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trajectory

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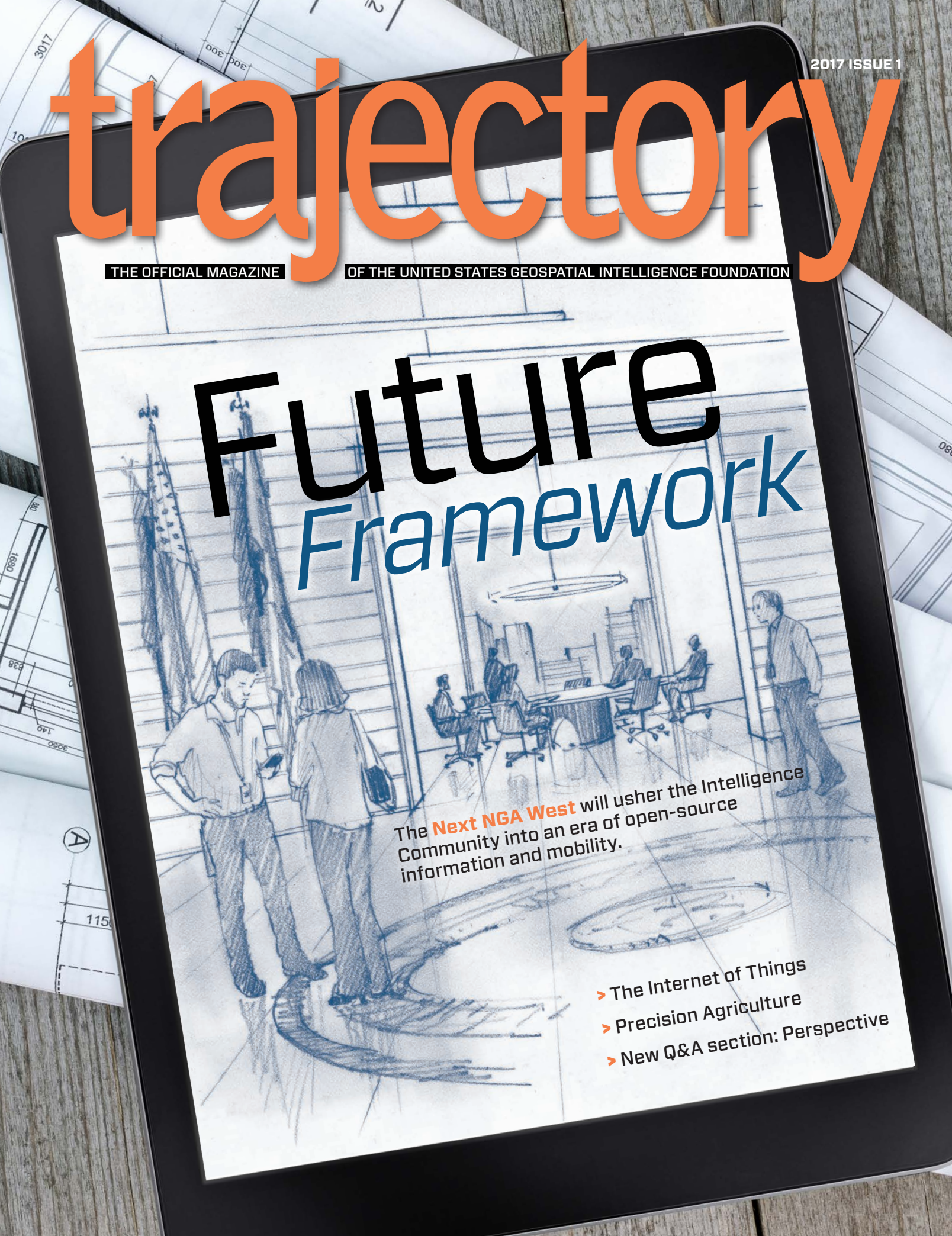


