
eBook
CREATE A SMART, SAFE CONNECTED AND SUSTAINABLE CITY
kloudspot

Contents

Building Smart Cities: The Digital Imperative To Fuel Economic Growth

Introduction

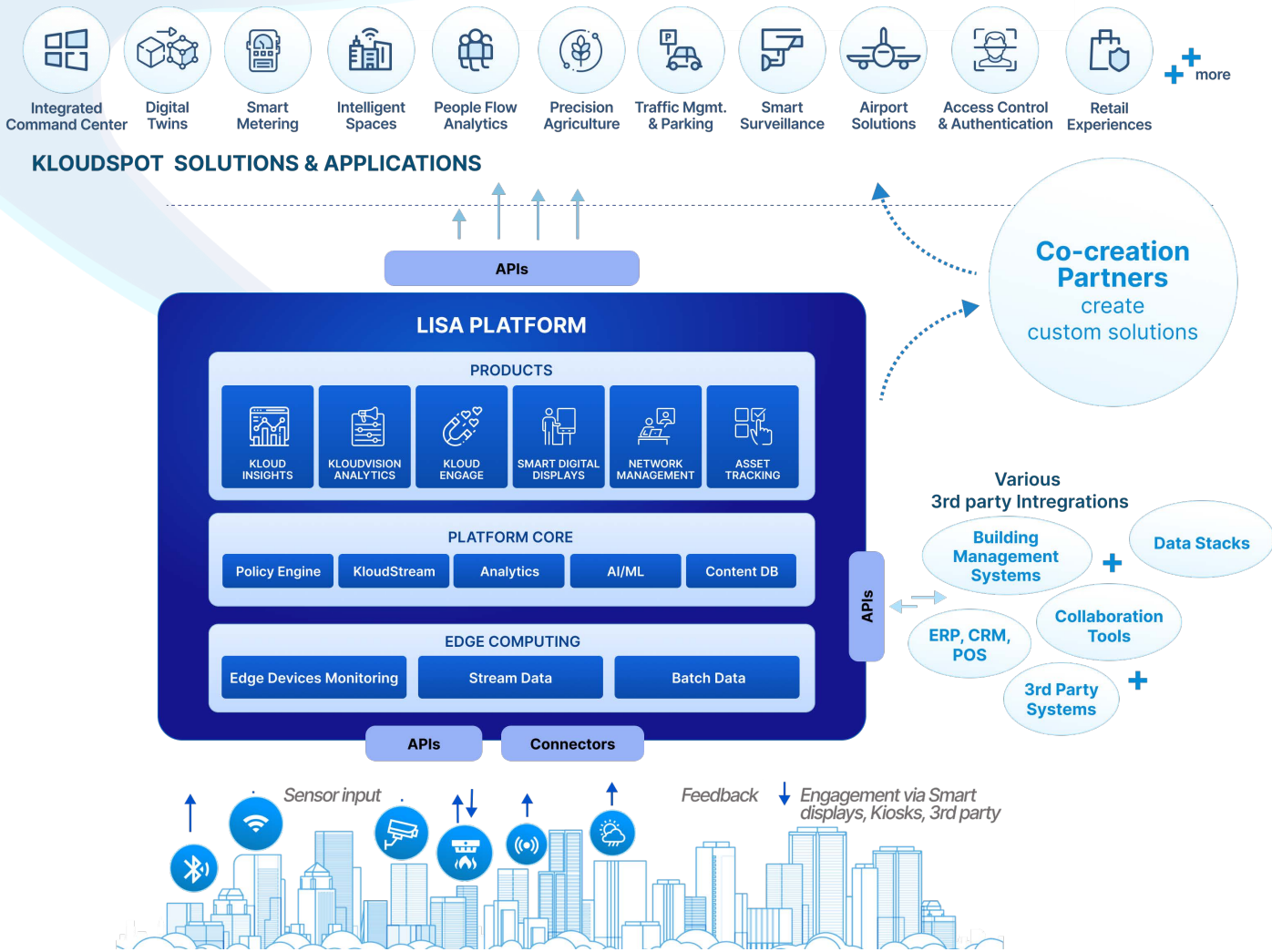
In 1962, the world met George Jetson, his wife Jane, daughter Judy, son Elroy, and dog Astro, and the world has been fascinated by visions of a fully tech-enabled, everyday living ever since. The cartoon family's Orbit City metropolis promised a future complete with smartwatches, video conferencing, tablets, drones, house-cleaning robots, holograms, flying cars and much more. Fast forward and we're already living in that future (except the still-elusive flying cars).

