OKLAHOMA

ADVANCED MOBILITY STRATEGY

OKLAHOMA

Produced by the Oklahoma Advanced Mobility Program Advisory Council In coordination with the Oklahoma Department of Aerospace and Aeronautics and the Oklahoma Department of Transportation.

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The future of mobility, brought to you by the State of Oklahoma, in partnership with

HNTB

FOREWARD

OKLAHOMA'S VISION FOR ADVANCED MOBILITY

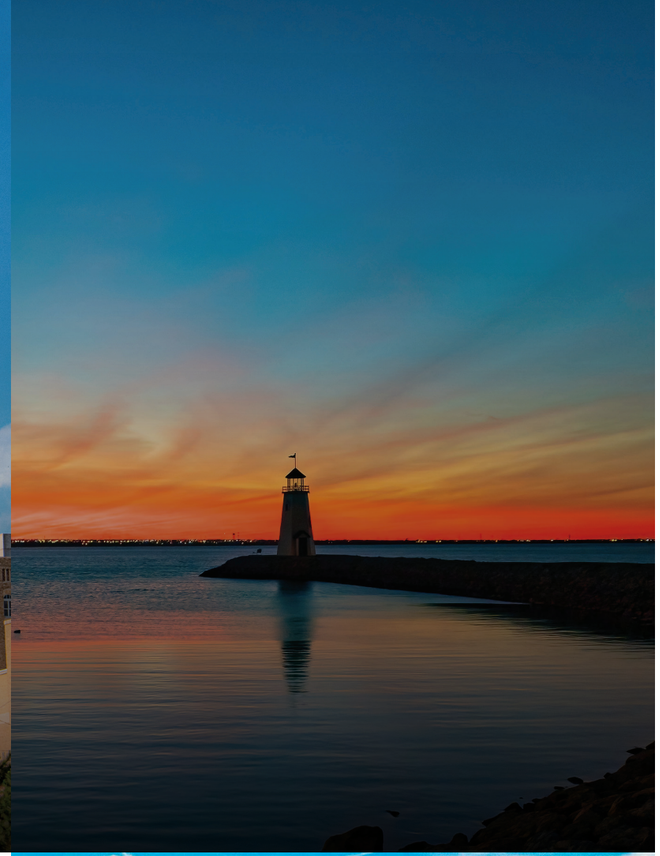
When the Oklahoma Legislature formed the Advanced Mobility Program Advisory Council, a public/private collaborative with a mission to pioneer the modern mobility frontier in the state, it positioned us not only to embrace the future of flight and autonomous transport, but also to define it. This Advanced Mobility Strategy is the next phase in the Council's work of strengthening Oklahoma's advanced mobility industry and creating economic opportunity by strategically investing in ways that catalyze a new generation of aerospace and ground mobility technology.

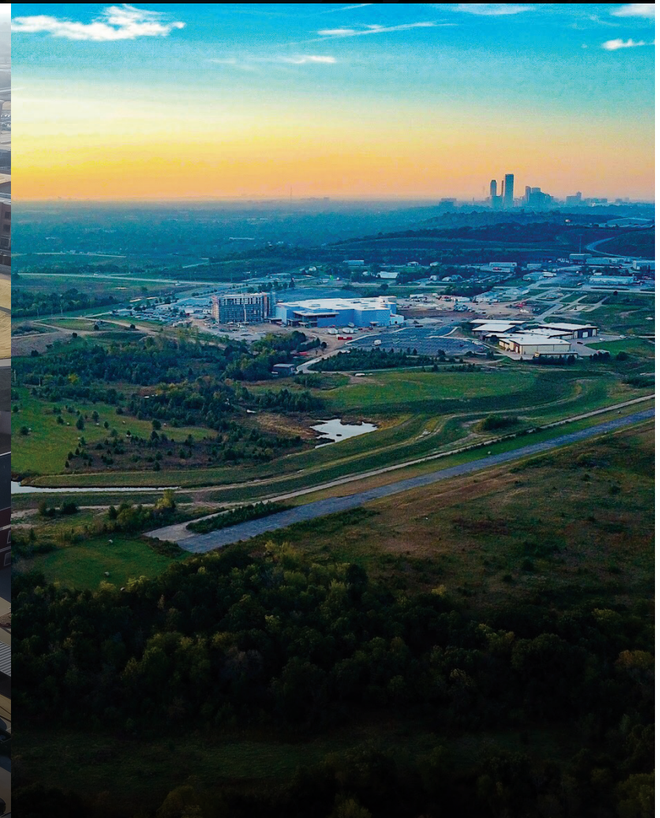
We have already begun charting new paths, leveraging cutting-edge technology and fostering collaboration and integration across ground and air transportation modes. The state is well-established as a leader in the advanced mobility space and, guided by this strategy, will continue to foster innovation in new and existing programs to keep Oklahoma's infrastructure and workforce ahead of the curve.

Through this work, we have the chance to directly support our communities and industry deploying safer, faster, more efficient mobility systems – innovated, built and delivered by our workforce. We are proud of the work done by Council partners to elevate Oklahoma in the advanced mobility industry. Together, we are shaping one of the most dynamic eras in transportation history. It is an honor to initiate the modern mobility frontier at home, with all of you, for all of us.

TIM GATZ
EXECUTIVE DIRECTOR
OKLAHOMA DEPARTMENT
OF TRANSPORTATION (ODOT)

GRAYSON ARDIES
EXECUTIVE DIRECTOR
OKLAHOMA DEPARTMENT
OF AEROSPACE and AERONAUTICS (ODAA)





INTRODUCTION

Oklahoma leads the way in advanced mobility research, embracing aerospace, aeronautics and ground mobility technology. The state's strategic plan prioritizes both ground and air mobility, aiming to align assets and resources for transportation innovation. Initiatives such as the unmanned aircraft systems program office and the Advanced Mobility Program Advisory Council (AMPAC) bolster this vision, while federal grants and partnerships fuel research and development. Oklahoma strives to maintain leadership in the heartland of America's advanced mobility landscape.

OKLAHOMA'S ADVANCED MOBILITY ROADMAP

This strategic plan lays out Oklahoma's overall advanced mobility strategy and provides a roadmap for bringing that strategy to life throughout our state. The strategic planning process included getting input from diverse stakeholders; developing the advanced mobility vision, mission and goals; and identifying high-level policies needed to realize those goals.

As an advanced mobility roadmap, this document can be thought of as the birds-eye view for "why" and "what," whereas subsequent implementation planning will be dedicated to more specific tactics and resource allocation to answer the "when," "where" and "how."

"STRATEGIC INVESTMENT IN ADVANCED AIR MOBILITY LAYS THE FOUNDATION FOR OKLAHOMA'S FUTURE TRANSPORTATION GROWTH. AS WE MOVE TOWARD A MORE CONNECTED LANDSCAPE, EMBRACING EMERGING AEROSPACE AND AVIATION TECHNOLOGY IS IMPERATIVE TO OUR SUCCESS. OUR COMMITMENT TO AEROSPACE, AVIATION AND DEFENSE GOES BEYOND NUMBERS; **IT'S ABOUT SECURING OUR PLACE AS A GLOBAL LEADER IN THE SKIES."**

— MATT PINNELL, LIEUTENANT GOVERNOR
STATE OF OKLAHOMA

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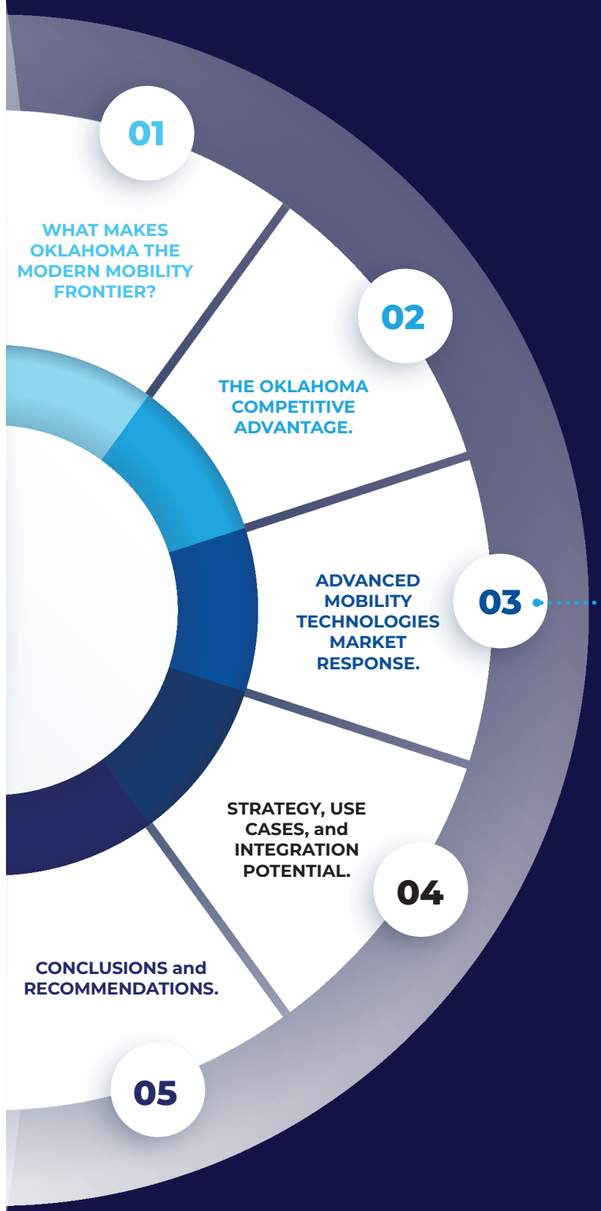
Advanced Mobility Strategy Development Process

Policy and investment priorities aligned to the goal for recommended future implementation of advanced mobility technologies in the state of Oklahoma are further outlined in ***the Policy and Investment Recommendations section of this document.***



VISION

Improve economic opportunity and quality of life for all Oklahomans.

MISSION

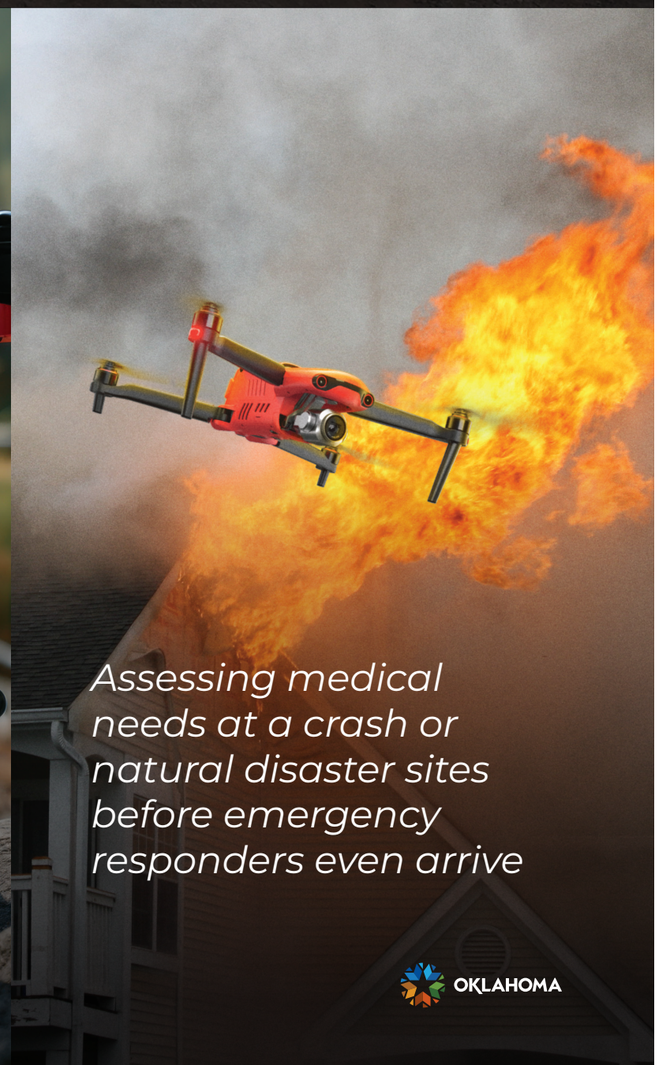
Accelerate development, testing and adoption of advanced mobility technologies through proactive, coordinated state-level guidance and efforts.

GOAL

Leverage advanced mobility technologies to improving efficiency, safety, resilience, access and economic opportunity in Oklahoma.

Keeping workers out of harm's way with driverless truck-mounted attenuators

Providing faster, more efficient transport of critical medical supplies



Assessing medical needs at a crash or natural disaster sites before emergency responders even arrive

OKLAHOMA IS THE MODERN MOBILITY FRONTIER

Known for its enterprising and pioneering spirit, Oklahoma has forged a strategy that leverages talented technologists and citizens of the state as a proving ground for safer and more efficient transportation in the United States.

Between March and September 2023, diverse stakeholders across Oklahoma were surveyed and interviewed to inform the development of the state's advanced mobility strategy. These stakeholders included state and local governments, tribal nations, academia and industry representatives. Several themes emerged repeatedly across stakeholder groups:

- Advanced mobility is not only the future of the transportation system, it is here today.
- The time for coordinated action is now; hesitancy or delay will result in significant loss of economic opportunity for all.
- Coordinated, statewide efforts building upon Oklahoma's existing advanced mobility assets is essential.

Stakeholders also focused on three distinct phases of advanced mobility adoption - prepare, establish and invest -each building on the former until a new technology becomes the industry standard.

PREPARE

- Continue collaborative, cutting-edge research and development.
- Develop supportive, agile frameworks and policies.
- Set standards for integrating emerging technology and modes into the larger transportation network.

ESTABLISH

- Establishing a center of excellence and state of practice where the future of mobility is built and tested.
- Build on and fine tune advanced mobility assets in the state.

INVEST

- Strategically invest in existing industries and support home grown startups by building modern infrastructure (e.g. vertiports and fiber-connected highways) and providing an effective and highly-visible workforce pipeline.

“AS PIONEERS ON THE MODERN MOBILITY FRONTIER, WE’RE CHARTING NEW PATHS, LEVERAGING CUTTING-EDGE TECHNOLOGY AND FOSTERING COLLABORATION ACROSS THE AEROSPACE INDUSTRY *TO HELP BRING ABOUT THE INTEGRATION OF ADVANCED AIR MOBILITY AND TRANSFORM TRANSPORTATION FOR THE BENEFIT OF ALL OKLAHOMANS.”*

— GRAYSON ARDIES, EXECUTIVE DIRECTOR
OKLAHOMA DEPARTMENT OF AEROSPACE AND AERONAUTICS

WHAT IS ADVANCED MOBILITY?

Aerospace and Aeronautics

» UNMANNED AIRCRAFT SYSTEMS (UAS) are commonly called drones and the systems that support them. The widespread adoption of UAS in Oklahoma will contribute significantly to the well-being and prosperity of its communities, resulting in enhanced efficiencies, safety and environmental stewardship. The Oklahoma Department of Aerospace and Aeronautics (ODAA) plays an important role in realizing these benefits by facilitating collaboration and UAS training across agencies.

THESE TECHNOLOGIES

- *Inform disaster response*
- *Deliver lifesaving medicines*
- *Support emergency response: drones as first responders (DFR)*
- *Revolutionize precision farm practices*
- *Minimize risk in infrastructure inspections*

» ADVANCED AIR MOBILITY (AAM) is defined by the National Aeronautics and Space Administration (NASA) as a system of safe, affordable and ultimately automated air transportation for passengers and cargo in urban and rural settings.

THESE TECHNOLOGIES

- *Utilize conventional, short and vertical takeoff and landing styles*
- *Improve emergency services response*
- *Add convenient connections to remote locations*
- *Offer a more efficient, economical and eco-friendly mode of air transportation*

Ground Mobility

» CONNECTED VEHICLES (CVs) and AUTONOMOUS VEHICLES (AVs) are being developed to enhance road safety and efficiency. The Oklahoma Department of Transportation (ODOT) is improving connectivity through intelligent transportation systems that optimize traffic flow and improve safety on Oklahoma’s corridors through a real-time data exchange.

Leveraging intelligence from real-time data analysis of these vehicles will create safer, less congested corridors through artificial intelligence and predictive crash analytics.

THESE TECHNOLOGIES

- *Guide delivery vehicles through cities*
- *Provide support and improve service, goods movement and logistics*
- *Address driver shortages and support workforce needs*
- *Reduce accidents and lower the death toll on our roads*

» SHARED MOBILITY SERVICES, such as transit, ride-sharing and bike-sharing, give local governments and private developers more opportunities to support mobility in our communities.

THESE TECHNOLOGIES

- *Provide convenient alternatives to car ownership*
- *Work to improve accessibility and air quality*
- *Coordinate management of people and goods delivery, improving congestion on the road and at the curb*
- *Provide driverless movement of people and goods*

“ADVANCED MOBILITY SOLUTIONS HAVE THE POWER TO TRANSFORM HOW WE MOVE AND CONNECT WITH THE WORLD AROUND US. BY EMBRACING CUTTING-EDGE TECHNOLOGY AND CREATIVE SOLUTIONS, **WE CAN CREATE A MORE SEAMLESS, EFFICIENT AND SUSTAINABLE TRANSPORTATION ECOSYSTEM FOR ALL.”**

— TIM GATZ, EXECUTIVE DIRECTOR
OKLAHOMA DEPARTMENT OF TRANSPORTATION

BENEFITS TO OKLAHOMANS

Advanced mobility technologies offer significant potential benefits to the state's transportation system and economy, improving efficiency, safety, resilience, access, economic opportunity and job creation.

EFFICIENCY

Optimizes transportation planning, reduces congestion, improves first-mile/last-mile services and reduces costs.

SAFETY

Reduced crashes and fatalities and utilizes autonomous air and ground vehicles to access hard to reach and hazardous areas.

RESILIENCE

Increases transportation system redundancy and improves sustainability.

ACCESS

Expands transportation affordability, convenience and reliability for all.

ECONOMY

Improves transportation and efficiency for key industry sectors, attracts and diversifies industry investment and creates high-quality jobs.

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FORECASTING OUR FUTURE IN FLIGHT

Aerospace and Aeronautics

The potential market for UAS and AAM technologies is expansive. Not only can these technologies revolutionize Oklahoma's transportation system, but they can also bring unprecedented economic benefits to the state in terms of new jobs, investment and revenue streams. By 2045, it is forecasted that Oklahoma will accumulate: [1] [2]

UAS

$100 MILLION
Annual capital expenditure anticipated for new drones that will operate in the state.

UAS

$69 MILLION
Statewide annual payroll of commercial drone operators.

