
Connected City
Smart City

# Connected Cities Tour
# "Getting to Smart"
# Dallas

**Jennifer Sanders**
Founder
North Texas Innovation Alliance

W Hotel
2440 Victory Park Lane
April 23 | 9:00 am to 2:00 pm

**Girish Ramachandran**
CTO, City of Dallas

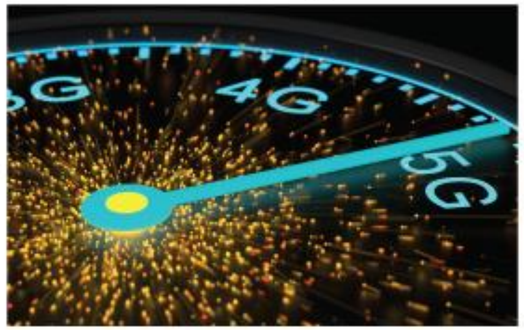
## Presenting Sponsor: GraybaR

"Getting to Smart" is a quick dose of knowledge to help you navigate in our increasingly mobile, always-on, information intensive, and SMART Society.

Network Technologies: 4G/5G, IoT, Fiber, Small Cells and WiFi are enabling new smart solutions that are transforming transportation, public safety, real estate and other critical aspects of society.

- 4G is evolving to 5G
- Small Cell deployments are being integrated into Smart Poles
- Cities are creating Smart Spaces with Video and AI
- IoT applications are creating terrabytes of data

Join Industry Thought Leaders and explore Business Models, Technology Architectures and First Hand Use Cases that are driving Innovation and Disruptive Solutions.




HITACHI
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T-Mobile BUILD YOUR OWN COVERAGE

SAFER BUILDINGS COALITION

JMA WIRELESS

extenet SYSTEMS

Gabe's

Fiber Broadband Association

Aero Wireless Group

Granite

CityPole

CompTIA

www.densenetworks.com

# "Getting to Smart" Connected Cities Tour

5G

Connectivity and Bandwidth are the oil of the Gig Economy.

Network Technologies such as:
4G/5G, IoT, Fiber, Small Cell and Wi Fi
are Transforming How Society Operates.

These sessions bring together thought leaders from Government, Enterprise, Academia and the Tech Community to look at the Business Models, Technology Architectures and action plans that City and Community ecosystems are using to build Dense Broadband Infrastructure.

## Be part of the Solution

## 2020 Event Schedule

| | |
|---|---|
| March 12 | Tampa |
| April 23 | Dallas |
| May 14 | Raleigh |
| June 11 | Washington DC |
| June 18 | Chicago |
| August 13 | Boston |
| September 10 | Philadelphia |
| September 24 | Kansas City |
| October 6 | Detroit |
| October 22 | San Jose |
| October 29 | Los Angeles |
| November 12 | New York |
| December 3 | Phoenix |

