Texas State University
CIEDAR Opportunity

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Texas State University

- 4th largest university in Texas, 1,800 faculty, 40,000 students, over 5,100 acres of land housing two campuses and multiple research labs.
- 50% of our students are ethnic minorities;
  - 10-year Hispanic Serving Institution (HSI), 35% Hispanic population.

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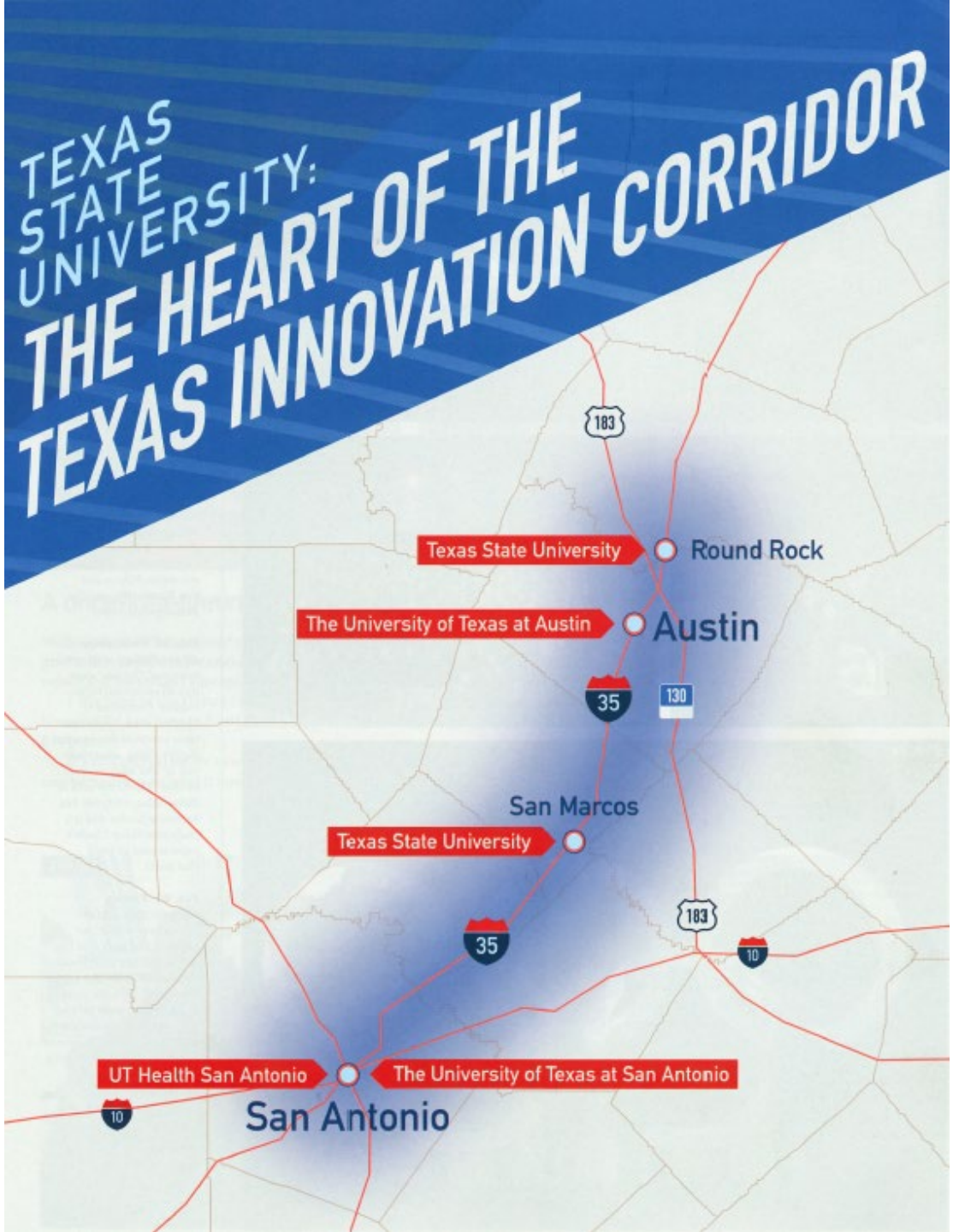

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TXST CIEDAR Locations

- Round Rock Campus – 100 acres
- San Marcos Campus – 500 acres
- STAR Park – 100 acres
- Freeman Ranch – 4,200 acres
- Muller Ranch – 160 acres
- ALERRT Center – 65 acres

Grand Total 5,125 acres

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TXST CIEDAR Vision

- Connected Infrastructure for Education, Demonstration, and Applied Research (CIEDAR).
- The creation of nine (9) living labs within smart neighborhoods in partnership with industry to accelerate ***digitalization, decentralization, and decarbonization*** of industry via our own Technology Enhanced Infrastructure vision.

