

BLUE RIBBON COMMISSION:

A Roadmap for City of Tulsa Drone Leadership

2024



TULSA
INNOVATION
LABS®



Tulsa is Poised for Global Drone Leadership

The City of Tulsa is at an important inflection point. Recent investments have positioned the Tulsa region to be a global leader in the development, testing, manufacturing, and deployment of autonomous systems, such as drones. These investments draw on Tulsa's longstanding strengths in the aerospace industry to build the world's leading center of innovation in the future of aerospace, transforming the future of the city's economy and creating thousands of new, good jobs. To realize this vision, the City of Tulsa must be fully engaged in supporting the adoption of autonomous technologies in a way that benefits Tulsans from every community.

Recognizing the importance of the City's involvement, in November 2023, Tulsa Mayor G.T. Bynum announced his intention to establish Tulsa as the "Drone Capital of the World." Mayor Bynum established the Blue Ribbon Commission to bring together leaders from across the public, private, and non-profit sectors to develop recommendations for how the City of Tulsa could achieve his vision to become the drone capital. Through monthly meetings, the Commission considered critical questions within the City's jurisdiction, such as:

Municipal Services:

How can the City leverage autonomous systems, such as drones, to improve the delivery of municipal services?

Infrastructure:

What infrastructure is needed within the City to enable a multi-operator environment in a safe and secure manner?

Economic and Workforce Development:

How can the City promote the expansion, relocation, and creation of autonomous systems companies in Tulsa, and how can it develop the workforce necessary to support rapid economic development?

Rules, Regulations, and Policy:

What City policies or regulations need to be amended or created to support the safe operation of autonomous systems?



This report is the culmination of the Blue Ribbon Commission’s efforts and sets forth action-oriented recommendations on how the City can adopt emerging technologies and support the growth of Tulsa’s burgeoning technology industries.

The recommendations are cross-functional in nature – seeking to bridge across City of Tulsa departments and community partners to develop a holistic approach to leveraging technology to benefit all Tulsans. The City cannot do it alone, and numerous implementation partners will be needed to achieve the goal of establishing Tulsa as the “Drone Capital of the World.” It is the Commission’s hope that this report can serve as a guide for Tulsa’s next mayor and partners across the city as they consider the future of technology and economic opportunity across the city.

Why Now: Tulsa is Positioned for Global Leadership

The last five years have seen a significant increase in investment in Tulsa’s technology ecosystem. These investments come at an important time, as it is becoming increasingly clear that the stable, well-paying jobs of the future will be grounded in a thriving innovation economy. However, Tulsa – and Oklahoma more broadly – have struggled to compete nationally in advanced industries. This has led to an economy that struggles to provide good jobs to Tulsans, with the median income in Oklahoma more than \$15,000 less than the national median income.

A consortium of local partners, led by Tulsa Innovation Labs, has been working since 2020 to reverse these trends and position the Tulsa region for global competitiveness. Their strategy has focused on leveraging Tulsa's strengths, especially in the aerospace industry, to build a thriving center of innovation in autonomous technologies, such as drones. The goal is to establish Tulsa as the best place to develop, test, manufacture, and deploy advanced mobility technologies at scale. If successful, Tulsa will be globally synonymous with these technologies and autonomous systems in use worldwide – whether protecting Americans on foreign battlefields or delivering medicine to Oklahoma's rural communities, will bear the moniker "Tested and Made in Tulsa, USA." Most importantly, Tulsa's leadership in these technologies will translate to tens of thousands of jobs for all Tulsans.

Over the last two years, Tulsa's technology strategy has received significant validation and investment from the U.S. federal government. In 2022, Tulsa was a recipient of \$38.2 million from the U.S. Department of Commerce, which made foundational investments in the region's advanced mobility industry, including strengthening research and development, establishing new testing environments, and supporting workforce development.



In 2023, Tulsa was designated a “Tech Hub” by the U.S. Economic Development Administration (EDA).

