Executive Summary

The widespread adoption of autonomous systems (AS), such as uncrewed aircraft systems (UAS), has the potential to protect Americans on the battlefield, increase mobility and access for underserved communities, and improve medical outcomes. They also present significant risk to U.S. national security unless they are designed in a way that ensures they are resilient to routine disruptions and malicious threats while not perpetuating systemic bias. Yet, despite the potential benefits and the significant risks, the U.S. has lost global leadership of these technologies to foreign competitors such as China. To restore U.S. economic competitiveness and protect national security, the Tulsa Hub for Equitable & Trustworthy Autonomy (THETA) will transform the Greater Tulsa Region (GTR)[1] into a globally competitive hub for the development, testing, manufacturing, and deployment of Trustworthy and Equitable Autonomous Systems (TEAS).[2] Led by Tulsa Innovation Labs (TIL), THETA represents a consortium of 70+ members from across the GTR, a 12-county region focused on the Tulsa Metropolitan Statistical Area (MSA). THETA will leverage Tulsa's strong legacy of aerospace manufacturing, significant investments in TEAS research and development, nationally unique testing facilities, and commitment to advancing racial equity to build a globally competitive Tech Hub. A Tech Hubs award will catalyze at least $120 million in investment[3] into the Tulsa region's innovation economy, resulting in the creation of 60,000 new jobs and an additional $1.6 billion in GDP for the GTR. Moreover, TEAS in use worldwide will bear the moniker "Tested and Made in Tulsa, USA."

Synopsis of THETA's Vision for Economic Development

The Greater Tulsa Region is poised to lead the autonomous systems revolution. In 10 years, THETA envisions the GTR as the center of the development, testing, manufacturing, and deployment of Trustworthy and Equitable Autonomous Systems at scale. Tulsa will be globally synonymous with TEAS such as uncrewed aircraft systems, and autonomous vehicles, drones, and robotics in use worldwide – whether protecting Americans on the battlefield or delivering medicine to the Heartland's rural communities – will bear the moniker "Tested and Made in Tulsa, USA." THETA will be the domestic autonomous systems hub needed to secure the U.S.'s economic vitality through widespread adoption and assure defense technology dominance, while unlocking a wave of new companies and good jobs across the region. The GTR will be the model for how to leverage federal, philanthropic, and private investment to drive equitable place-based economic development and self-sustaining growth.

Four years ago, in the aftermath of another downturn in the energy industry, this vision would have seemed far out of reach. However, recent federal, private, and philanthropic investments, built around nationally-unique assets and industries decades in the making, have renewed Tulsa's momentum and aligned partners behind the TEAS opportunity. Among the catalysts, the 2020 founding of Tulsa Innovation Labs (TIL), THETA's Lead Entity, with the mission to establish Tulsa as a nationwide leader in inclusive tech-based economic development, and the 2022 Build Back Better Regional Challenge (BBBRC) award to the Tulsa Regional Advanced Mobility (TRAM) Cluster to fund growth in the region's advanced mobility industry, have been particularly impactful in driving significant investments in the GTR's TEAS industry. Now, THETA's Tech Hub designation has accelerated the Tulsa region's ambition to build a globally competitive TEAS industry.

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[1] The Greater Tulsa Region consists of the Tulsa Metropolitan Statistical Area (Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa, and Wagoner counties); the Bartlesville (Washington), Muskogee (Muskogee), Stillwater (Payne), and Tahlequah (Cherokee) micropolitan areas; and Mayes County. The region also includes seven tribal jurisdictions (Muscogee (Creek), Cherokee, Osage, Pawnee, Otoe-Missouria, Sac and Fox, Iowa).

[2] THETA defines TEAS as systems that perform tasks without human intervention while prioritizing safety, security, privacy, and public trust. Using artificial intelligence (AI) and cybersecurity technologies, TEAS, including drones, autonomous vehicles, and robots, are designed and developed with the principles of fairness, transparency, and accountability in mind.