Future *Framework*

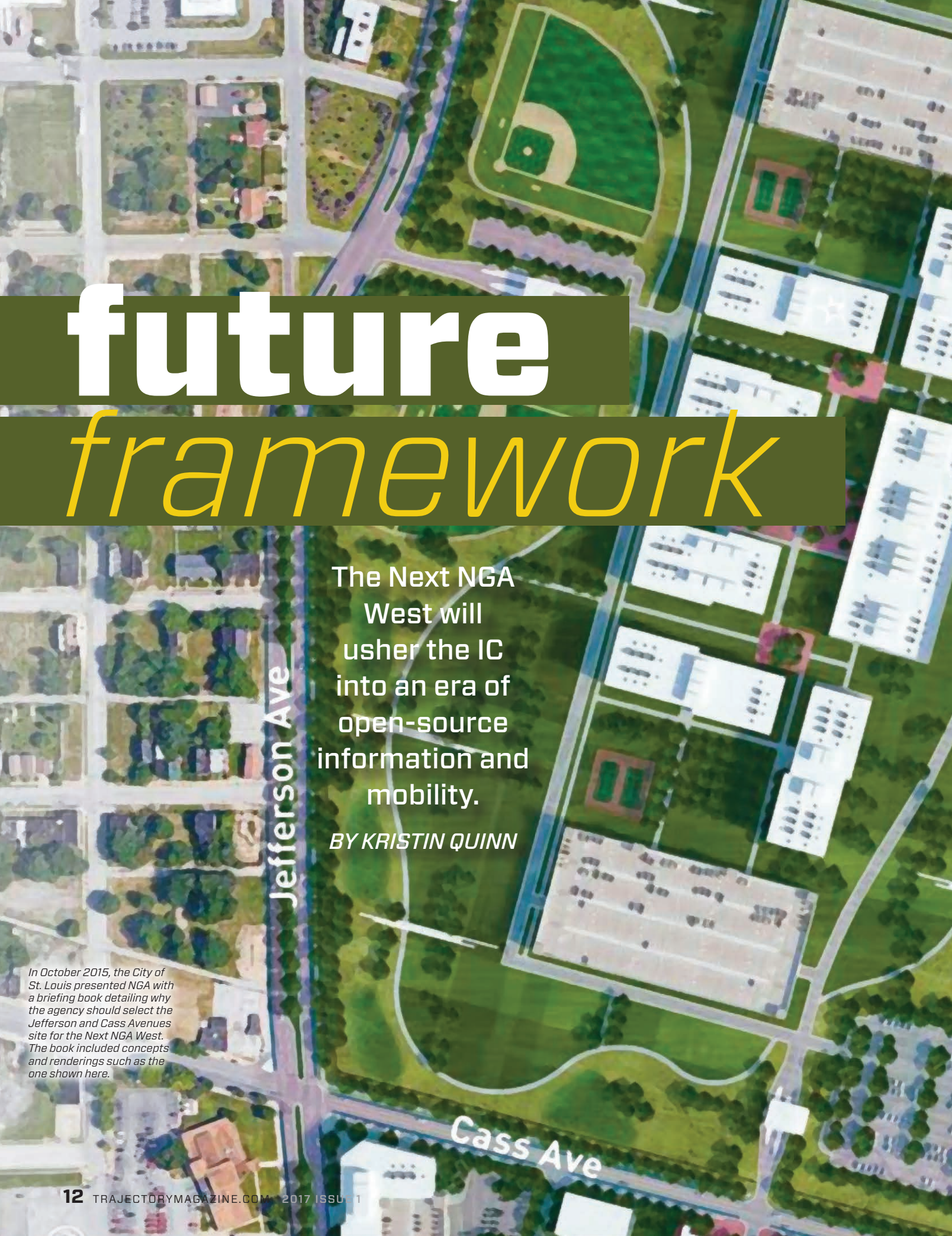
The **Next NGA West** will usher the Intelligence Community into an era of open-source information and mobility.