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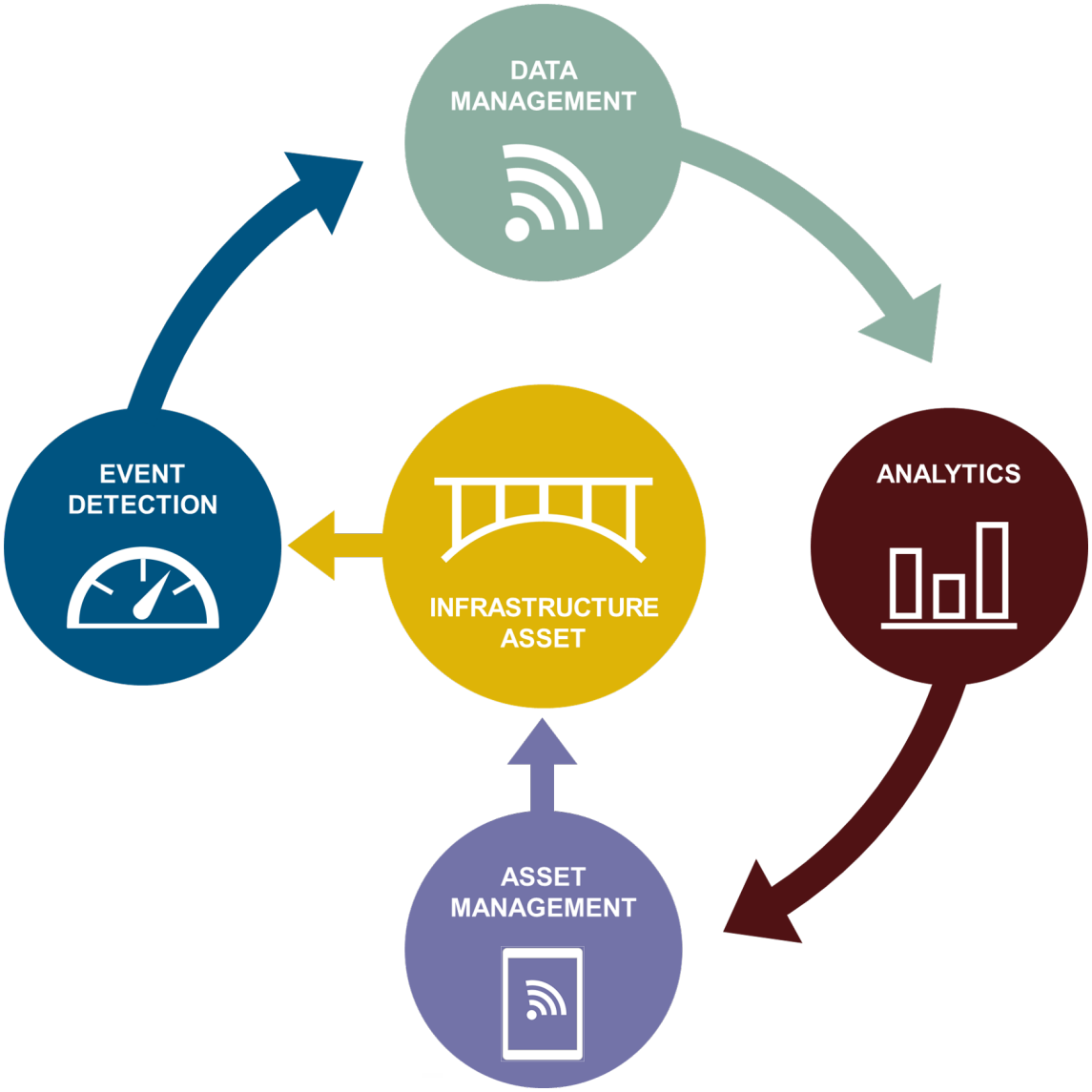
Technology Enhanced Infrastructure



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TXST CIEDAR Mission

- The study of technologies with application to the lifecycle monitoring of infrastructure assets.
  - Validation of existing technologies
  - Evaluation of emerging technologies
  - Development of new technologies
- The multidisciplinary study of technologies with application to infrastructure.
  - project teams may include engineering (civil electrical, industrial, manufacturing, mechanical), physics, chemistry, geography, mathematics, computer science, business, design, biology, psychology, communications and many others.