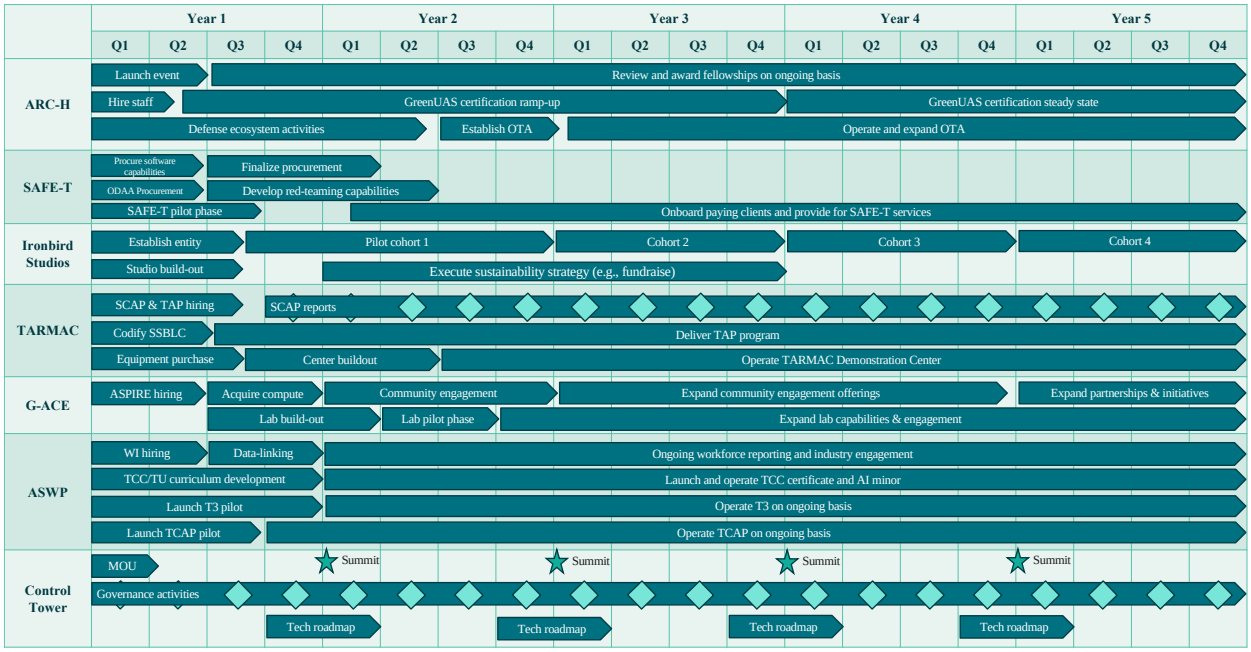
[3] THETA will catalyze this investment through $70,760,049.97 in EDA funding, $18,524,666.00 in direct matching funding, and at least $30,600,000.00 in investment commitments to support THETA initiatives.

Table 1. Description of THETA's Component Projects

Project	Project Description	Interconnection
Applied Research Commercialization Hub (ARC-H) *Lead: TIL*	● *ARC-H* to promote coordination across GTR universities to enhance TEAS commercialization. ● *THETA Fellows Program* to attract top-tier, commercialization-focused faculty. ● *Green UAS Certification* to accelerate industry-standard cyber certifications. [Subawards: Oklahoma Cyber Innovation Institute (OCII) at The University of Tulsa (TU), Oklahoma Aerospace Institute for Research and Education (OAIRE) at Oklahoma State University (OSU)] ● *Defense Innovation Pathways* to democratize access to DOD contracting.	● Researchers, Green UAS, and startups have prioritized access to SAFE-T capabilities for TEAS projects and certifications. ● TEAS innovations developed by GTR researchers will inform SCAP of emerging supply chain needs. ● Researchers and technologies have access to Ironbird for commercialization/startup creation.
Secure Autonomy Feedback and Evaluation Testbed (SAFE-T) *Lead: TIL*	State-of-the-art testing and simulation environment for companies, researchers, and regulatory entities to address fundamental barriers to widespread commercial adoption of TEAS, with a focus on cyber and data management. [Subawards: DronePort Network, OCII]	● SAFE-T is leveraged by researchers, IS companies, and Green UAS certification to test, validate, and certify TEAS. ● Leverages GTR innovations to produce data required for updated regulatory regimes.
Ironbird Studios (IS) *Lead: TIL*	Venture studio with prototyping facilities, investor consortium, and diverse pipeline of entrepreneurial talent focused on accelerating the commercialization of TEAS technologies into viable startups. [Subaward: Ironbird Studios]	● Portfolio companies have prioritized access to SAFE-T capabilities. ● Portfolio companies inform SCAP of supply chain needs and can access TAP/TARMAC Center for manufacturing needs. ● Portfolio companies engage Co-Lab to develop AI solutions. ● IS coordinates closely with ARC-H to identify commercially-viable research opportunities.
Tulsa Advanced Research and Manufacturing Acceleration Center (TARMAC) *Lead: TIL*	● *Supply Chain Analysis Program (SCAP)* to leverage data analytics to identify gaps and risks in TEAS supply chains and build local capacity to address them. [Subawards: Oklahoma Manufacturing Alliance (OMA), OSU] ● *Technical Assistance Program (TAP)* to provide technical and financial assistance to Small and Medium Manufacturers (SMMs) in the GTR. [Subawards: OMA, Tulsa Economic Development Corp. (TEDC)] ● *TARMAC Demonstration Center*, a 100,000 sq. ft. facility to democratize access to manufacturing equipment. [Subaward: TARMAC, LLC]	● SCAP, TAP, and TARMAC Center leverage Co-Lab to develop AI manufacturing solutions. ● IS companies can grow seamlessly from early-stage venture to scaled manufacturing. ● IS companies have access to diverse sources of capital from the Lending Consortium to grow their businesses.
Greenwood AI/AS Center of Excellence (G-ACE) *Lead: TIL*	● *AI/AS Program for Innovation, Research, and Education (ASPIRE)* to provide events, trainings, and resources to engage underserved communities in THETA. [Subaward: Black Tech Street (BTS)] ● *Microsoft AI Co-Innovation Lab* to offer access to globally-leading AI technology solutions, prioritizing Black and underserved community members. [Subaward: BTS]	● ASPIRE engagement informs ARC-H researchers and Ironbird entrepreneurs on equity considerations in product design. ● ASPIRE recruits entrepreneurs from community to Co-Lab and supports with resources.
Autonomous Systems Workforce Program (ASWP) *Lead: TIL*	● *Workforce Intermediary (WI)* to align industry needs with training programs, including first-in-nation data platform. ● *TEAS Talent Training (T3)* Program to expand on-the-job-training opportunities. [Subaward: Tulsa Higher Education Consortium (THEC)] ● *TEAS Career Advancement Program (T-CAP)* to provide industry-designed upskilling modules. [Subaward: Atlas School] ● *Community College (TCC) Certificate* to expand software development and computer engineering pathways. [Subaward: Tulsa Community College (TCC)] ● *AI Minor* to provide cross-disciplinary opportunities to build AI literacy. [Subaward: TU]	● ASWP develops talent across the continuum – from founding to scale-up – to support TEAS industry growth in the GTR. ● THETA projects inform the WI of emerging talent needs to guide workforce program alignment.