- The Internet of Things
- Precision Agriculture
- New Q&A section: Perspective

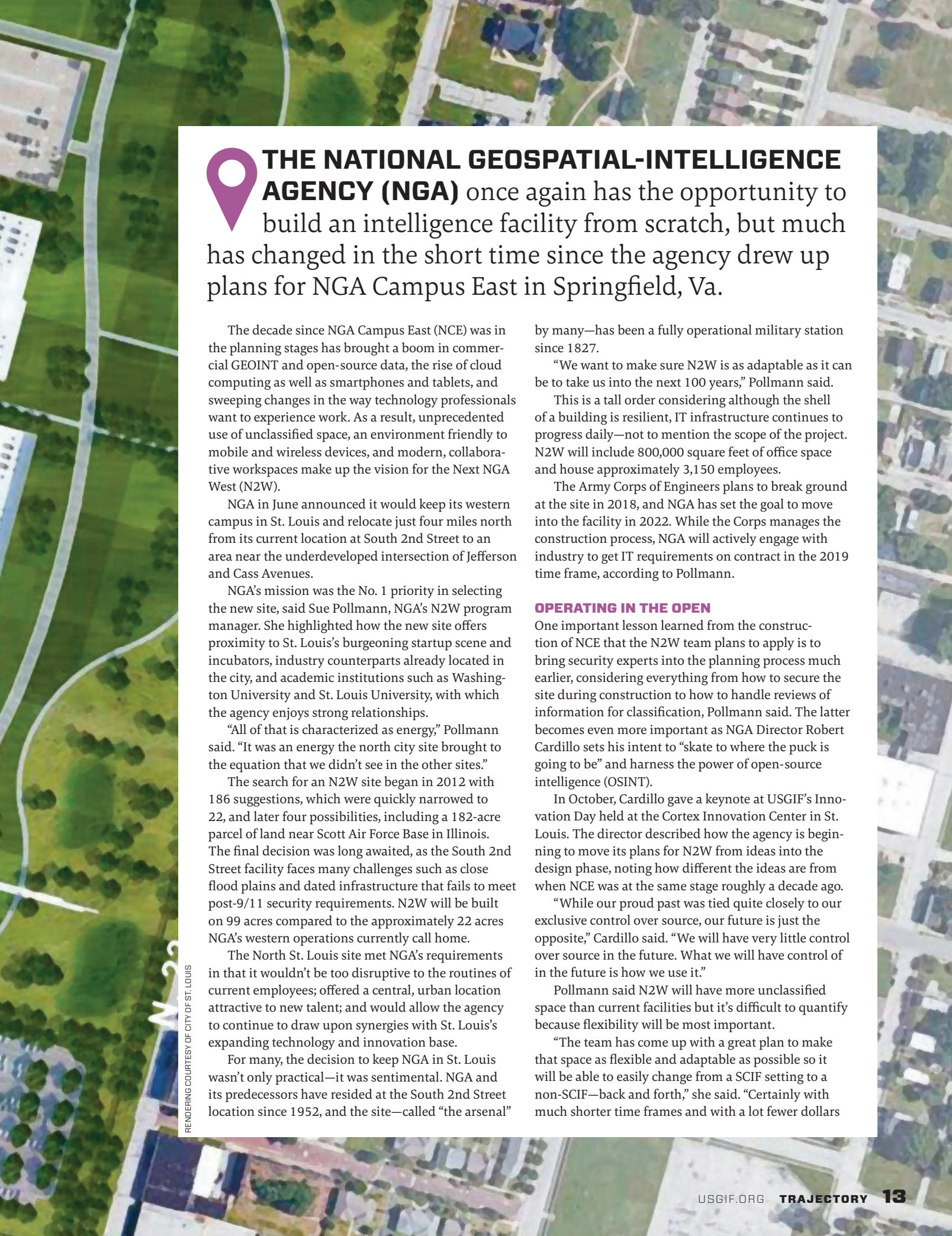
future framework

The Next NGA West will usher the IC into an era of open-source information and mobility.

