate most in the world is the Genius Bar at Apple because it sets up this dichotomy," he said. "It sets up this world where they're geniuses and we have to just do what they tell us."

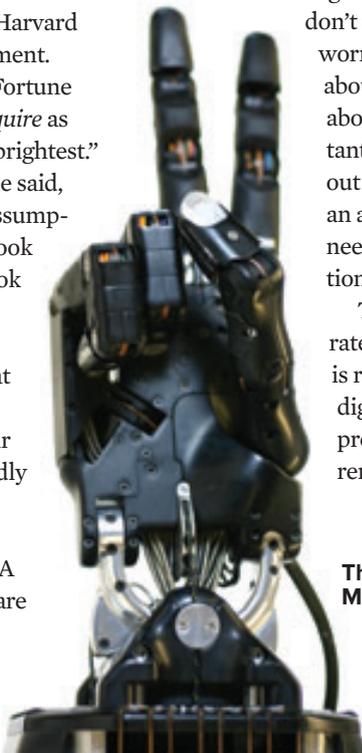
People must demand that their leaders be technologically literate, Mele said, because "it's profoundly dangerous to have elected officials or policymakers who don't have any technical literacy to evaluate what's going on." A recent Gartner report identified that 60 percent of CEOs dismiss the idea that automated and smart technologies could displace a huge percentage of jobs in the next 15 years.

Michael Armstrong, CIO of Corpus Christi, Texas, is not a denier of the second machine age's power and influence. As a CIO, Armstrong said, the best one can hope for is to influence policymakers.

The coming years will bring incredible new changes, he said. Advances in 3-D printing have applications in medicine and other fields that haven't even been realized yet. Advances in prosthesis are allowing people to live longer, and there are even philosophical questions being opened up about what it means to be human. The Shadow Robot Co., based in London, spent \$1 million building the Bionic Man, a robot composed entirely of artificial body parts and internal organs. Life is changing fast for everyone.

"I think we're hitting the knee of the curve and things are getting exponential," Armstrong said. "Make sure that you understand and your leadership understands what is happening in these areas and what the implications are because that's going to drive social policy and government policy to a huge degree. A lot of this stuff is happening very quietly."

"Government has been shrinking for so long, that's been an accepted way of doing business. I think this is not going to leave anyone alone. One way or another, it's going to affect us all," he said. "In any kind of revolution, we always lose jobs, but there's always been something to replace all those jobs, and that may not be the case this time." **GT**



The Shadow Robot Co.'s Bionic Man even has artificial organs.

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The possibilities for drones are seemingly limitless, from aiding emergency response to scouting the locations of polar bears.

Sharing the Skies

FAA drone test sites in North Dakota, Nevada and Alaska offer unique resources and expertise to help unmanned aircraft safely integrate into the national airspace.

By **Colin Wood** / Contributing Writer

Drone research has been ramping up in workshops and universities around the country for more than a decade, but it's the scientists at six test sites (see sidebar) designated by the Federal Aviation Administration (FAA) who will pave the way for a new future in flying. Just as the Wright brothers changed the world with the invention of manned flight, these pioneers will propel unmanned aircraft into the skies and alter the course of history.

In November 2013, the FAA released a road map report that recognized the

untapped value of drones and also outlined the obstacles to integrating them into the National Airspace System. Unmanned aircraft were never designed or intended to meet the same rigorous standards as traditional aircraft, so there are many technical and logistical barriers that prevent the FAA from permitting their use in the national airspace if its leaders want to sleep well at night. There's much work to be done before a Boeing 747 full of passengers eastbound for Chicago crosses paths with an unmanned airplane seeding clouds

over a ski resort in Colorado, but that day will soon come. The six drone test sites, announced at the end of 2013, have until September 2015 to find solutions that will allow drones to weave seamlessly into the national airspace.

Like a crack team of bank robbers planning a heist, each test site brings different resources to the project.

Nevada was a shoo-in with its clear skies, huge amount of restricted airspace and history of military research. The University of North Dakota has one of the largest civilian flight training schools in the world and is the only continental test site located in a temperate climate zone. Researchers in Alaska have been involved with drone

Drone Test Sites

- University of Alaska
- State of Nevada
- Griffiss International Airport, New York
- North Dakota Department of Commerce
- Texas A&M University, Corpus Christi
- Virginia Tech

research for 13 years, and their partnerships with institutions in Oregon and Hawaii offer a geographically diverse testing area.