THETA Control Tower *Lead: TIL*	Governance procedures, including the establishment of a Steering Committee, and backbone support to ensure exemplary project execution, pursue additional funding opportunities, and drive THETA strategy beyond projects.	• Control Tower supports project execution and collaboration across THETA projects. • Control Tower identifies additional funding opportunities and supports sustainability across projects.

Figure 1. THETA's Implementation Timeline



To achieve THETA's lofty vision, critical issues that hold back the widespread adoption of TEAS must be solved, including the cyber-resilience and trustworthiness of current systems, the ability of these systems to operate in complex and multi-operator environments, and ensuring these systems do not perpetuate systemic bias. THETA is uniquely positioned to develop globally competitive solutions to these challenges due to the GTR's unique combination of nationally-leading assets, such as a unique combination of leading UAS and cybersecurity applied research, the longest drone flight testing corridor in the country developed alongside Tribal partners, a robust aerospace manufacturing industry primed for entry into the TEAS market, and a deep commitment to renewing the historic Black Wall Street as a hub for Black tech talent and entrepreneurship.

THETA's strategy is predicated on leveraging these existing assets to develop globally competitive TEAS solutions, including the creation of an unparalleled industry-validated testing and simulation environment for complex TEAS use-cases that pairs university and Tribal partners, a significant expansion of TEAS manufacturing capacity with an emphasis on tribally-owned small and medium manufacturers (SMMs), and the meaningful incorporation of underserved communities in TEAS through a focus on community engagement and economic empowerment in artificial intelligence (AI), built on a partnership between Microsoft and Black Tech Street. In addition, THETA recognizes that it must continue to build local capacity to enable the GTR to become an equitable and globally competitive Tech Hub. Investment in THETA will enable the Tulsa region to close key gaps in our ecosystem, including the development of an industry-aligned workforce, expanding access to capital by providing specialized TEAS equipment and services, and accelerating commercialization of TEAS innovations.

In addition, each of THETA's component projects rests on three key pillars. The first pillar is embedding equity into every aspect of THETA's efforts, including leadership and governance, the technological development of future TEAS technologies, and the design and execution of

component projects. THETA's commitment to equity is reflected in an explicit focus on democratizing access to innovation, capital, and talent programs across the region. The second pillar is increasing capacity at regional partners along the key stages of the secure autonomy commercialization journey, from prototyping to testing to manufacturing to scale-up to workforce, enabling a holistic approach to ecosystem development. The third pillar is strengthening regional coordination capacity to enable the development of an interconnected TEAS industry and ecosystem in the GTR. This will also ensure that THETA's activities do not stop where and when the component projects end. Instead, they become the North Star to toward which all regional economic development strategies bend. **Table 1** above provides a summary of THETA's industry-led and tightly interconnected component projects.

THETA Consortium Membership and Commitments

Led by TIL, THETA brings together partners from across sectors dedicated to advancing AS innovation and economic development in the Tulsa region. The THETA consortium combines the expertise needed in science and innovation (e.g., Oklahoma State University, The University of Tulsa), capital and business support (e.g., Radius Capital, Tulsa Economic Development Corporation), workforce development (e.g., Tulsa Community College, Madison Strategies Group), manufacturing (e.g., Cherokee Nation Businesses, Oklahoma Manufacturing Alliance), economic development (e.g., PartnerTulsa, Black Tech Street, TIL), and industry (e.g., Microsoft, Accenture) to tackle the multifaceted challenges preventing the widespread adoption of TEAS.