Connected, intelligent technologies are everywhere. According to a 2019 Deloitte study, U.S. households own an average of 11 connected devices, including seven with screens to view content. Most people carry at least one of these smart devices everywhere they go, if not several. And cities around the world are leveraging them, alongside a host of networking, location-based services/geo location, communications, sensor and display technology to create 'smart cities' that begin to rival the Jetson's hometown.

"Smart cities" bring together Information and Communication Technologies (ICT), cloud-based Internet of Things (IoT) applications, and the data they gather to help municipalities and their constituents improve their quality of life and address growing urban challenges, from economic and urban development to enhancing public safety and environmental sustainability.

Analyst firm Frost and Sullivan predicts that there will be at least 26 fully-fledged major smart cities globally by 2025, in addition to hundreds more in varying stages of development.

Kloudspot LISA Platform for Smart City Enablement



Highlights

Enterprise Grade, Modular
Scalable high availability, high scalability, Activate required modules

AI & ML
Descriptive, Predictive and Prescriptive analytics capabilities

Hardware Agnostic
Integrate any IoT sensors and systems with seamless data communication

Deployment
Cloud Native, On-premise and Hybrid deployment with on-premise data

Security & Governance
Containerized environment with security embedded in DevOps process

Breaking Down Data Silos using AI: Fostering Collaboration for Smart City Success

Removing data silos and promoting collaboration is crucial for the success of smart city initiatives. By enabling seamless data sharing and cooperation among various stakeholders, cities can harness the full potential of integrated technologies and data-driven insights, leading to more efficient, responsive, and sustainable urban environments.

By integrating AI into various aspects of urban management, smart cities can become more adaptive, responsive, and resilient, ultimately improving the quality of life for their residents while promoting sustainability and economic growth.

Layered stakeholders and their needs

The diverse stakeholder entities each playing a vital role in the planning, implementation and operations of the smart city have various needs and solution requirements. These entities include

1. Government & Public Sector
2. Citizens and Residents
3. Private Sector
4. Utilities - Energy, Water, Waste Management
5. Heathcare
6. Emergency Services
7. Transportation & Mobility
8. NGOs and Environmental Groups
9. Academia & Thinktank
10. Telecommunication

Erie Smart City, Pennsylvania: Unlocking Growth and Greater Prosperity

> Erie is helping us change the dynamic of how cities communicate with citizens, provide connectivity to Opportunity Zones, and evolve this experience for greater, two-way communication and engagement with citizens.

Ed Olsen, Vice President of Outcome-Based Funding at Quantela, Inc

With a population of just under 100,000 people, Erie is the fourth largest city in Pennsylvania. The "Flagship City" is located in the northwest corner of the commonwealth, on the southern shore of its namesake lake, and is home to a diverse community and a thriving tourism and events economy.

Erie has sought to reinvigorate several of its Opportunity Zones by helping citizens make these areas more viable for economic development, more productive and ultimately more prosperous via:

1. Strong, reliable Wi-Fi connectivity for families and businesses who may not ordinarily have access – giving the city tools to disseminate critical information and monetize related services
2. Intelligent LED lighting solutions that dramatically reduce energy consumption, increase public safety and will drive down expenses by up to 40%
3. Smart video and analytics solutions that help monitor license plates in order to help law enforcement spot vehicles of interest and enforce traffic/ parking regulations

"Erie is a model smart city," contends Ed Olsen, Vice President of Outcome-Based Funding at Quantela, Inc., which funded and is helping to lead Erie's digital transformation. "Erie is helping us change the dynamic of how cities communicate with citizens, provide connectivity to Opportunity Zones, and evolve this experience for greater, two-way communication and engagement with citizens."

In this eBook, we'll explore the factors driving the rise of smart cities, common challenges to urban digital transformation, and seven best practices for successfully creating a smart city – all pulling from and culminating in Erie's success story.

