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Disrupter Series: Smart Communities
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Summary

The City of Pittsburgh is changing rapidly. Investments made by philanthropists and industrialists decades ago have helped position the city to be on the leading edge of revolutions in healthcare, technology, and advanced manufacturing. A high quality of life and low cost of living attracts new residents from across the country and around the world. For the first time in a long time, we are managing growth instead of managing decline. Given this new opportunity, the City of Pittsburgh is attempting to reshape the way that residents interact with our local government.

The City has been building a three part framework for smart cities: Collaboratively using technology to measurably improve the quality of life of our residents and visitors, building a data utility for government, industry, and citizens to use, and preparing our systems and our residents for future disruption. We believe that these initiatives and others that will come can improve the quality of life for residents by improving safety, reliability, efficiency, and resiliency of our networks. And slowly but surely, we are making the investments and finding the partnerships that advance those goals.

Full Testimony

Chairman Latta, Ranking Member Schakowsky, and all members of the House Energy & Commerce Subcommittee on Digital Commerce and Consumer Protection, on behalf of Mayor Peduto and the City of Pittsburgh, I want to start by thanking you for the opportunity to speak with you today about Pittsburgh's emergence as a "smart community." It is a pleasure to be here.

The culture of the City of Pittsburgh is one of innovation. The industrial base that made Western Pennsylvania the engine of the country was not only built on manufacturing, but on research and development. US Steel, Westinghouse, Alcoa, and others produced products and materials, but also inventions and improvements. That history of innovation led to a number of firsts that we still take pride in today: the first commercial radio station, the first polio vaccine, and the first robotics center, among others.

But in Pittsburgh we're also keenly aware of the side-effects those innovations can create. When Pittsburgh was described as "Hell with the lid off", it was not meant to be a compliment. Only through a concerted partnership of the public sector and industry were Pittsburgh's air and water improved.

Disruptions in manufacturing during the 1970s and 1980s posed challenges of a different sort. Depopulation in the region during that time have been eclipsed only by post-Katrina New Orleans. Unemployment in some parts of Western Pennsylvania approached 20%. As a result we are now a city half the size of our peak in the 1960 census. These changes decimated City

government, putting us on the path to seek oversight from the Commonwealth of Pennsylvania's program for distressed municipalities in 2003.

Yet we are a resilient city. Investments made by philanthropists and industrialists decades ago have helped position the city to be on the leading edge of revolutions in healthcare, technology, and advanced manufacturing. A high quality of life and low cost of living attracts new residents from across the country and around the world. For the first time in a long time, we are managing growth instead of managing decline. Given this new opportunity, the City of Pittsburgh is attempting to reshape the way that residents interact with our local government.

An initial challenge in our "smart cities" work has been defining what it means to Pittsburgh. During the USDOT Smart City challenge, the definition was provided to us through the twelve *Beyond Traffic* vision elements including urban automation, connected vehicles, and sensor-based infrastructure. While these applications are vital to the city of the future, they are not goals in and of themselves. They also relate almost exclusively to transportation, which is only one aspect of the broad range of services that local government provides.

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Our smart city initiatives start with a simple question: what is the challenge we are trying to solve? Instead of letting the latest and greatest technology drive our decisions, we are oriented around real world problem-solving. For example, the City has partnered on a number of projects with the Traffic21, Metro21, and newly created Mobility 21 Institutes at Carnegie Mellon University to use academic research to solve real issues in traffic management, infrastructure preservation, and transportation safety.

An example of successful implementation of this methodology can be seen in the City's SURTRAC deployment. SURTRAC (Scalable Urban TRAffic Control) was designed by robotics researchers at Carnegie Mellon to solve the system inefficiencies that occur as a result of fixed traffic signal timing. By detecting the volume of traffic at an intersection, and providing that information to other signals in the network, the adaptive signals are able to provide more efficient light timings, reducing travel times and stops for vehicles. Future applications include additional capabilities to minimize not just vehicular delay but also pedestrian wait times, and using vehicle to infrastructure communications to optimize the flow of heavily occupied mass transit vehicles. The success and potential of adaptive traffic signal networks in Pittsburgh led to our successful application to the Advanced Transportation and Congestion Management Technologies Deployment Program application to upgrade dozens of new intersections along "Smart Spines"- the two and four lane roads that are the backbone of transportation through the valleys and across the bridges that make up our City. As we make investments in those corridors, it is a perfect opportunity to layer additional communications, stormwater, and energy infrastructure supported by technology and to improve connections between historically isolated neighborhoods and major centers of employment and educational and healthcare services.