UAS

1,425 JOBS
Cumulative drone pilot jobs forecasted, with similar job totals forecasted for software creators and analysts.

AAM

$8.2 BILLION
in total economic benefit.

- **$500 MILLION** in local and state tax revenues.
- **$2.2 BILLION** in direct, indirect and induced economic activity with an electric vertical takeoff and landing (eVTOL) manufacturer commitment.
- **$5.5 BILLION** in new business activity.

AAM

AMOUNTING TO 12% of commercial air traffic in the state.

- **8 THOUSAND** passengers per day.
- **3 MILLION** passengers annually.

AAM

22 MILLION
Passengers are expected to travel in Oklahoma using new eVTOL services.

AAM

9,000+ NEW JOBS
Projected as full-time employment growth in the industry and associated fields.

Taking to the Skies with UAS and AAM

Increase efficiency and make the most of existing airport infrastructure

Save lives with patient/ doctor transport and search and rescue

Fast, efficient travel bypassing surface road congestion

Safer, More Efficient Ground Mobility

Safer, more efficient freight while addressing driver shortage

Improved efficiency and sustainability in less densely populated areas

Optimized routing that adapts to real-time conditions

Protects workers and equipment

Ground Mobility

Advanced mobility technologies not only improve the safety and sustainability of our ground mobility systems but are also critical to accommodating the increased freight volumes and associated economic activity expected in coming years. [3]

$197.5 BILLION VALUE and 153 MILLION TON

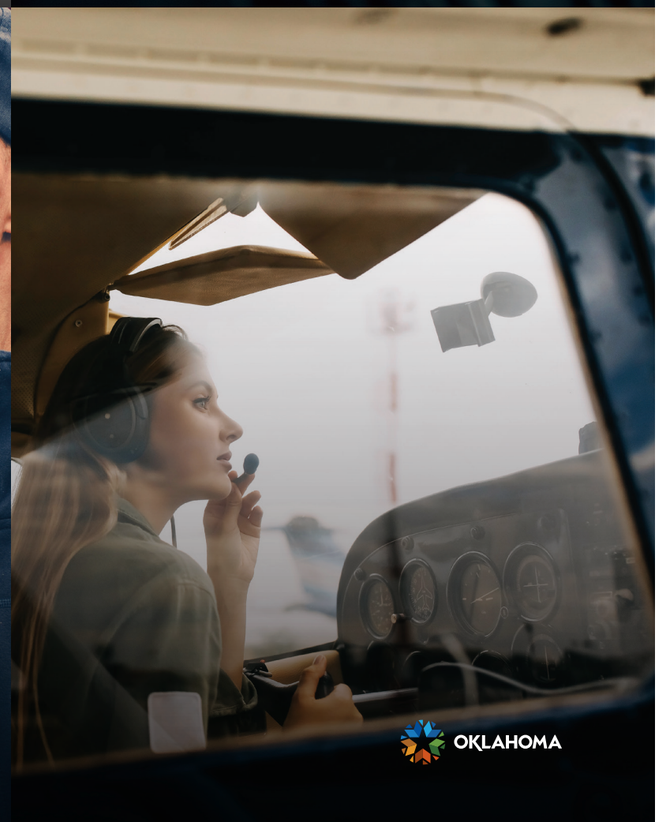
Increase in freight moving into, out of and within Oklahoma between 2017 and 2025 (66% increase by value; 35% increase by tonnage).

$141.5 BILLION

In trucking freight expected between 2017-2045 (Accounts for 72% of overall increase).

53% OF STATE'S EMPLOYMENT

Over 825,000 jobs depend on freight transportation (4th quarter 2021).



OKLAHOMA'S COMPETITIVE ADVANTAGE

This section highlights the state's rich history, diverse partnerships and significant investment in advanced mobility technologies, including AAM, UAS, and connected and automated vehicles (CAV), which is bolstered by supportive legislation. These unique factors position Oklahoma to lead the nation in mobility innovation.

KEY TRANSPORTATION AND MOBILITY ACHIEVEMENTS IN OKLAHOMA

The history of transportation in Oklahoma is rich with pioneering advancements and remarkable milestones, from the first road surveyed in 1836 to the remarkable research and test flights of groundbreaking aerospace and UAS technology today. This history fills volumes and includes many great individuals with a tremendous amount of leadership and courage. This representative list of transportation history in the State of Oklahoma is focused on key steps and investments made that brought the state to be the modern mobility frontier that it is today.

World-Class Support for National Aviation Defense and Industry

Prepare

1941: World War II training bases and facilities Tinker Air Force Base (AFB) and Vance AFB were established. [4]

Establish

1946: Civil Aeronautics Administration (CAA) Standardization Center moved from Houston to Oklahoma City. This facility had steady growth in mission, employment and construction under the newly organized FAA in the 1950s and 1960s. It was renamed the Mike Monroney Aeronautical Center (MMAC) in 1978. [5]

Invest

1953: Boeing Company became formally involved with Tinker AFB when the base started preparing to be the depot for the B-52 bomber. Prior to that, employees at Tinker AFB had worked briefly on other Boeing bombers, the B-29 and the B-47. Tinker AFB and Boeing share a long history.

Building A Ground Mobility Network

Prepare

1826: The first surveyed road in Oklahoma was built. [6]

Establish

1924: Oklahoma established a state highway system, and shortly after in 1926, the US established a numbered highway system including Route 66 stretching more than 400 miles across the state of Oklahoma as a major transportation hub, fostering connectivity and mobility throughout the region. [7]

Invest

1953: The Turner Turnpike, the state's first, opened to support business connection between Oklahoma City and Tulsa. [8]

Advanced Air Mobility

Prepare

2015: Oklahoma State University opened the Unmanned Systems Research Institute (USRI) to conduct research and development in UAS technology, contributing to the growth of the drone industry in the state. [9]

Establish

2017: FAA selects the Choctaw Nation of Oklahoma (CNO), the only tribal nation selected, to participate in the UAS Integration Pilot Program (IPP). [10]

Invest

2022: Tulsa Innovation Lab and its partners were awarded a $39 million Build Back Better Grant to support advanced mobility deployment. [11]

Advanced Ground Mobility

Prepare

2020: The Oklahoma Advanced Mobility Pilot Program was signed into law, furthering the state's investment in emerging transportation technologies. [12]

Establish

2022: Oklahoma state law allows autonomous vehicles to operate on public roads. [13]

Invest

2022: Kodiak and Ceva complete their first autonomous truck delivery in Oklahoma. [14]

TESTING AND INVESTMENT-READY ENVIRONMENT

Oklahoma is uniquely positioned for advanced mobility development, testing and investment due to the state's location and unique topography, regulatory frameworks, existing advanced mobility assets, robust partnerships and strong transportation economy and workforce pipeline.

LOCATION

- Favorable climate enabling over 350 flying days per year. [15]
- 12 distinct ecosystems, making Oklahoma one of the most ecologically diverse states in the US and a great location for advanced mobility testing.
- Plentiful low-risk, real-world testing opportunities due to low population density in much of the state.
- Central location is ideal for a transportation technology hub.

INDUSTRY

- Kratos Defense relocated to Oklahoma City from California in 2018, investing over $20 million and creating 350 jobs. They've recently expanded their facility to produce aerial tactical drones and target drone systems. [16]
- Oklahoma has the only U.S. Small Business Administration (SBA) contract for an Unmanned UAS Cluster Initiative (UASCI) that identifies and supports early-stage start-ups through an ecosystem of private industry, tribal partners, angel investors and public partnerships. [17]
- Easy access to usable airspace.
- Well-established general, commercial and military aviation sectors.

VIBRANT ECONOMY

- Over 1,110 aerospace entities. [18]
- 150 million tons of trucking freight annually along major freight routes alone (I-35, I-40, I-44, US 412, and US 69). [19]

ROBUST WORKFORCE PIPELINE

- 120,000 aerospace jobs today. [20]
- Over 56,000 employed in Oklahoma's transportation sector. [21]
- Created the Workforce Transformation Task Force to pinpoint systemic challenges and areas for improvement.
- Oklahoma has made strides in addressing employment equity gaps and has shown willingness to partner with companies to expand its workforce.

INVESTMENT and INFRASTRUCTURE FOUNDATION

- A foundation of investment and infrastructure is already in place, acting as a launch pad for further investment.

EDUCATION

- Multiple initiatives and opportunities available to support science, technology, engineering and math (STEM) and advanced mobility-related education.
- University of Tulsa (TU) funds TU students and alumni who undertake entrepreneurial efforts in the state of Oklahoma.
- Two major research institutions support the industry through direct and allied educational offerings and research opportunities.
- ODAA aerospace education programs offer grants to support aerospace industry coursework, spanning K-12 education. These programs provide aerospace career guidance and connect students to institutions across the state with additional resources.

More information about all of Oklahoma's related education opportunities are cataloged in ***Appendix A.***

ENGAGEMENT and OUTREACH

- Cross-sector outreach and engagement is already underway.
- Stakeholder feedback played a key role in developing this document.

LEGISLATIVE

- Advanced mobility-friendly legislation already on the books.
- Over the last few years, Oklahoma has ranked at the top in drone readiness in terms of policy when compared to other states.
- Advanced Mobility Pilot Program revolving funds and grants established for air and ground vehicle support infrastructure, per ***SB1688 (2020) and SB773 (2023)***. [22]
- Annual appropriations for advanced mobility programs have increased and in a 2022 Special Session the legislature delivered more than $250 million in funding for Oklahoma's Aerospace and Defense Industry, including commitments for AAM and UAS project funding.

More information about all of Oklahoma's advanced mobility enabling legislation is listed in ***Appendix B.***

ADMINISTRATIVE

- Oklahoma has multiple champions for advanced mobility leading the way, which include:
  - *Oklahoma Department of Aerospace and Aeronautics*
  - *Oklahoma Department of Transportation*
  - *Oklahoma Department of Commerce*
  - *Oklahoma CareerTech*

Tulsa Tech plans to secure a position as global a tech leader with an approximately $51 million award from the U.S. Economic Development Administration (US EDA).

ADVANCED MOBILITY CHAMPIONS

Oklahoma boasts outstanding practitioners in the field of advanced mobility. These champions exemplify the state motto, 'Labor Omnia Vincit', (Labor Conquers All Things). Their contributions to the advanced mobility industry make the state proud and their leadership extends well beyond its borders, inspiring innovation and progress.

TIM GATZ

Executive Director of ODOT. Previously served as the Oklahoma Secretary of Transportation and the Executive Director of the Oklahoma Turnpike Authority.

GRAYSON ARDIES

Executive Director of the ODAA since November 2020. Honored with the 2020 State Aviation Distinguished Service Award from the National Association of State Aviation Officials (NASAO).

JAMES GRIMSLEY

Executive Director for Advanced Technology Initiatives with the CNO and Oklahoma Transportation Commissioner for Oklahoma District 2. Appointed to the FAA's BVLOS Aviation Rulemaking Committee in 2021.

JAMEY JACOB, PHD, PE

Executive Director of the Oklahoma Aerospace Institute for Research and Education (OAIRE), Director of the Counter-UAS Center of Excellence, and Professor of Mechanical and Aerospace Engineering at Oklahoma State University (OSU).

TOM ROBINS

Founder of Work Zone Safe, an award-winning national program for teen drivers to navigate work zones safely. Served on the City Council for Edmond, Oklahoma.

JENNIFER HANKINS

Managing Director of Tulsa Innovation Labs (TIL), a tech-led economic development organization responsible for catalyzing the Tulsa region's leadership in advanced industries.

MICHELLE COPPEDGE

Director of the Federal Aviation Administration's (FAA) Mike Monroney Aeronautical Center in Oklahoma City since 2013. The Center houses over 6,300 employees and operates on a $1 billion annual budget.

DAVID ZHAN

NASA Research Pilot with the AMES Research Center and Principal Investigator for the National Campaign for Airspace Procedure. Also serves as a UH-60 Blackhawk pilot with the Oklahoma National Guard.

Advanced Mobility Stakeholders

Outside of the mobility champions, the following stakeholders were interviewed and instrumental in the development of this advanced mobilty strategy.

ADVANCED MOBILITY PROGRAM ADVISORY COUNCIL

- Oklahoma Autonomous Vehicle Working Group
- Oklahoma Emerging Aviation Technology Subcommittee

OTHER GROUPS

- Federal Aviation Administration
- Mike Monroney Aeronautical Center
- Oklahoma Airport Operator Association Members
- Oklahoma CareerTechs
- Oklahoma Community Colleges
- Oklahoma Regional Universities
- Oklahoma State Chamber
- Oklahoma State University
- Oklahoma Department of Transportation Tribal Advisory Board
- Tribal Nations
- University of Oklahoma
- University of Tulsa
- Various Cities' Chambers of Commerce

LEGISLATIVE FRAMEWORK

Oklahoma is leading the way in terms of advanced mobility-friendly legislation. Most notable are efforts to organize transportation advancement within the state through the AMPAC. In 2020 legislation created this council to coordinate activities among state government, academia tribal, and industry partners to ensure Oklahoma can leverage its assets and create an environment that enhances the state's transportation network and allows advanced technologies to benefit all Oklahomans. This council was appointed with the goal of creating a strategic plan for advanced mobility and making recommendations through the Secretary of Transportation to the state's executive and legislative leaders for what investment and policy needs are required to improve infrastructure, better prepare our workforce for tomorrow and support innovation that positions Oklahoma as a US leader.

Advanced Air Mobility and Unmanned Aircraft Systems

In 2022, the Mercatus Center at George Mason University ranked Oklahoma as a leader in state readiness for drone commerce. ODAA is the UAS Clearinghouse for the State of Oklahoma (as established by ***SB 659*** in 2021) and promotes and develops the UAS sector within the state. It serves as a central point for UAS strategy development, research, funding and coordination of test sites. It also maintains registries of UAS aircraft used by state agencies and UAS training programs at educational institutions. Amendments to ***SB 782 and SB 773 in 2023*** expanded its scope to include AAM.

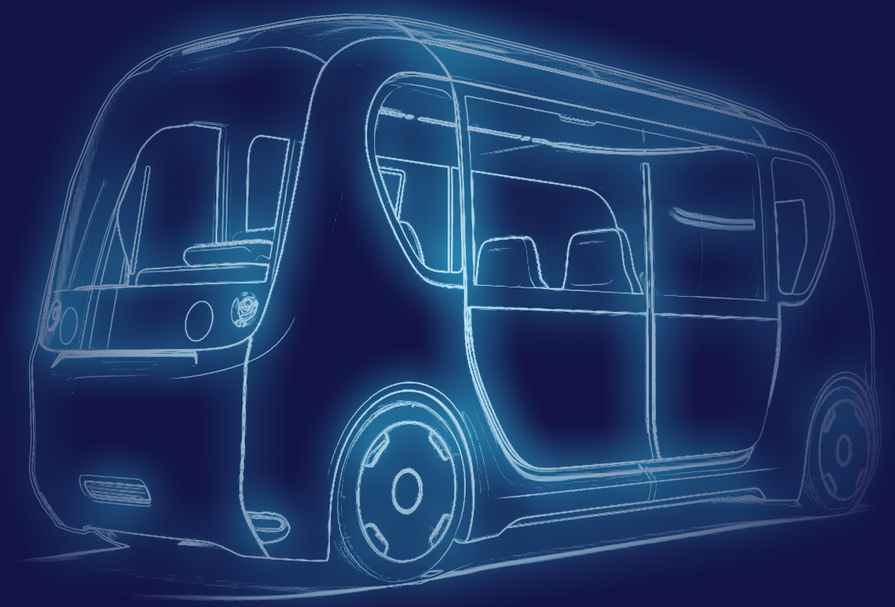
Federal regulators continue to identify and address key obstacles as the industry progresses. Widespread implementation of AAM will require the development of off-airport infrastructure, which necessitates action to protect airspace and surrounding neighborhoods. For UAS, rulemaking enabling beyond visual line of sight (BVLOS) is needed to unlock the full potential of commercial UAS use.

There is opportunity to expand upon recent legislation and promote a collaborative environment to establish a statewide regulatory atmosphere. This will position the state to attract integrators and testers of UAS and AAM. Oklahoma industry experts and researchers have conducted multiple interim studies to educate themselves and the public on the current best practices in other states. This effort encourages broad participation and stakeholder perspectives. Proactive states are considering actions that promote the use of AAM and UAS for public benefit, ensuring that statewide technology incentive programs encompass these technologies and ensuring government entities use UAS.

Connected and Autonomous Vehicles

The Oklahoma legislature and administration is vested in supporting the state's economy and in turn has been progressively modernizing state laws with respect to the state's transportation industry. In 2022, the state legislature introduced the most significant law to address autonomous transport with ***SB 1541***. The Oklahoma governor signed the law into effect, approving the usage of autonomous vehicles on state corridors. At the time Oklahoma was the only state on the I-40 corridor that wasn't already allowing AVs. Oklahoma leaders recognized that a failure to modernize this policy would be an economic and public safety disadvantage to the state.

In addition to the passage of ***SB 1541***, the state has enacted a number of laws in support of new fueling systems that will be used for ground and air transportation. These laws primarily focus on the distribution of electric and hydrogen fuel sources. They include production goals, fair play clauses in the fuel industry, exemptions for certain fueling regulations, transport weight limits and access to tax incentives.



PARTNERSHIPS and INITIATIVES

Realizing the full potential of advanced mobility will require extensive stakeholder collaboration. Entities across the state, including state agencies, institutions, tribal nations, the FAA and more, have created a strong foundation in support of the advanced mobility industry through research and development, testing and deployment. Overall, Oklahoma is progressive in embracing emerging transportation technologies to enhance public services, infrastructure management, collision avoidance and emergency responses. This section discusses existing government and industry initiatives across Oklahoma.

Federal Partners

FAA's Mike Monroney Aeronautical Center trains over 76,000 students annually at the FAA Academy. The Center has partnered with the CNO to develop prospects for AAM, emphasizing connections to underserved communities. Oklahoma is also home to the National Oceanic and Atmospheric Administration's (NOAA) Severe Storms Laboratory in Norman. The state boasts five Department of Defense installations; Altus AFB, Fort Sill, McAlester Army Ammunition Plant, Tinker AFB, and Vance AFB. Tinker AFB is the world's largest military aircraft maintenance, repair, and overhaul (MRO) facility, while Ft. Sill hosts the Joint Counter-small Unmanned Aircraft Systems University (JCU) at the FIRES Center of Excellence. The JCU is the US Military's centralized and standardized training hub dedicated to combating evolving drone threats to US and Coalition forces, both at home and abroad.