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TXST CIEDAR Overview

- Multidisciplinary Industry Research & Development Consortium to achieve an additional $200 million of annual R&D revenues over the next 10 years.
- Create 9 new living labs for utilities, cities, structures & buildings (IRL), energy, water & wastewater, mobility, networks, sensors, and data/software.
- Over 100 faculty (working on 291 projects), with 250 students, in 32 laboratories, and 7 centers already up and running.

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TXST CIEDAR Key Benefits

- Each lab is a R&D marketplace of solutions solving real life problems.
- Our faculty and students deliver world-class solutions at a 50% less in labor cost. All Intellectual Property licensing have been pre-set at super affordable rates.
- Buyers and Sellers get to work together quickly and efficiently to find practical and affordable answers to pressing challenges.
- Deploying the solutions within TXST real state grounds and/or at any of the Cities and Utilities members.

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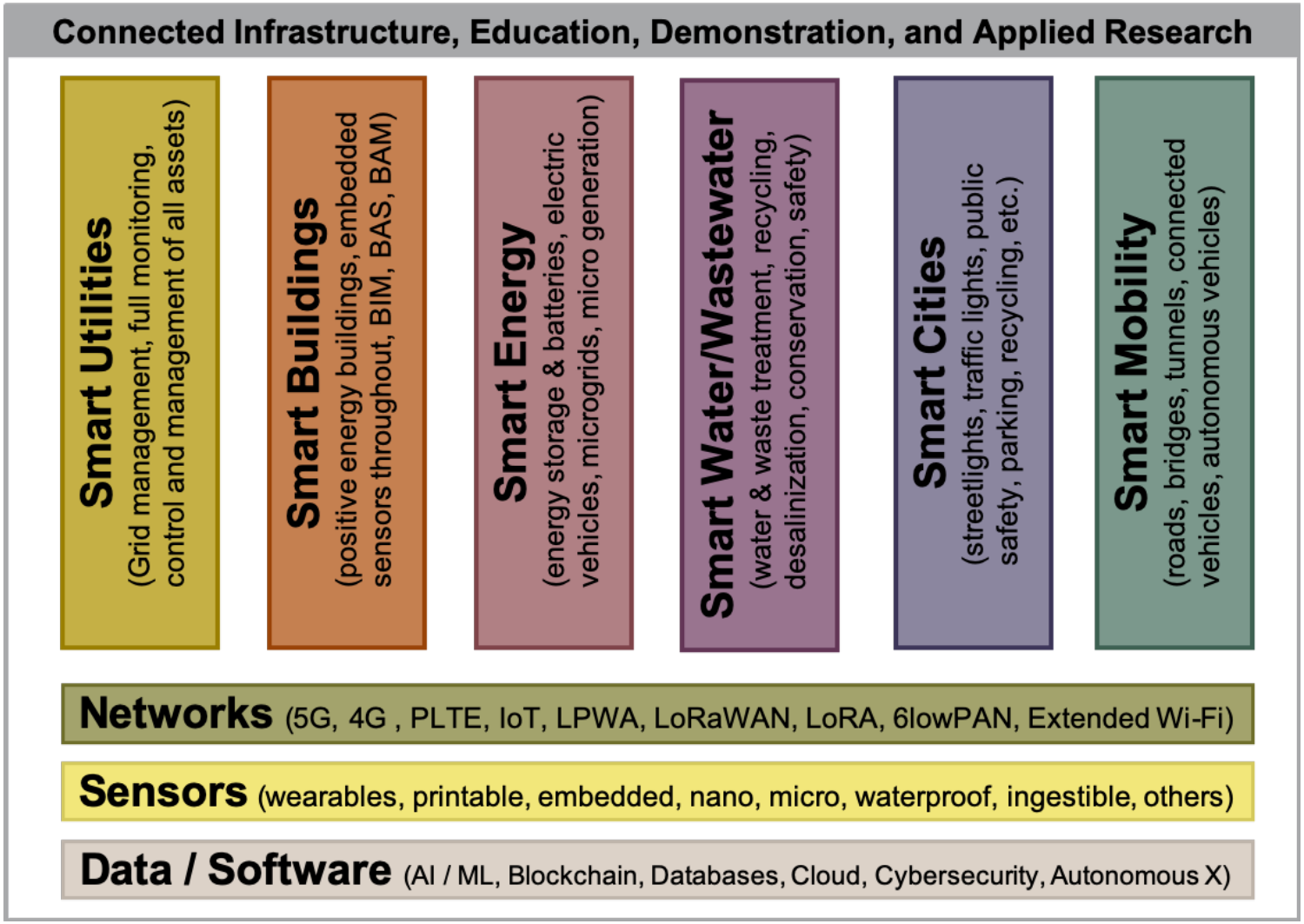
TXST CIEDAR Living Labs