Read on and learn how you can create a smarter, safer more connected city

Smart Cities are On the Rise

Since the first computer tools to model transportation flows emerged in the 1950s, cities have used technology to improve municipal services and the quality of life for their constituents. Today, that technology includes advanced ICT solutions and a broad ecosystem of infrastructure and Internet of Things (IOT) devices – networking and Wi-Fi equipment, sensors, cameras, RFID and more. These solutions are ushering in a golden age of tech-enabled municipalities.

And though the term 'smart city' has been prevalent since as far back as the 1990s, past developments have been just a prelude to a perfect storm of technological innovation. Not only are more people connected to more pervasively connected devices, new 5G connection speeds, the exponential proliferation of IoT devices and the emergence of advanced artificial intelligence (AI) are unlocking always-on, city-wide and real-time insights.

But more than the tech, there are social, economic and environmental factors making the development of smarter, more intelligent cities a critical imperative.

Increasing populations, increased demands on infrastructure

Today, over half of the world's population already live in metropolitan areas. And by 2050, the UN estimates that number will grow to 70% – another 2.5 billion people – placing an even greater burden on already strained urban infrastructures.

Although cities make up less than two percent of the earth's landmass, their citizens consume more than 75% of the world's natural resources and generate the majority of carbon emissions. As a result, rapid urbanization can seriously impact livability, from creating waste management challenges and resource scarcity, to traffic congestion and pollution, to aging infrastructure and human health concerns.

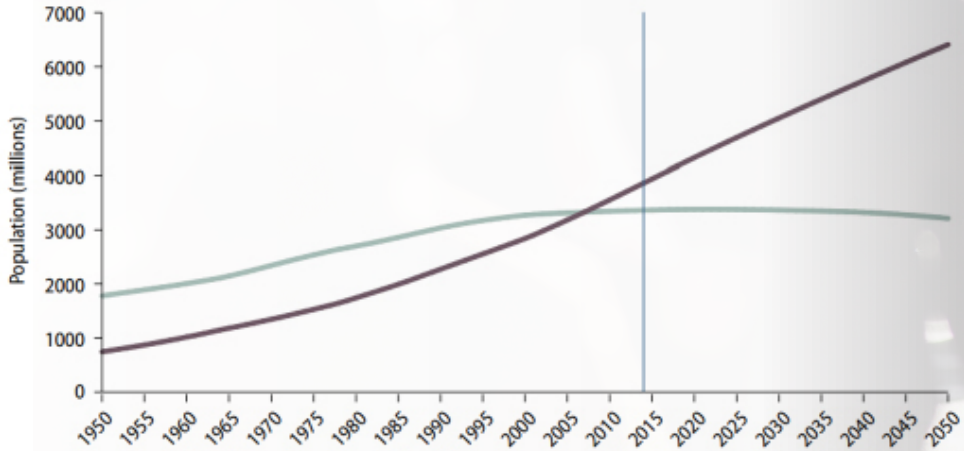
"While the remarkable technological advances of the last decade are a significant factor in the growth of smart cities, it's the human needs that underscore the tremendous imperative," states Ravi Akireddy, one of the luminaries behind many of the technologies powering our connected world today and founder of Kloudspot, the first situational awareness and intelligence SaaS platform. "People don't decide where to live based on the tech. They care about the experiences that the tech enables. Clean, safe neighborhoods. Great schools and jobs. Access to transportation. Increasingly, fast and reliable connectivity. For cities to evolve and continue to attract businesses and other economic growth stimuli, they will need to create more intelligent spaces – and always in service of their citizens and local businesses."

A Global Health Crisis and Social Unrest

2020 irrevocably changed the world. The ongoing pandemic and social unrest have amplified the call for smart city technologies and, in many cases, accelerated their implementation.

“Prior to the pandemic, discussions were very different. Many of these technologies were still considered just nice to have,” says Quantela’s Ed Olsen. “Cities that have invested in smart technologies are in a much better position to not only plan and make decisions during the current pandemic, but also to be prepared for the next big scenario.”

Urban and rural population of the world, 1950–2050



Olsen counts Wi-Fi, digital signage and video analytics among some of the technologies that have proven most essential: “Now you can see that contactless communication is incredibly powerful, especially when we want people to engage while social distancing. Internet connectivity has been critical to enabling remote work and school. Video cameras and analytics have been instrumental for contact tracing of COVID-19 patients or people potentially exposed – as well as for security, distinguishing between protestors and agitators. With these solutions in place, we can see objects in hands, cross-reference faces with criminal databases, and maintain communication to keep people safe.”