Applications for Drones

Ro Bailey is the deputy director of the Alaska Center for Unmanned Aircraft Systems Integration at the University of Alaska Fairbanks and a retired Air Force brigadier general. Her test site will help develop safety standards for drone systems and run test flights in extremely high altitudes and at high speeds over water.

“There are so very many beneficial uses of unmanned aircraft systems that have nothing to do with people looking in windows.”

But the public should first understand why they're doing all this, Bailey said — this technology will change the world.

“There are so very many beneficial uses of unmanned aircraft systems that have nothing to do with people looking in windows,” she said.

A big piece of the FAA's push to integrate drones into the national airspace is to put an end to the battle between legislators, advocacy groups and drone proponents. Drones can help save lives, put out fires and rescue lost people, but the red tape limiting their use by first responders has made such stories rare. The 19 firefighters who died in a blaze outside Phoenix in June “probably” would have been spared with the help of drone intelligence, Bailey said.

“We have mapped the borders of wildfires, which provides better information to the incident commander for deployment of firefighters the next day,” Bailey said. “We could use [unmanned systems] to assist with monitoring rivers that are at risk of flooding and provide better information to emergency managers in real time. We've used them for infrastructure assessment, in cases where putting manned aircraft in that place was too dangerous,” she said, referring to a case where drones were used to survey an oil company's active flare stack.

“We can do volumetric measurements far more accurately and more quickly for potential avalanches or how much material

has been taken out of a gravel pit. We can do precision mapping for archaeological digs, and in many cases be able to give them such detailed instructions that they can go straight to more promising locations to begin the digs,” Bailey said. “We can locate polar bear dens so you can keep people away from those dens.”

When the imagery comes back for Steller sea lion counts, she said, the team can always tell whether the images were captured by a drone or by a manned helicopter — when it's a manned helicopter, the animals are either staring at the camera or diving into the water, but they don't notice the drones.

Drone research allows scientists to be less invasive. Researchers in Alaska, for example, are developing a Breathalyzer drone that flies through a whale's spout and analyzes the bacteria collected to determine the animal's health.

Drones are also used to study volcanoes to learn more about how their ash interacts with aircraft and where it's safe for manned aircraft to fly.

Bailey also described how drones are used in research to help ships navigate

dangerous, icy waters. In one instance, 250 miles north of Alaska's northern shore, drones were flown at 1,800 feet, dropping small buoys into the water that collected temperature data from 9 meters underwater and then wirelessly transmitted that data back to the drones.

“There's not a manned aircraft in the world that would do that for safety reasons,” she said. There's no replacement for unmanned aircraft when it comes to that kind of work, Bailey added, and that kind of work could prevent a ship from sinking someday.

Safety Focus

While the FAA wants drones in the air, it has also made it clear that compromising existing aviation safety standards is not an option. One of the ways Alaska will facilitate the harmonious integration of drones into the airspace is by helping to develop the drone type certificate process. Type certificates for traditional aircraft are the proof that its design has been approved by an authority like the FAA, so when someone buys an aircraft, there's no question as to whether it is safe, assuming it's current on maintenance. Drones don't have FAA-approved designs, and most people probably wouldn't feel



The six test sites have until September 2015 to work on technical and logistical issues that currently prevent drones from entering the national airspace.

Researchers in North Dakota hope to improve not just drone safety but aircraft safety in general.



comfortable flying if they knew they were sharing the air with a drone someone built in their garage. It would be the air equivalent of a pedestrian wandering around on the freeway.

All three test sites that *Government Technology* interviewed named “sense and avoid” functionality as one of the most pressing areas of research. One of the biggest problems with putting drones in the air is there’s no consistent way for an aircraft without a person on it to obey the rules of the sky as currently written. But the FAA has stated that it will not change existing “sense and avoid” rules to accommodate drones, so researchers will need to get inventive so unmanned aircraft can follow the regulations.

Linking and sense-and-avoid systems are two areas of research North Dakota will help develop. The Northern Plains Unmanned Aircraft Systems Test Site is led by Bob Becklund, a colonel with the North Dakota National Guard and former commander of the 119th Fighter Wing.

“Links have got to be assured and reliable, which means they have to be secure from hacking, encrypted, redundant, reliable — all that kind of stuff,” Becklund explained. “That’s quite a challenge. Or in the event a link gets unreliable or there’s a component failure, which of course can happen and the airplane loses its link, then it has to have onboard systems that it can recover itself safely and without hurting anybody on the ground, autonomously in this example.”