- CIEDAR is exploring partnerships with industry to develop the following **9** living labs populated by its expert faculty and students:



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TXST CIEDAR Members

Planning to onboard another 20 new members in the coming months. Cities, Utilities, Enterprises.

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Digital 360 Summit 2019
Potential Member Relationships

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Digital 360 Summit 2020
Potential Member Relationships

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Digital 360 Summit 2021
Potential Member Relationships

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TXST CIEDAR Industry Advisory Board

Dave Anderson
President & CEO

semi

Richard Soley
Executive Director

industrial internet CONSORTIUM

Gabriel Reyna
Managing Partner

bandera capital

Jason Giulietti
President

GREATER SAN MARCOS PARTNERSHIP

Greg Walker
Director of Research

CABA
Continental Automated Buildings Association

Curtis Rodgers
Principal

BRICK & MORTAR VENTURES
INVESTING IN TECHNOLOGY FOR THE BUILT WORLD

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FCC License for Smart Networks Lab

Experimental Licenses on 900 MHz*

Ameren	SDGE A Sempra Energy utility®	Exelon. Private LTE: Wide range of use cases for Electric and Gas.
Southern Company	New York Power Authority	NREL NATIONAL RENEWABLE ENERGY LABORATORY
Dominion Energy	Xcel ENERGY	TEXAS STATE UNIVERSITY The rising STAR of Texas

*Experimental Licenses as recorded on file at the FCC

Texas State is the only university in the US
With an FCC license for 900MHz

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TXST CIEDAR Key Projects

- 100-acre STAR Park for research partners to lease / build open
  - Smart LED / Solar Powered / Energy Storage Street Lights with 4G / 5G cells and Optical, Noise, Air, Humidity, Temperature, and Flood sensors by Q2 2022
- NOC/SOC Training Lab at STAR One (173) by Dec 9, 2021
- Smart Building & Infrastructure Lab ground break Aug 31, 2021 at STAR Park
- 125 MW 510-acres Solar PV Farm testbed and Smart Energy Lab buildout by Q1 2023 at Freeman Center and Muller Ranch. Focus on solar PV, power electronics, fuel cells, energy storage, tracking systems, energy management, control systems, and green hydrogen.
- Stand up Smart Mobility Lab buildout by Q3 of 2022
  - 100-acre smart mobility track testbed buildout by Q1 2023 at either Freeman Center or Muller Ranch
  - Drone Power Line and tower Inspection testbed buildout by Q3 2022 at STAR Park or Muller Ranch
  - Drone Commercial Packages Delivery testbed buildout by Q3 2022 at STAR Park or Muller Ranch
  - Drone People Transport testbed buildout by Q3 2022 at STAR Park or Muller Ranch
- Workforce Housing competition followed by testbed and Smart Homes Labs buildout by Q2 2022
  - 1,000 square feet, 2 bedroom, 1 bath, zero energy, zero water, design and build cost at or less than $100 per square foot. 3 winners build at STAR Park models. Deploy region wide with local developers.
- Digital Substation of the Future testbed and Smart Utilities Lab buildout by Q4 2023
- Stand Up Smart Networks Lab by Aug 31, 2021 at STAR One. - DONE
  - Private LTE/5G 900 MHz licensed research network testbed buildout reaching all facilities
  - Wirepas 900 MHz unlicensed research network testbed buildout reaching all facilities
  - LoRAWAN 900 MHz / 2.4 GHz unlicensed research network testbed buildout reaching all facilities
  - Wi-SUN 900 MHz unlicensed research network testbed buildout reaching all facilities
  - CBRS 3.55 – 3.7 GHz research network testbed buildout reaching all facilities
  - 10/100 Gbps fiber research network testbed buildout reaching all facilities
- Smart public safety testbed + Smart XReality Lab by Q4 2022 at ALERRT Center