The Tech Hub designation recognizes Tulsa as the U.S. federal government’s go-to region for drone innovation and signals their belief that the city can become globally competitive in this industry in 10 years. In 2024, EDA awarded Tulsa \$51 million in Tech Hub implementation funding. This award will support projects to increase the capacity of the Tulsa region’s manufacturers to reshore critical supply chains, create globally unique testing environments, expand the region’s talent pool, increase applied research in autonomous technologies, accelerate local start-up creation, and create an artificial intelligence (AI) center of excellence in Greenwood. Altogether, the U.S. federal government has invested over \$90 million in Tulsa’s drone industry and unlocked hundreds of millions of dollars in complementary investments.

These investments position Tulsa to be a global leader in the next generation of autonomous systems. The Blue Ribbon Commission’s recommendations recognize the important role the City of Tulsa must play in advancing the Tulsa region’s leadership in autonomous technologies and seeks to build upon these successes to propel Tulsa to the “Drone Capital of the World.”

Drivers, Actions, and Partnerships

The City of Tulsa has a unique opportunity to accelerate the adoption of emerging drone technologies to support the delivery of municipal services to Tulsans while advancing the growth of the drone industry within the city. This section presents actions that will advance Mayor Bynum’s vision to establish Tulsa as the “Drone Capital of the World.” Implementing these actions will depend on leveraging local assets and partnerships to advance technology use cases and deploy them across the City of Tulsa. Each action is aligned to a driver demanding change – whether it’s a challenge currently impacting the city or an opportunity to seize to drive the future of Tulsa.

To become the “Drone Capital of the World,” the City of Tulsa should implement actions across four major themes:

1

Enhance innovation within and among municipal departments.

2

Support the growth of Tulsa’s diverse innovation economy.

3

Invest in both advanced and traditional infrastructure.

4

Create the national model for privacy, safety, transparency, and community engagement.

Taken together, delivering the actions set out across these themes will significantly improve the delivery of services to all Tulsans while greatly expanding access to economic opportunity across the entire city. Achieving these actions will position Tulsa as the “Drone Capital of the World” and the center of the development, testing, manufacturing, and deployment of autonomous systems, such as drones, at scale.

Key to Understanding Recommendations

Driver:

The challenge or gap that an action seeks to address.

Recommendation:

The suggested action the City of Tulsa should take to support the identified gap, often with considerations for implementation.

Potential Partners:

Organizations and departments – within the City and without – that should help lead or accomplish this recommendation (these suggestions are not meant to be inclusive of all potential partnerships).

Enhance innovation within and among municipal departments.

The City of Tulsa is already emerging as a leader in the municipal use of autonomous technologies such as drones, especially in the use of Drone as a First Responder. However, supporting and growing the City's capacity to coordinate and implement emerging technologies will be critical to supporting the growth of Tulsa's drone industry. An essential component will be creating intentional mechanisms to foster communication and collaboration across City departments. This will not only facilitate new innovations and use cases but also ensure alignment on its use of drone technology. Additionally, the City should be intentional in seeking private and academic partners in these discussions, ensuring municipal staff remain abreast of emerging trends and augment the City's capacity to leverage these technologies.

Action 1: Strengthen Coordination Across the City

Driver

Efforts to implement emerging technologies are spread across multiple City of Tulsa departments, with no overarching coordination or accountability mechanism.

Recommendation

Establish a position and/or office within the City of Tulsa, such as a Chief Innovation Officer and/or Office of Emerging Technologies, to coordinate the City's efforts and resources around emerging technologies. This position and/or office would act as the clearinghouse for the City of Tulsa and be responsible for interdepartmental policy development and coordination, communications, technology sharing, and infrastructure investments. This office should also serve as the lead in establishing external partnerships to accelerate and support technology adoption. The goal would be to accelerate the pace with which the City of Tulsa can leverage emerging technologies to deliver its services. Many of the recommendations of this report could be undertaken by this role (though, the recommendations are also designed to be independent of one another).