The State of Oklahoma has both Air and Army National Guard Units, with several assigned strategically important national defense missions. One of these, Camp Gruber Training Center hosts the new Counter UAS and Drone School designed to enhance the readiness and capability of the National Guard's dual responsibility in responding to both domestic and military contingencies.

Advanced Mobility Program Advisory Council

The AMPAC was established in 2020 to provide recommendations on policy and regulatory issues related to adopting advanced mobility technologies. AMPAC comprises nine members appointed by the Oklahoma Secretary of Transportation. The Council began meeting in late 2021 and includes two subcommittees: the Emerging Aviation Technology Subcommittee and the Autonomous Vehicle Working Group. The AMPAC holds monthly meetings to share updates on advanced mobility activity throughout the state, as well as discussions of federal, legislative and regulatory activity The meetings feature a range of guest speakers from the advanced technology sector including NASA, Supernal, ATA, Mercatus Center, Tulsa Innovation Labs, Genesis Aerospace Systems, University of North Texas, and Droneport Network.

The Emerging Aviation Technology Subcommitee, staffed by the ODAA, and the Autonomous Vehicle Subcommittee, staffed by ODOT, meet bimonthly and are made up of professionals from across industry, academia and tribal nations. Representatives from the subcommittees update the Council at their montly meetings.

Local and Regional Governments

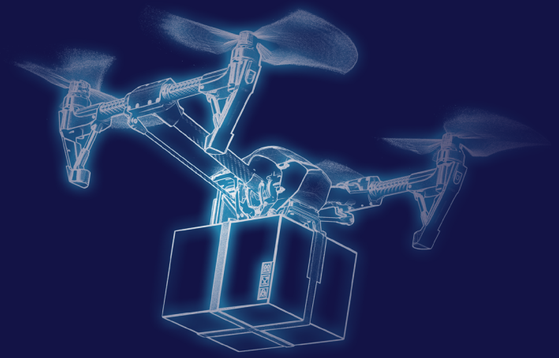
Drones have become integral to various sectors in Oklahoma. They have been deployed to assess mudslide damage and aid in emergency responses during severe weather events. Environmental preservation is another key application, with drones spraying invasive plant species in marshlands.

Some communities in the state have adopted drone technology for various operations. Fire departments have implemented drones equipped with thermal imaging capabilities, providing firefighters with an aerial view during emergencies. Police departments are deploying drones for patrolling, including their use in officer-involved shooting incidents.

Regional Economic Development Initiatives

Tulsa Innovation Labs [23]
Designing and launching economic and workforce development initiatives for emerging tech clusters, including advanced air mobility, is the primary focus of TIL. Their mission is to establish a strategy for inclusive, tech-led growth. This is achieved through startups, training programs, expanded job opportunities, and influence in academic innovation.

In 2022, the US Department of Commerce awarded a $39M grant to the Tulsa Regional Advanced Mobility (TRAM) Cluster coalition as part of the Build Back Better initiative. The TRAM Cluster includes OSU, Osage, TIL, Tulsa Ports, the City of Tulsa, the Tulsa Regional Chamber and PartnerTulsa.



TIL is also leading the $51 million THETA consortium, awarded by the US EDA in 2024, as one of 12 Tech Hubs intended to strengthen the region's capacity in autonomous systems through advanced manufacturing and deployment of technologies critical to the future of national and economic security. UAS/AAM projects funded under the TRAM coalition include:

- 114-mile BVLOS UAS flight corridor from Skyway36, to Tulsa, to OSU in Stillwater.
- Creation of the Launchpad Research and Technology Center at OSU-Tulsa with a focus on research and development of drone technology and urban air mobility.
- Training and education for a skilled workforce.

The Skyway Range, which is a component of the Skyway36 initiative, will be implemented in four phases. It will expand an existing BVLOS site near Stillwater, Oklahoma, extending to nodes in Pawhuska and Tulsa. Upon completion, the Skyway Range will span 114 nautical miles and will incorporate access to the 43,000-acre Osage Ranch. Notably, it will also include the Skyway36 drone port in Tulsa, further emphasizing the integral role of Skyway36 in this expansive project.

TRIBAL NATIONS

Choctaw Nation

CNO is the only tribal nation selected for participation in FAA's UAS IPP, as well as the follow-on BEYOND program. The CNO's Department of Advanced Technology Initiatives (ATI) hosts a 44,600-acre aviation test facility, known as the Emerging Aviation Technology Center (EATC), [24] to support innovative research, development, testing and evaluation (RDT&E) of manned and unmanned aircrafts.

THE CHOCTAW NATION:

- Is a member of the Commercial Drone Alliance
- Is a Charter member of the Community Air Mobility Initiative
- Has a Partnership with the National Air Transportation Association (NATA)
- Is a grantee of FAA's BVLOS waivers
- Has a Public Aircraft Operations (PAO) Certificate of Authorization (COA) from the FAA

"ONE OF THE BIG THINGS THAT WE STILL HAVE LEFT TO RESOLVE IN THIS COUNTRY IS SAFE and RELIABLE ACCESS. **IT'S REALLY A FUNDAMENTAL TRANSPORTATION PROBLEM WE'RE ABOUT TO SOLVE WITH AVIATION. IN OUR LIFETIMES, WE'RE GOING TO SEE SOME AMAZING THINGS."**

— JAMES GRIMSLEY, EXECUTIVE DIRECTOR
ADVANCED TECHNOLOGY INITIATIVES, CHOCTAW NATION OF OKLAHOMA

Osage

Through their business arm, Osage LLC, the Osage operates Skyway36, [25] comprising the Skyway36 Droneport and Technology Innovation Center and the Skyway Range. The Skyway36 Droneport and Technology Innovation Center is located at the former Tulsa Downtown Airpark and includes a runway, helipad space and a 40-acre industrial park for AAM manufacturing. It is also the primary access point to Skyway Range, 1,200 square miles of UAS flight test range between OSU, Osage LLC and Tulsa facilities. It will allow UAS to be tested in various terrains and conditions, mostly in rural areas, to demonstrate safety, security and performance.

Skyway36, in collaboration with other facilities, seeks to close the gap between public research and private sector opportunities.

- The LaunchPad Center of Advanced Air Mobility at Oklahoma State University-Tulsa
- Partnership with Tulsa Innovation Labs
- Partnership with Windshape
- TRAM Cluster coalition

Skyway36 Test Center [26]

Skyway36, an unmanned aerospace testing center in the Osage, provides access to the 1,200-square-mile Skyway Range for BVLOS drone testing. In 2024, they initiated UAS testing in "sense and avoid" technology and began constructing WindShape's cutting-edge 19,000-square-foot drone testing facility.

This facility will allow testing under various conditions, reflecting the Osage's commitment to innovation and citizen opportunities. Once completed, Skyway36 will offer unparalleled expert drone testing globally.

"OSAGE RECOGNIZES THE PROMISE THAT AAM AND UAS REPRESENT TO OKLAHOMA'S ECONOMY. OUR PARTNERS, TULSA INNOVATIVE LABS AND OKLAHOMA STATE UNIVERSITY, DEVELOPED THE SKYWAY RANGE, THE LONGEST BVLOS FLIGHT TESTING CORRIDOR IN THE COUNTRY. **OUR GOAL FOR SKYWAY36 IS TO ESTABLISH A SELF-SUSTAINABLE, GLOBALLY COMPETITIVE FLIGHT TESTING AND CERTIFICATION HUB FOR THE RESEARCH, DEPLOYMENT AND COMMERCIALIZATION OF TRUSTWORTHY AND EQUITABLE AUTONOMOUS SYSTEMS (TEAS)."**

— RUSSELL GOFF, CHIEF EXECUTIVE OFFICER
OSAGE LLC

Interstate Collaboration

Oklahoma-Arkansas Partnership [27]

Oklahoma Governor Kevin Stitt and Arkansas Governor Asa Hutchinson signed a memorandum of understanding (MOU) to initiate a partnership to support advanced mobility solutions, including EVs, AVs and battery manufacturing. The signatory states are committed to the following:

- Partnering with TIL to establish a launch pad for research and commercialization of EVs, AVs and battery manufacturing at OSU-Tulsa.
- Collaborating with industry leaders and fueling stations.
- Supporting workforce development opportunities and growth.
- Coordinating EV, AV and battery manufacturing economic development efforts across the region.

AAM Multi-state Collaborative [28]

Oklahoma has joined Alaska, Ohio, Oregon, Pennsylvania, Texas, Utah and Virginia, as well as the National Association of State Aviation Officials (NASAO) in an intrastate collaborative to support the growth of the AAM industry. In late 2023, the collaborative met to begin to exchange ideas related to AAM and UAS technologies, the infrastructure needed to support those technologies, economic opportunities and policies to ensure a continuity of operations between states. The collaboration is expected to grow and address topics including the state's roles, policy, infrastructure needs and funding models.

Oklahoma UAS Targeted Flights for Low-level Observations of Weather (OUTFLOW) Project [29]

In collaboration between the NOAA Weather Program Office, OSU and the University of Oklahoma (OU), the OUTFLOW project includes research conducted to understand severe weather development better and how the NOAA can better predict these storms before they begin to develop. The drones can collect measurements of moisture, temperature and air pressure and use a "wind vane mode" that commands the drone to always face into the wind for the most accurate measurements.

Oklahoma UAS Cluster Initiative [30]

UASCI, funded by private industry and a contract with the US Small Business Administration, brings together industry, academia, tribal nations and government agencies to foster innovation and growth in the UAS and AAM sectors. UASCI accelerates the growth of the UAS industry in the US by enabling established companies and emerging entrepreneurs to connect, work together and gain access to national technology, global capital, advanced business models and global markets.

Academia

Universities, community colleges and technology centers are crucial in positioning the state for success with future UAS/AAM deployment. In addition to training the future workforce through undergraduate and graduate-level degree programs, universities have built robust research facilities for developing, testing and deploying UAS/AAM to further advance the ecosystem.

Oklahoma State University

- OAIRE: [31] As part of OSU, the OAIRE was started in 2021 to be a global leader in emerging aerospace technology. OAIRE supports partnerships across university, commercial, military and government agencies, focusing on K-12 and higher education programs, building the aerospace workforce pipeline and promoting community involvement. OAIRE now supports two independent research centers: the Counter-UAS Center of Excellence in Oklahoma City and the LaunchPad Center of Advanced Air Mobility in Tulsa.
- COUNTER-UAS CENTER OF EXCELLENCE: [32] Started in 2022, the Counter-UAS Center of Excellence is a partnership with the US Army base at Fort Sill to strengthen national defense by developing counter-measures to thwart malicious UAS. The Center seeks to coordinate efforts across industry, academia and government agencies to gain efficiencies, share best practices and accelerate advances to counter threats from drones and other UAS.
- LAUNCHPAD CENTER OF ADVANCED AIR MOBILITY: [33] In June 2023, OSU cut the ribbon for the LaunchPad Research Center in Tulsa, which is dedicated to the research, development and promotion of modern technologies in AAM. OSU partnered with TIL and the Osage, as part of the TRAM Cluster coalition, to leverage a grant from the US Economic Development Administration and private monies to establish the LaunchPad Research Center, in addition to other facilities, to "close the gap" between public research and private sector opportunities. The LaunchPad Research Center will support the development and deployment of emerging aviation technologies, with uses from critical infrastructure inspection and agricultural monitoring to emergency response and medical supply delivery. The LaunchPad Research Center will also focus on developing new air transportation systems to safely and sustainably move people and goods in places currently underserved by aviation, including rural and tribal communities.

University of Oklahoma

In support of research initiatives using UAS, OU received one of FAA's first Certificates of Authorization (COA) for UAS activity. Through various departments, OU owns and operates 25 UAS. Research activities focus on meteorology and radar research in collaboration with the National Weather Center (NWC), the NOAA, the Department of Commerce, NASA, and the Oklahoma Mesonet. UAS are flown to test and calibrate various radar systems, and to gather weather data to improve forecasts and better understand the atmosphere's boundary layer and its effects on severe weather formation. OU is also home to the Center for Autonomous Sensing and Sampling (CASS). CASS was established in 2016 and originated from a grant from the National Science Foundation awarded to OU and three other universities under the CLOUD MAP project to evaluate low-altitude weather.

- THE OKLAHOMA AEROSPACE and DEFENSE INNOVATION INSTITUTE (OADII): [34] In 2022 OADII was launched at OU to support the Aerospace, Defense, and Global Security initiative. OADII unites OU research facilities with industry and government partners to advance security and prosperity for the state in four focus areas: radar innovations, sustainment and modernization, advanced technologies, and international security policy.

University of Tulsa [35]

Ranked among the nation's top 25 programs, TU offers a range of degrees in cybersecurity. Its programs are supported by the US Departments of Defense, Homeland Security, Energy, and Transportation. TU's cyber program is certified by the National Security Agency and Department of Homeland Security as a center of excellence in information assurance education, research, and cyber operations.

OKLAHOMA'S WORKFORCE PIPELINE

Workforce

The introduction of widespread UAS and AAM activity will require a robust workforce. Operation of UAS aircraft will rely on remote pilots or automated software controls. AAM aircraft will rely on remote and/or onboard pilots. Certified maintenance technicians will need to be versed in avionics, flight controls, electric propulsion systems and carbon-fiber composites. Additional opportunities will exist in engineering, software engineering and dispatch.

The United States aerospace industry is growing at a rate faster than the current workforce pipeline can keep up with, and it is estimated there will be a 50,000-person deficiency nationally by 2027. [36] Oklahoma has and will continue to take an aggressive role in economic and workforce development programs and incentives. The state is well positioned to meet this challenge, with aerospace degrees and certifications offered at several universities.

Education

Strong Enrollment in Secondary Education Programs Throughout the State

In Oklahoma, Aircraft Owners & Pilots Association's (AOPA) 'You Can Fly' and 'Choose Aerospace' programs have been ranked first nationally for enrollment. This was announced by Lieutenant Governor Matt Pinnell and backed by the ODAA [37]. AOPA is a four-year high school aviation education program that offers students an introduction to multiple career pathways and STEM concepts to prepare them for a career in the industry. More than 100 schools across the state, including the full-immersion program in the Norman Aviation Academy and some homeschool co-ops, will offer this program during the 2024-2025 school year. Choose Aerospace is a non-profit partnership of aerospace stakeholders whose goal is to promote this curriculum that puts students on a fast-paced pathway towards FAA mechanic certification.

Two Major Research and Development Programs

Oklahoma's flagship universities enable the state to position itself as a leader in innovative research and workforce development, enhancing the integration of these new technologies. OSU's OAIRE and OU's OADII are leading the way in supporting the state's aerospace industry with advanced research personnel, state-of-the-art technology testing facilities, and responsive industry-supporting research services that advance technologies across the spectrum.

The Oklahoma Department of Career and Technology Education

Connects students and businesses with training opportunities. Oklahoma CareerTech is recruiting record numbers of students, including more women and minorities than ever before, to support the workforce needs of the aerospace industry.

"WE ARE IN A NEW GOLDEN AGE OF AVIATION. WITH NOVEL PROPULSION, ELECTRIFICATION, AND AUTONOMY SYSTEMS, STUDENTS CAN DESIGN and BUILD ROBOTIC AIRCRAFT TO ACCOMPLISH UNIQUE MISSIONS FROM PACKAGE DELIVERY TO ENVIRONMENTAL SENSING and SAMPLING. **WE ARE EXCITED TO NURTURE and TRAIN THE NEXT GENERATION WORKFORCE AS WE USHER STUDENTS INTO THE ERA OF ADVANCED MOBILITY."**

— JAMEY D. JACOB, PhD, DIRECTOR
OKLAHOMA AEROSPACE INSTITUTE FOR RESEARCH AND EDUCATION, OKLAHOMA STATE UNIVERSITY

Figure 1. Key Existing and Proposed Advanced Mobility Assets in Oklahoma

CULTIVATING EXCELLENCE IN THE MOBILITY PIONEERS OF TOMORROW

In Oklahoma, mobility education propels students toward sky-high careers through hands-on STEM activities and industry partnerships. Several education facilities are highlighted to show the breadth of Oklahoma'sworkforce pipeline. However this is not an exhaustive list as new programs and certifications are being added all the time. For more information refer to ***Appendix A***.

TECHNOLOGY CENTERS

AVIATION PROGRAMS

- Tulsa Tech
- Gordon Cooper Tech
- Moore-Norman Tech
- MetroTech
- Canadian Valley Tech
- Southwest Tech
- Mid-Del Tech
- Francis Tuttle Tech
- Southern Tech

TRANSPORTATION PROGRAMS

- Caddo Kiowa Tech
- Central Tech
- Tulsa Tech
- Mid-Del Tech
- Moore-Norman Tech
- Canadian Valley Tech
- Autry Tech
- Francis Tuttle Tech
- Chisholm Trail Tech
- Eastern Oklahoma County Tech
- Gordon Cooper Tech
- Great Plains Tech
- High Plains Tech
- Indian Capital Tech
- Kiamichi Tech
- Meridian Tech
- MetroTech
- Mid-America Tech
- Northwest Tech
- Northeast Tech
- Pioneer Tech
- Pontotoc Tech
- Red River Tech
- Southern Tech
- Southwest Tech
- Tri-County Tech
- Western Tech

COLLEGES and UNIVERSITIES

- Cameron University
- Embry-Riddle Aeronautical University
- Langston University
- Oklahoma State University
- Rogers State College
- SE Oklahoma State University
- SW Oklahoma State University
- Spartan College of Aeronautics and Technology
- University of Oklahoma
- University of Tulsa
- OSU Institute of Technology
- Rose State College
- Tulsa Community College

MILITARY

- Altus AFB
- Camp Gruber Training Center - Oklahoma National Guard
- Fort Sill - Army Base
- Tinker AFB
- Vance AFB
- McAlester Army Ammunition Plant (MCAAP)

BUILDING THE ADVANCED MOBILITY WORKFORCE PIPELINE

Widespread adoption of advanced mobility technologies will transform our transportation landscape. Preparing a robust workforce pipeline today is essential to attracting industry investment, creating jobs and being able to leverage these investments long term.

Alternative Fuels [38]

Oklahoma's shift to alternative fuels necessitates a larger workforce. This encompasses urban planning for facility deployment, infrastructure design, and research and development (R&D) for alternative fuels and related systems like transport, storage and vehicle integration. It also includes operations, construction and maintenance.

For example, being a certified Electric Vehicle Infrastructure Training Program (EVITP) electrician will be an asset. EVITP certification is required to install charging stations funded by the National Electric Vehicle Infrastructure (NEVI) Program. Currently, there are 29 EVITP-certified electric contractors that operate in Oklahoma. As more electric vehicles are adopted and charging expands across the state, it is crucial to have a qualified pool of EVITP-certified electricians to install, upkeep and maintain charging infrastructure. Through Oklahoma's student electrical intern program, electrical apprenticeships and journeyman programs, the state can scale up the number of electricians to support electric infrastructure.