BY KRISTIN QUINN



In October 2015, the City of St. Louis presented NGA with a briefing book detailing why the agency should select the Jefferson and Cass Avenues site for the Next NGA West. The book included concepts and renderings such as the one shown here.



THE NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA) once again has the opportunity to build an intelligence facility from scratch, but much has changed in the short time since the agency drew up plans for NGA Campus East in Springfield, Va.

The decade since NGA Campus East (NCE) was in the planning stages has brought a boom in commercial GEOINT and open-source data, the rise of cloud computing as well as smartphones and tablets, and sweeping changes in the way technology professionals want to experience work. As a result, unprecedented use of unclassified space, an environment friendly to mobile and wireless devices, and modern, collaborative workspaces make up the vision for the Next NGA West (N2W).

NGA in June announced it would keep its western campus in St. Louis and relocate just four miles north from its current location at South 2nd Street to an area near the underdeveloped intersection of Jefferson and Cass Avenues.

NGA's mission was the No. 1 priority in selecting the new site, said Sue Pollmann, NGA's N2W program manager. She highlighted how the new site offers proximity to St. Louis's burgeoning startup scene and incubators, industry counterparts already located in the city, and academic institutions such as Washington University and St. Louis University, with which the agency enjoys strong relationships.

"All of that is characterized as energy," Pollmann said. "It was an energy the north city site brought to the equation that we didn't see in the other sites."

The search for an N2W site began in 2012 with 186 suggestions, which were quickly narrowed to 22, and later four possibilities, including a 182-acre parcel of land near Scott Air Force Base in Illinois. The final decision was long awaited, as the South 2nd Street facility faces many challenges such as close flood plains and dated infrastructure that fails to meet post-9/11 security requirements. N2W will be built on 99 acres compared to the approximately 22 acres NGA's western operations currently call home.

The North St. Louis site met NGA's requirements in that it wouldn't be too disruptive to the routines of current employees; offered a central, urban location attractive to new talent; and would allow the agency to continue to draw upon synergies with St. Louis's expanding technology and innovation base.

For many, the decision to keep NGA in St. Louis wasn't only practical—it was sentimental. NGA and its predecessors have resided at the South 2nd Street location since 1952, and the site—called "the arsenal" by many—has been a fully operational military station since 1827.

"We want to make sure N2W is as adaptable as it can be to take us into the next 100 years," Pollmann said.

This is a tall order considering although the shell of a building is resilient, IT infrastructure continues to progress daily—not to mention the scope of the project. N2W will include 800,000 square feet of office space and house approximately 3,150 employees.

The Army Corps of Engineers plans to break ground at the site in 2018, and NGA has set the goal to move into the facility in 2022. While the Corps manages the construction process, NGA will actively engage with industry to get IT requirements on contract in the 2019 time frame, according to Pollmann.

OPERATING IN THE OPEN

One important lesson learned from the construction of NCE that the N2W team plans to apply is to bring security experts into the planning process much earlier, considering everything from how to secure the site during construction to how to handle reviews of information for classification, Pollmann said. The latter becomes even more important as NGA Director Robert Cardillo sets his intent to "skate to where the puck is going to be" and harness the power of open-source intelligence (OSINT).

In October, Cardillo gave a keynote at USGIF's Innovation Day held at the Cortex Innovation Center in St. Louis. The director described how the agency is beginning to move its plans for N2W from ideas into the design phase, noting how different the ideas are from when NCE was at the same stage roughly a decade ago.

"While our proud past was tied quite closely to our exclusive control over source, our future is just the opposite," Cardillo said. "We will have very little control over source in the future. What we will have control of in the future is how we use it."

Pollmann said N2W will have more unclassified space than current facilities but it's difficult to quantify because flexibility will be most important.