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STAR Park Location

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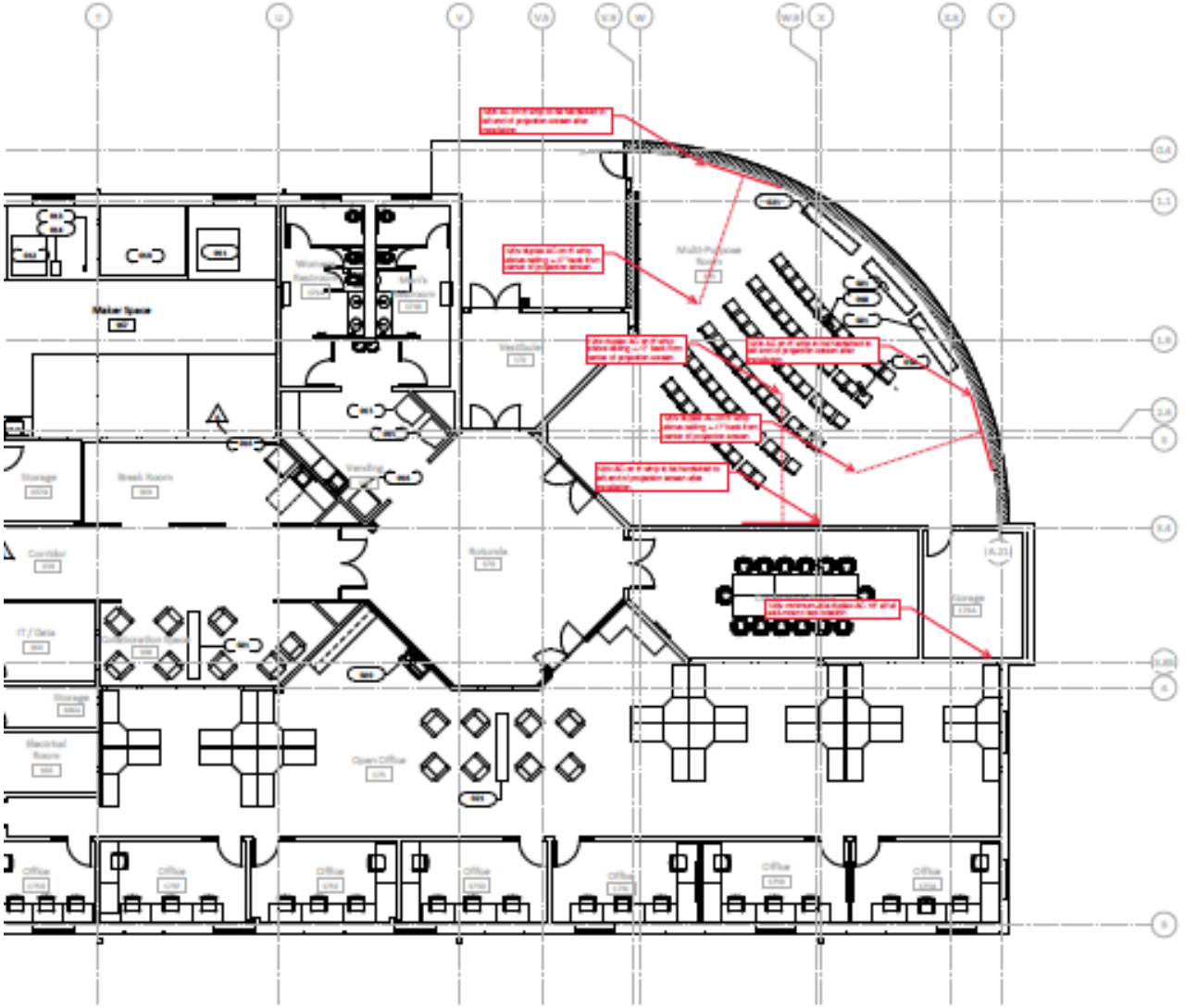
NOC/SOC Training Lab Location



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Networks, Sensors, BigData and Software Labs at STAR Park