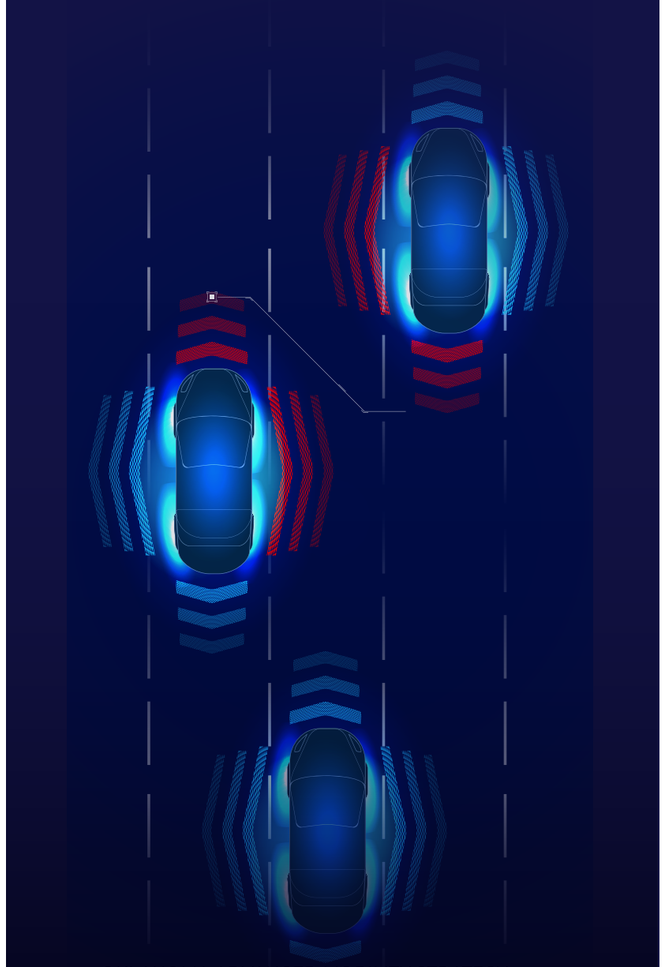
The programs include:

- STUDENT ELECTRICAL INTERN PROGRAM: Overseen by Oklahoma's Construction Industries Board (CIB), students 16 years or older get hands-on experience on job sites with direct supervision from journeymen and contractors.
- ELECTRICAL APPRENTICESHIPS: Overseen by CIB, electrical apprentices work for active, licensed electrical contractors or journeymen who will provide direct, on-the-job supervision. All work hours during the apprenticeship count towards experience to become a journeyman.
- ELECTRIC VEHICLE (EV) TECHNICIANS: Oklahoma City Community College (CCC) offers a three-day Electric Equipment (Vehicle) Technician Certification course. New EV-specific technicians will also be needed to maintain the new electric fleets.

Like electric infrastructure, hydrogen production and the adoption of hydrogen fuel vehicles is rising and could create 675,00 new jobs in the United States by 2035. A workforce will be needed to support the production, storage, transportation and delivery of hydrogen; the installation and maintenance of fueling infrastructure; and the maintenance of hydrogen-powered vehicles.

Autonomous Vehicles

The rise of AV use, especially for freight transportation, is poised to revolutionize transportation and the workforce in many ways. AV can increase efficiencies, reduce costs and improve safety but raises concerns about job displacement. The transition to AVs demands a workforce adept at handling advanced sensors, artificial intelligence and data analytics. For instance, vehicle technicians must be capable of maintaining and calibrating LiDAR, radar and camera systems integral to AV functionality.



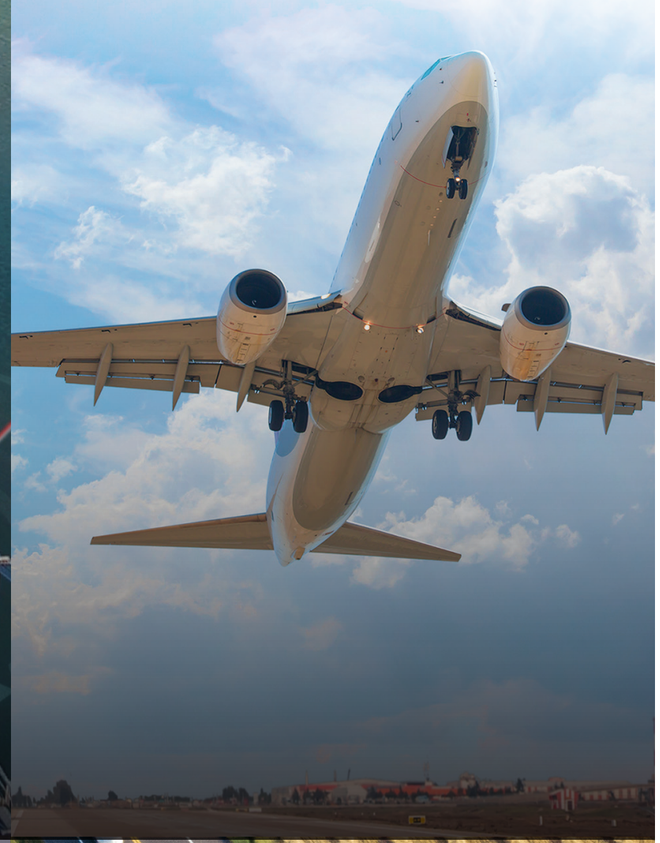
Upskilling Opportunities

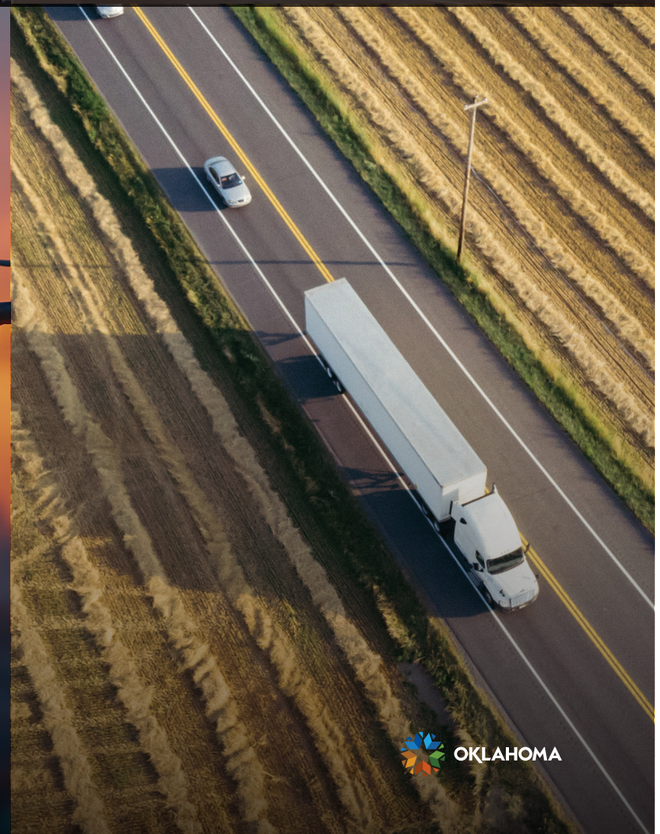
With the advent and advancement of technologies, there is an opportunity to create upskilling programs for existing workers to help the workforce transition.

Industries like Oklahoma's oil, gas and utilities industries already have deep expertise in monitoring and maintaining their pipeline facilities. Drones and autonomous vehicles are being implemented in this industry and upskilling the workforce for the next generation of technology will continue job growth and advanced mobility deployments in the state.

Forward-thinking companies are investing in training and upskilling programs, preparing their workforce for the transition and ensuring that employees remain integral to the evolving logistics landscape. Companies are looking for skills in many areas that impact emerging transportation technologies, including:

- Autonomous Vehicles
  - *Maintenance*
  - *Programmers*
- Digital Occupations:
  - *Cybersecurity Specialist*
  - *Data Analyst*
  - *Data Engineer*
- Software Developments
  - *Systems Integration Specialist*
  - *Artificial Intelligence and Machine Learning*





ADVANCED MOBILITY TECHNOLOGIES

While advanced mobility includes a vast array of vehicle concepts, power sources, devices and functions, this section provides an overview of key technological advancements that underpin and drive Oklahoma's efforts in the advanced mobility space.

MARKET and TRENDS
MACRO DRIVERS

There are several key drivers of advanced mobility technology development and implementation.

Safety

In 2021, there were 762 persons killed [39] and 2,437 persons seriously injured in crashes in Oklahoma.

Promoting safety protects lives, reduces congestion, improves efficiency in often underserved rural areas, and saves costs associated with crashes.

Resiliency and Sustainability

The transportation sector is ***responsible for approximately 35% of the state carbon emissions,*** [40] the most of any sector.

Oklahoma is an all-energy state prioritizing technology advancements that support oil and gas as well as alternative fuels.

Increasing frequency of weather and climate disaster events. From 1980 to 2023, the annual average was 2.5 weather/climate-related events. This increased to 5.8 events annually in the five most recent years, between 2019 and 2023. [41]

Access/Fairness

Focus on ensuring all Oklahomans benefit equally from innovations, including advanced mobility technology access and affordability.

Larger investments may be needed in underserved or rural areas in order to achieve the same results as densely populated areas.

Economy and Workforce

Shortage of 36,000 workers in 2022 in Oklahoma alone. [42]

Truck driver shortage leaves 55% of jobs unfilled in Oklahoma in 2021. [43]

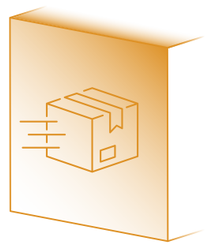
Global pilot shortage of 50,000 by 2025. [44]

Roughly 53% of the ***state's employment depends on freight transportation.*** [45]

E-commerce and increased demand for ***same day/next day deliveries is dramatically changing the logistics environment.***

E-commerce retail sales ***grew by more than 50% in recent years to $870 million.*** [46]

Geopolitical unrest and the COVID-19 pandemic exposed supply chain vulnerabilities, including lack of redundancy, limited visibility beyond immediate suppliers, and vulnerability to cyber attacks.



Technological Advances

Increased battery capacity.

Semiconductor advancements enable more efficient control of motor functions, energy conversion, battery management and charging efficiency.

Vertical takeoff and landing capabilities.

Automation sophistication.

AI and machine learning.

Figure 2. CV, AV, and Platooning Concept

AUTOMATION and PROPULSION

Transportation technology is evolving at an unprecedented pace. Advanced mobility technologies with ever higher levels of automation and new vehicle concepts promise to dramatically improve the transportation landscape, offering safer, more efficient and more sustainable mobility options. The sections that follow provide a high-level overview of this technological innovation. For readers seeking more detailed information, a technical brief on advanced mobility technologies is provided in ***Appendix C and D***.

Connected and Automated Vehicle Systems

Vehicles currently exist that leverage advanced technologies such as sensors, artificial intelligence (AI), computer vision and machine learning algorithms. These are often referred to as CAVs, self-driving cars or driverless vehicles. They perceive and interpret their surroundings, make decisions and control their movement. With the potential to significantly enhance road safety, reduce traffic congestion and provide increased mobility options for individuals unable to drive themselves, AVs hold promise in various sectors. These include personal transportation, ride-sharing services, delivery logistics and public transportation systems. Equipped with wireless connectivity and capable of communicating with other vehicles, infrastructure and external networks, there are vehicles that use various technologies to gather and share information. These technologies include sensors, processors and wireless communication. Their primary goals are to enhance safety, improve efficiency and provide additional features and services for drivers and passengers. These CAVs are a significant advancement in the automotive industry.

Unmanned Aircraft Systems and Advanced Air Mobility

LEVELS OF AUTONOMY: While autopilot features are widely used on aircraft today, UAS and AAM aircraft are transitioning to higher levels of autonomy. With sufficient levels of automation, remote pilots could operate multiple aircraft simultaneously from a central location and, eventually, operate completely autonomous systems flying without an onboard or remote pilot.

BVLOS: Currently, unmanned aircrafts must be operated within visual line of sight (VLOS) of the pilot in command to ensure safe operation. In some cases, it is possible to fly BVLOS, but a special waiver from the FAA under Part 107 of Title 14 of the Code of Federal Regulations [47] (CFR) – 14 CFR Part 107.31 – is required.

Novel propulsion systems have enabled new takeoff and landing styles that do not need conventional long runways. Short takeoff and landing (STOL) systems require some runway, but not as much as conventional takeoff and landing (CTOL) aircraft. STOL are able to become wing-borne at low speeds after only a short distance of ground roll. Vertical takeoff and landing (VTOL) aircraft can takeoff from a very small footprint, as they do not use a runway at all. Many UAS are even able to operate from the roof of a vehicle, making them incredibly versatile.

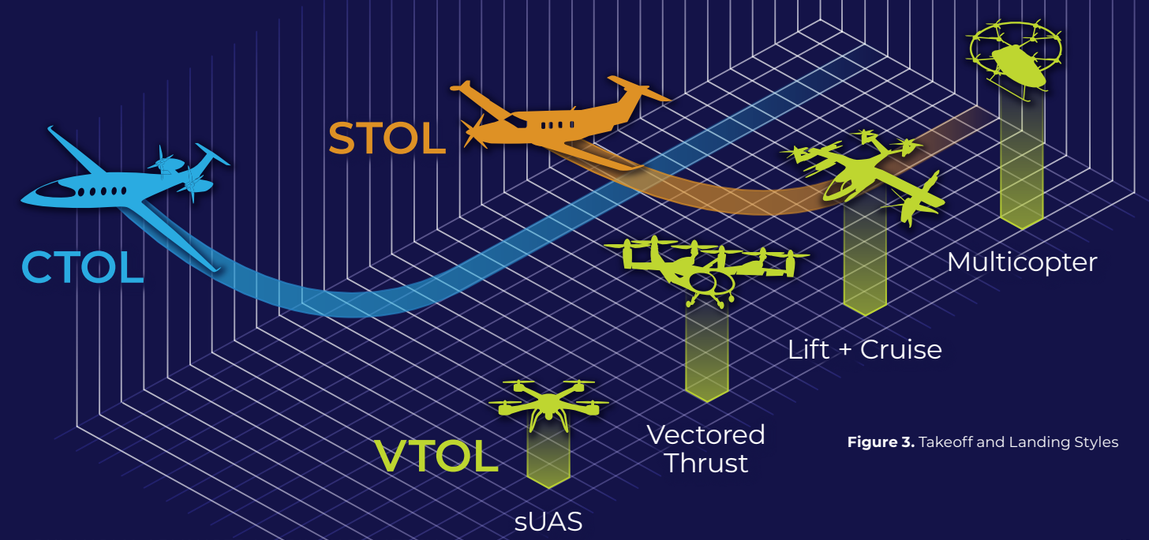


Figure 3. Takeoff and Landing Styles

ALTERNATIVE FUELS

Environmental and sustainability initiatives are growing in the United States and in Oklahoma. Alternative fuels are an advanced mobility trend aiming to feed into a more sustainable and efficient transportation ecosystem. Various alternative fuel sources have been extensively researched as potential substitutes for conventional fossil fuels, and electrification already has a strong presence in Oklahoma's transportation ecosystem.

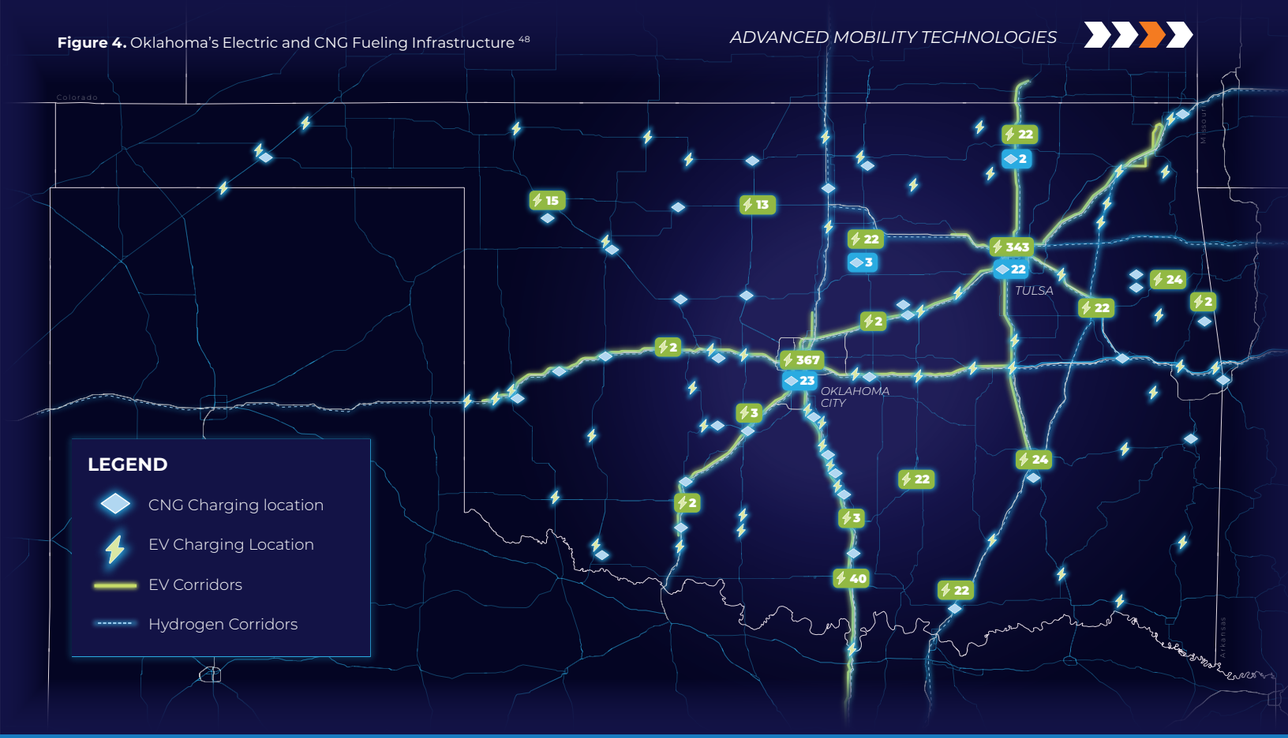
Electrification

Electric battery energy density increases have been critical in driving electrification of ground vehicles and innovation in AAM.

