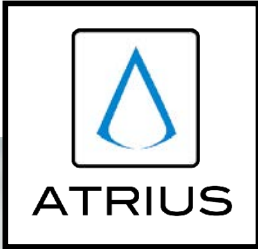


Autonomous Systems **require the Edge**

Autonomous Mobility Corridors Will be a **Key Catalyst** in Driving **Edge** and **5G Network** Deployments

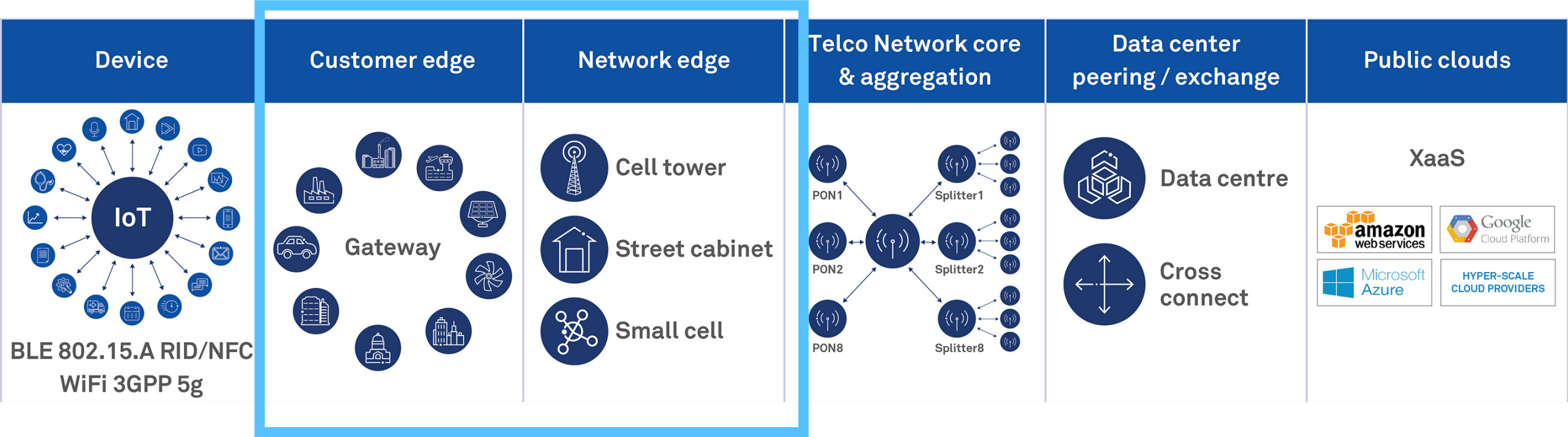


Prepared for
select members:





What we Define as Edge?



Cell Towers, Private Facilities or
Regional Data Centers

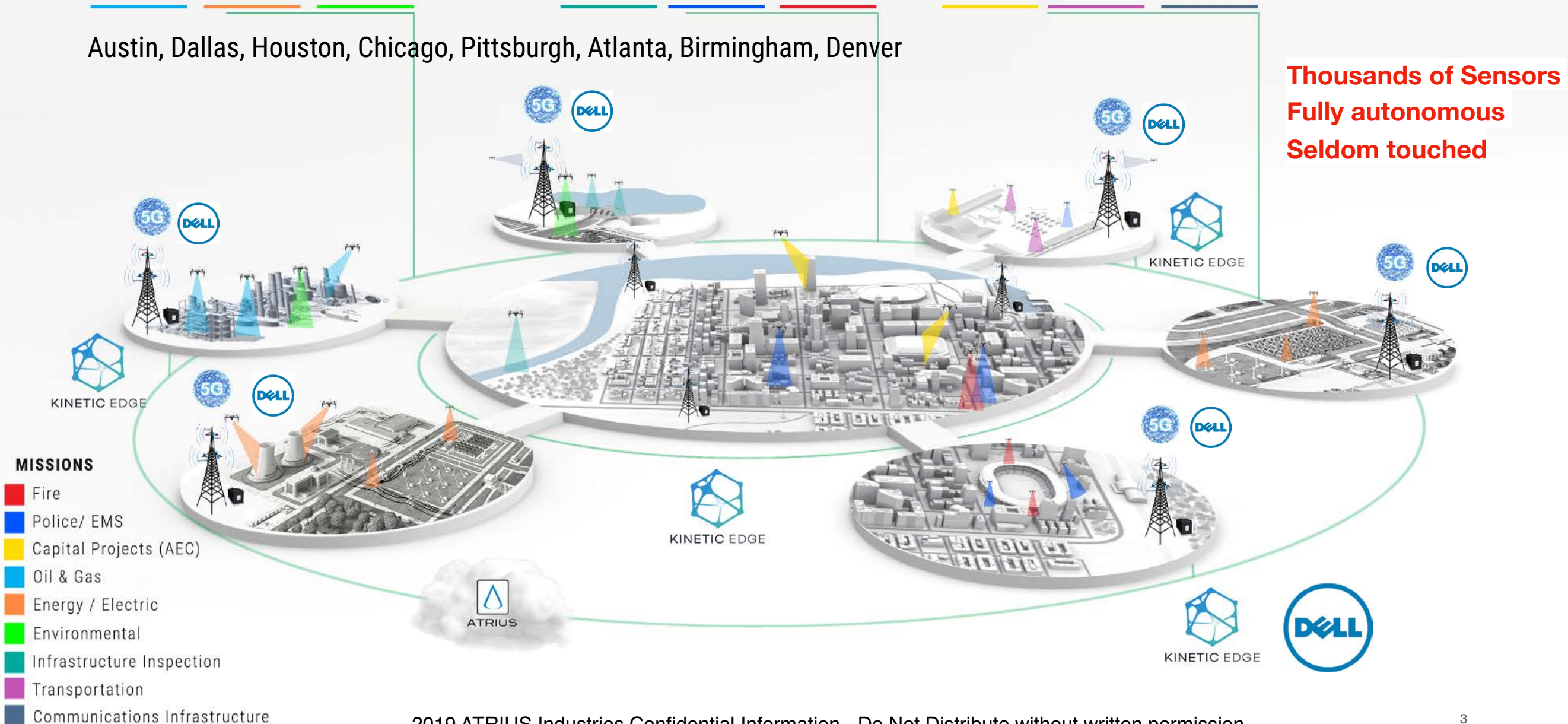
ATRIUS is creating a new **Data Utility** for Public and Private Industry