Small and Medium-Sized Cities Have the Most to Gain

In February, IDC projected global spending for smart cities to be $124 billion in 2020, an increase of 18.9% over 2019. Perhaps most compelling about the growth in spending is that the largest 100 smart cities only represent 30% of total investment. Medium-sized and smaller cities are stepping up, and many experts believe they actually have an advantage in driving transformation over their larger urban cohorts.

In a statement from IDC, program manager Serena Da Rold said there is a "great opportunity for providers of smart city solutions who are able to leverage the experience gained from larger projects to offer affordable smart initiatives for small and medium-sized cities."

"We face all the same budget and people challenges that large cities do," says Chris Ponsford, Vice President at Paradigm Infotech, Inc., and implementation lead for Erie's smart city initiative. "From accounting to supporting siloed departments and systems, we deal with it all. But, being a smaller city, we often can introduce innovation to make things easier and solve these challenges."

Echoing Ponsford, research by global risk management company DNV GL found significant leadership and innovation on climate change and sustainability is happening in midsize cities, in part because they can be nimbler and more flexible in addressing problems.

Quantela's Ed Olson adds, "Many of these smaller cities have been run incredibly well and have their budgets balanced. There are real opportunities for smaller cities to be safer and run with fewer resources – and deliver higher value for citizens."

The Positive Impact of Smart City Technologies

What kinds of results can a municipality expect from investing in smart city technologies? While metrics vary from study to study, the positive impact is undeniable. Here are several recent measures of success, both quantitative and qualitative.

10-30% improvement in quality of life

The McKinsey Global Institute assessed dozens of current smart city applications in three sample cities with varying legacy infrastructure systems and baseline starting points. MGI found these technologies could deliver:

8% – 10%
reduced fatalities

20% – 35%
accelerated emergency response times

15% – 20%
off the average commute time

8% – 15%
lower disease burden

10% – 15%
reduced greenhouse gas emissions

Top Use Cases in Smart Cities include

According to IOT Analytics' 2020 Smart City Use Cases & Technology Adoption Report, Smart City technologies help address problems that are and will continue to impede the quality of life for its citizens including increasing operational efficiency and improving decision making in the short term while addressing long term challenges of sustainability and pollution in ever-growing cities.

74%
Connected Public Transport

68%
Weather Monitoring

72%
Traffic Monitoring and Management

68%
Air Quality/ Polution

72%
Water Level/ Flood Monitoring

66%
Smart Metering-Water

72%
Video Surveillance and Analytics

66%
Fire/Smoke Detection

68%
Connected Streetlights

64%
Water Quality Monitoring

Multi-million-dollar return on investment

According to a 2019 ESI Thoughtlab study, the average return on investment in hyperconnected smart city initiatives ranges from 3% to 4%. The average city can unlock $45 million in returns as a result. And, as cities become more interconnected, their ROI grows.

$45 mil ROI
according to ESI

Impediments to More Intelligent Cities

Change is hard. That's a colossal understatement for cities undertaking a digital transformation. Every metropolis, regardless of size, faces several common fiscal, technological, organizational and societal challenges.

Funding and resources

City budgets are always a barrier. And, Quantela's Ed Olsen notes the painful irony as it relates to smart city solutions today: "Now, when we have proof that these technologies deliver impact and cities might need them more than ever, the opportunity for funding isn't as high due to unexpected costs stemming from the pandemic. So, you need solutions that can help manage and pay for themselves. You need to be able to provide essential services and support local businesses. And you have to do so at a low entry cost.

"Funding is a challenge for every city," Chris Ponsford agrees. "What we were able to do in Erie was find significant savings from utilities, money that we could deploy in other places for citizens to enjoy."

At the same time, many cities struggle with projecting results or being able to demonstrate return on investment. According to an ESI Thoughtlab 2019 report, only 46% of surveyed cities believe that they have staff in place with the necessary data analytics, strategic thinking, and problem-solving skills.

Both teams and tech operate in siloes

The foundation of a smart city is connectivity. Between objects and devices and the people wearing them. Between data. Between people. The trouble for many cities is that municipal departments and partners often operate independently, as do their technology systems. Bringing everything and everyone together can prove challenging, to say the least.