Potential Partners

N/A

Action 2: Develop the City's Workforce

Driver

City of Tulsa human resources practices, such as job descriptions, are not positioned to support the hiring, development, and retention of the workforce needed to support the adoption of emerging technologies.

Recommendation

Incorporate emerging technology needs, such as drone pilot certifications, into City of Tulsa human resources standards and job training. The City should focus on ensuring that its workforce of the future is prepared for the adoption and implementation of emerging technologies, including artificial intelligence. Standards should be developed for assisting City employees in receiving certifications for drone operations, such as a Remote Pilot Certificate from the Federal Aviation Administration.

Potential Partners

Human Resources

Action 3:

Identify Existing Capabilities and Assets

Driver

Autonomous system assets and capabilities, such as drones and robotics, exist in multiple City of Tulsa departments, sometimes with little awareness across other parts of municipal government. This can lead to a lack of maximization of those resources and duplicative expenditures.

Recommendation

Develop an asset map of the robotic and autonomous system capabilities across the City of Tulsa departments. This asset map, and the identified capabilities and relationships, should be used to develop a concept of operations for joint response capabilities across the City (e.g., emergency response). This asset map can be modeled on the Language Access Plan and should be updated regularly.

Potential Partners

All departments of the City of Tulsa, City Public Private Partnerships

Action 4:

Standardize Drone Policy

Driver

There is no overarching policy directing use of drones across City departments, and each department is procuring its own technology and platforms, limiting efficiencies and interoperability.

Recommendation

Establish shared standards and infrastructure (e.g., data management plan, approved technologies, etc.) for emerging technology usage by City of Tulsa departments to enable efficiencies of scale in the development and deployment of these solutions. These standards should align procurement and deployment practices across City of Tulsa drone usage. In addition, shared infrastructure to support drone usage across City departments should be implemented where possible. Interoperability should be prioritized while maintaining operational freedom in line with individual department missions. The City should consider how these investments align with National Defense Authorization Act (NDAA) standards on foreign platforms and components.

Potential Partners

Tulsa Fire Department, Tulsa Police Department, Communications, City Council, Information Technology

Action 5:

Expand Drone as a First Responder

Driver

Drone deployment across City departments can enhance the efficiency and efficacy of municipal services, especially for first responders.

Recommendation

Expand drone as a first responder programs at the Tulsa Fire Department and Tulsa Police Department. Investments should include the creation of full-time positions on the respective departmental staff, as well as the technology (e.g., drones) and infrastructure (e.g., docking stations) needed to support robust drone operations. An initial focus on first responders will enable the City to create immediate impact with drone operations, build public trust, and develop repeatable processes that can be expanded across other departments. The City should consider pursuing state and federal funding to support the expansion of drone as a first responder operations.

Potential Partners

Tulsa Fire Department, Tulsa Police Department



Support the growth of Tulsa's diverse innovation economy.

Tulsa is home to an emerging economy centered on autonomous systems and advanced mobility, including drones. To adequately support Tulsa's vision for advanced mobility, the City will need to attract and cultivate relationships with multiple partners, including private industry, top-tier talent, and venture capital. At the same time, Tulsa must maximize local assets and efforts to support the growth of the region's technology industry.

Action 1:

Develop Ready-to-Build Industrial Sites

Driver

There is insufficient availability of “site-ready” or “build-ready” industrial space in Tulsa, limiting the city’s ability to attract autonomous systems companies and manufacturers. Additionally, industrial partners such as Tulsa International Airport are unable to undertake “at risk” development.

Recommendation

Identify opportunities for the City of Tulsa to support industrial development at City-owned properties, such as Tulsa International Airport or Fair Oaks, to create “site-ready” space for industrial development. These properties should prioritize industry partners in targeted industries, such as advanced mobility and autonomous systems.