ACTIVE MOBILE SENSORS and NEAR GROUND GEOSPATIAL INSIGHTS



Austin, Dallas, Houston, Chicago, Pittsburgh, Atlanta, Birmingham, Denver

Thousands of Sensors
Fully autonomous
Seldom touched



Exploding Market for Petabytes of Data

The need for this Data will Drive **EDGE DEPLOYMENTS**

Energy



Construction



Intelligence



Telecom



Infrastructure



Wildfires



Tornadoes



Hurricanes



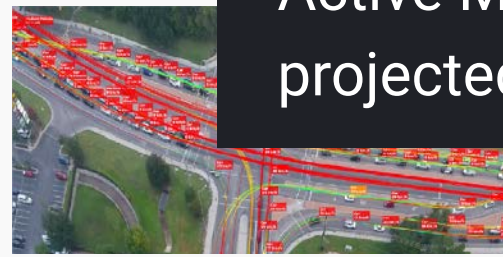
Smart City



Insurance



Traffic Management



McKinsey - **\$581 Billion** for Global IoT

The Global Sensor market is expected to contribute **\$287 billion** to global GDP in 2025

Active Mobile Sensor Market is projected to reach **\$5.4 billion** by 2022

All Autonomous Systems require the Edge Computing and Low-Latency RAN



Autonomous Systems is Driving the Next **Trillion Dollar** Industry

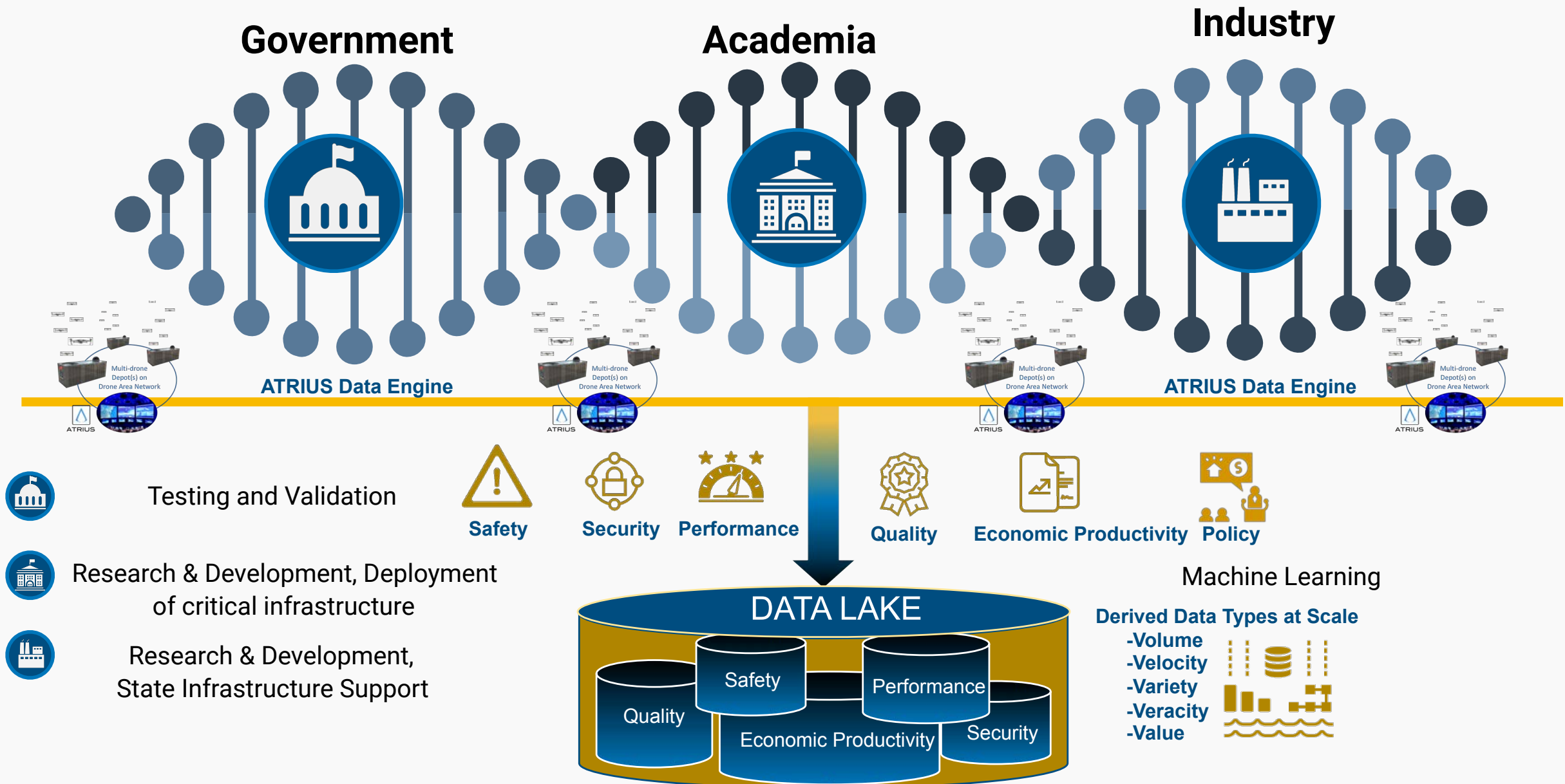
Autonomous Systems will drive a major **New Industry** at the scale of Silicon Valley, the Internet and Mobile Systems.