In most cities today, data is fragmented across any number of organizations – municipal departments, corporations, nonprofits, and personal contractor databases – all with little standardization. At the same time, most cities won't start a smart city initiative from scratch; they'll need to build on their existing infrastructure and ensure that everything seamlessly works together.

"Many [cities] struggle with how to accomplish [digital transformation] when they are faced with complex infrastructures, multiple platforms, the need for different types of data, and customized technological applications," says Susan Wilkinson, Microsoft's Director of Business Strategy, Smart Cities in ESI Thoughtlab's report. "Across the board, the research tells us that the cities that overcome these challenges are the ones that recognize the greatest benefits."

"Big data has been a problem for years – collecting it but with no mechanism to do anything with it, and no outcomes," states Kloudspot's Akireddy. "What's required is a layer of software that integrates and translates the data between every system – cameras, sensors, network devices. What's different now, thanks to an AI platform like ours, is that we have the ability to interoperate among all of this new and legacy technology to help cities realize their intelligent spaces."

Security and privacy

Security and privacy are top of mind for every municipality and their citizens. And with good reason: cybercriminals are using distributed denial of service (DDoS) attacks, ransomware and other tools to disrupt and damage city services. In fact, more than 70% of all reported ransomware attacks in the United States target state and local governments.

For example, Atlanta was held hostage by a ransomware cyberattack for five days in 2018, paralyzing America's busiest airport and affecting law enforcement and business licenses, among other areas. Similarly, ransomware attacks in 2018 and 2019 took down many of Baltimore's servers and shut down its 911 emergency call center, resulting in $18 million in damages. Last year, Lloyds estimated that New York City alone could face over $2.3 billion in cyber-related losses in 2020.

One reason that cities are often targets is because their systems are often older and less technologically sophisticated than enterprise systems, making them easier prey. What's more, city IT staff often lack the skills and expertise to manage and mitigate the threats – and they feel under-supported by city leadership. According to the International City and County Management Association, approximately 60% of municipal technology officials cite a lack of support from their elected officials and top appointees for their city's poor cybersecurity.

Seven Steps to create a Smart, Safe and Connected City

Based on the learnings and input of the experts already cited in this eBook, as well as case studies from many successful smart cities, here are several best practices to help city leadership, city planners and IT teams to develop and deploy an intelligent city initiative.

1. Do your homework and share your learnings

Begin with general due diligence into smart city technologies and initiatives in similar municipalities around the globe. See what worked, what didn't, and what's possible (and read on for one such example!). At the same time, involve your citizens through surveys to understand what their needs and concerns may be. Importantly, take the time to educate stakeholders throughout your city – and engage city leadership early.

"It's essential to have the right teams and team members involved, and to give them the awareness and education from the top down, including the mayor's office and staff," suggests Paradigm Infotech's Chris Ponsford. "Have them in the survey process to see the benefits associated to them. Help them understand how they could become more efficient, save money and reutilize those funds to be more useful for citizens of the city. It's an extensive learning curve. They need to see how they can lower operating costs, create a more connected citizenship, and help the whole city move ahead.

2. Know your entire asset and partner ecosystem

Ponsford raises another important issue that many cities don't realize early enough in the smart city planning process: many assets you'd like to leverage may not be city owned. He shares, "You need to have insight into ownership to inform the overall strategic vision. In our instance, the City of Erie doesn't own the lighting equipment and telephone poles. So, you need to find the right partners, bring in the utilities, educate them and get their support – and then communicate those benefits to the citizenship."

Audit, map and understand your asset ecosystem. Bring everyone to the table at the same time. When you have disconnects between assets and owners, the entire project will be slowed until everyone is brought up to speed and in alignment.

3. Think long term – and connect everything

You can start small with your smart city initiatives, but it's important to look at your technology and city planning roadmap and think ahead, even years out. As Ed Olsen contends, "Where are you today is not where you were yesterday. A lot has changed in the last 12 months! You can't think solely about immediate needs because that always puts you behind the eight ball. Society and tech change so quickly that you'll always be playing catch up. Success is not about one or two smart city opportunities. It's an umbrella for many options, big or small. Thinking about how things work better together is how you get to bigger outcomes."

Kloudspot's Akireddy agrees, "The more that you can integrate and maintain an open and flexible system, and enable data sharing and interoperability, the more you'll be able to accelerate speed to insights, drive innovation and future-proof your smart city investments."