Potential Partners

Tulsa International Airport, Tulsa Ports of Catoosa and Inola, PartnerTulsa, Tulsa Innovation Labs

Action 2:

Establish Economic Incentives

Driver

The City of Tulsa’s existing incentive programs are focused on infrastructure support, whereas peer cities offer more flexible programs focused on incentivizing quality, knowledge-based jobs.

Recommendation

Establish an economic development incentive fund administered by the City of Tulsa, such as a “closing fund,” to support the attraction of autonomous systems/ advanced mobility companies to Tulsa. Such a fund would enable the City to complement incentives offered from the State of Oklahoma, increasing the competitiveness of industrial sites within the city limits. This fund should be limited to targeted industries, such as advanced mobility and autonomous systems.

Potential Partners

PartnerTulsa, Tulsa Regional Chamber, Tulsa Innovation Labs

Action 3:

Create Urban Testing Environments

Driver

There is a lack of testing environments for urban drone use cases, with most existing testing facilities located in rural areas. Further, there is a need for unique assets that draws technology companies to Tulsa.

Recommendation

Implement a “Tested in Tulsa” concept to unlock City assets and infrastructure for testing complex, urban autonomous systems use-cases. These testing facilities should, to the extent possible, tie-in with existing assets, such as Skyway Range and Windshape’s unique capabilities at Skyway 36. A flexible regulatory sandbox should be associated with the testing environment, enabling the City and industry to partner on the development of a regulatory framework for urban drone operations. A third party could be considered to administer the day-to-day operations, which should integrate with existing testing facilities in the Tulsa region (e.g., Skyway Range). As a nationally unique testing environment, “Tested in Tulsa” can serve as a magnet for emerging advanced mobility and autonomous system companies, attracting companies and talent alike.

Potential Partners

Tulsa Innovation Labs, Skyway 36, Skyway Range, Oklahoma State University, University of Tulsa, Tulsa Innovation Labs

Action 4:

Market Tulsa as a Drone Hub

Driver

Outside of Tulsa, there is a lack of awareness of the region’s unique assets to support and advance autonomous technologies. Tulsa has an opportunity to seize the mantle as the “Drone Capital of the World.”

Recommendation

Leveraging an existing contract with the Tulsa Regional Chamber, the City should develop a “Drone Capital of the World” marketing campaign for external audiences (i.e., outside of the city) to highlight Tulsa’s strong positioning as a hub of innovation in these technologies. This campaign could include an annual event (e.g., a drone competition or conference), a tourism-specific campaign, and collateral to support business attraction. Opportunities in Tulsa’s drone economy could be tied to existing narratives around our region’s aerospace leadership. Tulsa’s emerging drone economy should be a central focus of the City’s storytelling and marketing efforts.

Potential Partners

PartnerTulsa, Tulsa Regional Tourism, Tulsa Regional Chamber, Tulsa Office of Film, Music, Arts & Culture, Tulsa Innovation Labs

Action 5:

Build Public-Private Partnerships

Driver

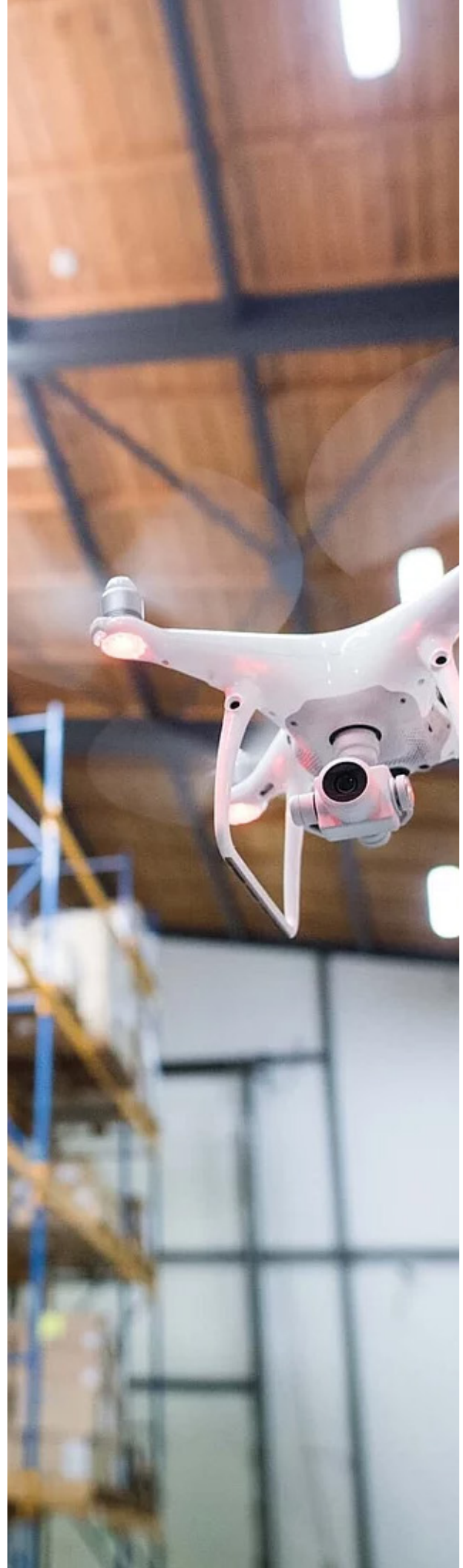
Local technical expertise and capacity can accelerate the City's efforts to adopt these technologies for municipal services.

Recommendation

Develop pathways for public-private partnerships to support the deployment of emerging technologies for use by City departments, such as challenge grants, contracting pathways for startups, and capstone/competition programs with students at local universities. Such pathways can meaningfully improve municipal services, thus providing a direct impact on Tulsans, while also supporting local academic institutions and startups.

Potential Partners

PartnerTulsa, Tulsa Regional Chamber, Tulsa Innovation Labs, Oklahoma State University, University of Tulsa, OU Polytechnic Institute



Invest in both advanced and traditional infrastructure.

Infrastructure investment is crucial to attract and retain private investment. Traditional infrastructure projects will be required to support the growth of Tulsa's advanced mobility and autonomous systems industries, as the demands on local water, sewer, gas, electricity, and roads infrastructure increase. At the same time, the deployment of emerging technologies, such as drones, is changing the demands on local infrastructure. The City of Tulsa must ensure that both types of infrastructure are sufficient to support the growth of the region's drone industry, and that infrastructure investments receive the investment necessary to realize the region's ambitions.

Action 1:

Plan for City Infrastructure Investments

Driver

An expansion of drone usage by the City of Tulsa will require investment in specialized infrastructure to support continuity of operations.

Recommendation

Develop a roadmap to guide infrastructure investments to support the expansion of the City's drone operations. These investments are likely to include communications (e.g., radio networks), digital (e.g., command and control systems), and physical (e.g., sensors) assets. In addition, docking and charging stations will be needed to support broader deployment of drones within City limits. The City should consider how these investments can be co-located or otherwise leverage existing City infrastructure and/or support broader connectivity across municipal assets. The City's Comprehensive Plan is a potential vehicle for implementing this roadmap. Future Improve Our Tulsa packages could be a vehicle for investments in enabling infrastructure.

Potential Partners

Asset Management, City Experience, Public Works, Water and Sewer, Information Technology, Tulsa Fire Department, Tulsa Police Department

Action 2:

Leverage City Assets to Expand Drone Infrastructure

Driver

Significant public and private investment in infrastructure, such as radar, sensor, and communication networks, is required to enable the widespread commercial adoption of drones.