Autonomous Mobility Corridors will be the first to see fully adopted **autonomous trucks, cars, shuttles, industrial robotics, drones, and urban air.**


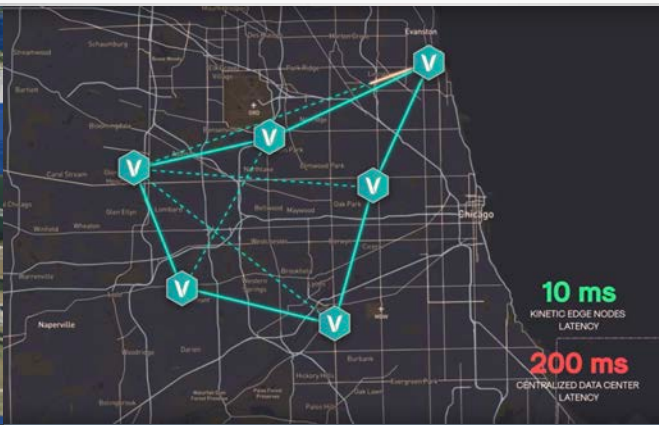


With a unified plan and industry leadership we can align the billions that are about to be spent on **5G, Edge Computing, and Intelligence Transportation Systems.**

Autonomy will create **hundreds of thousands of jobs**, create **billions of economic impact** and drive the **largest productivity increase** in history.

Autonomy Requires Deep Collaboration Among Many Domains



Autonomous Systems Requires **Multi-Disciplinary Approach**

|  |  |  |  |
|--|--|--|---|
| Policy (Avigation Easements) | Infrastructure (5G, Edge Computing) | Autonomy Drones, Cars, Shuttles . . | Business Economic/Community |
| Law and Political | Computer Science | Engineering and Aerospace | Business and Education |
| <p>Law and Policy - There is going to be decades of work around new regulations, Federal and State policies, Risk mitigation and control, privacy issues, public/private easements within the new domain of the Z dimension.</p> | <p>Computer Science - UTM / Situational Awareness Data Processing High speed ingest Low-latency networks Precision Navigation Micro Weather Computer Vision/Machine Learning</p> | <p>Engineering / Aerospace - innovation around new flight systems, propulsion, advanced control theory, new electronics, materials, energy sources, industrial design.</p> | <p>Business / Education - Autonomous systems will spearhead all forms of new business opportunities as robotics start to impact everything from delivery, transportation, infrastructure monitoring/repair and even the foundation of smart city programs. Tens of thousands of new jobs.</p> |