"The team has come up with a great plan to make that space as flexible and adaptable as possible so it will be able to easily change from a SCIF setting to a non-SCIF—back and forth," she said. "Certainly with much shorter time frames and with a lot fewer dollars

RENDERING COURTESY OF CITY OF ST. LOUIS

PHOTO BY DAVE RICHARDS, NGA

NGA Director Robert Cardillo spoke about the Next NGA West in October during USGIF's Innovation Day at the Cortex Innovation Center in St. Louis.

> "We will go where the data is. How quickly the mindset has changed from going low when we have to. We're planning to turn that on its head."
>
> —ROBERT CARDILLO, DIRECTOR, NGA

involved than the way it would work today if we wanted to say, 'de-SCIF,' part of a building."

Cardillo and Pollmann both emphasized the need for unclassified space that would allow the agency to easily meet with talented individuals from the many tech companies and universities in the St. Louis area, and asked industry to help develop solutions to facilitate that connectivity.

Chris Rasmussen, NGA's public software development and GEOINT Pathfinder lead, described how participants in the Pathfinder project—launched in 2015 to help the agency learn to operate in a commercial, unclassified environment—had to disconnect from NCE and work from a "WiFi bubble" at an offsite location.

NCE now faces hurdles in a closed environment as it aims to transition elements of Pathfinder to be operational and create wireless, innovative hubs of technology, according to Cardillo.

"Now, classified is the baseline with unclassified sprinkled on top. We need to invert," Rasmussen said in a presentation at USGIF's Small Satellite Workshop in November.

During a keynote address at the Small Satellite Workshop, Cardillo echoed Rasmussen's sentiments.

"We will go where the data is," the director said. "How quickly the mindset has changed from going low when we have to. We're planning to turn that on its head."

Rasmussen said classified data will always be needed, but GEOINT is moving quickly toward OSINT.

"There is value in fusion, but you aren't going to re-host the internet on JWICS to utilize that," Rasmussen said. "We need to go down, the world isn't going to come up."

Once again, Cardillo's words mirrored Rasmussen's, as he said the approach at N2W would be to "build low and find a way to lift as necessary."

Cameron Chehreh, chief technology officer for Dell EMC Federal, advocates for bringing as much data as possible forward in the unclassified environment without exposing sources and methods, then moving the information to the high side when it gets fused to the point that it must be classified.

"Mission requirements should be the forcing function and IT should be a very agile enabler to allow the mission to execute," Chehreh said.

He explained it's possible to strike this balance and support the OSINT mission by handling unclassified data in a highly secure environment to ensure there's no chance of the classified side bleeding over. For example, Chehreh recommended treating collaboration rooms as SCIFs but not accrediting them as such so unclassified talent could still be brought in, or treating unclassified data with the same best practices applied to TS/SCI information, but not classifying it as such to incorporate the value of OSINT and uncleared expertise. He added that a "robust and flourishing" insider threat detection program would be essential as well.

Andy Kemp, director of Dell EMC Federal's national security group, said the trend toward OSINT isn't exclusive to NGA—open-source now comprises 60 to 70 percent of data for most of the company's customers, and Dell is actively building systems to address such a sea change.

CLOUD FIRST

In addition to security protocols, Chehreh said the cloud is essential to safely leverage OSINT. He clarified the cloud doesn't always mean public and explained there is a rapidly emerging demand for private, hybrid cloud architectures.

"Cloud native infrastructure is a must, it's not a desire," Chehreh said, adding the cloud is more of a business and service delivery model than a technology. Dell has built portable, mission-specific clouds for several customers, including U.S. Special Operations Command.

Jim Manzelmann, assistant deputy director of national intelligence for facilities, said the Office of the Director of National Intelligence has mandated a "cloud first" strategy across the Intelligence Community (IC) in an effort to eliminate the tradition of each facility having its own data center and to promote greater flexibility, increase open space, and reduce energy costs.

Chehreh said fourth-generation, cloud native apps are the future of OSINT data fusion. For example, he pointed to an Adobe product introduced at the Defense Intelligence Agency (DIA) under Lt. Gen. Michael Flynn that allowed the director to not only view the final product, but to trace the fusion process from the raw data all the way through annotations by various analysts—SIGINT, HUMINT, GEOINT—to check the sovereignty and pedigree of the raw data and ensure accuracy.