Recommendation

Identify opportunities to leverage city-owned assets and right-of-way to expand the communications and sensor network necessary to support widespread use of autonomous systems with the City of Tulsa. The City should be flexible in these arrangements and think creatively about how it can use its permitting, licensing agreements, and the ability to collocate on City property/assets to support investment in needed infrastructure. The City could build upon its recent use of right of way to expand 5G networks within the city for implementing this recommendation.

Potential Partners

Asset Management, City Experience, Public Works, Water and Sewer, Oklahoma Department of Aerospace and Aeronautics, Indian Nations Council of Government, Tulsa Innovation Labs

Action 3: Strengthen Utility Infrastructure

Driver

Local industrial development is hampered by the lack of sufficient supporting infrastructure, including water, sewer, natural gas, and electricity.

Recommendation

Identify and incorporate infrastructure needs for the testing and deployment of autonomous systems into the City of Tulsa's infrastructure planning process, with an emphasis on the water, sewer, natural gas, and power needs associated with related industrial sites, charging stations, and other enabling infrastructure (e.g., sensor and communications network). The City should prioritize investments within its control (e.g., water and sewer) to align with anticipated industrial development in targeted industries, including advanced mobility and autonomous systems. It should also seek to align power and natural gas infrastructure investments to these prioritized projects, where possible.

Potential Partners

Asset Management, Public Works, Water and Sewer, PartnerTulsa, Public Service of Oklahoma, Oklahoma Natural Gas, Tulsa Innovation Labs

Action 4: Incorporate Into Regional Planning

Driver

For effective operations, drone use policy, planning, and infrastructure must extend beyond the city limits and be coordinated across surrounding communities.

Recommendation

Partner with the Indian Nations Council of Governments to incorporate advanced mobility and autonomous systems use into regional transportation planning. These plans are an important tool for driving regional cooperation in responding to the region's transportation needs and developing multi-modal plans that advance the region. They also play an essential role in prioritizing capital plans in communities across the region.

Potential Partners

Indian Nations Council of Governments, Tulsa Innovation Labs

Action 5: Build an Innovation Hub

Driver

There is no physical hub for drone technology innovation in the City of Tulsa, where innovators, entrepreneurs, policymakers, and community members can gather to exchange ideas and advance these technologies.

Recommendation

Leverage publicly owned assets, including land, to support the development of a physical innovation hub for drone technologies. Such a hub should support research, development, and innovation in drone technologies across a variety of partners, including academia, entrepreneurs, industry, policymakers, and community members. This location could anchor a formal innovation district in Tulsa, and the City could identify additional resources to support the districts growth (e.g., Tax Increment Financing (TIF) district).

Potential Partners

City Experience, PartnerTulsa, Tulsa Innovation Labs



Create the national model for privacy, safety, transparency, and community engagement.

Public acceptance and trust will be critical to the ethical adoption and implementation of autonomous systems. Yet, the pace of technological innovation has outpaced the regulatory frameworks meant to engender public trust. Tulsa has an opportunity to create the national standard for how communities support the adoption of advanced mobility and autonomous system technologies. To do this, the City of Tulsa will need to develop thoughtful and effective regulatory frameworks, policies, and guidance to address the impact of the adoption of emerging technologies on our communities.

Action 1:

Define Guiding Principles for Technology Adoption

Driver

Technology is quickly evolving, and major regulatory questions are caught in bureaucratic rulemaking processes. Yet, the City of Tulsa needs to align on priorities as it determines how to implement local regulatory frameworks.

Recommendation

Establish principles to guide the City's adoption and implementation of emerging technologies, including the development of a regulatory framework for the use of drones. These principles should clearly state the major values the City will prioritize in implementing emerging technologies that enable Tulsa to maximize benefits for Tulsans and proactively address challenges. A definition of principles will ensure that the City is aligned on its priorities while maintaining a flexible approach to an evolving technology landscape.

Potential Partners

All departments of the City of Tulsa, members of the Tulsa community

Action 2:

Provide Public Guidance on Technology Impact

Driver

Tulsans are largely unaware of the impact autonomous systems will have on their community, and there is a lack of clarity on current regulations regarding the operation of these systems.