Just last week, Pittsburgh released a request for information focused on smart streetlight technologies, looking for ideas from the community of innovators that will enable and enhance the services we provide. As we plan to replace the entirety of our 40,000 city-owned and operated streetlights, Pittsburgh has the potential to build out a platform for future deployments such as mid-block traffic detection, gunshot detection, air quality monitoring, and public wifi access. We are exploring new models of public-private partnership that can finance these new investments and help us manage the constantly evolving technology risk.

The second pillar of our Smart City strategy is a data infrastructure that allows for the City to operate more effectively, and to allow the public and private sectors to build on top of our resources. In much the same way that our electric grid, water systems, and roadways and bridges allowed for Pittsburgh's success in the 20th century, our Data Utility will advance Pittsburgh into the 21st.

We have been laying the technical groundwork for this work for several years. The City, County, and University of Pittsburgh are partners in the Western Pennsylvania Regional Data Center, a regional effort to make public non-sensitive municipal data. For Pittsburgh, this collaborative structure has been a tremendous success, and has brought a number of outside partners to the table to publish their own data. Over 150 datasets, provided by local governments, public agencies, university partners, and non-profit organizations help citizens engage with the communities they call home. Trainings, hackathons, and partnerships with local libraries are producing a vibrant ecosystem of civic tech that engages with us, creating a feedback loop. In

response to resident concerns, the City recently used the data it publishes on the Data Center to create public-facing information portals where residents can find out about neighborhood building permits, response times for constituent concerns, and tax delinquency.

Our push for innovation is also internal. The smart community must use connected technology and data to enhance city services and increase the efficiency of its own operations. Our Analytics & Strategy team, housed in our Department of Innovation & Performance, works with the city departments to enhance service delivery and ensure data-driven performance. A salient example comes from our Department of Public Works, which is deploying sensors in litter cans to monitor the fill level. By knowing which cans need to be emptied, the City can reduce the time spent on collection by 33%, representing a major increase in efficiency that will save the City money and afford time to focus on other Public Works priorities.

A number of city departments are using custom, interactive maps to view and make decisions based on city data. These maps, cleverly named Burgh's Eye View, allow our fire department to see up-to-date building code violations - to better understand a building before entering it. They allow our police department to monitor 311 requests for city service and see when residents request graffiti removal, note excessive noise, or submit a host of other requests connected to their quality of life. These cases remind us that the smart community isn't just about self-driving cars and sensors, but has mechanisms to learn from itself, and make decisions to improve performance that are based on data.

The final pillar of Pittsburgh's Smart City strategy is the need to build a policy and planning framework for the considerable disruption technology is going to continue to play in the way that we deliver services to residents. Many of the innovations in the Smart City space are in the private sector. Some of these innovations, such as autonomous vehicles and transportation network companies, rely on access to public right of way for their business models to work, and an appropriate and even-handed regulatory framework that balances safety with innovation is required for the good of our residents. Pittsburgh's strong working relationship with the Pennsylvania Department of Transportation and our recent designation as an Autonomous Vehicle Proving Ground will allow us to continue to represent the concerns of our residents on the subject.

The potential for autonomous, connected, electric, and shared vehicles poses significant uncertainty for cities. Depending on advances in technology and cultural adoption rates, large-scale deployment of these innovations could be a matter of decades or a matter of years away. Local governments have operated on a series of assumptions for the last half century which could be substantially upended by these technologies. For example, the City of Pittsburgh receives nearly 15% of its revenue from parking tax, a source that could be eliminated. Likewise change in parking demand could have significant effects on the financing of public garages and parking minimums for development. Competition for precious curb space across different users including rideshares, charging infrastructure, and drone-enhanced deliveries could force a rethinking of land use patterns in the City. The potential for significantly improved efficiency and safety of the transportation network as a result of technology should factor heavily into any decision to debt-finance capacity expansions. And most importantly, technological advancement

will create significant disruptions in employment for the transportation and logistics industry, requiring thought on the future of work and the pathways to the advanced manufacturing, cybersecurity, and data science jobs of the future.

The City of Pittsburgh is approaching our Smart deployments by keeping these three concepts in mind. By focusing on real use cases of need, making data available to the public, and preparing for disruption, we are trying to harness the promise of new technology to benefit our residents. We believe that these initiatives and others that will come can improve the quality of life for residents by improving safety, reliability, efficiency, and resiliency of our networks. And slowly but surely, we are making the investments and finding the partnerships that advance those goals.

The mayor likes to say that Pittsburgh is small enough that you can get all of the right people together to get a project off of the ground, and big enough that when you do, the world takes notice. The lessons we are learning in our urban laboratory can be imparted across the country, and on behalf of the City, we are grateful for the opportunity to share what we have found. Thank you.