Autonomy Requires **Research and Development**



System Components

Batteries
Gimbals
Payloads
Sensors
Motors
Autopilots



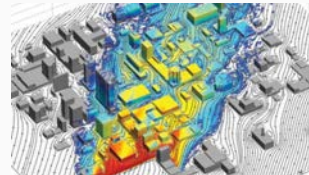
Drones/Sensors

Small UAVs,
Delivery Drones,
Drone Taxis



Autonomy Infrastructure

Navigation
beacons, Drone
Depots,
Trackers,
Vertiports,
Micro-Weather,
Radar



UTM/Security

Precision Nav,
Micro-Weather,
UTM,
Situational
Awareness



Business Operations

Integrated
drone, data and
operational
management



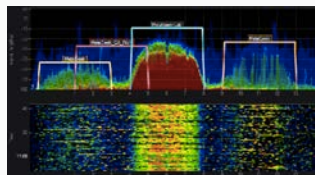
Aviation Easements

Route planning,
GPS support, AI
flight, UTM



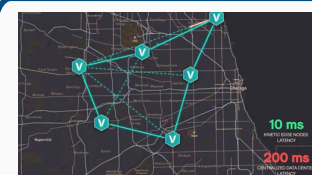
Data Analytics

Inspections,
sensor data,
Image
processing,
analytics,
machine learning



Wireless Network

Secure, Reliable, Low-latency Radio Access Networks
supporting 5G and new Data Spectrums



Edge Computing Infrastructure



Edge Computing and 5G RAN will be the Foundation of Autonomy

Autonomous Systems



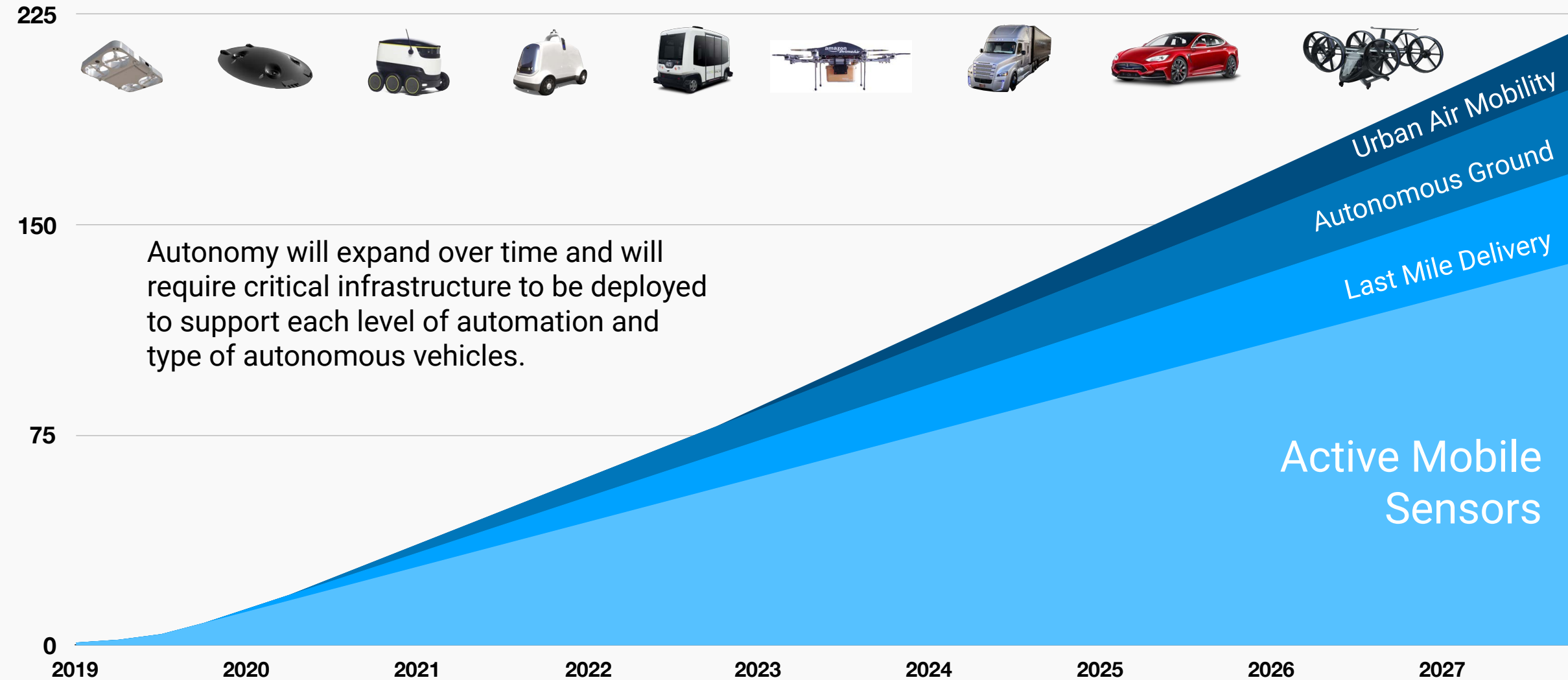
Business Operators



Autonomous EDGE Infrastructure



Autonomy Adoption Timeline based on **Infrastructure & Regulations**



How are we Supporting this New Industry?

Establishment of the Autonomy Institute

This is a corporate entity that is focused entirely on the fundamental issues surrounding autonomy. Research, infrastructure, technology, policy, and business programs.

- State seed funding for Foundation (Universities, DOT and DOD)
- DOT Leadership and Engineering

The Autonomous Infrastructure Labs

These are persistent deployments of the critical infrastructure that is required to support autonomous systems. Low-Latency RAN, Edge Compute, Precision Navigation, Situational Awareness, and Edge Ingest being a few.