"It was an early sign that we can apply these fourth-generation apps in the OSINT world," Chehreh said. "We absolutely can embrace this head-on with a high degree of success."

Bradley Beach, federal storage CTO at IBM, said flexibility and adaptability are as important to modern IT infrastructure as they are to facility design and classification levels.

"Make [the infrastructure] modular enough that you can swap out pieces—be it cooling, compute, storage, networking, or even a software stack," Beach said. "When you're doing the overall design of a forward-thinking infrastructure, consider how you could replace any component without making disastrous results for any of the remaining components."

Beach also observed as IT hardware becomes commoditized, software-defined networking and storage is becoming the new norm—in other words, implementing an intelligent layer of software on top of the hardware that can increase mission effectiveness and decrease costs.

When paired with machine learning, Beach sees a future in which the infrastructure can learn where it needs to move workloads, and then move the data to get the best performance in support of the mission.

"The next generation is about having the infrastructure itself make those decisions for you," he said.

WELCOMING WIRELESS

Another essential element of the N2W IT infrastructure will be to create as mobile an environment as possible given security considerations.

"We tell our exciting, excited, vibrant new teammates—interns, 21-year-olds, even 41-year-olds joining from the military—'Whatever you do, take that smart device and lock it up,'" Cardillo said in October during USGIF's State of GEOINT Content Exchange in St. Louis. "But we won't do that in the new campus. Now, will we have rooms in which we won't have wireless devices inside? Yes, but those will be the exception. A rule will be a secure, wireless, mobile environment."

The next generation not only seeks to use smart, mobile devices in the

A SPIRIT OF CITYWIDE INNOVATION

USGIF FILE PHOTO

Chad Dalton, a developer with OGSystems, and Carrie Drake, director of communications, in the company's St. Louis headquarters at the Cortex Innovation Community. Several USGIF Organizational Members have a presence at Cortex, and NGA is expanding its staff at the innovation hub.

NGA Director Robert Cardillo views N2W as an opportunity for the agency to "reset" its relationship with the broader St. Louis community.

"We are quite proud of our history here and of the engagement we've had," he said in October during a keynote at USGIF's Innovation Day held at the Cortex Innovation Community in St. Louis.

Cortex is a 200-acre innovation hub and technology district in the city's historic Central West End and Forest Park Southeast neighborhoods. St. Louis is also home to T-REX, a co-working space and technology incubator downtown that houses nearly 200 companies. Further, the city is known for its nationally ranked universities and medical centers, including St. Louis University, Washington University, Barnes-Jewish Hospital, and more.

"The fact of [this citywide innovation] as we approached the decision on our new campus was important," Cardillo said.

At the time of Cardillo's speech, three NGA employees had worked full-time at Cortex for about a year sharing space with industry partners. He noted that by the end of 2016 the agency would have its own space and 15 employees stationed at Cortex supporting cloud migration, development activities, and industry and academic interaction.

"The growth in technology here and the innovation we're seeing has been tremendous," said Otis Williams, executive director of the St. Louis Development Corporation with the mayor's office.

Arch Grants, a nonprofit organization that provides $50,000 of equity-free grants to entrepreneurs who locate their early-stage businesses in St. Louis, has played a significant role in this growth—particularly as many businesses launched in St. Louis decide to stay there.

Dr. Patricia Hagen, president and executive director of T-REX, said several of the incubator's startups are already partnered with NGA.

"We've been talking with a number of NGA representatives about what kinds of partnership opportunities there might be in helping NGA achieve its objectives around connecting with the community," Hagen said. "The new facility is going to be less than 1.5 miles away from T-REX. The opportunities for partnership within the community are great."

St. Louis Mayor Francis Slay is excited for N2W to continue to foster vibrancy throughout the city—both technologically and economically.