Recommendation

Develop and disseminate proactive public guidance on the impact of emerging technologies on city services and operations within the city limits (e.g., rules regarding UAS operations). The City should seek to proactively educate and inform the public on existing rules and regulations regarding advanced mobility and autonomous systems platforms, as well as provide timely updates as regulations change. Existing channels, such as the monthly brochure that accompanies the water bill, can be used.

Potential Partners

Communications

Action 3:

Engage Community in Technology Adoption

Driver

Deeper engagement is needed with Tulsans to proactively understand their desires and concerns as it relates to emerging technologies, demonstrate the positive impact of these technologies, and engage them in the growth of the local drone industry.

Recommendation

Develop and launch a proactive community engagement campaign around emerging technologies, with an emphasis on outreach to Tulsa's historically underserved communities. This strategy should include public engagement on policy and projects, participation in local STEM events, and a technology retirement program that provides hands-on learning experiences. Existing efforts, such as PartnerTulsa's community engagement and Tulsa Regional STEM Alliance afterschool programs, should be supported to the extent possible. The City should also consider hosting town halls and/or public forums that allow Tulsans to proactively provide input on the adoption of emerging technologies in their community.

Potential Partners

Communications, City Experience (Community Development), PartnerTulsa, Tulsa Regional STEM Alliance, local school districts, Tulsa Innovation Labs

Action 4:

Conduct a Proactive Policy Review

Driver

Emerging technologies will impact the efficacy of City of Tulsa policy and processes, and changing infrastructure needs (e.g., vertiports) will have an impact on the city environment.

Recommendation

Conduct a proactive review of the adoption of autonomous and emerging technologies on City of Tulsa nuisance, licensing, permitting, zoning, and land-use policies. The review should anticipate the impact of emerging technologies on City policies, identify best practices, and recommend adjustments to align with the City's established principles while enabling the widespread adoption of these technologies.

Potential Partners

City Experience (Planning Office), Development Services, City Council



Acknowledgements

The Blue Ribbon Commission is deeply grateful to Jennifer Hankins of Tulsa Innovation Labs and Bailey J. Siegfried of NORDAM for their leadership as co-chairs. Thank you to all who participated in the Blue Ribbon Commission for their dedication and contributions, including Blake Ewing, Erran Persley, Daniel Jeffries, Peter Killian, and Matt Liechti of the City of Tulsa; Mandy Monahan of NORDAM; Capt. Jacob “Moose” Johnston of the Tulsa Police Department; Chief Michael Baker, Capt. Justin Lemery, and Officer Gabe Graveline of the Tulsa Fire Department; Justin McLaughlin and Stacey Smith of the Tulsa Regional Chamber; Kian Kamas, Michelle Barnett, and Adrienne Yandell of PartnerTulsa; Tyrance Billingsley II of Black Tech Street; Grayson Ardies and Doug Wood of the Oklahoma Department of Aerospace and Aeronautics; Dr. Teri Reed of the University of Oklahoma Polytechnic Institute; Dr. Jamey Jacob of Oklahoma State University; Dr. Rose Gamble of The University of Tulsa; Jed Cochran of Capitol Ventures Government Relations; Rick Perrier of Osage LCC; Andy McMillan of Cherokee Nation Businesses; Alexis Higgins of Tulsa International Airport; Josh O’Leary of Airwise; Jay Shears of Windshape; Jeff Stava of the George Kaiser Family Foundation; and Rich Brierre and Wilson Fram of the Indian Nations Council of Government. In addition, special thanks to the Tulsa Innovation Labs team, including Mak Cochran, Allison Foster, Allison Rhodes, Jessica Remer, Hayden Hinchey, Caragan Tillman, MaryBeth Dewitt, and Justin Kits, for their time supporting the Blue Ribbon Commission.