- UT JJ Pickle, Camp Mabry, TxDOT Corridor, TAMUS RELLIS

The Autonomous Systems Operation Command Center

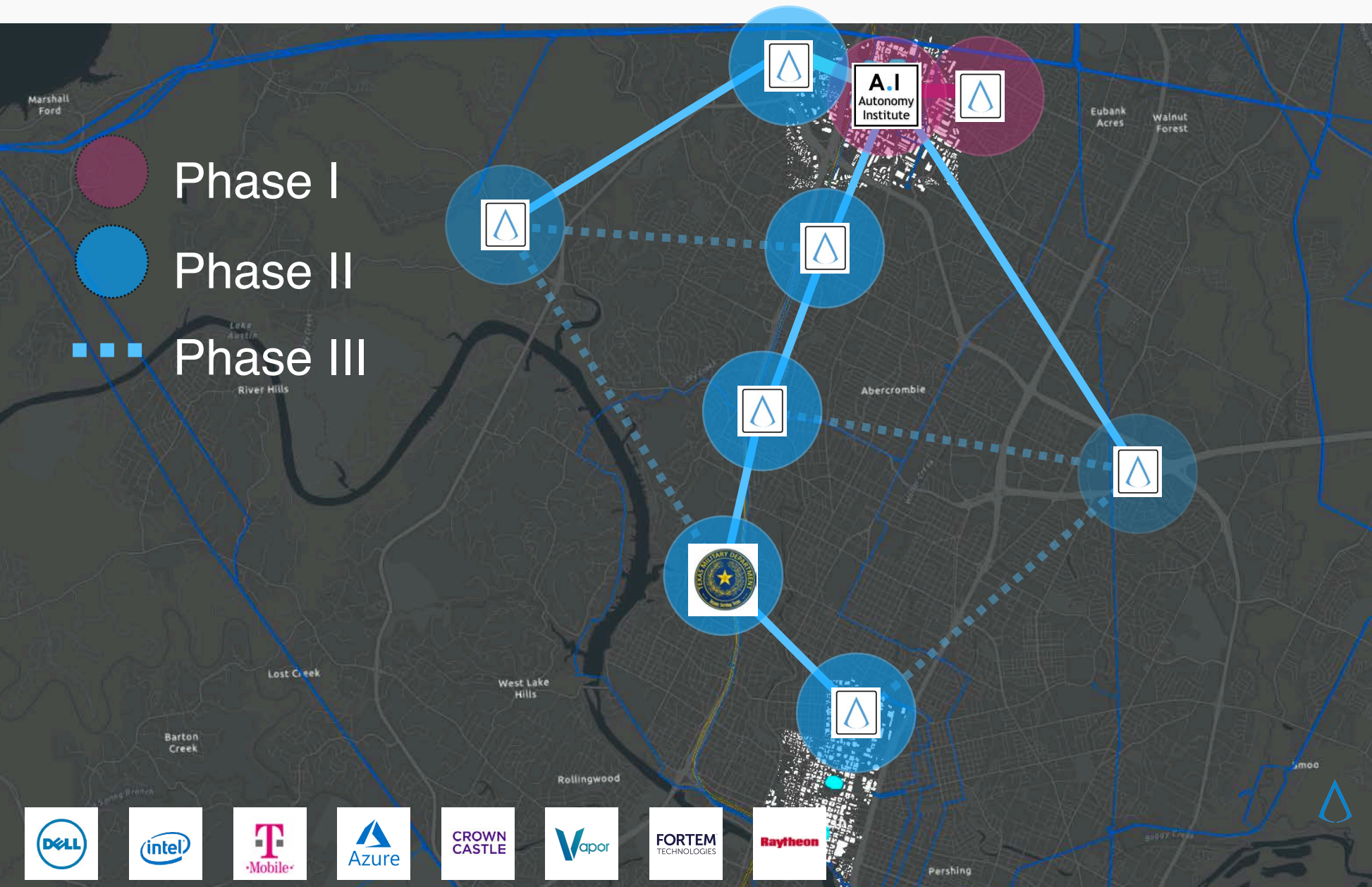
A common Operations Command Center for Autonomous Systems. The Nations first Autonomous Robotics Operations Center supporting all industry, government and academia pilots and operational ventures.

- State Agencies
- DOT Autonomous Operations
- Industry partners like from automotive, delivery and urban air.

The Resilient MicroGrid

This program has been under development for over two years and is focused on providing regional scale resilient power platforms mandated by the Federal Government. They are currently supporting a deployment at Camp Mabry and San Antonio.