EVs are powered by motors that use electricity stored in rechargeable batteries or other energy storage devices. Unlike conventional vehicles that rely on internal combustion engines fueled by gasoline or diesel, EVs produce no tailpipe emissions during operation. According to the US Department of Energy, the benefits of EVs include improved fuel economy, lower fuel costs and reduced emissions. There are various types of EVs, including battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs) and hybrid electric vehicles (HEVs), each utilizing electric propulsion to varying degrees. As technology advances, battery-only driving ranges continue to increase and costs continue to decrease.

Batteries are increasingly able to meet the substantial energy needs of VTOL aircraft takeoff and landing while still being light enough for a useful trip distance. Significant ongoing research evaluates multiple battery types, including lithium-ion cells, Li-NMC, Li-Ti, lithium-sulfur and Li-Air batteries. Over time, continued advances in battery technology are expected to increase range and payload. Hybrid-electric fuel types combine the energy density of battery technology with traditional aircraft engines to achieve an increased range of up to a few hundred miles, unlocking additional potential.

Figure 4. Oklahoma's Electric and CNG Fueling Infrastructure [48]



Compressed Natural Gas

Compressed Natural Gas (CNG) is a good alternative to conventional fuels because it can be produced domestically, is low cost, is commercially available and produces less emissions. Composed primarily of methane, it is used as an alternative fuel for residential and commercial uses–sometimes in transportation. CNG is sold in units of gasoline or diesel gallons based on its energy content and gets similar fuel economy to conventional gasoline vehicles.

Oklahoma has an abundant supply of CNG. The state has been investing in CNG infrastructure, including vehicle fueling infrastructure. This has enabled many fleets, including government vehicles, public transit buses and commercial trucks, to adopt CNG as a fuel source. Oklahoma also offers incentives and grants to encourage vehicle adoption and CNG infrastructure investment, and is rolling out rebate programs for fleets that use CNG and other natural gases, further increasing CNG's appeal.

Hydrogen

Hydrogen fuel is a clean and versatile energy carrier that can be used to power a variety of applications. When used in fuel cells, it produces only water vapor as a byproduct, reducing harmful emissions compared to traditional fuel options.

Hydrogen fuel cell electric vehicles (FCEVs) use a fuel cell to convert hydrogen gas into electricity to power an electric motor that propels the vehicle, providing zero tailpipe emissions, long driving ranges and quick refueling times. The availability of low-cost renewable electricity has made electrolysis an increasingly attractive method for producing hydrogen fuel, as it offers the potential for truly emissions-free transportation when coupled with FCEVs.

Hydrogen offers significantly increased energy density versus jet fuel, making it a promising fuel source, but liquid hydrogen requires four times more volume on an aircraft than traditional jet fuel. Hydrogen is being explored as fuel in larger airplanes and as fuel cells in smaller propeller aircraft. Though challenges in storage and production of hydrogen remain, its high energy density, lack of harmful emissions and overall global availability warrant further experimentation.

Oklahoma is taking steps to incorporate hydrogen fuel as an alternative fuel source in the state's transportation ecosystem. ***In 2021, SB 1021*** created the Hydrogen Production, Transportation and Infrastructure Task Force to propel Oklahoma to be a top ten state in the production/marketing of hydrogen fuel with the furtherance of our hydrogen economy ecosystem. The task force researched and gathered stakeholder feedback. In November 2021 they produced a comprehensive report of Oklahoma's hydrogen potential.

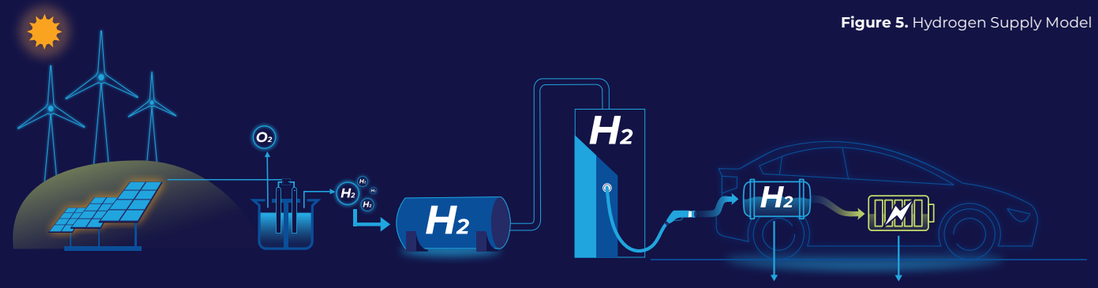
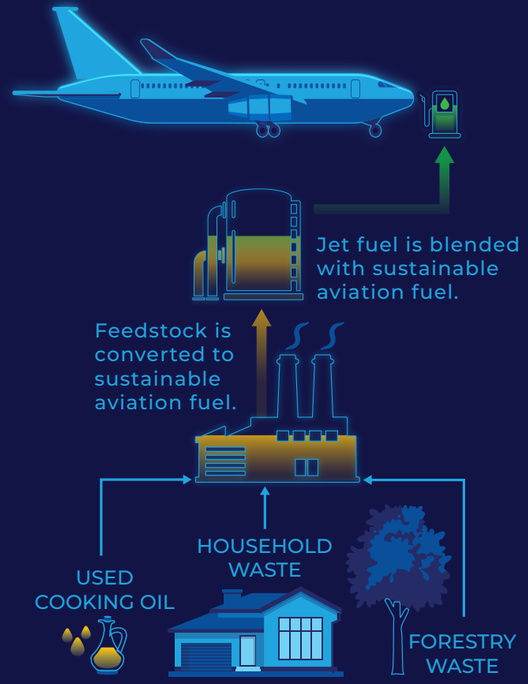


Figure 5. Hydrogen Supply Model

Figure 6. Sustainable Aviation Fuel Supply Model

Sustainable Aviation Fuel

Sustainable Aviation Fuel (SAF), a fuel alternative made from renewable biomass and waste products, is gaining interest as a key component of the decarbonization strategy aimed at reducing the environmental impact of existing aviation. SAF is generally composed of waste byproducts such as municipal waste, algae and cooking oil, and offers the possibility of use without modification to existing combustion systems. While SAF is expected to have a significant role in the existing aviation industry's push for net zero emissions, cost and production challenges remain.



SUPPORTING AEROSPACE and AERONAUTICS INFRASTRUCTURE

Advanced air mobility technologies require a wide variety of supporting infrastructure to integrate into the existing transportation ecosystem and operate safely.

Unmanned Traffic Management (UTM)

A set of separation services needed for UAS low-altitude operations (generally below 400 ft above ground level (AGL) within uncontrolled airspace distinct from, but complementary to, traditional air traffic control separation services. Unlike traditional air traffic management, where the FAA communicates with pilots via air traffic controllers, communication between the FAA and UAS operators will be through a network of digital infrastructure systems often provided by third-party networked information exchanges.

Takeoff and Landing Facilities

Vertiports, charging/fueling stations and maintenance and storage facilities at general aviation airports, intermodal transportation hubs or other locations are needed to support AAM and UAS operations.

Minimum Viable Infrastructure

FAA will regulate AAM operations in the National Airspace System (NAS). The state government will play a crucial part in developing a minimum viable infrastructure (MVI) as a uniform baseline of capabilities that enable safe integration of AAM into the NAS. This includes essential infrastructure, policies and funding required to support this transformative mode of transportation on the ground, as a precursor to UTM.

Low-Altitude Aircraft Surveillance

Surveillance networks are designed to detect both cooperative and non-cooperative aircraft, pinpointing their position, velocity, flight intent and other critical factors. This is all in an effort to ensure efficient, safe and secure AAM operations. These networks can be comprised of one or multiple types of systems, including short-range radars, acoustic, optical, radio frequency, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensors.

Communications Network

A reliable and widespread communications network is essential for Command and Control (C2) activities and UTM. C2 refers to the communications link between an autonomous or piloted aircraft and a ground based remote controller, which will rely on dependable, robust communication networks, including both fiber optic and cellular technologies. Weather monitoring and reporting systems ensuring full operability will require an enhanced understanding of existing weather conditions and the ability to forecast weather conditions into the future to reduce the risk of flying into undetected weather hazards.

Weather Monitoring and Reporting Systems

Ensuring full operability will require an enhanced understanding of existing weather conditions and the ability to forecast weather conditions into the future to reduce the risk of flying into undetected weather hazards. More widespread real-time, low-altitude, high-fidelity meteorological data will be necessary for real-time operations, flight planning and scheduling. Closing these gaps will be critical to supporting BVLOS operations in operational areas for key corridors for AAM and small UAS.

Security and Privacy

Physical and cybersecurity is of paramount importance, not only to protect cargo and passengers onboard but also the surrounding airspace, people and structures below.

SUPPORTING GROUND MOBILITY INFRASTRUCTURE

Electric Grid Resilience

Widespread electrification of aircraft and ground vehicles will put significantly more strain on the electric grid system. Grid updates and security measures will be critical in enabling broader adoption of these technologies.

Refueling/Charging Infrastructure

Increasing adoption of electric and alternative fuel-powered vehicles will require a robust network of refueling and charging infrastructure to enable longer-range driving.

Dedicated CAV Lanes

During peak times, vehicle volume can far exceed highway capacity, and high-occupancy vehicles (HOVs) may be insufficient to meet demand. While research suggests congestion will ease as the proportion of CAVs increases on a corridor, CAVs are not expected to dominate the vehicle market in the near term. In the interim, dedicated CAV lanes can still make a significant impact, as there is a direct correlation between the proportion of CAVs and corridor capacity.

AV Infrastructure

AVs may eventually reach a level of sophistication sufficient to operate under any conditions. Currently, however, inconsistencies in roadway markings and signage often pose a challenge to interpretation by the AV system. For example, when lane lines are repainted to accommodate a work zone, it may be difficult for the AV to determine which lines to follow. Maintenance-related changes, such as fading, graffiti, varying retro-reflectivity levels, debris in the roadway and potholes can lead to misinterpretations by lane detecting systems. Flickering electronic signs may also pose a problem depending on refresh rates. Standardization and supplemental markings or components can be useful mitigating current AV limitations.

Machine Vision Environment

In Oklahoma's diverse climate, variable lighting conditions, shadows and inadequate exposure challenge machine vision systems. Factors such as dirt, precipitation and haze further influence sensor performance, creating occlusions and impacting visibility during extreme weather and light conditions. Notably, foggy conditions emerge as a significant challenge, affecting contrast ratios and hindering the satisfactory operation of advanced driver assistance systems (ADAS).

Mobility Platforms and Apps

Shared mobility services, such as ride-sharing and bike-sharing, provide convenient alternatives to car ownership and work to improve equity and reduce congestion. Mobility-as-a-service (MaaS) platforms integrate various transportation options into seamless digital experiences. Micromobility options like electric scooters are becoming popular for short-distance travel in urban areas.

Integrating robust mobility platforms and applications is instrumental in shaping an interconnected transportation system. By fostering the development of user-friendly, data-driven applications, Oklahoma can empower our residents with real-time information on transportation options, traffic conditions and multimodal routes. These applications enhance user experience and contribute to efficient traffic management, reducing congestion and optimizing the overall transportation network. Inclusivity should be a central focus, ensuring that these platforms cater to the diverse needs of urban and rural populations across the state.

Artificial Intelligence and Machine Learning

Artificial intelligence and machine learning will play an increasingly pivotal role in processing sensor, video and other data generated by advanced mobility technologies and infrastructure in order to utilize information in real time and interface with other transportation systems.

Shared Payments

Shared payments and integrated billing systems simplify the user experience for various mobility services, including ride-sharing, public transit, parking management and emerging mobility solutions. This streamlined approach enhances user convenience, access to different modes and mobility options, and contributes to a more integrated and sustainable transportation ecosystem. Shared payments are typically achieved through account-based payment systems with multiple ways to add funds: credit card, debit card and cash.

Security and Privacy

Digital infrastructure must be secure, and the privacy of users' data protected during entry, transmission and storage. It must also be resilient to cyber attacks and other disruptions.

Standardization and Interoperability

Standardized communication protocols and data formats are essential to ensure that different advanced mobility technologies can work seamlessly with one another and be interoperable with existing transportation systems and infrastructure.

Data Management and Analytics

Robust data management policies are needed to handle increasingly vast amounts of data, as advanced mobility adoption accelerates. Data format, sampling rates and processing must be carefully considered to make the data usable and relevant. AI and machine learning will play an increasingly pivotal role.

STRATEGY

To move the needle on advanced mobility adoption, ODOT and ODAA have identified key use cases based on potential impact and technical feasibility, developed a blueprint for leveraging, and building upon Oklahoma's advanced mobility assets and laid out clear, actionable policy and investment recommendations that catalyze the transition to a safer, more efficient, more sustainable transportation landscape.

USE CASES

Unmanned Aircraft Systems

Because of their smaller size, remote or autonomous operations and ability to takeoff from almost anywhere, UAS can be used in a variety of ways to benefit Oklahomans, including transporting time-sensitive medical supplies and getting eyes-in-the-sky visibility of a natural disaster or crash site conditions faster than ground crews can.

Medical Transportation

UAS can transport critical medical supplies, medications and lab samples between hospitals or to and from rural or hard-to-reach areas.

- UAS is already in use in some areas, demonstrating proof of concept and tangible benefits.
- BVLOS UAS operations, once authorized, will provide significantly more efficient movement of medical supplies in rural areas with dispersed populations and long distances between medical centers, distribution hubs and patients.
- Security and privacy are key concerns that must be addressed before UAS transport of sensitive packages is widely available.

TESTING UNDER WAY IN OKLAHOMA:

- CNO is testing delivery of lifesaving blood products to rural areas. [49]
- Vigilant Aerospace and OSU conducted a demonstration of medical supply delivery drones in 2020. [50]

First Responder Services

DFR can provide eye-in-the-sky support for law enforcement officers, fire departments, search and rescue personnel and emergency medical services personnel.

- Using UAS with thermal and movement sensors to scan larger areas will drastically reduce the time to locate survivors and aid in search and recovery. This could be particularly useful during a post-tornado event where ground clutter makes survivor location difficult.
- UAS can be used as crash scene surveillance to link current scene status to other government agencies to assist in traffic routing, hospital preparedness and emergency response.

OPERATIONS UNDER WAY IN OKLAHOMA

- OKC Fire Department has implemented a fleet of thermal imaging tethered drones. The drones provide firefighters with an aerial view of an emergency. [51]
- OKC Police Department uses Skydio drones for patrol-led deployment, including use in officer-involved shooting incidents. [52]
- TIL has partnered with various agencies, including the Oklahoma Bureau of Narcotics, the Oklahoma Highway Patrol, the Oklahoma State Medical Examiner's office, and the Tulsa Fire Department on UAS operations that support fugitive apprehension; forensic evidence collection; criminal, traffic, and death investigation; and DFR. [53]
- State of Oklahoma agencies include the Oklahoma Bureau of Narcotics, the Oklahoma State Bureau of Investigation, and the Oklahoma Highway Patrol.

Small Package Delivery

UAS enables faster transport of small packages and on-demand commerce from or between distribution centers, manufacturers and retailers to end consumers, facilitating quicker transport to areas that are hard to reach via ground.

TESTING UNDER WAY IN OKLAHOMA

The CNO is actively involved in testing and advancing UAS for safe integration into the NAS. [54]

- Exploring safe UAS operations beyond the pilots VLOS.
- Supporting one of the world's largest UAS testing sites.
- Ability to travel line of sight rather than on conventional roadways increases efficiency.

Inspection and Monitoring

UAS enables more efficient inspection and monitoring of hard to reach places, without the cost or safety risk of getting upclose in person. It can be used for routine inspection and monitoring as well as in times of crisis across multiple sectors, including infrastructure, agriculture and renewable energy.

- UAS video feeds can be recorded for potential further analysis, avoiding the need for multiple site visits or personnel.
- UAS can be equipped with other sensors to detect a variety of things including radiation levels and structural imperfections not visible to the human eye (such as some cracks).
- Small size and VTOL capabilities enable operations from almost anywhere, without requiring a large infrastructure footprint.
- Data can be ingested into systems where machine learning is used to improve efficiency, and digital twins help monitor and manage assets, resulting in sector growth.

OPERATIONS UNDER WAY IN OKLAHOMA

UAS is already being used in a variety of ways in the state.

- Oklahoma state agency uses (DEQ, Wildlife Conservation, ODOT, Water Resources Board) [55]
- Inspection/monitoring of infrastructure and construction site surveys
- Oklahoma Gas & Electric utility inspections
- Damage surveying following tornado events
- CNO assessments of construction, grid pattern tracking, agriculture monitoring, forestry fire training, regenerative ranching and emergency management

Advanced Air Mobility

Larger AAM vehicles can carry heavier payloads and even people, offering benefits similar to UAS. AAM requires a larger infrastructure footprint for operation, so significant investment in infrastructure is needed to enable adoption. For short and medium range flights, electric AAM vehicles are a clean, quiet, cost-effective alternative to combustion engine-powered aircraft or ground vehicles. Vehicle configurations include eVTOL, electric short takeoff and landing (eSTOL) and eCTOL, each suited to different applications.

Cargo and Freight Delivery

- AAM can be used to transport heavy cargo and freight from or between airports, distribution centers and manufacturers.
- Offers significant efficiencies in logistics and e-commerce transportation.
- Can leverage existing airport infrastructure (i.e., runways, hangars), underutilized general aviation airports, manufacturing facilities and warehouses, or even parking lots and empty fields (depending on regulations) and fly directly to distribution hubs or end users.

TESTING UNDER WAY IN OKLAHOMA.

CNO partners with the National Air Transportation Association (NATA) to develop prospects for AAM, emphasizing connections to underserved communities. [56]

Regional Air Mobility

AAM aircraft can be utilized by Part 121 and 135 carriers to enhance regional connection services between airports within Oklahoma and neighboring states, reducing travel times, by passing congested roadways and improving access to and from rural areas. Future testing and adoption is dependent on technology maturation and regulatory authorization.

Example: *Regional air mobility could be used between Stillwater and Enid, Bartlesville and Tulsa, Tulsa and Bentonville, Arkansas, to ease traffic congestion and provide more convenient connections.*

Passenger Emergency Services

AAM and particularly eVTOL can be used for hospital patient and equipment transfers, search-and-rescue operations into hard-to-access areas, and support for law enforcement activities. AAM would be particularly beneficial to rural hospitals without helicopters or helipads, providing lifesaving transport between rural areas and urban hospital centers.

TESTING IS UNDER WAY IN OKLAHOMA.

CNO is working with AAM companies looking at the use of eVTOL to transport doctors to patients. [57]

On-Demand Air Taxi

AAM could be used to provide on-demand and unscheduled taxi service for transit between rural areas or tribal reservations and metropolitan centers, such as Oklahoma City and Tulsa.