Northeast

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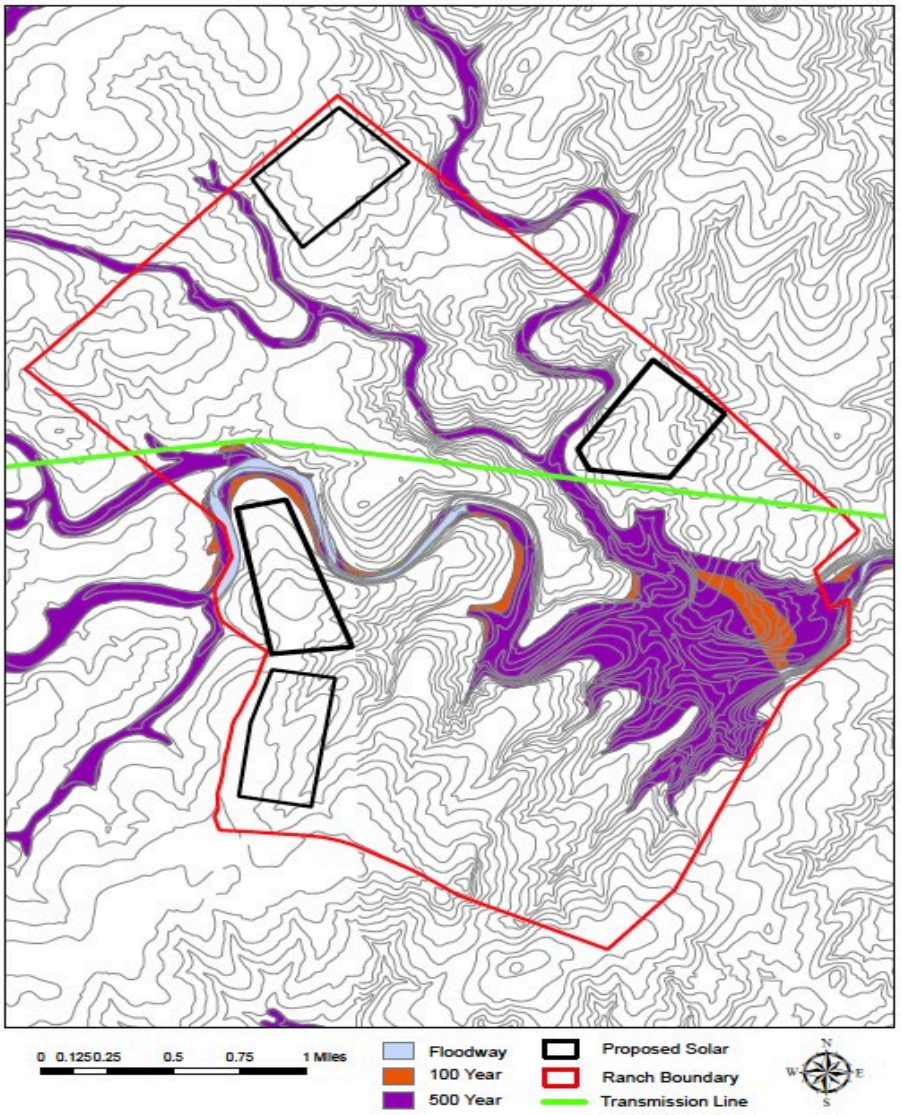
Freeman Center Location



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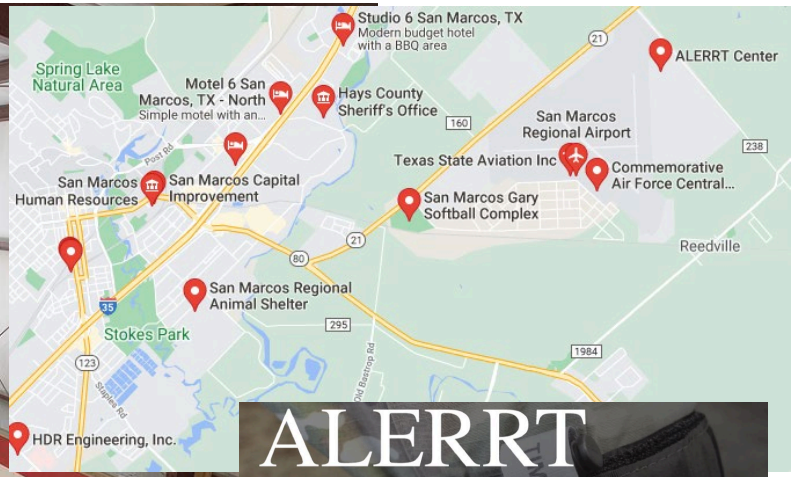
ALERRT Center Location