The First Autonomous Mobility Corridor



ATRIUS Terminal:

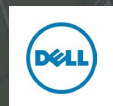
- JJ Pickle Research Center Campus

ATRIUS Nodes:

- JJ Pickle West
- Domain Tower (Braker)
- Austin Substation (Steck)
- Austin Substation (2222)
- Camp Mabry (Loop 1)
- UT Aerospace Engineering

Initial Use Cases:

- Fire Response
- Traffic Management
- Parks Management
- Accident Scene Capture
- Situational Awareness
- Austin Energy Inspection
- Water Treatment
- Tollway Intelligence





EDGE will Enable the **Largest Productivity** Gain in History - Autonomy

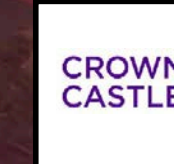
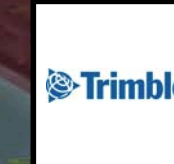
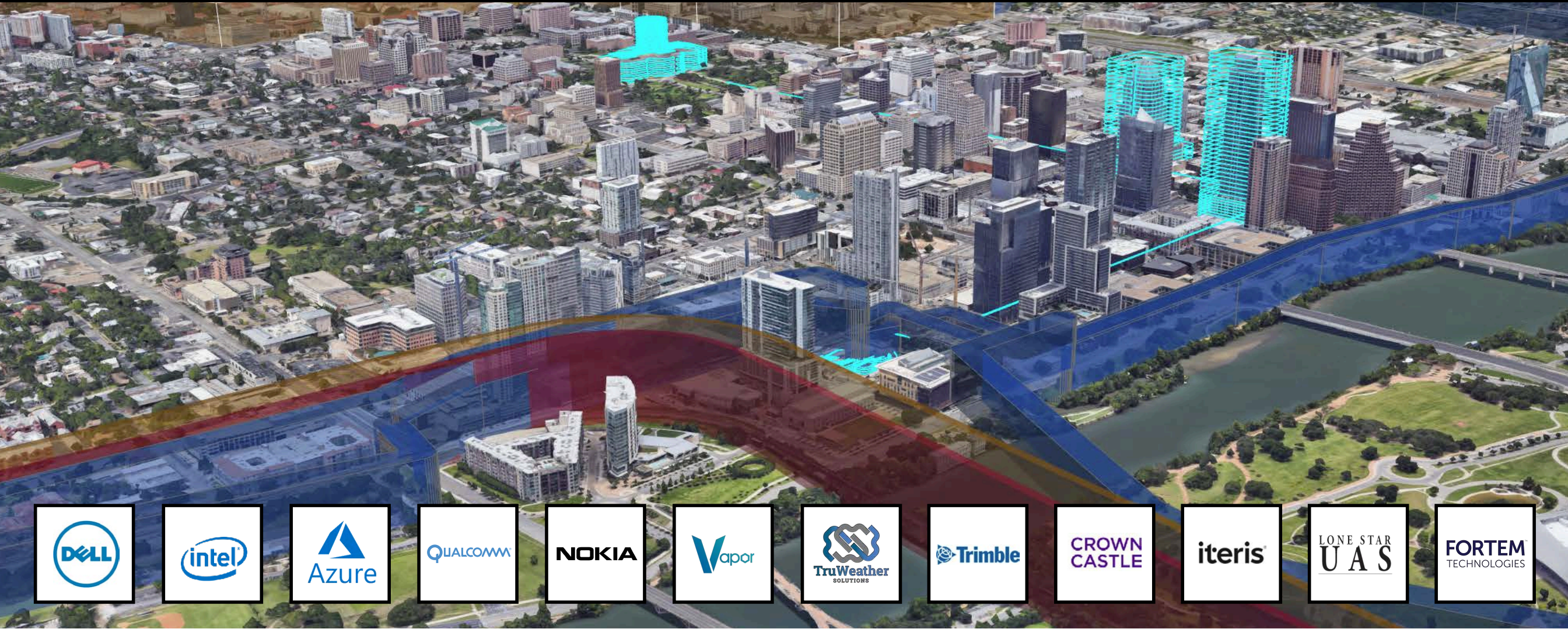