Further, THETA has secured meaningful commitments needed to eliminate barriers to the widespread commercial adoption of TEAS. For example, Microsoft's commitment to establish an AI Co-Innovation Lab in Tulsa's Historic Greenwood District will bring industry-leading AI capabilities and solutions to the GTR and make them accessible for local startups, firms, and community members. Cherokee Nation Businesses' and Accenture's participation with TARMAC will pair Industry 4.0 manufacturing expertise with a significant regional manufacturer to nurture new small and medium manufacturing enterprises. Finally, the Oklahoma Department of Aerospace and Aeronautics (ODAA) has committed to building radar stations across the GTR, enabling real-world testing and adoption of TEAS.

Desired Outcomes and Tulsa's Path to Global Competitiveness

Tech Hubs funding will enable significant economic growth for the GTR through THETA's systems-level interventions to address gaps in workforce, startup generation, commercialization, manufacturing, and scale. THETA estimates the component projects will create approximately 60,000 direct and indirect jobs and add $1.6 billion to regional GDP over the next 10 years. In addition, these projects will ensure that the GTR's workforce of the future is diverse by connecting 20,000 female, 4,000 Black, 4,000 Latino, and 3,000 Indigenous workers into the good jobs[4] created by THETA.

THETA's component projects will address critical regional barriers to global competitiveness. In workforce, only 28% of TEAS-related jobs are filled annually in the GTR, compared to 50% in peer regions. The Autonomous Systems Workforce Program (ASWP) will more closely align regional workforce development programs to regional needs and expand non-degree pathways into the industry. Local commercialization of TEAS technologies is not occurring at requisite scale, and current entrepreneurial support programs are not tailored to TEAS industry needs. Ironbird Studios will fill this gap by building a venture platform with specialized equipment and engineering skills to catalyze TEAS startup growth. Further, despite leading research assets and significant investment, THETA partners struggle to commercialize innovations. The Applied Research Commercialization Hub (ARC-H) will enable local research institutes to attract top-tier,

[4] As defined by the U.S. Department of Labor.

commercialization-focused researchers to position the GTR as a go-to location for the testing and certification of UAS.

At the same time, THETA projects will create a regional environment to test TEAS safely and securely. To date, testing environments have not provided the capabilities to test complex use cases for TEAS technologies while ensuring safety, security, privacy, or public trust. The Secure Autonomy Feedback and Evaluation Testbed (SAFE-T) will establish globally-unique testing facilities for complex use-cases that address this gap. Additionally, the TEAS industry in the U.S. is hampered by the lack of domestic supply chains and a significant reliance on foreign manufacturers for critical components. The Tulsa Advanced Research and Manufacturing Acceleration Center (TARMAC) will accelerate the expansion of domestic TEAS manufacturing capacity and align it with national security priorities. These efforts will be complemented by the Microsoft AI Co-Innovation Lab at the Greenwood AI/AS Center of Excellence (G-ACE), which will enable stakeholders across the GTR to develop cutting-edge AI solutions and decrease the time to scale. Combined, THETA projects will transform the GTR into the most attractive region for commercializing TEAS.

Climate and Environmental Considerations

AS and AI have the potential to enhance climate resiliency and support the energy transition. For example, AI has the potential to enable sustainable development through mechanisms such as supporting resource efficiency in Smart Cities and improving modeling of climate change impacts. Broadly, the success of THETA will support Tulsa's and Oklahoma's transition from a historic reliance on the oil and gas sector to a diversified industrial base insulated from "boom-and-bust" cycles. At the same time, THETA acknowledges the potential negative environmental impact of AS through their production, use, and disposal. However, these can be offset through the benefits of AS technology through increased efficiency, optimized utilization, and the numerous novel applications of AS to climate and environmental solutions. Through community-based outreach, THETA intends to provide education on the benefits of AS adoption.

National Security Imperative and Problems Slowing TEAS Advancement

U.S. leadership in the development, manufacturing, and deployment of TEAS is an imperative for global economic competitiveness and national security. The recent use of drones as weapons in Ukraine, Jordan, and Yemen demonstrate the deadly threat AS present to U.S. service members, civilians, and international commerce. The threat is closer to home as well, with the Department of Homeland Security declaring foreign-produced drones a "significant risk to U.S. critical infrastructure." Further, the U.S. risks falling further behind due to a significant reliance on foreign manufacturers for both completed TEAS and essential component parts. Despite leading in nearly every other sector of aviation, the U.S. has fallen behind in UAS and drone manufacturing. For instance, according to the Association of Uncrewed Vehicle Systems International (AUVSI), Chinese drones currently account for "more than 90% of the consumer market, 70% of the enterprise market (drones used as industrial tools), and 92% of the first responder market." These factors have led the U.S. Congress to ban federal purchases of foreign made drones, and elevated TEAS advancements to an across-the-board federal priority.[5]