Air traffic control needs to be aware of what a drone is doing at all times, just as with any aircraft, so if something goes wrong such as losing the link with the ground, it can then direct other aircraft away from that area, Becklund said.

Safety research is a huge priority for the North Dakota site, but the staff hope that drone research won’t just minimize safety impacts in 2015 when drones begin launching, but also that their discoveries will contribute to making all of aviation safer. “As far as what we proposed for the test site, that covers the whole spectrum, everything from pilot training standards, which is what the University of North Dakota specializes in, certification in pilot training and evaluation standards for air crew, the aircraft and ground station and air worthiness [type] certification.”

The university offers undergraduate degrees in unmanned aircraft systems operations, and it’s that industry and culture of aviation and drones that likely led the FAA to select it as one of the test sites, he said. The university’s engineering school also leads research on nanoscale electronics, which is connected to many of the size-weight-power engineering problems faced by drone researchers.

“This region can really offer the FAA and this nation and the world, for that matter, an expertise pool and airspace that’s unencumbered by other aircraft density, and a ground population that’s nice and low,” said Becklund. “It’s a perfect place to do flying with new technologies.”

There are a few potential drone applications that Becklund likes: The movie industry will be able to save money renting helicopters if it wants aerial shots, real estate developers can easily and cheaply get aerial photos of properties, energy companies will have a cost-effective solution to look for breaks in their pipelines or power lines, and auto racing events could be enhanced for fans by assigning each car a drone with a camera.

In Nevada, the Desert Research Institute has already begun promoting its own brand of drone innovation, as it looks for new ways to increase snowpack in Lake Tahoe ski resorts. Lake Tahoe today relies on cloud seeding towers that introduce silver iodide crystals into

the atmosphere, increasing regional rain and snowfall by an estimated 10 percent. In January, the Desert Research Institute put a cloud seeding drone on display at Heavenly Village in South Lake Tahoe, Calif., to promote what its drones might someday offer the region.

Nevada was a natural choice for one of the FAA's test sites. The state has about 320 flying days per year, thanks to limited cloud cover and 10 times more restricted airspace than all the other states combined, said Tom Wilczek, defense and aerospace industry liaison at the Nevada Governor's Office of Economic Development. The huge amount of airspace it can use for testing and the existing



TOM WILCZEK,
NEVADA GOVERNOR'S
OFFICE OF ECONOMIC
DEVELOPMENT

“We could use [unmanned systems] to assist with monitoring rivers that are at risk of flooding and provide better information to emergency managers in real time.

drone research and industry experts in Nevada would have made it seem strange if it wasn't selected, Wilczek said.

“This is its birthplace,” he said. “The industry came from here, and it came here because of the [U.S. Defense Department] applications. I'd say the whole unmanned systems industry is kind of our birthright. It was a matter of pride.”

The University of Nevada, Las Vegas and the University of Nevada, Reno were both quick to offer their research and development to the project, Wilczek said, and they received 100 percent political support from all levels.

Nevada's wide open airspace will allow researchers to test things they might not be able to experiment with in other areas,

Wilczek said, like various climb rates and angles of descent. The FAA has said Nevada will concentrate its efforts on developing drone standards and operations, operator standards, certification requirements and air traffic control procedures. The state has a wealth of experts in all areas of drone manufacturing and research to help.

Some applicants that wanted to be test sites may have talked about creating a local economy around drone manufacture and research, Wilczek said, but the FAA doesn't have time for that. The FAA chose the places that already have an industry in place, because it wants drones now. **GT**

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Ponca City's Big Idea

A small Oklahoma city claims it has the fastest free public wireless network in the country, and local officials did it themselves.

By **Wayne E. Hanson** / Contributing Editor

A decade ago, cities jumped on the free municipal wireless bandwagon, but free was not a very good business plan, and most projects went dark when cities or vendors pulled the plug. Today free wireless is most commonly offered by public libraries and businesses wanting to attract customers, and only a few localities still offer citywide coverage. But as mobile devices proliferate and the thirst for connectivity grows, free municipal wireless may be poised for a comeback.

One of the United States' most successful muni Wi-Fi examples is located in a small city in northern Oklahoma — not necessarily what many picture as a cutting-edge, highly connected tech hub. But Ponca City is.