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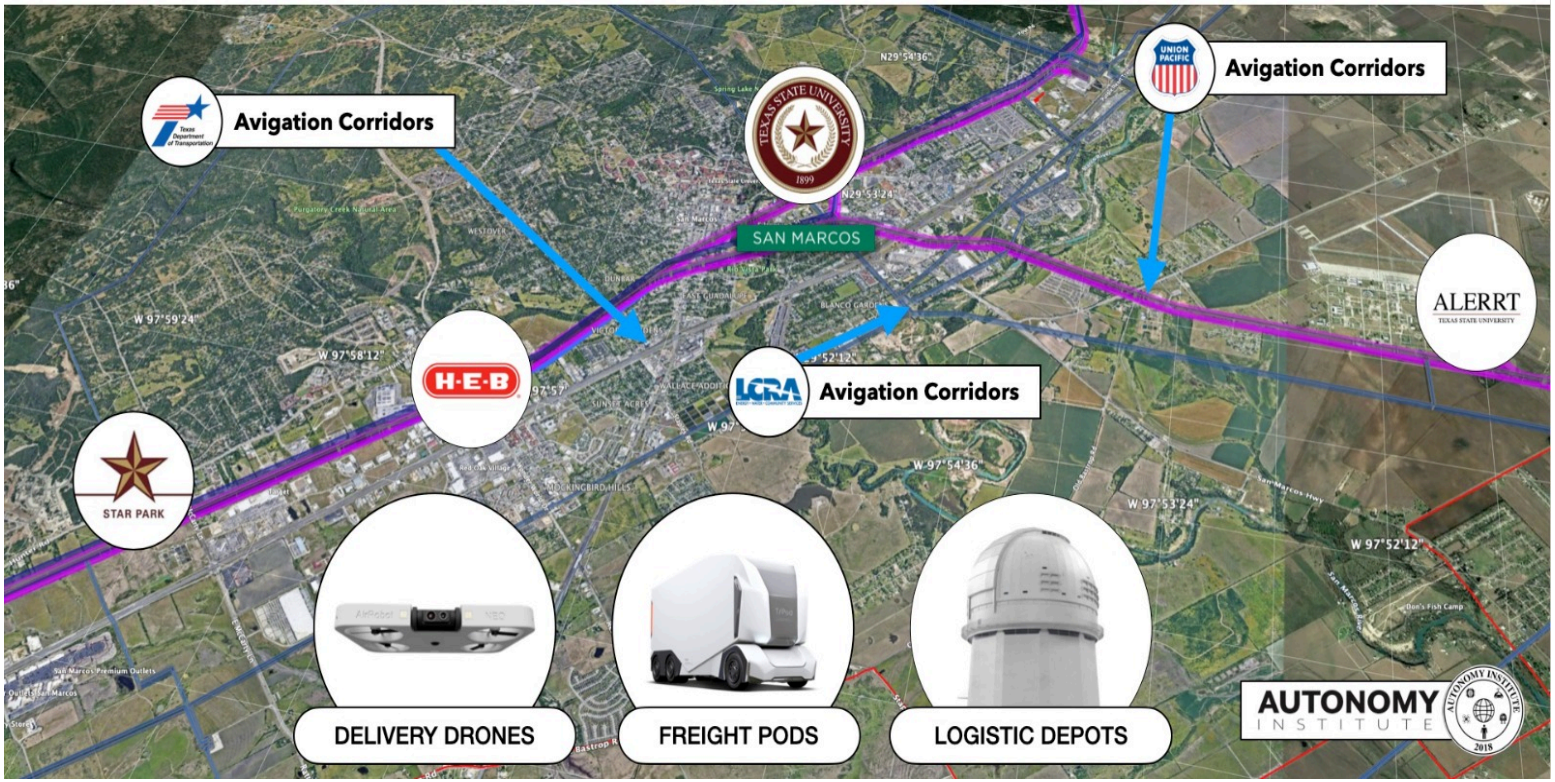
Autonomous Vehicle Test Track



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