Several critical impediments to commercializing TEAS technologies must be addressed for the U.S. to regain leadership of these technologies. First, the benefits of widespread adoption of TEAS – whether on the battlefield or in the commercial market – is dependent on the industry's ability to develop technical solutions that enable complex, multi-operator environments. Further,

[5] For example, The DOD has defined numerous TEAS-related "Critical Technology Areas," including Trusted AI and Autonomy, Directed Energy for CUAS, Integrated Network Systems-of-Systems, and Integrated Sensing and Cyber. The White House, through the Domestic Counter-Unmanned Aircraft Systems National Action Plan, has also identified the development of counter-UAS technologies and regulations as a national security priority.

adoption is dependent on the ability to validate the security of the vehicles and their ability to respond to routine disruptions and malicious threats. However, existing testing facilities and regulatory regimes focus largely on single operator environments, and expected near-term rule changes are likely to fall short of permitting full-scale autonomy.

Second, recent incidents, such as a series of drone crashes in Switzerland and a self-driving Uber crash that killed a pedestrian in Arizona, have demonstrated that advancements in AS cannot be separated from the trustworthiness and equitable impact of the technologies. As a result, security and public trust of AS have become priorities for regulatory bodies (e.g., Federal Aviation Administration), federal labs (e.g., MITRE), industry groups (e.g., AUVSI), and the defense community (e.g., Defense Innovation Unit, AFWERX). These authorities have also identified a need to closely coordinate technology development with regulatory frameworks and to test AS in increasingly complex environments. Moreover, only 48% of Americans believe AI applications are safe and secure, while just 37% of Americans would use autonomous rideshare. If public concerns about the risks of autonomy continue to outweigh the perceptions of the benefits, adoption of these technologies will be slow, the private sector will be disincentivized from investment, and market growth will be hampered.

Third, the U.S. must develop a cost competitive domestic manufacturing base for TEAS. U.S. reliance on foreign producers for TEAS goes beyond drone production, with the industry also largely reliant on China for critical components as well. Domestic manufacturers struggle to compete due to higher costs of non-Chinese critical components and artificially low drone prices caused by Chinese drone dumping. A U.S. drone manufacturer was forced to end domestic production after a Chinese rival dropped prices by more than 70% in one year.

THETA is well-positioned to tackle these challenges and reassert U.S. leadership in autonomous systems due to the Tulsa region's nationally-unique assets, a legacy of aerospace and advanced manufacturing, and a strong track record of collaboration by consortium members. The scientific expertise to develop, test, and validate the trustworthiness of AS resides uniquely in the GTR. Oklahoma State University (OSU), a public land-grant university, has an extensive legacy of aerospace and UAS research excellence, including a 50-year partnership with the National Aeronautics and Space Administration (NASA). In addition, The University of Tulsa (TU) has a longstanding history of cybersecurity innovation, including its status as the National Security Agency's (NSA) largest Cyber Corps program. The region's scientific expertise is complemented by unique testing assets, including the nation's most ambitious beyond visual line of sight (BVLOS) drone testing corridor and TU's North Campus, a real-world testing environment for energy solutions and critical infrastructure.

The Tulsa region also has a strong legacy in aviation manufacturing. First opened in 1946, the American Airlines maintenance, repair, and overhaul (MRO) facility at Tulsa International Airport is the largest such facility in the world. This has spurred Tulsa to become one of the top 15 regions in the country for concentration of aerospace manufacturing. The GTR also has seen significant investment in industrial capacity specifically for TEAS, including wastewater treatment at the Tulsa Port of Inola through BBBRC and the Fair Oaks Ranch site in the City of Tulsa, which received $50 million in American Rescue Plan Act (ARPA) funding.

In addition, these challenges are inherently complex and interconnected and cannot be solved by a single consortium member, and the THETA partners already have a long-standing history of collaborating to advance Tulsa's TEAS industry. Nearly all of the THETA consortium members were members of the Tulsa Regional Advanced Mobility (TRAM) Cluster that received a $38.2 million BBBRC award or have participated in the cluster's subsequent activities. The BBBRC award built upon Tulsa's historic strengths to establish the LaunchPad Center for Advanced Air Mobility at OSU's downtown Tulsa campus and invest in the Osage-owned Skyway36 facility and associated Skyway Range. An additional $12 million federal investment

from ARPA catalyzed the creation of the Oklahoma Cyber Innovation Institute (OCII), which will develop and pilot cyber technologies across multiple domains, including smart city environments, self-adaptive AS, and human-machine teaming.