Home to 25,000 residents, Ponca City is 90 miles equidistant from Wichita, Oklahoma City and Tulsa. It has a world-class wireless network providing free Wi-Fi across its 25 square miles, an unusual

attraction these days for a city “90 miles from anywhere.” The free wireless mesh service — which is so fast and forward-looking that Kansas City, Apple and Google came calling to check it out — has been so successful that Ponca City again is hosting delegations from Oklahoma, throughout the U.S. and places as far away as Australia and Italy.

So what makes Ponca City's wireless network a long-term success, and what suggestions do city officials have for other areas that want to replicate it?

It all starts with fiber, said Technology Services Director Craig Baird and City Manager Craig Stephenson. But fiber's price tag stops many local governments in their tracks, especially when they want to do it in a year instead of building a network out slowly over a number of years.

“Other cities want to get where we are,” Baird said, “but they say, ‘Well, that's just too expensive.’ The biggest problem

other cities have is that they want to do it this year. Not ‘I want to do it over 10 years.’ It's too big an investment and so it gets killed. The first thing is get some fiber out there; start small and work your way up.” Ponca City began 15 years ago, steadily adding fiber for city communications and disaster recovery. Today it has 350 miles of fiber that have opened vast opportunities to the city and its residents.

“Cities can't do it, it's too hard,” is the next obstacle, Stephenson said. “You're told to leave it up to the big guys.” But that's not true, he said. The city's Technology Services and Ponca City Energy ran the fiber and did the fusing and installation in-house.

Then in 2008, the city launched a wireless network to make GIS available in real time for public safety, public works, utilities and development services. Ponca City spent \$2.3 million to buy the radios, and again city crews stepped up. “One of the benefits is we own the electric system,” Stephenson said. “So we own the poles, and we put the radios where we need to put them.”

Businesses were eager to buy bandwidth on the system after the city's needs were met, and that's what “buys the pipe,” as Stephenson said. An additional 200 megabytes of bandwidth was allocated to resident use over the public mesh network that blankets the city.

Five hundred ABB Tropos radios cover the city's 25 square miles, with 150 more just added to serve the system's 17,000 users. Stephenson and Baird are very pleased with the results. Ponca City touts the initiative as the fastest Wi-Fi mesh network in the world, with speeds of 3 to 8 megabytes per user, transferring a total of nearly a terabyte of data per day.

While the network can be accessed by wireless-enabled devices throughout the city, residents can install a Wi-Fi modem in their house to receive a stronger signal indoors. The optional modem, called a Pepwave, costs about \$150 and comes set up to connect to the free public network. The city got local computer stores to stock and support the devices, and in so doing, helped those businesses.

The benefits to the city were striking. "A disaster recovery system replicates every five minutes with dual-path fiber, so we basically iCloud our own organization," Baird said. "Since city desktops and servers are all virtual, users can get their office desktops over the Wi-Fi anywhere out in the field."

And since it's carried on the city Wi-Fi network, there are no extra costs involved. Some cities contract to get cellular signals in police cars, which runs \$20 to \$30 per car each month. "We don't do that," Baird said. "Our vehicles do not have any cellular signals piped into them, so that's another cost savings."

But there's more to the network than hard-dollar cost savings. During the recent recession, the \$30 to \$70 per month residents had previously paid to commercial Internet service providers stayed in Ponca City, helping "churn the economy," Stephenson said.

In addition, Stephenson and Baird cited the network as a huge benefit to the schools and career technology center to help train and keep students in the area for economic development. Eighth-graders up through high school have electronic textbooks, laptops or notebooks, said Stephenson, "and that was only possible because everyone inside the city limits has Internet access."