Low-Latency RAN
<20ms

Edge Computing
Petabytes

Situational Awareness
Radars/UTM

Precision Navigation
DGNSS





ATRIUS and Autonomous Systems needs **Edge Computing and Your Support**



**Low-Latency
RAN**

**Precision
Navigation**

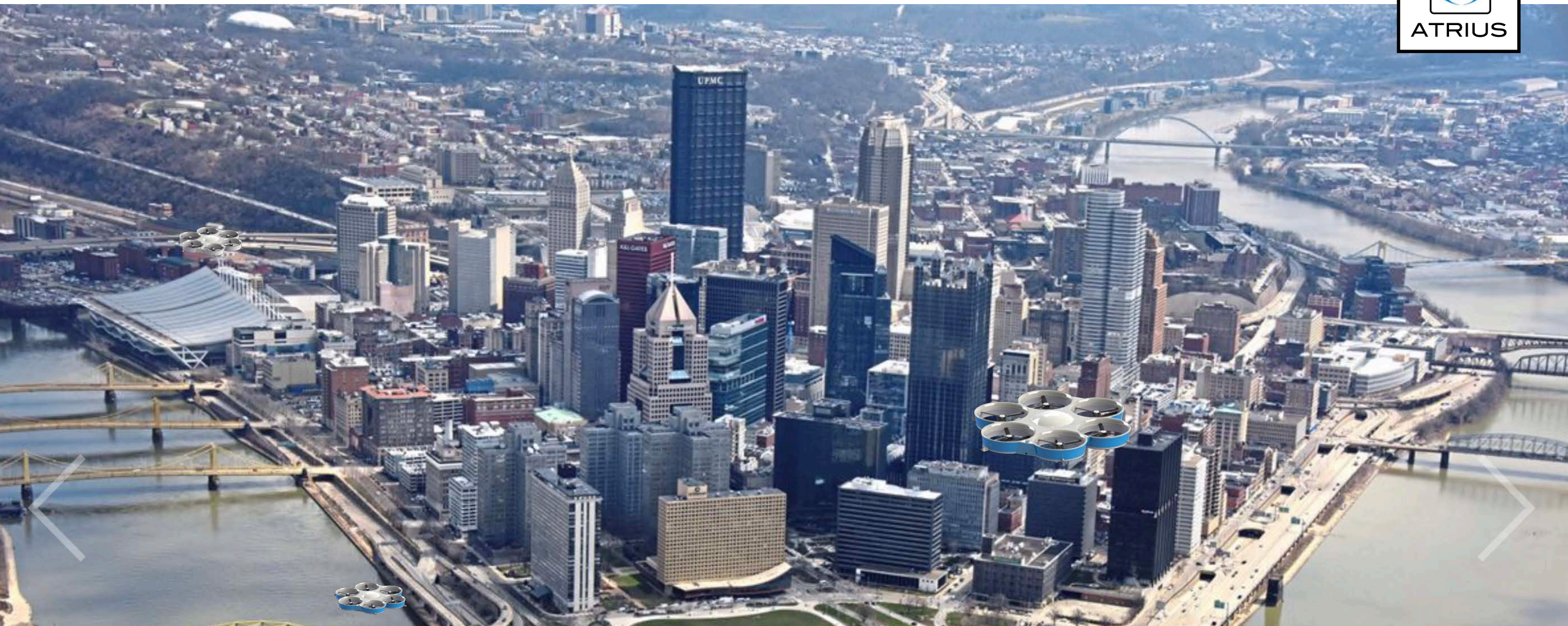
**Situational
Awareness**

**Autonomy
Easements**



Pittsburgh Autonomous Infrastructure Consortium

Leading the Nation in Establishing Autonomous Mobility Corridors



Prepared for
select members:



Establishing a CMU Autonomous Mobility Corridor

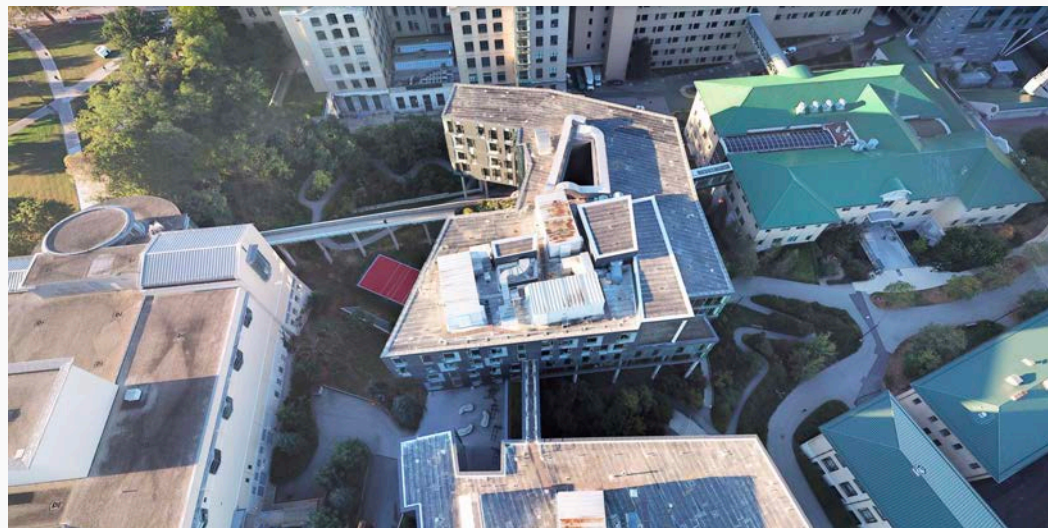
Downtown Corridors



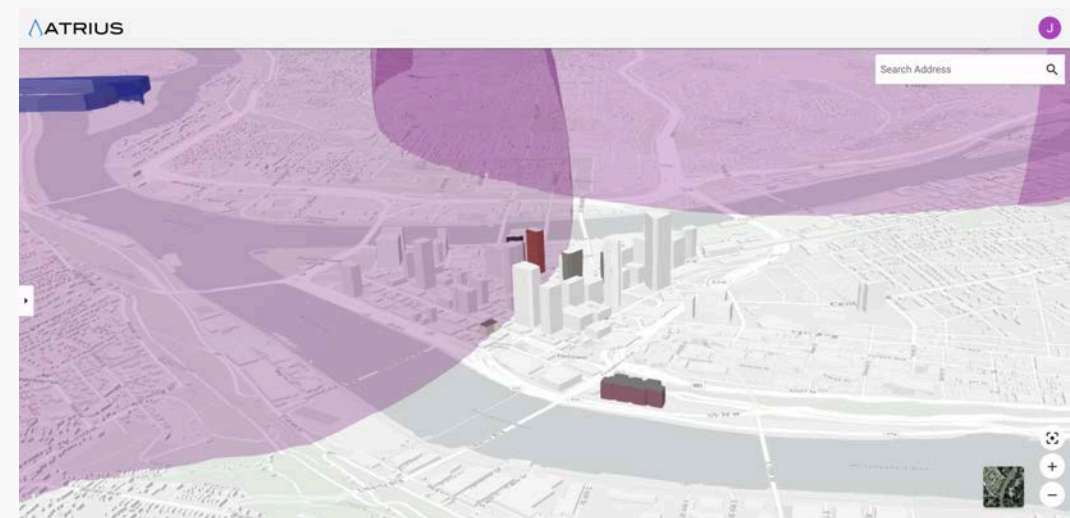
CMU Corridors



CMU Deployment



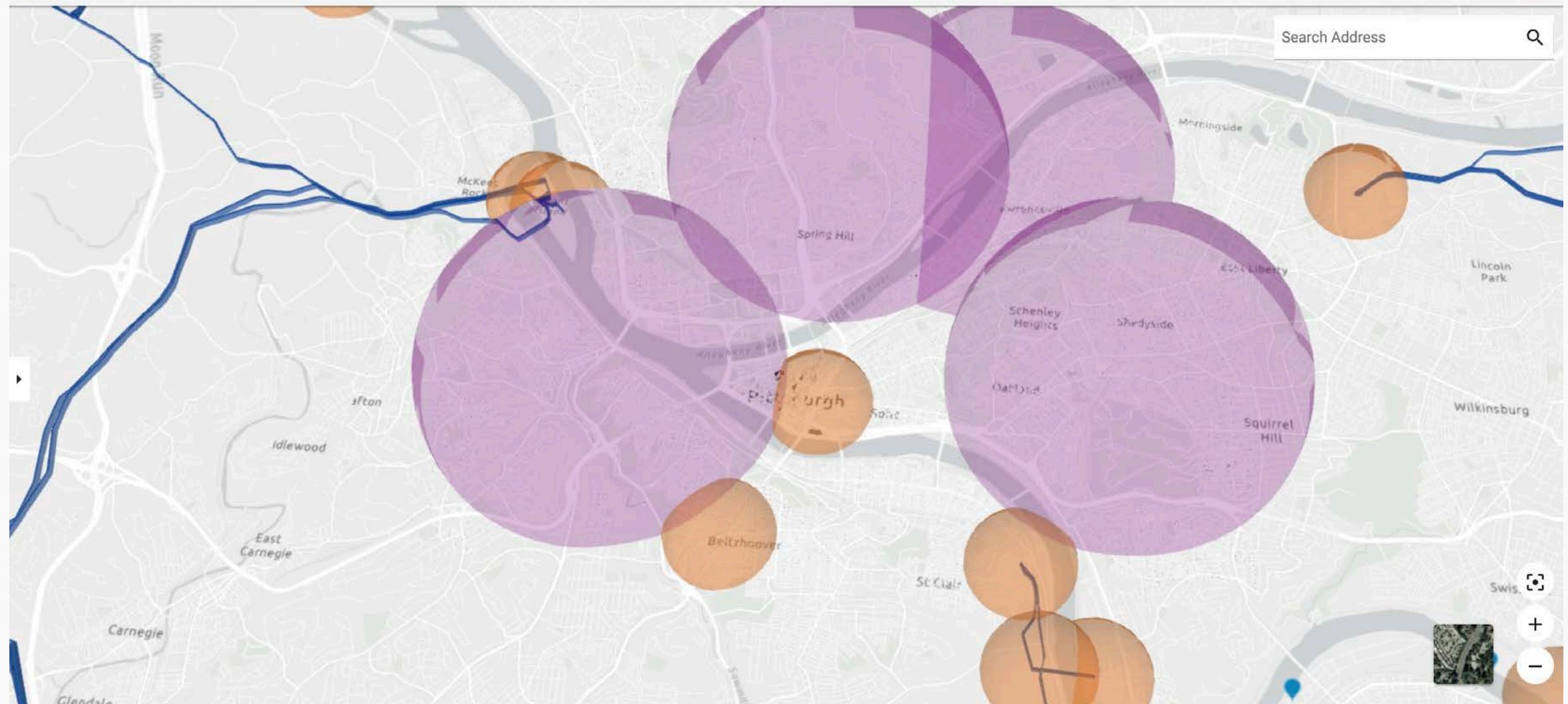
City Deployments



Establishing a CMU Autonomous Mobility Edge Network Locations



ATRIUS



Vapor CMU Kinetic Edge - Autonomous Mobility Corridor