Role of the Private Sector in THETA

At its heart, THETA is industry-driven. This is reflected in the commitment of 45 local, regional, and national companies to support and contribute to the Hub's strategy and activities. THETA's strategy has received significant input and validation from regional and national industry partners, including the CEO Council, a Tulsa forum where private, philanthropic, and public sector stakeholders address key economic issues for the region. In the near-term, Department of Defense is expected to be a major customer of TEAS, and THETA has consulted them extensively on this effort (see Defense Innovation Unit Letter of Commitment). However, longer-term, THETA anticipates new entrants, founded and grown in the GTR, in delivery, emergency services, and other commercially-applicable industries. **Table 2** provides an overview of the significant industry leadership in each of THETA's component projects:

Table 2. Private Sector Commitments to THETA Projects

Project	Industry Participation
Autonomous Systems Workforce Program (ASWP)	• **L3 Harris Aeromet**, **NORDAM**, **Spirit AeroSystems**, **Williams**, and **WindShape**, among others, have agreed to participate in the activities of ASWP. • **CymSTAR** has committed $100,000 to funding THETA-driven workforce development activities.
Applied Research Commercialization Hub (ARC-H)	• **Association of Uncrewed Vehicle Systems International** will contract THETA to conduct testing and remediation assistance to companies participating in Green UAS and will promote the overall efforts of THETA to its global membership. • **Fortress Information Security** will provide necessary software licenses and data sets to support Green UAS certification.
Secure Autonomy Feedback and Evaluation Testbed (SAFE-T)	• **Osage, LLC**, the business entity of the Osage Nation, will house project equipment and personnel at the Skyway36 facility and explore additional industrial investments. • **DronePort Network** will lead the procurement, implementation, and operation of all technical infrastructure for SAFE-T. • RFI responses from 11 companies from across the U.S. validated the SAFE-T concept and helped inform project design decisions.
Ironbird Studios (IS)	• 12 investors, including **Energy Innovation Capital** and **Atento Capital**, have agreed to participate in the Investor Consortium. • **Radius Capital**, **Balerion Space Ventures**, and **46 Ventures** have committed to exploring a raise in support of Ironbird Studios sustainability. • **Nordam** and **L3 Harris Aeromet** have committed to providing Ironbird technology and/or evaluate portfolio companies for investment/partnerships.
Tulsa Advanced Research and Manufacturing Acceleration Center (TARMAC)	• **Cherokee Nation Businesses (CNB)**, the business entity of the Cherokee Nation, will participate as a strategic partner and participant with TARMAC. • **Accenture** will support the operations of the Demonstration Center and open an Automated Technology Manufacturing Innovation Zone at the facility. • 10 regional banks totaling $77.5 billion in assets, including **Prosperity Bank**, **Arvest Bank**, and **Regent Bank**, have joined the Strategic Small Business Lending Consortium (SSBLC).
AI/AS Center of Excellence (G-ACE)	• **Microsoft**, in partnership with BTS, will open an AI Co-Innovation Lab in historic Greenwood, their seventh global location for the Lab.
THETA Control Tower	• **QuikTrip** has committed $1.25 million to support strategically-aligned THETA initiatives. • **CEO Council** validated THETA's strategy and has committed to a strategic partnership with TIL to guide the development of the Tech Hub.

Public Sector and Philanthropic Commitments

THETA's designation as a Tech Hub has been a significant catalyst for commitments from the public, non-profit, and philanthropic sectors to support the advancement of the TEAS industry across the GTR. In particular, THETA has secured the following commitments:

- *George Kaiser Family Foundation (GKFF)* will make significant commitments to the success of THETA, including providing $50 million in sustained funding for TIL, funding the development of the Peoria Mohawk Business Park (PMBP) to enable the TARMAC Demonstration Center, $10 million to Madison Strategies Group to provide wraparounds for THETA workforce development initiatives, and $5 million in awards to Ironbird

Studios portfolio companies. In addition, GKFF is making complementary investments to develop 2,500 units of housing by 2026, invest $100 million in Tulsa's innovation economy, and provide $40 million in annual funding for early childhood education.

- *Tulsa Innovation Labs*, as Lead Entity, will bend its mission and strategy more directly to THETA and commit significant staff time to the execution and sustainability of the component projects and the development of the Tech Hub's long-term strategy.
- *City of Tulsa*, in line with Mayor G.T. Bynum's announcement of his intention to make Tulsa the "drone capital of the world," is establishing a Blue Ribbon Commission to develop recommendations to support TEAS industry growth.
- *State of Oklahoma* has committed significant resources to THETA, including $2 million in funding for radar infrastructure in support of SAFE-T from the ODAA, and a $15 million commitment to THETA's sustainability from leadership in the Legislature.

Additionally, THETA builds upon significant federal investment in the Tulsa region, including the $38.2 million award from EDA for TRAM's BBBRC award to invest in Tulsa's advanced mobility assets, and $12 million in Oklahoma American Rescue Plan Act fundings to enable OCII to extend cyber workforce development across the state.

Creating Good Jobs and Ensuring Equitable Growth Through THETA

THETA is building a Tech Hub in the shadow of the 1921 Tulsa Race Massacre and the historic exclusion of Black and Tribal citizens from economic opportunity. The consortium recognizes that if not done carefully, Tulsa's Tech Hub may inadvertently repeat the mistakes of the past and exacerbate economic inequalities in our community. As such, THETA is committed to ensuring that the benefits of Tech Hubs investments accrue equitably across the Tulsa region.