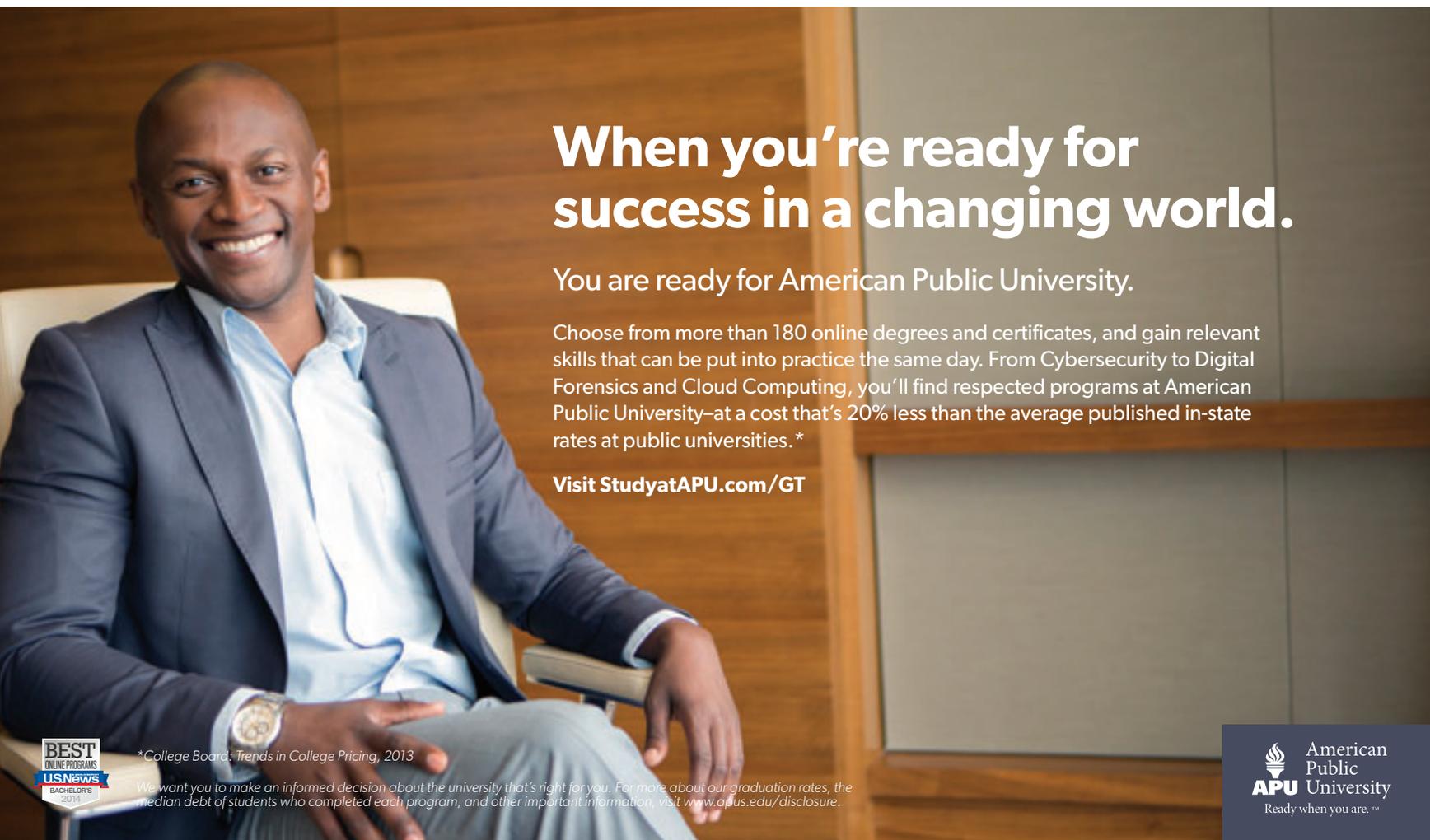
The wireless also helps attract and retain professionals — such as the scientists and

engineers employed by Phillips 66 — with the kind of connectivity they would find in Houston or Denver.

Stephenson said an initiative like this doesn't happen overnight but by steadily adding to it over time, and that requires a governing body that buys into the plan. "You can't get halfway through it and someone says, 'I don't want to fund it anymore.' We've been blessed here in Ponca City. We've had commissioners change, but they bought into what we do and they've stayed the course."

Technology changes rapidly, so what does Baird think about how the network might evolve? He said cellular companies will be pushing out new technologies and there may be a day that Ponca City will decide to change its network technology. But for now, he said, it is working very well serving the city and the public, and as long as it continues to do so, there's no reason to change. **GT**

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Utah Debuts Transit App for Google Glass

The launch tests citizens' appetite for wearable technology — part of an overall strategy to better serve mobile users.

By **Tod Newcombe** / Contributing Editor

Want to find out when the next light rail train arrives in downtown Salt Lake City? Then put on the glasses. Google Glass, that is. Utah.gov, the state's portal, has launched OnTime for Glass, the first-of-its-kind transit tracking app for Google Glass.