Mobility hubs in rural areas are needed to provide the infrastructure to operate air taxis.

Use in Oklahoma is dependent on technology maturing enough to attract ridership from neighboring states to justify the cost of service.

Airport Shuttle

eVTOLs could be offered as an amenity to premium airline customers for transfers to or from businesses or residences to passenger terminals.

Another use could be to transport passengers between rural general aviation airports and commercial airports in metropolitan areas.

Domestic airlines, such as Delta and United, have partnered with Joby and Archer to develop this service to enhance travel speed and experience and avoid traffic delays en-route to the airport in some states.

ADVANCED MOBILITY MODES

Oklahoma has identified key advanced mobility use cases with the potential to significantly improve the safety, efficiency and sustainability of the ground mobility system.

Automated Trucks with Truck Mounted Attenuators [58]

Truck mounted attenuators play a pivotal role in highway maintenance to fortify safety measures by mitigating the impact of collisions for workers and equipment within work zones. Acting as energy absorbers, they effectively dissipate crash energy, reducing the severity of accidents for both the workers in front of them and the truck itself. Mounting attenuators on automated follow trucks provides even more safety benefits. Not only would they safeguard the physical integrity of the vehicles involved but also ensure the well-being of the work zone personnel, as no individuals would be needed in the automated truck.

Beyond their role as a protective barrier, these automated truck mounted attenuators function as advanced warning systems. By signaling the presence of potential hazards to approaching drivers, they contribute significantly to accident prevention. This proactive approach allows drivers time to adjust their speed and safely navigate the work zone, minimizing the risk of collisions and enhancing overall road safety.

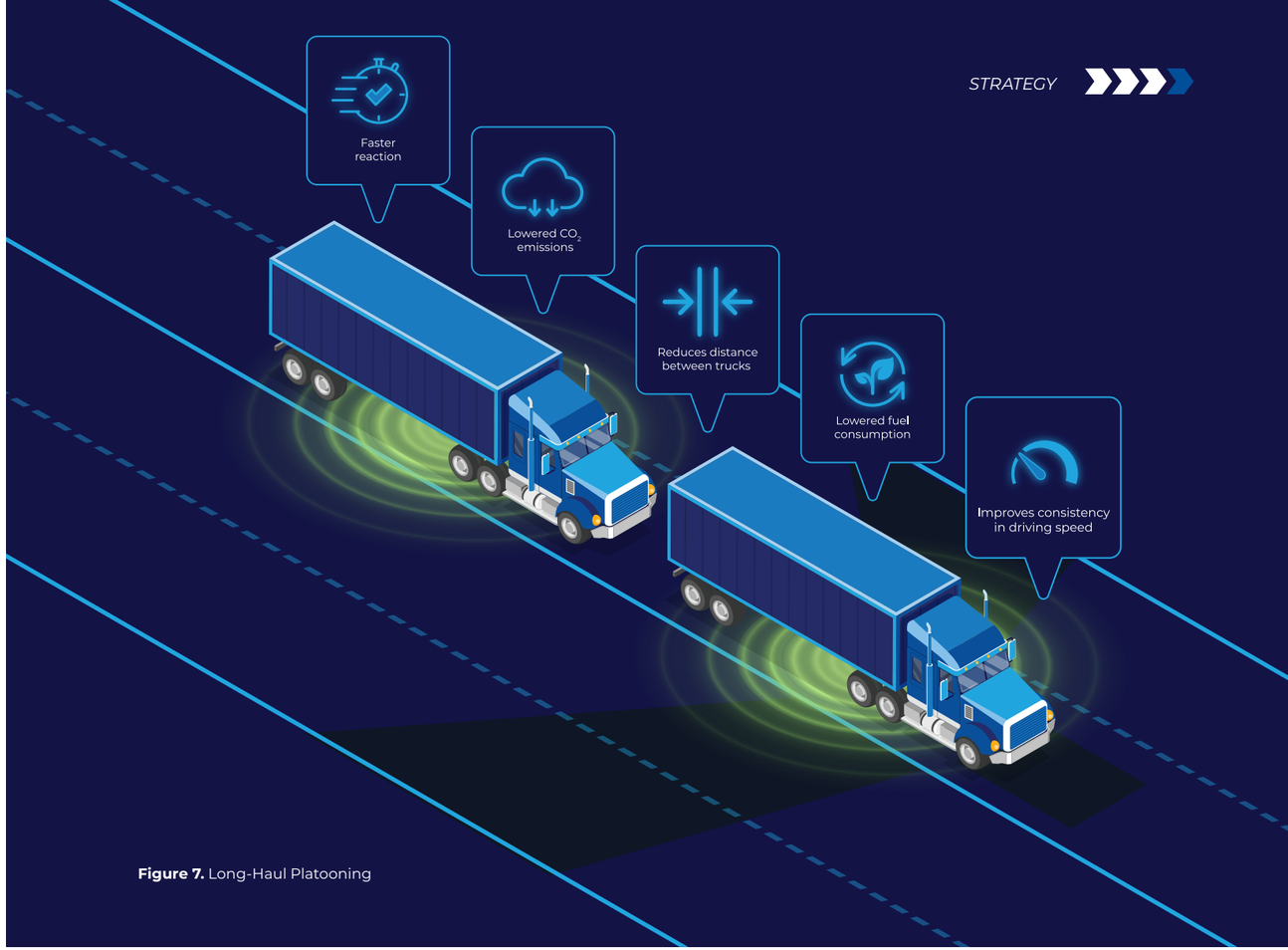


Figure 7. Long-Haul Platooning

Long-Haul/Platooning

Oklahoma is exploring the potential adoption of transformative long-haul freight automation through truck platooning. In truck platooning, multiple trucks can travel with minimal gap between them, reducing air drag and improving fuel economy. This is achieved by leveraging automation features like component redundancy, sophisticated software-based safety systems and high-precision GPS. Avoidance detection mechanisms enable trucks to collectively navigate potential hazards, while encrypted vehicle-to-everything (V2X) communication ensures secure information exchange within the platoon.

Platooning can help mitigate the effects of the national truck driver shortage by enabling the driver of the lead platoon vehicle to drive multiple vehicles. Platooning will also require access to facilities to transfer between automation and human-driven vehicles and inspect technology components. Oklahoma can support these initiatives by integrating facilities that provide systems checks and switch power units and trailers. Including alternative fueling at these facilities will further support the adoption of a broad range of advanced mobility solutions.

Urban/Suburban Middle-Mile Freight

Automating goods between key intermodal and freight distribution hubs presents an opportunity to harness emerging technologies, promoting heightened efficiency, enhanced safety and lower emissions when utilizing alternative fuels.

Typically unfolding beyond urban centers, middle-mile freight movement involves substantial journeys along dedicated access facilities, roads designated explicitly for traffic, with final connections made through signalized arterial networks. The middle-mile freight automation system can consist of routes designated as part of the National Highway Freight Network and, like the long-haul facilities, provide connectivity for goods distribution.

Early engagement through partnerships can identify and establish this network, attracting the development of freight clusters around the nodes with further integrated technology.

Figure 8. Urban/Suburban Middle-Mile Freight Automation Example

URBAN DYNAMIC ROUTING FOR SHARED AV TRANSIT

Urban dynamic routing uses algorithms and systems to optimize and adapt transportation routes in urban environments. This concept is often applied to public transit, ride-sharing and other city-shared mobility services. Dynamic routing can be especially successful in shared AV transit.

Unlike fixed or predetermined routes, dynamic routing considers real-time data, adjusting routes based on current conditions such as traffic congestion, road closures and passenger demand.

This use case is most effective in densely populated urban areas like Oklahoma City and Tulsa.

KEY FEATURES:

- Real-time data integration
- Adaptive planning
- Passenger demand consideration
- Integration with smart infrastructure
- Multimodal integration
- Sustainability considerations

HYDROGEN AND RURAL FREIGHT

Oklahoma is a predominately rural state, with only four cities above a total population of 100,000 residents, but with truck volumes that reach 50% of interstate average annual daily traffic in rural sections.

The highest percentage of truck traffic on Oklahoma roadways is found on rural segments of I-40, where trucks constitute up to 50% of the total traffic. Other notable routes with significant truck traffic include US-69 with 40%, and I-35 with 30%. [59]

HYDROGEN CONSIDERATIONS

Zero carbon emissions, when produced with renewable energy sources:

- Have high energy density
- Require hydrogen fueling infrastructure

Oklahoma will continue to leverage hydrogen equipment manufacturing, production facilities, and carbon sequestration facilities to expand their opportunities in this nascent market.

MULTIMODAL CORRIDOR DEVELOPMENT: *A Seamless Integration of New Technologies*

While each of these use cases individually provide value, realizing advanced mobility's full potential in Oklahoma hinges on strategic, seamless integration of these technologies into the overall transportation network. It is through state-level planning and coordination that we can put the right suite of technologies in the right places to maximize safety, resiliency, accessibility, access and economic benefits for our state.

Though the specific mix of transportation modes and infrastructure needs may vary from place to place, strategic planning will involve creating multimodal corridors with the foundational infrastructure in place to enable adoption of both advanced mobility technologies available today and those that will continue to emerge in the future.

Figure 10 provides an example of how a designated multimodal corridor would improve freight movement between the Port of Catoosa, Tulsa and Oklahoma City.

Figure 9. Last-Mile Freight Modal Options

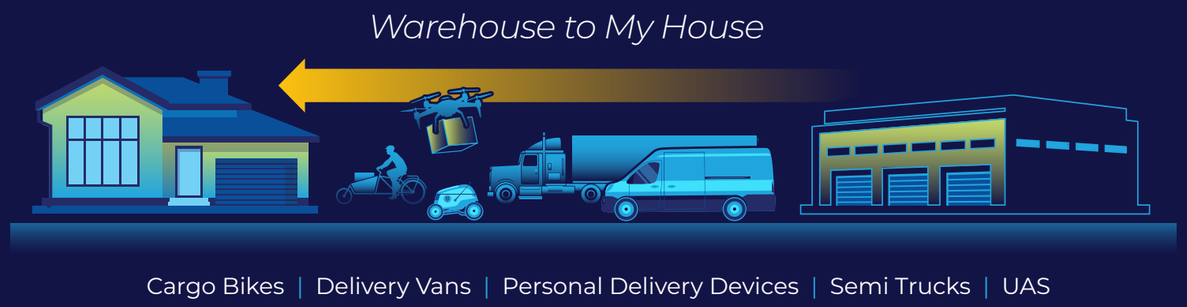


Figure 10. Tulsa to Oklahoma City Multimodal Corridors and Hubs

THE BLUEPRINT FOR OKLAHOMA'S ADVANCED MOBILITY SUCCESS

The Blueprint for Success on the following page shows where designated advanced mobility corridors exist today, as well as potential locations for key multimodal corridors that could amplify the benefits of advanced mobility technologies in the future.

AAM/UAS MOBILITY

- AEROSPACE RESEARCH AND DEVELOPMENT ASSETS
- AEROSPACE RESEARCH AND DEVELOPMENT FACILITY
- PUBLIC SAFETY AND EMERGENCY MANAGEMENT ORGANIZATIONS
- EDUCATION

GROUND MOBILITY

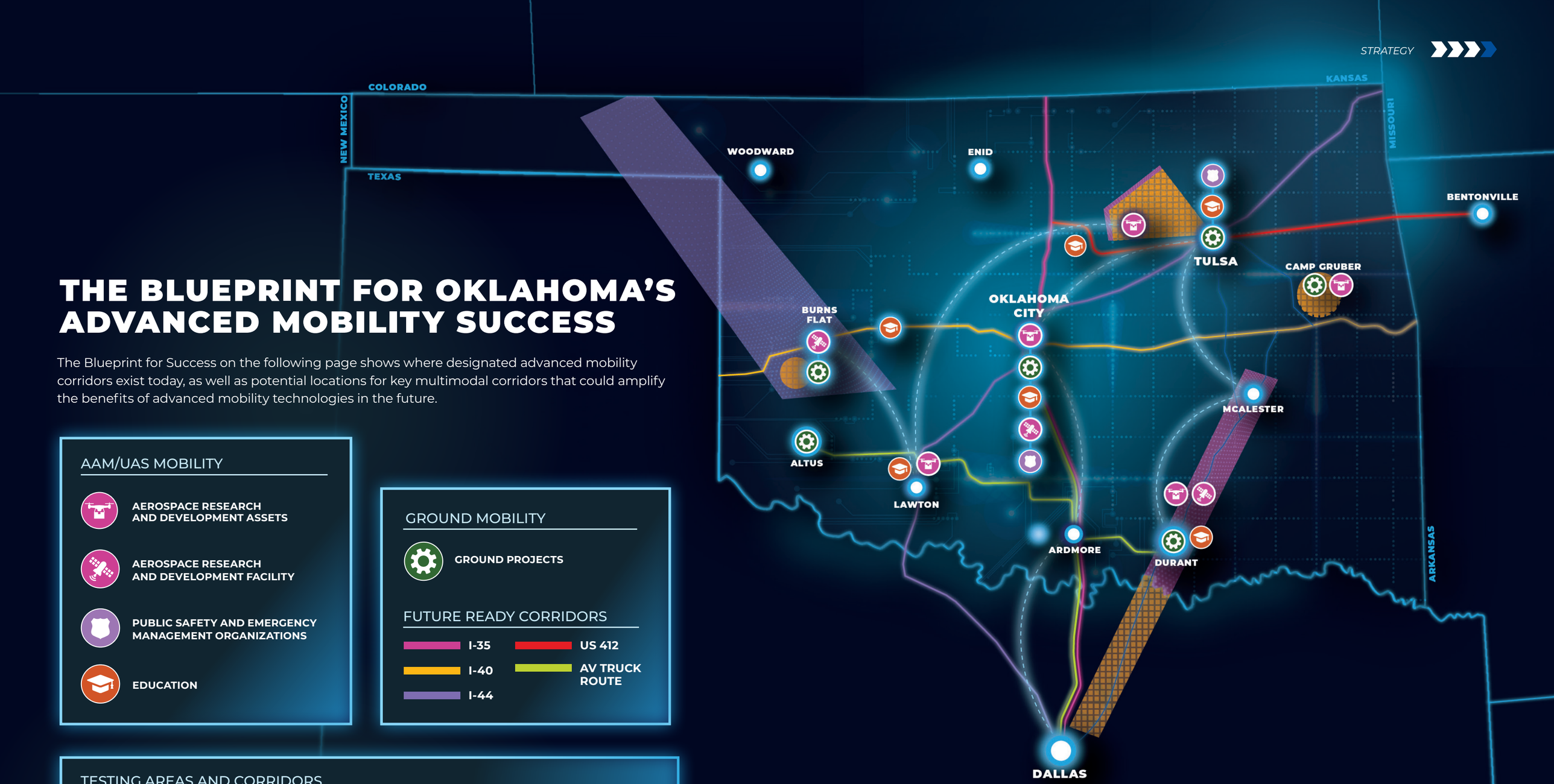
- GROUND PROJECTS

FUTURE READY CORRIDORS

- I-35
- I-40
- I-44
- US 412
- AV TRUCK ROUTE

TESTING AREAS AND CORRIDORS

- AIRSPACE OPERATING AND TESTING AREA
- *PROPOSED* AIRSPACE OPERATING AND TESTING AREA
- *PROPOSED* FLIGHT CORRIDORS
- SPACE FLIGHT CORRIDOR



POLICY and INVESTMENT RECOMMENDATIONS

As part of the Oklahoma Advanced Mobility Strategy, this action agenda provides a framework for policy development and strategic implementation items, **from Short Term (2024 – 2026) to Long Term (2030 – 2045),** to spark the growth and economic vitality of the Oklahoma advanced mobility ecosystem.

Policy

PREPARE

- Review state policies and provide recommendations in support of advanced mobility technology, including zoning needs for vertiports and alternative fueling stations.
- Conduct feasibility and financials studies for a multi-site advanced mobility center of excellence and a centralized command support system for advanced mobility testing.
- Leverage the AMPAC to set minimum annual thresholder infrastructure investment and support proposal decision-making.
- Identify and maintain a database of potential federal and state funding sources (through ODOT, ODAA and AMC).
- Regularly review policies and update recommendations.
- Monitor advanced mobility technology development at research institutions and other in-state partners, and identify policy action needed to expedite commercialization.

ESTABLISH

- Develop standards for advanced mobility integration, interoperability, cyber and physical security, and privacy, including systems engineering documents, as needed.
- Standardize application and approvals process for research, development, testing, evaluation and operation with expedited processing for specialized industry uses.
- Develop templates to support local and regional governments in planning, implementing, operating and maintaining advanced mobility infrastructure, including minimum support staff thresholds.
- Regularly review and update standards, approval processes and support resources to reflect changing technologies and costs.
- Establish funding review and renewal cadence.
- Review and allocate new infrastructure investment and existing infrastructure maintenance funding for advanced mobility infrastructure, including minimum support staff thresholds.

Infrastructure

PREPARE

- Research and benchmark advanced mobility infrastructure needs statewide through feasibility and financial studies on:
  - A multi-site state-assisted advanced mobility center of excellence.
  - An AAM/UAS command and control center.
  - Alternative fuels sourcing and siting (multimodal).
  - Vertiport siting.
  - CV/AV infrastructure.
- Present infrastructure recommendations and budget proposal to state legislature, based on research and benchmarking.
- Develop a cooperative public-private partnership model for investing infrastructure, including alternative fuels and vertiports.
- Develop an Infrastructure Investment Prioritization Program.
- Review and update the Infrastructure Investment Prioritization Program to reflect changing needs and technologies.
- Annual review of existing infrastructure maintenance and new infrastructure needs.
- Develop and maintain a portfolio of shovel-ready advanced mobility infrastructure projects.
- Encourage industry and local government partners to plan, study and develop strategies to invest in advanced mobility infrastructure through outreach and collaborative planning.

INVEST

- Work with partners to build out critical foundational infrastructure needed as a springboard for further infrastructure investment, i.e., fiber optic conduit, the vertiport network, enhanced electric grid capacity and resiliency, and an expanded hydrogen distribution network.
- Construct and operate the Centralized Command Center and the multi-site Advanced Mobility Center of Excellence.
- Scale up infrastructure construction statewide and support operations and maintenance.

Economic Development

PREPARE

- Work with the Oklahoma Department of Commerce to develop and publicize incentives for existing and new advanced mobility companies to invest in the state, leveraging Oklahoma's competitive advantage talking points.
- Centralize advanced mobility economic incentive messaging under a single channel and highlight targeted content for small businesses and local startups.
- Monitor key technologies, such as radar, alternative fuels and autonomous transportation, under development in the state and identify ways to support expedited commercialization.
- Regularly update the incentive and industry attraction strategy to align with evolving needs and priorities.