The main driver of economic benefits will be the creation of approximately 60,000 new jobs in the Tulsa region over the next 10 years, with wages significantly higher ($7,000+) than the current regional average. THETA expects more than half of these jobs to be occupied by workers from underrepresented populations and is working with industry partners to expand pathways for Tulsans without college degrees. The ASWP will provide pathways for existing workers to upskill or reskill and transition up the "skills ladder," thus enabling access to higher earning potential. Further, TEAS jobs are also more resilient than other jobs in the region, growing 4.3 times faster than other sectors and having returned to pre-pandemic levels, while other industries have yet to recover, providing stable earning potential. The Oklahoma AFL-CIO has committed to advising THETA on how to expand access to TEAS jobs and the potential impact of automation on the existing workforce (see Letter of Commitment).

THETA's strategy to ensure equitable economic growth starts with providing wraparound support services for every participant in THETA workforce programs through a partnership with Madison Strategies Group. Wraparound services are critical to removing barriers to participation in workforce training programs, such as lack of child care and transportation, which are especially prevalent in underserved communities. The physical locations of projects like G-ACE, which will be housed in the historic Moton Hospital, where victims of the 1921 Tulsa Race Massacre were once served, and SAFE-T, at the Osage-owned Skyway36 facility, were selected deliberately to reverse decades of disinvestment in these communities. G-ACE will offer a suite of programming on outreach, awareness-building, and inclusion that focuses on bringing underserved communities into THETA's activities and initiatives. Finally, THETA's leadership and partners intentionally include organizations like Black Tech Street, Cherokee Nation Businesses, Osage, LLC, and Tulsa Economic Development Corporation. The inclusion of these organizations on the steering committee will ensure diverse voices are heard in THETA decisions and implementation of the component projects is accountable to equity considerations.

Expected Outcomes

At the Tech Hub level, THETA is tracking three main goals: The creation of jobs, the creation of companies, and an increase in global autonomous systems market share. **Table 3** provides an overview of those goals, accompanying outputs, and relevant THETA initiatives.

Table 3. THETA's Expected Outcomes Logic Model

Goal	Outputs	Primary THETA Activities
Goal 1: Create 60,000 direct and indirect jobs by 2034, with 20,000 of those jobs occupied by females, 4,000 occupied by Black workers, 4,000 by Latino workers, and 3,000 by Indigenous workers.[6]	1. New graduates and trainees from TEAS workforce programs 2. Increased exposure to TEAS careers among GTR workforce 3. Creation of new jobs and retention of existing works	• ASWP workforce training programs • ASWP Intermediary career support services and marketing • Scaling and creation of firms through TARMAC and Ironbird technical and financial assistance • G-ACE community engagement events
Goal 2: Create 300 new TEAS companies by 2034.[7]	1. Maturation and licensing of TEAS technology innovations 2. Number of TEAS products brought to market 3. Investment in new TEAS ventures 4. Number of firms utilizing THETA programming and services	• ARC-H, SAFE-T, Ironbird, and TARMAC provision of equipment and technical assistance for prototyping, testing, certifying, and scaling new technologies • ARC-H recruitment of applied researchers and projects • ARC-H and TARMAC DOD contracting pathways • G-ACE scaling of AI-enabled solutions
Goal 3: Increase GTR's global market share by $1.6 billion by 2034.[8]		

In addition, THETA intends to track a variety of indicators relating to the rates of use for services provided through component projects, the demographics of those benefiting from services rendered, and additional opportunities for strategic alignment. THETA will measure these variables through surveys and content analysis. In addition, THETA will measure outputs and outcomes through a combination of primary data from program participants, public data from Lightcast, the Bureau of Labor Statistics, the Bureau for Economic Analysis, and others, as well as original data created via the Labor Market Observation (LMO) (see Research, Analysis, and Data Letter of Commitment). Each component project narrative includes a more detailed breakdown of relevant goals and outcomes.

Accommodating Housing Demand

While, on average, Tulsa is more affordable than other metro areas in the U.S, the number of housing-burdened Tulsans is growing across all levels. Partners across the GTR have demonstrated significant investment in ensuring adequate availability of housing over the next 10 years. Most notably, the City of Tulsa will deploy $75 million in dedicated funding for housing initiatives and as a part of efforts to address the identified demand for 13,000 new housing units over the next decade. Central to the City of Tulsa and PartnerTulsa's efforts is a focus on revitalizing Tulsa's vibrant historic districts, including the recent community-led Kirkpatrick Heights-Greenwood Master Plan, which includes 700+ new units in and adjacent to Tulsa's Historic Greenwood District. Additionally, the City of Tulsa and Tulsa's Housing Authority are among a select number of cities to have received two Choice Neighborhood Initiative (CNI) grants through the U.S. Department of Housing and Urban Development. The most recent CNI grant will support a $190 million project at 36th Street North and Peoria in North Tulsa, and will create 274 new mixed income housing units immediately adjacent to the Peoria Mohawk Business Park (the location of the TARMAC Demonstration Center).