With the wearable technology, users can receive notifications for an approaching train or bus, view route information and track public transit vehicle locations in real time. The state decided to test the capabilities of the cutting-edge technology as a way to continue offering mobile services to its growing number of users, said David Fletcher, Utah's chief technology officer. "We have a large development community in Utah. You can see people wearing Google Glass around here."

When smartphones first took off, Fletcher thought his state was a little behind the curve in terms of offering mobile services. With the arrival of wearable technology, Utah didn't

want to find itself playing catch-up again. "By creating a Glass app now, we can see what the interface is like and how people are responding to it, before it becomes mainstream," said Fletcher.

The use of mobile services in state government is exploding in Utah and around the country. Last year, the National Association of State Chief Information Officers launched a catalog that currently contains more than 225 mobile apps covering 20 different types of services. In Utah, between 20 and 25 percent of visitors to the state's portal are mobile users. "In the last three days, we've had 647 different types of mobile devices access our domain," Fletcher said in late February.

"You'll see everything from PlayStation gaming devices to mobile phone platforms from just about every device manufacturer imaginable, and tablet devices as well."

Of the 1.65 million unique visitors to Utah.gov in January, nearly 400,000 were mobile users. Utah's population is 2.8 million.

Utah heavily promotes its online services in large part because of the cost savings. The number of state employees has been declining, while demand for services continues to rise. The cost to conduct an online transaction is a fraction of what it costs when humans are involved, said Fletcher. When the online transaction occurs on a mobile device, the state not only saves money, but it also gains some context about the customer.

"With their permission, we can get the mobile user's geolocation and provide information and services based on their location," Fletcher said. "Many people are looking for jobs and employment services right now. When they access our portal via a mobile device, we can give them information that's relevant to where they are."

Fletcher said he expected the demand for mobile services to take off, given the rapid growth in smartphones and tablet computers. "But our overall [online] growth has surprised us." Last year, the state expected the number of unique visitors to grow from 1.2 million to 1.45 million. Instead, it surged to 1.65 million. "To gain an extra 200,000 unique visitors in that time frame is quite an accomplishment," Fletcher said. **GT**

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LG's G2 smartphone features a 2.26 GHz Qualcomm Snapdragon 800 Quad-Core processor and an intuitive rear-key placement. All buttons are located on the back of the phone instead of the sides, allowing fast access to apps like QuickMemo and the camera. The G2 has a 5.2-inch full HD 1080p IPS display with 423-pixel-per-inch resolution. Other features include Text Link, which allows information embedded in text messages to be selected and easily saved in a memo or calendar and searched on a map or the Internet. Its 13-megapixel camera has scratch-resistant sapphire crystal glass to help protect the lens and provide clear photos and videos. www.lg.com



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The Acer DA223 HQL, a portable 21.5-inch all-in-one with Android OS, features a 10-point responsive touchscreen with full HD 1080p (1920 x 1080) resolution, a built-in battery and edge-to-edge glass design. The DA223 is outfitted with Android OS Jelly Bean and provides fast and smooth performance with the Qualcomm Snapdragon 600 processor with 1.7 GHz quad core CPUs. It has a wide viewing angle of 178 degrees, and is equipped with an adjustable tilt stand so the device can be used at various angles and lying flat. It has a mobile high-definition link so it can be used as an external monitor. www.acer.com

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The 6-pound Toshiba Tecra W50 mobile workstation is designed with engineers and 3-D designers in mind. It has a 15.6-inch widescreen ultra-high-definition display (with 1920 x 1080 native resolution), along with an Intel Core i7-4800MQ processor and 8 GB DDR3L memory. The laptop contains 500 GB 7200 rpm SATA hard disk drive, DVD-SuperMulti, and NVIDIA Quadro K2100M discrete graphics. It uses a high-definition 2.0 megapixel webcam and Intel Centrino a/g/n Wi-Fi connectivity. The laptop contains a 6-cell lithium-ion battery with a life rating of four hours and 51 minutes.

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Are Cities Losing Control Over 'Smart' Initiatives?

Data-driven transformation raises question of how much power to keep versus farm out.

From the thermostats on our walls to the sensors under the asphalt of our streets, digital technology — the so-called Internet of Things — is pervading and infecting every aspect of our lives.