Slay said he is pleased NGA isn't "an island," and that Cardillo is committed to connecting with the community and having the agency engage with area academic institutions from the K–12 through university level.

"I'm looking forward to a mutually beneficial relationship that will not only enhance the mission of NGA but also one that will enhance the St. Louis community," the mayor said.

IMAGE COURTESY OF NGA

St. Louis Arsenal Postcard from 1911: *The cavalry was moved from the former arsenal to Jefferson Barracks in 1878. The following year, the facility became a depot for the Quartermaster Corps. The U.S. Army Medical Corps occupied the site from 1923 to 1952 when control passed to the U.S. Air Force. The Aeronautical Chart Service moved from downtown St. Louis to the arsenal. As the mission grew, the name was changed to the Aeronautical Chart and Information Center.*

office, but also to gather and collaborate from wirelessly connected laptops rather than being tethered to stationary desktops.

"Wireless is here," Manzelmann said. "[The key is] how to manage it to address security concerns but at the same time give analysts the opportunity to be more collaborative and work together in a more flexible way."

Manzelmann said the National Counterterrorism Center is looking at the development of wireless policies for the community. He added some agencies, such as NGA, DIA, and the National Security Agency (NSA), have initiated test pilots, allowing wireless devices in parts of their buildings on a limited basis.

The movement to wireless, coupled with the migration to the cloud, is poised to help intelligence agencies reduce costs.

Thought it may seem counterintuitive, the more connected devices in a building, the more secure the building may actually become—and the more cost-saving data you have on the building itself, according to Jason Vollen, high performance building principal with AECOM.

A wirelessly networked building provides data and analytics on who is using what rooms, where people are located, and other information necessary to understand how the workforce uses the facility.

"High-performance smart buildings operating today can actually be more secure because there's so much more data available—there are no surprises," said Jill Bruning, executive vice president and general manager for AECOM's Intelligence Community and services strategic business unit. "You have total situational awareness all the time."

The opportunity to maintain so much data on the building dovetails into energy use, as the data can help organizations conserve resources by better understanding heating, cooling, and lighting needs.

"Energy costs basically become overhead and it takes money away from the mission," Manzelmann said, adding that eliminating the actual wires also yields savings.

"Add up all the wiring in a [federal] building and you have miles of it," Manzelmann said. "If you can get part of a building to a wireless environment successfully within security guidelines, it saves a lot of money in cabling costs."

Although the move to wireless is exciting, security must remain paramount in today's landscape of cybersecurity threats. Bruning warned wireless is "the next battle space," and therefore it is essential for the IC to build secure wireless communications.

"Keeping pace with the future of secured wireless is going to be really critical in how IC ITE (the Intelligence Community Information Technology Enterprise) evolves and transforms to be able to incorporate wireless, whether segmented and outside of the SCIF or inside SCIF spaces," Bruning said.

The cloud-based nature of IC ITE lends itself to the expansion into wireless and the embrace of OSINT, she continued.

However, experts agree there are many policy discussions to be had surrounding wireless, and those charged with security policy will have to make judgment calls on where acceptable risk lies.

SEEING THE LIGHT

Beyond wireless, it's going to take more than allowing smartphones in the building to ensure a good quality of life for employees.

"Perception is reality" when it comes to a facility's design, according to Vollen.

"If one perceives themselves to be in an open space, in a place where they can be collaborative and have access to fresh air and daylight … then [they] feel connected to the world in a way that feels most comfortable and able to be productive," Vollen said, adding workforce productivity directly affects an organization's bottom line.

Bruning said it's important to consider even outdoor areas for open-source collaboration and mobility.

Manzelmann, who recalled working in facilities with concrete walls and no natural light, said the IC is learning to evolve in its design approach.

"The main purpose of the facility is to make that agency's workforce successful in meeting the mission," he said.

Design concepts in the commercial sector are much different than they were even five to 10 years ago, he continued, with a "cityscape" approach that includes open space, "touch down areas" for visitors from other facilities, and "huddle rooms" for collaborative work becoming the norm.