[6] This number was calculated based on the total direct jobs created by the component projects with estimated 5 indirect jobs per direct job. See here for more information on the multiplier effect.
[7] This is based on the average sales per firm in Tulsa's current TEAS industry divided by the expected growth of $1.6 billion, the expected increase in GTR's global market share (see Goal 3).
[8] This is an estimate assuming each new direct worker contributes ~$130,000 to the regional economy. This was estimated as the average revenue generated per TEAS worker. Estimates were calculated based on current and historical metrics from Lightcast and U.S. autonomous systems market forecasts from Omdia. We will measure this using standard NAICS codes to measure industry sales growth in TEAS over time.

THETA's Sustainability

The THETA consortium is committed to the sustainability of Tulsa's Tech Hub and has designed several initiatives to ensure the long-term viability of THETA's vision and strategy. Every THETA initiative has developed a sustainability plan that ensures it will continue beyond the first five years of funding awarded by EDA or sunset if unsuccessful. Several initiatives, including the Workforce Intermediary, THETA Control Tower, and wraparound supports from MSG, have received philanthropic commitment to their sustainability. The sustainability of most other THETA initiatives is predicated on revenue generation, whether that is tuition (AI Minor, TCC Certificate), employer or industry contributions (T3, T-CAP), or fee-for-service (AI Co-Innovation Lab, TARMAC, SAFE-T). Ironbird Studios will be sustained by raising a venture capital fund, potentially with leading TEAS investment firms. Finally, the Oklahoma Manufacturing Alliance has committed to assuming SCAP and TAP as part of their normal operations should the initiatives be successful.

In addition, TIL, as the THETA Control Tower lead, has committed to developing a grants and funding strategy that identifies additional funding opportunities from public, private, or philanthropic grants. The focus of the strategy will be on sustaining and expanding THETA component projects, as well as identifying opportunities to expand the programmatic and geographic reach of THETA. TIL will provide resources to members of the THETA consortium to pursue funding opportunities, as appropriate (see THETA Control Tower Narrative).

Relevant Activities Between Phases 1 and 2

Changes in THETA's Vision	• Strengthened focus on aligning with national security priorities, including the development of domestic supply chains and manufacturing capacity, given the threat of UAS demonstrated by recent events in Ukraine, Jordan, and Yemen, and its impact on international commerce. • Increased coordination and collaboration capacity, including formalizing TIL's role as the THETA Control Tower, in recognition of a systems failure in aligning disparate assets and partners; this change is particularly relevant in ASWP, where TIL will serve a formal industry engagement role and establish a first-in-the-nation data linkage to track student outcomes. • Expanded the proposed THETA Steering Committee to include additional industry and underrepresented perspectives, including Cherokee Nation Businesses, L3 Harris Aeromet, Nordam, Osage, LLC, and Radius Capital. • Designed projects to invest in local, home-grown solutions, rather than national partners, due to a belief that solutions grounded in the GTR have a better chance of success; the most prevalent example is Ironbird Studios.
New Consortium Members and Commitments	• THETA secured significant public sector commitments, including from the City of Tulsa and several areas of the State of Oklahoma, including Department of Aeronautics and the Legislature. • Cherokee Nation Businesses and Accenture have substantially increased their participation in THETA through their commitment to participate in TARMAC activities. • Other new consortium members include CymSTAR, Vigilant, SeedAI, Asemio, the Tulsa Regional STEM Alliance, Earthrise Ventures, and Techstars Tulsa.
Other Relevant Activities	• In December 2023, OSU announced a Polytech initiative to align academic programs with industry needs, expand innovative curriculum in science, technology, engineering and mathematics, and weave emerging AI technology into programming. The initiative will offer students across the GTR access to flexible learning opportunities and real-world AS experiences at Oklahoma State University's Tulsa, Stillwater, and Okmulgee campuses. • In January 2024, the National Robotics Engineering Center (NREC) at Carnegie Mellon University and TU signed a letter of intent to establish the first NREC Affiliate within TU. This will introduce opportunities for TEAS R&D and commercialization in the GTR. • In January 2024, TCC announced a $3.7 million grant from the U.S. Department of Education, the largest federal research grant in the school's history, to support first-year college students and improve retention and completion rates. • In February 2024, New York University (NYU), the largest private research university in the U.S., announced its intention to open an academic center in Tulsa that will host 100 students a year. The program will also include an innovation-focused Ph.D. fellowship. • In February 2024, TIL, TCC, and GKFF hosted a community update on Tulsa's Tech Hub designation, gathering feedback from community members on their view of TEAS and its role in Tulsa's economy. • In February 2024, BTS, in partnership with SeedAI, hosted Hack the Future: Greenwood, a two-day event to drive AI learning, engagement, and training with 100+ participants from Greenwood.