As this technology comes to cities, whether lazy suburban ones or frenetic urban centers, it is increasingly wearing the banner of “smart cities.” Like those other S-words and phrases, such as smart growth and sustainability, a smart city can be just about anything to anybody, and therein lies both its utility and danger. I use the term to mean the marrying of our places with the telecommunications revolution that has taken hold over the last half-century, including the silicon chip, the Internet, the fiber-optic line and broadband networks.

Because this transformation is so broad and deep, it's impossible to list or even dream of all the different ways we will reshape our communities, any more than we could 100 years ago name all the ways the then-new technologies of electricity or phone service would be employed. But we can list some of the ways digital technologies are being used right now. It's sensors in sewers, face-recognizing cameras in plazas, and individual street-lights being controlled through a dial in an office at city hall. It's entire new cities arising out of the ground, like Songdo in South Korea or others in the Middle East.

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From a central operations center in Rio de Janeiro, city officials keep tabs on conditions like crime, traffic and energy use.

As wondrous as these new technologies are, however, we should remember an old truth: Whether it's the silicon chip or the entire Internet, they are just tools that deliver power and possibilities to whoever wields them. So, it's important to know and to think about who will and should control these tools. A police officer can use street cameras with facial recognition software to look for a thief, or a dictator can use them to hunt for dissidents. So far, different cities even within the same country are answering that question differently.

One clear decision point for cities and states is how much control to keep in house,

and how much to give to private companies. While countless private companies are involved, three big companies — IBM, Cisco and Siemens — use the label “smart cities” in various ways and have attracted much of the attention. They have carved out different niches, if that word can be used for anything these giant companies do.

Siemens, a global giant founded in Germany in the mid-19th century, often works with private companies to install in-house systems for better building management, as well as with public organizations. It is currently working with New York City's Metropolitan Transportation Authority to digitize ancient

systems in the subways that space the trains apart. Cisco, a Silicon Valley powerhouse whose fortune grew out of routers, is supplying much of the hardware for cities, including entire digital cities from the ground up. Cisco designed and built the digital systems for Songdo, the new smart city under construction in South Korea. IBM, which sells its Smarter City software packages, says it has already worked with more than 2,000 cities around the globe to install systems that both monitor and take action

Different cities and states have made different choices. Still doing well are the hundreds of publicly owned utilities and power cooperatives, which grew out of deep political battles before World War II over who would control the vital and still emerging technology of electricity. These companies range in size like the giant Los Angeles Department of Water and Power, which provides precious water and electricity to more than 4 million people, to public utility companies serving small towns in North Carolina.

lawsuits to slow cities from installing or using fiber networks, and have lobbied, often successfully, state legislatures to prohibit such networks. About half of the states, including North Carolina, Texas and Minnesota, have laws that prevent or substantially impede cities from setting up their own broadband networks. (It's as if Poland Spring or Perrier had persuaded state legislators to stop cities from creating public water systems.) The Federal Communications Commission is now discussing the

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among the many systems that are part of a modern-day city.

One of IBM's showcases is Rio de Janeiro, a city that's preparing for the 2014 World Cup and the 2016 Olympics, and recovering from devastating flash floods in 2010. In a new building, called the *Centro de Operacoes*, officials sit in a theater-sized room behind personal computer screens, while in front of them a giant screen beams out constant information on the city. These officials can monitor traffic, crime, flooding and energy use. They receive “crowd-sourced” information from citizens' smartphones. In general, these systems work by collecting all this data — often called big data — from many sources, which is then analyzed for prescriptive use. Traffic jams can be eased before they occur, or streets repaired soon after damage is done. Water consumption can be fine-tuned. As the technology is improved and cities grow comfortable with it, the goal is to speed the cycle of data collection and analysis, and then response.

These companies offer cities services and expertise at less cost in the short run. But they also may lock cities into proprietary systems that reduce incentives to cultivate in-house expertise. Can Rio de Janeiro really walk away from IBM's Intelligent Operations Center now that it's up and running?

These are not new situations. States and cities in the past century have gotten into bed with railroads; water, gas and electric companies; and telephone companies.

Cities and towns that opted for this approach, over the vociferous objections of private utility companies, have generally fared well. Los Angeles, for example, was a happy bystander to the seesawing utility rates in California during the 1990s, which many believed occurred when energy companies like Enron manipulated electrical rates.