ESTABLISH

- Implement permitting for specialized industry testing and piloting advanced mobility vehicle and aircraft components.
- Create manufacturing and testing incentives specific to advanced mobility-related industry segments.
- Market Oklahoma's unique positioning for testing and operations: weather conditions, radar monitoring, desirable terrain, live/controlled traffic.
- Create and maintain a unified entry point for technology testing for efficient accountancy and quick response to industry needs.
- Regularly review and update incentive programs and positioning language to target key industry and supply chain gaps.

INVEST

- Dedicate ongoing staff to update and implement advanced mobility industry attraction strategies, in conjunction with the Oklahoma Department of Commerce.
- Coninue funding the Department of Commerce's Supporting Industrial Transformation and Economic Success (SITES) program. SITES is a program funded through an initial one-time federal investment that was designed to proactively address statewide site infrastructure needs to meet the demand of existing businesses andmcompanies. The SITES Program includes opportunities for communities to apply toreceive unallocated dollars set aside by the state for infrastructure improvements and industrial site development.

Workforce

PREPARE

- Regularly update list of educational institutions offering advanced mobility-related programs, degrees and certifications, including high schools, community colleges, CareerTech and secondary and post-secondary institutions.
- Set broad education standards, messaging and funding for educational programs.
- Develop educational materials to inform and promote workforce training programs and centralize messaging under a single channel.
- Prioritize funding for programs that target early adoption industries, such as infrastructure monitoring and public safety.
- Modify educational materials to inform and promote workforce training programs as industry expands.
- Maintain advanced mobility industry educational resource messaging under a single channel.

ESTABLISH

- Work with universities, community colleges and trade schools to develop advanced mobility-related curriculums, including upskilling and reskilling.
- Work with industry to identify and prioritize advanced mobility-related skillsets, and maintain a database of firms that regularly hire people with these skillsets.
- Work with industry to establish on-the-job-training internships and job placement opportunities in advanced mobility-related fields.
- Create specific training and career paths for early adopters in industries using advanced mobility technologies, such as UAS infrastructure inspection or autonomous driving monitoring, and specify base-level competency requirements.
- Establish an advanced mobility education committee made up of members from the education sector and industry to understand and incorporate evolving curriculum and degree needs to support the workforce.
- Increase university-coordinated research efforts that advance at market speed.
- Increase research efforts between higher education and private industry partners.

INVEST

- Leverage technical and policy experts to guide incentives program structure to build responsive programs to workforce needs.
- Expand curriculum to more institutions, and update resources to incorporate changing workforce needs and emerging technologies.
- Scale up infrastructure construction statewide, and support operations and maintenance.

Outreach and Engagement

Prepare

- Develop outreach and engagement strategy plan including messaging and channels by various stakeholder groups and high-level talking points.
- Update outreach and engagement plan leveraging existing channels.
- Develop new ways to educate leadership and the public about advanced mobility technologies.

Establish

- Hold statewide and regional education and advocacy events in partnership with legislative and state-level officials, including but not limited to the Oklahoma State Aero Day and Innovation Day at the capitol.
- Continue to update programs and methods to expand outreach on emerging technologies.

Invest

- Continue regular outreach and engagement cycle to update and inform stakeholders on projects and opportunities and solicit feedback.

OKLAHOMA ADVANCED MOBILITY STRATEGY

Administration Support Agencies, Aligned Plans and Stakeholders

Amplifying Impact: Coordination Across Sectors and Stakeholders
While advanced mobility technologies directly affect the work of ODOT, ODAA and the Advanced Mobility Council, the infrastructure investments laid out in this strategy document can, with cross-sector collaboration, extend benefits far beyond transportation. ODOT's electrification efforts, for example, should be made in conjunction with electric grid upgrades needed for other sectors, addressing the state's energy needs in a cohesive and holistic manner. The recommended Dig Once policy not only reduces fiber installation costs for transportation, but also could reduce the need for independent digging and installation by other sectors, producing even great cost savings. The following list highlights just a sampling of sectors with overlapping needs and complementary efforts, further amplifying the impact of advanced mobility investments.

OKLAHOMA Aerospace & Aeronautics

Aerospace Industry

- AERO Education
- Oklahoma Airport System Plan
- Statewide Economic Impact Study
- Oklahoma Aerospace & Defense Strategic Plan

OCAST Center for the Advancement of Science & Technology

Entrepreneurs

- Oklahoma Science and Innovation Strategic Plan

OKLAHOMA Commerce

Industry Attraction

- Workforce Transformation Task Force Report
- Oklahoma Aerospace & Defense Strategic Plan

OKLAHOMA Transportation

Transportation Industry

- Long Range Transportation Plan
- Carbon Reduction Strategy
- Freight Transportation Plan
- Active Transportation Plan
- NEVI

OKLAHOMA CareerTech

Workforce

- Strategic Plan

OKLAHOMA Environment Quality

OKLAHOMA Broadband Office

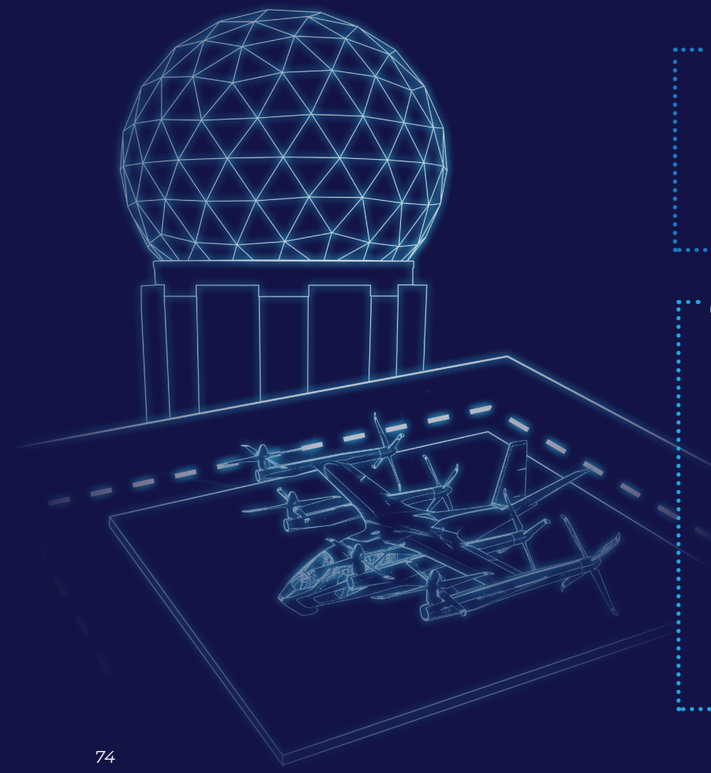
Environmental Oversight

- Hydrogen Production, Infrastructure, & Task Force Report & Roadmap
- Oklahoma Broadband Plan

BUILDING ON OUR FOUNDATION IN FLIGHT

AEROSPACE and AERONAUTICS

Both private and public contributors can work together to harness the future of AAM in Oklahoma. Based on initial needs and feasible revenue generation, we can support an estimated 30 strategically located vertiports and their required radar and detection systems by 2045.



CONSTRUCT

6 *radar and detection technology sites and one centralized command and control operation per region.*

CONSTRUCT

12 *vertiport sites on locations with no existing aviation infrastructure.*

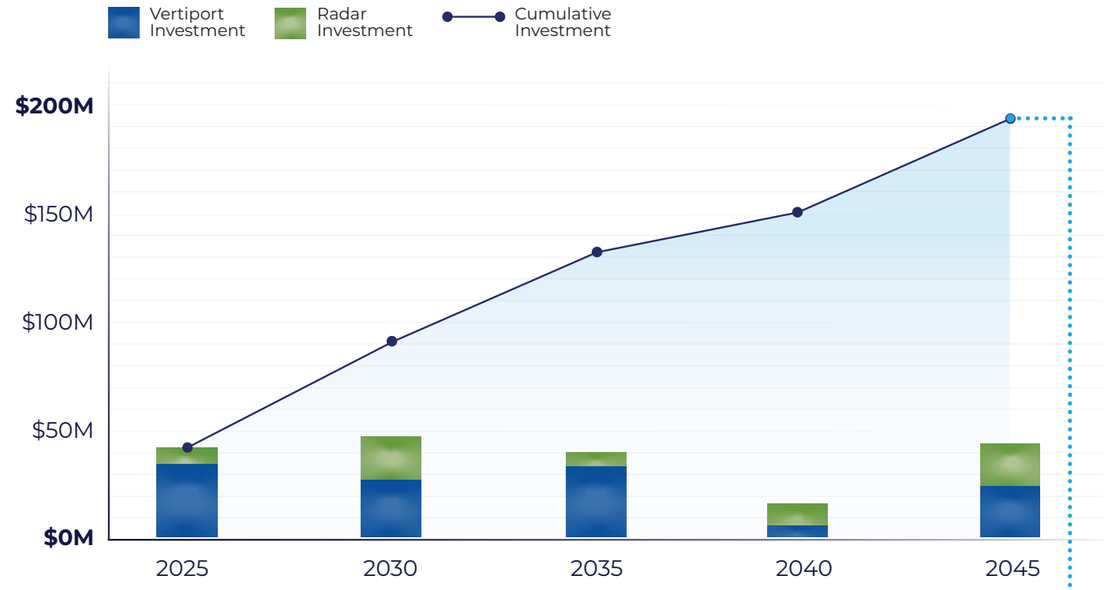
UPGRADE

18 *existing heliports and small airports to vertiports.*

OKLAHOMA

Building Vertiport and Radar Cumulative Infrastucture Investment by 2045

The data below refers to the public and private investment needs for vertiport ground infrastructure and radar communications equipment by time period.

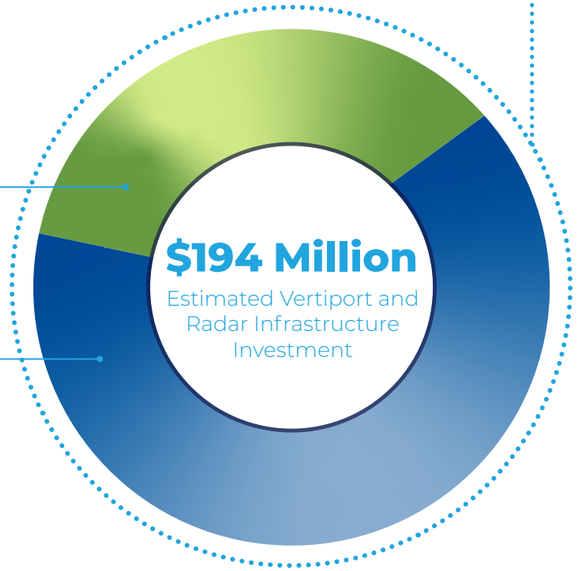


$67 Million

The estimated necessary capital expenditure (CAPEX) for AAM Centralized Command Support System for future UAS/AAM traffic management radar.

$127 Million

The estimated necessary CAPEX for AAM vertiports.



THE ROAD AHEAD

GROUND MOBILITY

Infrastructure improvements are at the foundation of preparing for emerging ground mobility technology deployment freight fleets, transit vehicles, public safety equipment and personal automobiles. Highway infrastructure must be well-maintained with AV-supportive markings and signage, incorporate digital infrastructure and fiber optic cable conduits that allow for growth and upgrades without additional digging, and offer consistent access to alternative fuel options. While additional studies are needed to determine comprehensive ground infrastructure investment needs, the following estimates provide a rough order of magnitude.

$1.4B

IN FIBER OPTIC CABLE TO COVER 11,920 ROUTE MILES ON NON-INTERSTATE HIGHWAY CORRIDORS IN OKLAHOMA.

INTERSTATE CORRIDOR FIBER INSTALLATIONS ARE COMPLETE AND CONNECTIVITY TO THEM IS NEEDED VIA THE CONNECTING HIGHWAY CORRIDORS

15%-33%

COST SAVINGS WHEN FIBER OPTIC CABLE IS INSTALLED DURING AN EXISTING ROADWAY PROJECT, RATHER THAN INDEPENDENTLY.

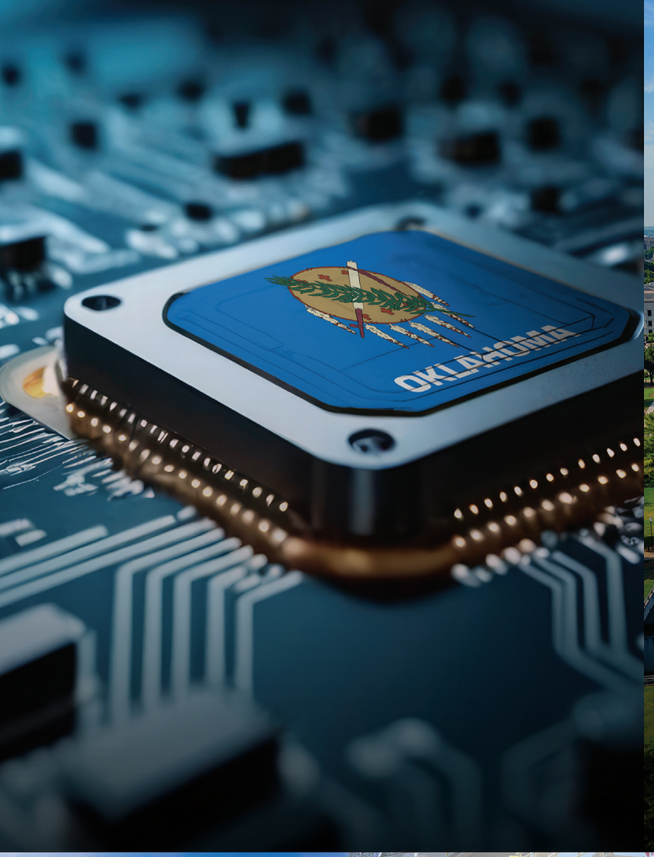
OKLAHOMA AS A NATIONAL HYDROGEN DISTRIBUTION CROSSROADS, WITH STRATEGIC PIPELINE DEVELOPMENT.

FEASIBILITY AND FINANCIAL STUDY NEEDED TO DETERMINE INVESTMENT AMOUNT.

$83M

MINIMUM ELECTRIC VEHICLE FUEL INFRASTRUCTURE INVESTMENT

THROUGH THE NEVI PROGRAM, WITH UP TO 80% FEDERAL CONTRIBUTION.



CONCLUSION

To reap the benefits advanced mobility promises both in the transportation system and the economy, we need to act now to bolster and build upon existing assets, infrastructure and partnerships.

State-level action in particular is critical to seamless, fair and cost-effective integration of advanced mobility in Oklahoma. Applying the prepare, establish, and invest framework and following the policy and investment recommendations presented above, we must:

- Continue to iteratively develop, test, deploy and scale advanced technologies.
- Take legislative and administrative actions to maintain and strengthen Oklahoma's position as an advanced mobility leader.
- Maximize return on investment (ROI) by proactively coordinating investments, such as fueling infrastructure and electric grid improvements, to support multiple technologies.
- Leverage our competitive advantages to attract industry investment and create jobs that bolster our economy.

We sincerely thank all the stakeholders who participated in interviews and provided input into this Advanced Mobility Strategy document. Your continued insight, leadership and investment in Oklahoma is essential to advancing the mobility landscape for the benefit of all Oklahomans.

IN OKLAHOMA, we are incorporating technology to improve safety and performance across all our mobility systems. We have wide-open spaces for testing emerging technologies and abundant talent resources across our modern mobility frontier. We are home to over 1,100 aerospace companies providing 120,000 jobs. Oklahoma enjoys 350+ flying days per year, making it ideal for testing unmanned aircraft systems. Major supply routes, such as I-35, I-40, I-44, US 412 and US 69, make it easy to deliver products across North America. The trucking industry moves 500 million tons of freight annually in Oklahoma and employs over 56,000 people. Greater Oklahoma City is geographically located in the center of North America and the south-central region of the United States, positioning it within a one-day drive of a vast number of regions and major cities.

PARTNERS IN PROGRESS

These organizations collaboratively contribute to the advanced mobility ecosystem in the state. They are resources and partners advancing the industry at home and creating more workforce opportunities for Oklahomans.