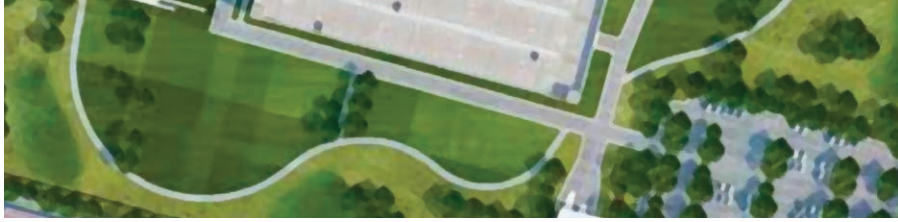
"The IC needs the best and brightest," Manzelmann said. "We're competing with the private sector—Microsoft, Google, those kinds of companies—for talent. A better facility makes us more competitive."

Chuck McGaugh, vice president of business development for the western region with NJVC, joked he's "a little too old to appreciate feng shui," but applauded modern design concepts such as the relatively new NCE facility as "visionary" for changing the employee experience.

"All of a sudden going to work became less of going to a map making factory and became an experience. It's fun, exciting, new, fresh," McGaugh said, referring to NCE's airy glass atrium, cafes, and color-coded floors.

"High-performance smart buildings operating today can actually be more secure because there's so much more data available—there are no surprises. You have total situational awareness all the time."

—JILL BRUNING, EXECUTIVE VICE PRESIDENT AND GENERAL MANAGER, INTELLIGENCE COMMUNITY AND SERVICES STRATEGIC BUSINESS UNIT, AECOM



Like Manzelmann, McGaugh cautioned N2W "won't be the only geospatial business in town," even as NGA continues to explore new ways of producing, examining, and integrating data.

Pollmann's team assembled a group of cross-agency personnel to visit dozens of locations around the country and in Canada, including the Bill & Melinda Gates Foundation, the National Renewable Energy Lab, and Canada's NSA equivalent—the Communications Security Establishment.

The group toured facilities known to be exemplars in at least one area such as sustainability, use of open space, or workplace mobility. The benchmarking trips, paired with about 600 interviews with agency personnel, helped the N2W team both realize the art of the possible and recognize which concepts might be a bridge too far for an intelligence agency.

"It's amazing that as new as NCE is, it's not where we need to be today," Pollmann said. "All of these trips and interviews are helping us determine what are the adaptability features we need to weave into the design, and where we can push the agency culturally and even from a policy and process standpoint." She added the City of St. Louis is seeking input from the NGA workforce on what sort of amenities it would like to see in the neighborhood surrounding N2W.

To ensure coordination and collaboration among neighborhood revitalization, transportation, and other re-development efforts in support of NGA, the city launched the Project Connect action plan and welcomes public opinion.

A strong mix of housing, shopping, services, dining, and transportation at the new location promises to improve quality of life for N2W's neighbors and the current workforce as well as lead to new dynamics in NGA recruitment.

PAVING THE WAY

As NGA enters uncharted territory for the IC, it is looking to the commercial sector to help envision what the future will look like and to provide the IT infrastructure for the next era.

"[N2W's IT requirements] won't look like what it takes today to support NCE or 2nd Street, or any of our other facilities," Pollmann said. "We will be looking for industry ideas on how to take this forward and be part of a wireless and cross-domain environment."

Manzelmann predicts N2W will take the IC to "the next level" in many ways, including the ability to adjust facilities internally to different levels of classification, to incorporate more wireless devices into the environment, and to create the employee workspace of the future.

"How you handle the internal part of the building to be adaptable and flexible in the most agile way is really going to be the measure of how well we do on this facility," he said.

Pollmann also said adaptation is a high priority for N2W.

"We have to adapt and we have to change," she said. "[Director Cardillo] has been very clear—operating in the open is the new of the game. We have to build N2W to allow that."