Some cities and states already see the parallels and are installing their own fiber-optic and broadband networks, and saying “no thank you” to private companies. This is the municipal fiber movement, which can result in localities, regions or even states providing not only broadband, but also telephone service, cable television and smart grids for electricity. Many are smaller towns and cities; often ones that already have a public power utility to build on.

Chattanooga, Tenn., has received a lot of attention for its fiber-optic system run by the city agency EPB, which was created in the 1930s to supply electric power. Burlington, Vt., has a citywide fiber network that serves 16,000 households and 2,000 businesses, built independently of cable or other private utility companies. Other cities include Thomasville, Ga.; Spanish Fork, Utah; and Clarksville, Tenn.

History repeats itself. As happened with electric power in the early 20th century, private telecommunication companies, including giants like Comcast, are fighting to stop this movement. They apparently fear government as a competitor. They have used

possibility of stepping in to overrule these local prohibitions so that cities can proceed.

“Every community should decide for themselves what the best solution is, but many state laws take that decision out of their hands,” said Christopher Mitchell, who is leading the Community Broadband Networks campaign through the Institute for Local Self-Reliance.

While our cities will doubtless become digitally smarter in ways impossible to imagine, we should remember that some of the best changes in cities in recent years involved conceptual and political overhauls — thinking different, as Apple founder Steve Jobs said — more than digital technology. These include the livable street movement, which grew out of an “aha” moment that streets can be more than just conduits for cars. This in turn has led to converting parts of streets over to bike paths and public plazas, and to reducing parking. It has led to the public bike share programs, which do use digital technology, but could arguably exist without it.

People were calling for public bike sharing programs two generations ago, and there were some limited attempts. What made them possible today is less the digital technology than the chutzpah of cities finding a means to distribute bicycles freely and encourage their use. Doubtless the best of the smart city initiatives in decades hence also will combine fertile combinations of imagination, technology and political will. 



Bacon Nation

If you've ever tried bacon ice cream or used bacon-flavored toothpaste, you might also be tempted by a new iPhone plug-in from Oscar Mayer.

Wake Up and Smell the Bacon tempts its groggy users by filling their sleeping quarters with both the sounds and smells of sizzling bacon. Only serious applicants need apply, via the wakeupandsmellthebacon.com website — the device will not be sold in stores.

SOURCE: BUSINESS INSIDER



The Healing Power of Silk

Scientists at the Tufts University School of Engineering and Beth Israel Deaconess Medical Center are experimenting with a new substance that could replace the metal plates and screws used to help broken bones heal. Protein from silkworm cocoons is strong, biodegradable and readily acceptable by the human body, and is therefore being used to make plates and screws that don't cause the same stress to healing bone as metal. Using silk, patients could also avoid a second surgery that's often required to remove metal plates and screws once the broken bone is healed. SOURCE: GIZMAG

INTERNET FOR ALL WITH DRONES?

Could drones be the answer to getting the rest of the world online? In what's been called Facebook's answer to Google's Project Loon, the social media giant is reportedly in talks to purchase solar-powered drone maker Titan Aerospace. Step one would be to build 11,000 Solara 60 drones,

which act as inexpensive atmospheric satellites, to help make the Internet accessible to the 5 billion people in the world who are currently offline. The machines' ability to remain 12 miles above sea level for five years makes them well suited for regional Internet systems, like those Facebook and fellow backers of the Internet.org project envision over Africa. SOURCE: TECHCRUNCH



TAKING A BYTE OUT OF CRIME:

While they're not as cuddly as a K-9 unit, the creators of the K5 crime-fighting robot hope its friendly, yet commanding presence can significantly reduce crime rates. The autonomous machines can see, hear, feel and smell, processing up to 90 terabytes of data in real time using a variety of sensors. Information that the robot collects is processed by Knightscope's predictive analytics engine and combined with other information from its surroundings. When an alert is triggered, authorities and the community are notified.

Current prototypes can operate for 24 hours without needing to recharge, at a cost of about \$6.25 an hour. Testing is planned for large public spaces like shopping malls and sporting events.

SOURCE: DIGITALTRENDS.COM



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A New Framework

Looking at a city as a system — or a system of systems — can help community leaders reap large, previously unrealized rewards. Water, waste and energy systems — and how they can work together — is the focus of this issue.

How Ideas Drive What We Build

The same old problems need to be handled with fresh solutions. This issue uses the FutureStructure framework to highlight solutions to some of the challenges around transportation systems and the built environment.



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