FEDERAL

- Department of Defense Installations
- FAA Mike Monroney Aeronautical Center

STATE

- Oklahoma Department of Transportation
- Oklahoma Department of Aerospace and Aeronautics
- Oklahoma Center for Advancement of Science and Technology
- Oklahoma Department of Commerce
- Oklahoma Department of Career and Technology Education
- Oklahoma State Regents for Higher Education

LOCAL and REGIONAL

- Association of Central Oklahoma Governments
- Commercial and General Aviation Airports
- Indian Nations Council of Governments
- Local and Regional Chambers of Commerce

TRIBAL

- Cherokee Nation
- Choctaw Nation
- Osage Nation

INDUSTRY

- Airwise Solutions
- Canoo
- Cox Automotive
- Droneport Network
- The FISTA Innovation Park
- Kodiak
- Kratos
- Tulsa Innovation Labs
- Vigilant Aerospace
- Windshape
- Oklahoma Space Industry Development Authority

EDUCATION

- Oklahoma CareerTech Institutions
- Oklahoma Community Colleges
- Oklahoma Regional Universities
- University of Oklahoma
- Oklahoma State University
- University of Tulsa

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APPENDIX A

WORKFORCE TRAINING PROGRAMS

Four-Year Institutions	Fields of Study		Supports
Rogers State University	**BACHELORS & ASSOCIATE DEGREE IN APPLIED TECHNOLOGY WITH A FOCUS IN:** » *Cybersecurity* » *Unmanned Aircraft Systems* » *National Security for Information Technology*		» Ground » Air » Aerospace Security/ Cybersecurity » UAS
Southeastern Oklahoma State University	**UNDERGRADUATE DEGREES** » *Aviation – Professional Pilot* » *Aviation Management* **GRADUATE DEGREES** » *Master of Business Administration with a focus on Aerospace Logistics.*	**MINORS** » *Unmanned Aircraft Systems* » *Military Science*	» Air » Pilot » Aviation Management » Aerospace Security/ Cybersecurity
Southwestern Oklahoma State University	**UNDERGRADUATE DEGREES** » *Engineering Physics* » *Applied Engineering Management*	» *Engineering Technology* » *Chemistry* » *Mathematics*	» Ground » Air » Aviation Management » Aerospace Security/ Cybersecurity » Engineering
University of Oklahoma	**UNDERGRADUATE DEGREES** » *Aerospace Engineering* » *Mechanical Engineering* » *Chemical Engineering* » *Engineering Physics* » *Computer Engineering* » *Electrical Engineering* » *Aviation Management* » *Air Traffic Management* » *Professional Pilot*	» *Cybersecurity* » *Computer Science* » *Meteorology* **GRADUATE DEGREES** » *Aerospace Engineering* » *Mechanical Engineering* » *Chemical Engineering*	» Pilot » Aviation Management » Aerospace Security/ Cybersecurity » Engineering » Air Traffic Control/ Management
Oklahoma State University	**UNDERGRADUATE DEGREES** » *Aerospace Engineering* » *Mechanical Engineering* » *Aerospace Administration and Operations* • *Majors in Aerospace Security, Aviation Management, Professional Pilot, and Technical Service Management* • *Minors in Aviation Management, Aerospace*	» Security and Professional Pilot » Mechatronics and Robotics » Computer Science » Chemical Engineering » Electrical Engineering » Electrical Engineering Technology	» Pilot » Aviation Management » Aerospace Security/ Cybersecurity » Engineering » UAS
University of Tulsa	**UNDERGRADUATE DEGREES** » *Physics* » *Chemical Engineering* » *Chemistry* » *Computer Engineering*	» Computer Science » Cybersecurity » Engineering Physics » Electrical Engineering	» Aerospace Security/ Cybersecurity
Spartan College of Aeronautics & Technology	**UNDERGRADUATE DEGREES** » *Technology Management* » *Aviation Electronics Technology* **ASSOCIATE DEGREES** » *Aviation Flight* » *Nondestructive Testing Technology & Quality Control Management* » *Aviation Maintenance Technology*		» Pilot
Embry-Riddle Aeronautical University	**ASSOCIATE DEGREES** » *Aeronautics* » *Aviation Business Administration* » *Aviation Maintenance* » *Engineering Fundamentals* **UNDERGRADUATE DEGREES** » *Aeronautics* » *Aerospace and Occupational Safety* » *Aerospace Engineering* » *Aeronautical Science- fixed wing* » *Aerospace Phsoilogy* » *Air Traffic Management* » *Aviation and Aerospace sustainability Aviation Business Administration* » *Aviation Maintenance* » *Cyber Intelligence and Security* » *Electrical Engineering* » *Engineering* » *Engineering Physics* » *Engineering Technology* » *Mechanical Engineering* » *Pilot Operations* » *Software Engineering* » *Space Operations* » *Space Physics* » *Uncrewed & Autonomous Systems* » *Unmanned Aircraft Systems* » *Cybersecurity Engineering* » *Electrical & Computer Engineering* » *Engineering Physics* » *Mechanical Engineering* » *Security & Intelligence Studies* » *Software Engineering* » *Space Operations*	» *Uncrewed & Autonomous Systems* » *Uncrewed & Autonomous Systems Engineering* » *Unmanned Systems* **GRADUATE DEGREES** » *Aeronautics* » *Aerospace Business Analytics* » *Aerospace Engineering* » *Airworthiness Engineering* » *Aviation* » *Aviation and Aerospace Sustainability* » *Aviation Cybersecurity* » *Aviation Finance* » *Aviation Maintenance* » *Aviation Safety* » *Business Administration in Aviation/ Aviation Management* » *Cyber Intelligence and Security* **PHD** » *Aerospace Engineering* » *Aviation* » *Aviation Business Administration* » *Electrical Engineering & Computer Science* » *Engineering Physics* » *Mechanical Engineering* **CERTIFICATIONS** » *Aircraft Dispatcher* » *Airline Management* » *Airworthiness Engineering* » *Aviation Maintenance Technology Part 65* » *Aviation Safety* » *Information Technology Management* » *Uncrewed Systems*	» Aviation Management
Cameron University	**ASSOCIATE DEGREES** » *Cybersecurity/Information Assurance* **UNDERGRADUATE DEGREES** » *Cybersecurity/Information Assurance*	» *Mathematics* » *Chemistry* » *Physics* » *Engineering* • *Electrical, Industrial, Mechanical, environmental and Civil*	

Two-Year Institutions	Fields of Study		Supports
Rose State University	**ENGINEERING ASSOCIATE WITH FOCUSES IN:** » *Coding Specialists* » *Unmanned Aircraft System Operations Certificate* » *Small Unmanned Aerial System Drone Mapping Credentials* **APPLIED TECHNOLOGY ASSOCIATES WITH FOCUSES IN:** » *Coding Specialists*	**ASSOCIATE IN APPLIED SCIENCES WITH FOCUSES IN:** » *Cybersecurity* » *Coding Specialists* **UNMANNED AIRCRAFT SYSTEM OPERATIONS CERTIFICATE** **SMALL UNMANNED AERIAL SYSTEM DRONE MAPPING CREDENTIALS**	» Air » Aviation Management » Engineering » Maintenance Technician Program » UAS
Tulsa Community College	**ASSOCIATE DEGREES** » *Engineering Technology* • *Focuses in: Drafting & Design Engineering Technology, Manufacturing Engineering Technology.* » *Electrical Engineering* » *Electronics Technology* » *Mechanical Engineering* » *Mathematics* » *Physics* » *Aviation Sciences Technology* • *Professional Pilot* » *Air Traffic Control* » *Applied Technology*	**CERTIFICATES** » *Drafting & Design Engineering Technology* » *Electronics Technician* » *Flight Instructor* » *Manufacturing Production Technician I & II* » *Private Pilot* » *Quality & Inspection Technician I & II* » *Secure Infrastructure Specialist* » *Aerospace Drafting* » *Aircraft Dispatch*	
OSU Institute of Technology	**ASSOCIATE** » *Information Technology* • *Focuses in: Cyber Incident Response, Cybersecurity & Digital Forensics, Network Infrastructure, and Software Development* » *Civil Engineering/Surveying Technology* » *Engineering Design Drafting Technologies* » *Engineering Technologies* • *Focuses in: Electric/ Electronics and Instrumentation & Automation Technology*	» *High Volage Line Technician* » *Industrial Maintenance Technologies* » *Instrumentation Engineering Technology* » *Pipeline Integrity Technology* » *Power Plant Technology* » *Variety of Transportation & Heavy Equipment Technicians*	

Technology Center	Fields of Study		Supports
Canadian Valley Technology Center	**PROGRAMS** » *Auto Collision Technology* » *Auto Service Technology* » *Aviation Maintenance Technology – High School* » *Computer Information Systems*	» *Computer Programming* » *Cybersecurity* » *Industrial Automation* » *Pre-Engineering* » *Underground Utility Location Technician*	Full A&P Ground Transportation Programs
Francis Tuttle Technology Center	**PROGRAMS** » *Auto Collision Repair Technology* » *Automotive Service Technology* » *Cybersecurity & Network Support*	» *Programming and Software Development* » *Aerospace Technologies* » *Data Analytics* » *Aircraft Electrician* » *Aircraft Sheet Metal* » *Composite Fabrication & Repair*	Aviation Technician Training Ground Transportation Programs
Gordon Cooper Technology Center	**PROGRAMS** » *Automotive Service Technology* » *Aviation Maintenance Technology* » *Automotive Collision Technology*	» *Computer Network Technology* » *Electrical Careers Technology* » *Pre-Engineering Academy*	Full A&P Ground Transportation Programs
Metro Technology Center	**PROGRAMS** » *Computer/Network Support Technician* » *Aviation Maintenance Technician*	» *Automotive Service Technician* » *Aviation Maintenance Technician* » *Electrical Technology*	Full A&P Ground Transportation Programs
Moore Norman Technology Center	**PROGRAMS** » *Aviation Maintenance Technology* » *Electrical Trades*	» *Automotive Service Technology* **CERTIFICATIONS** » *Remote Pilot Exam Prep (Part 107)*	Ground Transportation Programs Full A&P
Red River Technology Center	**PROGRAMS** » *Automotive Service Technology*		Ground Transportation Programs
Southern Technology Center	**PROGRAMS** » *Automotive Service Technology* » *Aviation Foundations*	» *Cybersecurity & Network Administration* » *Electrical Technology* » *Robotics*	Aviation Technician Training Ground Transportation Programs
Southwest Technology Center	**PROGRAMS** » *Aviation Maintenance Technology* » *Automotive Technology*		Full A&P Ground Transportation Programs
Tulsa Technology Center	**PROGRAMS** » *Electrical Trades* » *Electricity* » *Cybersecurity /Forensics* » *Foundations of Engineering* » *Aviation Powerplant* » *Aviation Generals*	» *Aviation Airframe* » *Automotive Service Technician* **CERTIFICATIONS** » *Drone Pilot Test Prep (Part 107)* » *Private Pilot Ground School* » *UAV Drone Maintenance*	Full A&P Ground Transportation Programs

APPENDIX B
LEGISLATIVE FRAMEWORK

Development and Funding of UAS/AAM Activity

Legislation (Year)	Description
SB 1688 (2020)	Creating the Oklahoma Advanced Mobility Pilot Project Revolving Fund, through the ODOT. Referenced as the Oklahoma Advanced Mobility Pilot Program, funds were to be used by ODOT to fund grants. [ODAA – this appears to still be on the books, but likely was expanded upon by SB773, correct?]
SB 659 (2021)	Established the Oklahoma Aeronautics Commission (now ODAA) as the agency for the promotion, enhancement, and development of UAS and its safe integration and use within the state. ODAA is to serve as a clearinghouse connecting entities that use, desire to use, or support UAS. ODAA will serve as "a central point within state government to develop the strategy for how the State of Oklahoma can become a leader in the UAS industry", conducting research on UAS rules and regulations in other jurisdictions, coordinate the application of any test site, integration opportunity, or grant funding, maintain a registry of UAS operating by State agencies, and maintain a registry of educational institutions that offer UAS training programs. This was subsequently amended by SB782 and 773 in 2023 to expand the scope to include both UAS and AAM.
SB 782 (2023)	Amended *Title 3. Aircraft and Airports, Section 82 – Definitions* to include the definition of an "unmanned aircraft" as an aircraft that is operated without the possibility of human intervention from within or on the aircraft; and an "unmanned aircraft system" as an unmanned aircraft and associated elements including communication links and components that control the unmanned aircraft that are required for the pilot in command to operate safely and efficiently in the National Airspace System.
SB 773 (2023)	Established the Oklahoma Advanced Air Mobility Revolving Fund, a continuing fund with the purpose of investing in UAS and AAM and associated infrastructure. SB 773 also amended the Oklahoma Advanced Mobility Pilot Program to focus on developing and improving on transportation technologies, including advanced ground transportation, autonomous ground vehicles, advanced air mobility vehicles, and autonomous electric vertical takeoff and landing (eVTOL) vehicles. The program will also look to enhance the interaction between modes of transportation to ensure the state is best prepared for the interconnected transportation technologies of the future. The bill also created the AMPAC and, subject to funding, directed the Program to make two matching grant awards (up to $500,000) each year to the selected pilot programs to support program activities. The grants will require a direct one-to-one match for nonstate funds invested or received by the pilot including funds from the pilot entity.

Usage of UAS

Legislation (Year)	Description
HB 2599 (2016)	Prohibits the overflight by unmanned aircraft of critical infrastructure, such as refineries, power plants, wireless telecommunications infrastructure, and more. Exceptions include UAS use by government entities or designees, law enforcement, owners or operators of such facilities or those with prior consent. HB2599 is codified in *Title 3. Aircraft and Airports, Section 322.*
HB 3171 (2022)	Addresses privacy by prohibiting trespass onto private property, including airspace, within 400 feet above ground level with the intent of surveilling others, record a person in a place where there is a reasonable expectation of privacy, or land a drone on private property without the consent of the owner or lessee. Exceptions include designated emergency management worker or government employee or contractor operating a drone within the scope of his or her lawful duties of employment. HB2599 is codified in *Title 21. Crimes and Punishments, Section 1743.*

Usage of Autonomous Ground Vehicles

Legislation (Year)	Description
SB 1541 (2022)	Allowing fully automated vehicles to operate on public roads and requiring certain submissions to the Department of Public Safety. This entails a law enforcement interaction plan and certain proof of insurance. Autonomous vehicles are to remain on the scene in the event of an accident and have required certain reporting in the event of an accident. This law also permits autonomous and on-demand autonomous vehciles with certain registration allowing persons to operate motor vehicles equipped with an automated driving system as commercial motor vehicles with certain conditions and exceptions.
SB 189 (2019)	Approved on April 30, 2019 and became effective on July 1, 2019, amended the state's FTC statute such that it would not apply to "a non-lead vehicle in a platoon" or "the operator thereof, as long as the platoon consists of not more than two motor vehicles." "Platoon" is defined in the bill as a group of vehicles "traveling in a unified manner at electronically coordinated speeds at following distances that are closer than would be reasonable and prudent without such coordination.

Electric Vehicle Charging Investment

Legislation (Year)	Description
SSB 502 (2023)	Establishes a framework encouraging private sector investments in electric vehicle charging station to prepare for increased adoption of electric vehicle use. The law ensures that private businesses, like gas station owners, can install EV charging stations without having to compete with electric utilities. If a utility wants to set up a charging station, it cannot be subsidized with rates paid by other customers, like those with residential electric service.

Development of Funding to Support Infrastructure Improvements Leveraging Automous and Connected Features

Legislation (Year)	Description
SB 773 (2023)	Created the Advanced Mobility Program Advisory Council and, subject to funding, directed the Program to make two matching grant awards (up to $500,000) each year to the selected pilot programs to support program activities. The grants will require a direct one-to-one match for nonstate funds invested or received by the pilot including funds from the pilot entity.

Hydrogen and Electric Fueling/Industry Support

Legislation (Year)	Description
SB 1190 (2023)	Enables the State Board of Career and Technology Education to establish hydrogen energy courses to meet workforce needs
SB 1852 (2023)	Addresses hydrogen production, storage, distribution and infrastructure among the state's Low-Carbon Energy Initiative activities.
SB 1853 (2023)	Establishes a state yearly hydrogen fuel production goal of 2 million metric tons by 2028 using a low- or zero-carbon source.
SB 1856 (2023)	Requires the state secretary of energy and environment will be able to create a grant program for carbon sequestered from hydrogen production using natural gas.
SB 3054 (2023)	Provides a weight exemption for motor vehicles whose engines are fueled partially or completely by electric battery or hydrogen fuel cells.
SB 1197 (2023)	Exempts hydrogen tank systems from state petroleum storage tank provisions.
SB 1875 (2022)	Hydrogen vehicles are eligible recipients for the state's 10/10/10 vehicle tax credit plan, which has a cap of $10 million for qualified, clean burning vehicles using compressed natural gas; a $10 million cap for property that has charging stations for electric motor vehicles; and would added a $10 million credit for property originally equipped so the vehicle may be propelled by a hydrogen fuel cell electric fueling system.
SB 1021 (2021)	Created the Hydrogen Production, Transportation and Infrastructure Task Force, which is a multi-agency effort to discuss issues regarding hydrogen production and distribution in the state.

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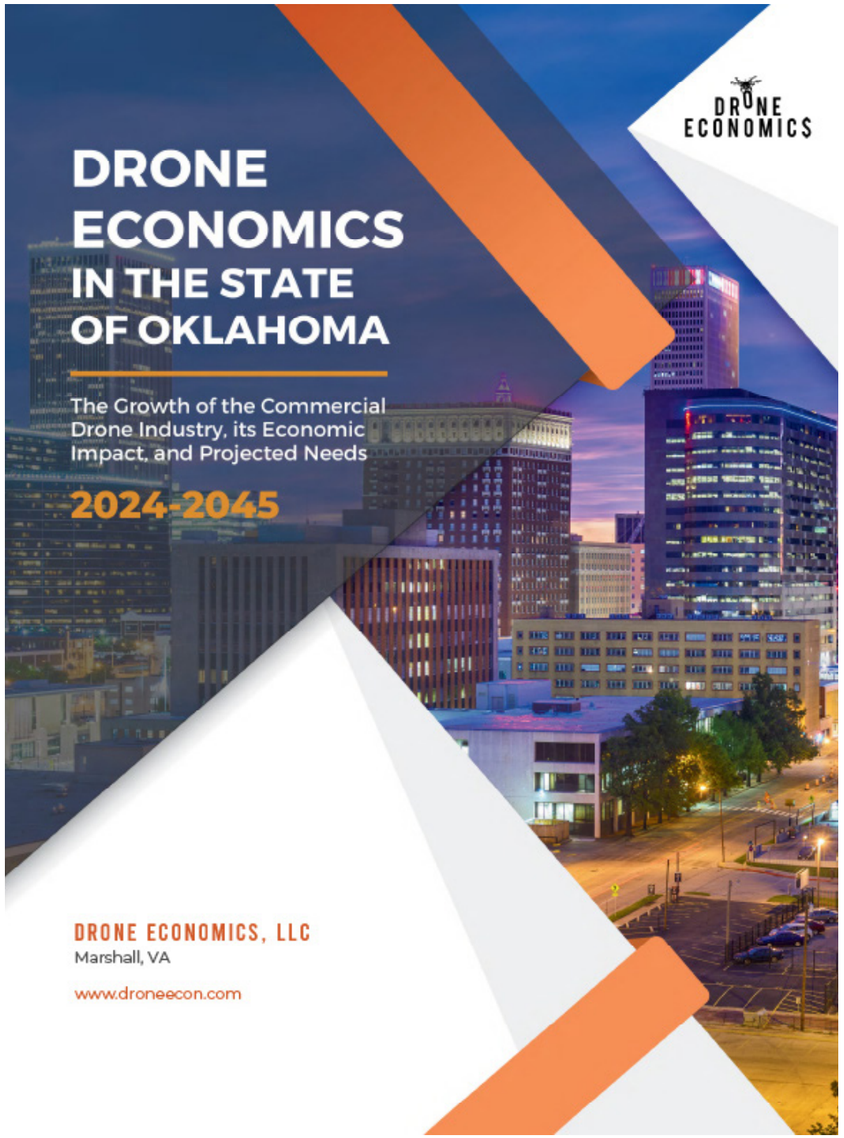
APPENDIX C

OK COMMERCE DRONE REPORT



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APPENDIX D

ADVANCED AIR MOBILITY REPORT

STATE MANAGER FOR
ADVANCED GROUND MOBILITY

STRATEGICCOMMS
405-522-8000

STATE MANAGER FOR
ADVANCED AIR MOBILITY

ODAA@AEROSPACE.OK.GOV
405-604-6900

Produced by the Oklahoma Advanced Mobility Program Advisory Council in coordination with the Oklahoma Department of Transportation.and the Oklahoma Department of Aerospace and Aeronautics.

OKLAHOMA Aerospace & Aeronautics

OKLAHOMA Transportation

HNTB