4. Start with self-sustaining projects

Smart cities, especially smaller ones, need to be thoughtful about where they begin to invest time, money and resources. That's why experts recommend considering technologies and projects that may not have been recognized on an immediate need basis, but can immediately unlock savings that can be reinvested, as well as generate revenue by themselves. These services could include Wi-Fi connectivity, lighting, traffic/parking, and digital signage for transportation or other way finding.

Both Ed Olsen and Chris Ponsford point to smart lighting as an ideal option. "LED lighting can save you millions of dollars a year and provides a great level of control for safety and security. That's a great one-two punch," says Olsen.

"Lights have come so far from incandescent to LED, it's amazing," observes Ponsford. "At a minimum, if you could save 40% on electric costs, that's a metric the city could really enjoy. In the City of Erie, you're talking 8,000 lights in the downtown area. That could be a huge savings." Both experts also point to Wi-Fi as a prime opportunity – and necessity – for smart cities. Internet connectivity can help to bridge the digital divide between affluent and underserved communities, enabling online work, learning, banking, access to food delivery and city services, and much more. These services are even more essential in the wake of the pandemic. At the same time, Wi-Fi portals can generate a steady revenue stream from advertising, while simultaneously supporting local businesses.

5. Target areas where you can have the most impact

Opportunity Zones or other underserved communities present profound opportunities for aspiring smart cities. To begin, the impact that connected services can have on these areas can be much greater. Chris Ponsford notes, "A lot of people are working from home. Unfortunately, many will be displaced as jobs are on hold. There's also the remote learning element. Those living in low-income housing may not have the resources to support a home network. Having a free Wi-Fi system has had a great level of interest for Erie's citizens..

Investing in Opportunity Zones can also enable small and medium-sized cities to gain financial support with federal funding or grants. At the same time, successful projects that lift up communities in need can help to raise the national reputation of a city and its standing with state-level stakeholders.

6. Make full use of your data

Real-time data is the lifeblood of a smart city, and it can be leveraged in myriad ways to optimize and strengthen your initiatives. "Only when you have a system to aggregate, analyze and act upon a city's data in real time can you truly articulate the value your smart city is delivering," says Ravi Akireddy. "That data is just as valuable for citizens and businesses as it is for the government and utilities operating the smart city."

Carlo Ratti, director of MIT's Senseable City Lab, echoes Akireddy in an article from consultant Roland Berger. Speaking about a waste management project his team oversaw in Seattle, he says: "Data means that we know more about our environment and about the consequences of what we do. We learned that the simple sharing of information through visualizations can promote behavioral change. People involved in the project were able to follow their trash, and this led some of them to embrace more sustainable consumption choices."

7. Security and privacy must be primary and resilient

Without the assurance of network and device security, as well the privacy of citizens, no smart city project will succeed. Be sure to communicate early and often with constituents to maintain transparency. And create a technology plan that has contingencies and emergency procedures, no different than city infrastructure plans that are developed to mitigate extreme weather or other catastrophic events.

Next Steps

Identifying the use cases in your city initiatives and developing the right IT infrastructure to support these is a critical first step. Contact Kloudspot for a free, 20-minute assessment and determine your next steps to building a smart city.

Throughout this eBook, you've read anecdotes from the architects of Erie, Pennsylvania's digital transformation. Now, you can read full their story and see how they've applied the best practices above to successfully jumpstart Erie's smart city journey.

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About Kloudspot

Founded in 2016, Kloudspot Inc. is a leading situation awareness and location intelligence platform that leverages cutting-edge technology, AI, and analytics to transform spaces. Our Kloudspot LISA Platform is a powerful enabler of solutions for smart cities, smart industry, smart agriculture and smart energy. The solutions are designed to enhance the efficiency of various domains such as operations, optimization, safety and security, network and communications, emergency response, hybrid workspaces and sustainability goals.

Today, Kloudspot supports a global customer base and partners all across North America, Latin America, Asia, Europe and the Middle East. Kloudspot customers include smart cities, airports, retail chains, aero cities, buildings, factories, events, theme parks and public spaces.

Our leadership team consists of industry pioneers in IoT, networking, AI, data science, and operations management, driving innovation and excellence in every project we undertake.

Kloudspot has offices in the USA, Middle-East, India and Japan.

Learn more at Kloudspot.com

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