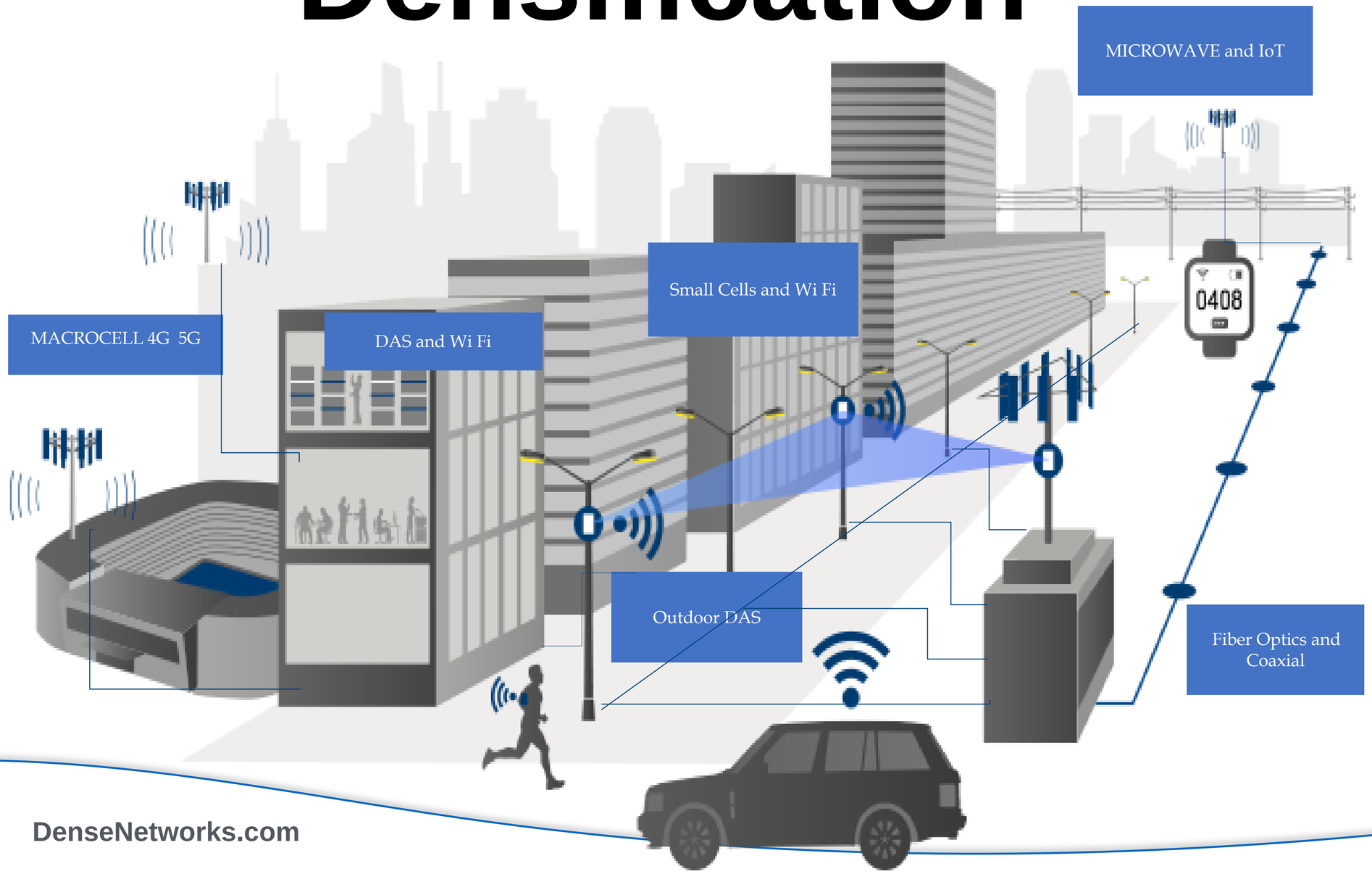
CONNECTED CITIES TOUR 2020

www.connectedcitiestour.com


CONNECTED CITIES
TOUR 2019
www.ConnectedCitiesTour.com

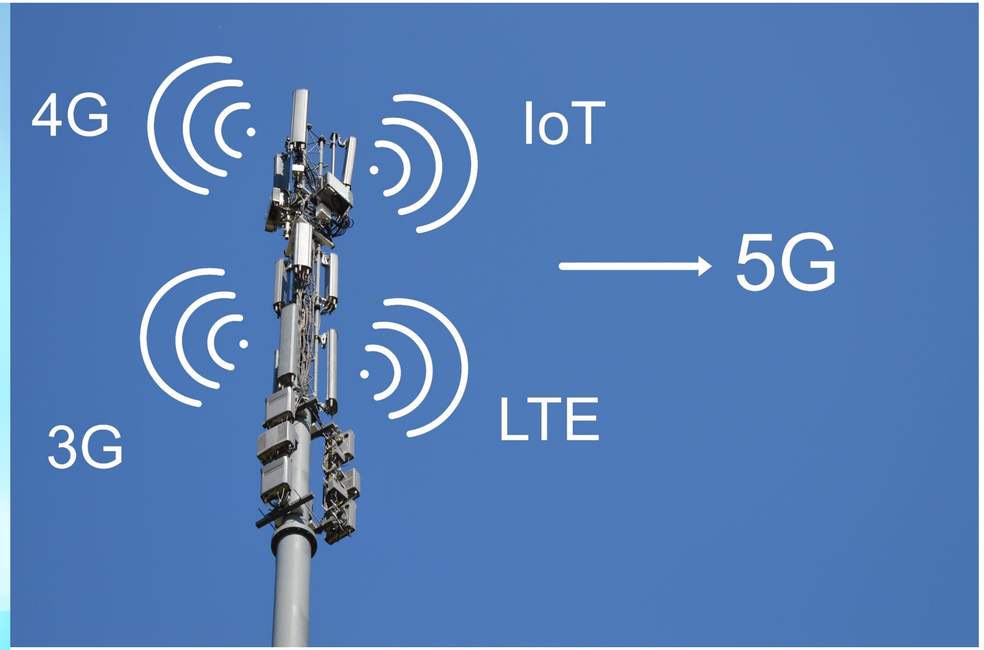

CONNECTED CITIES
TOUR 2020

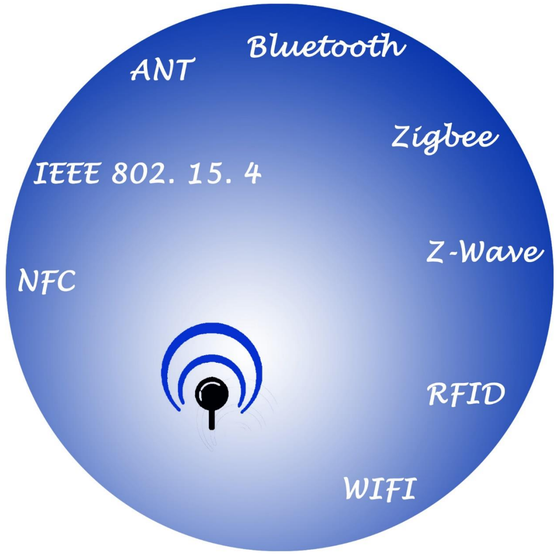
# Densification



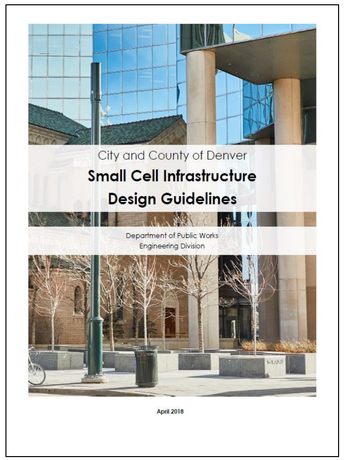
# How Many Networks?

## Capacity, Coverage, Compliance

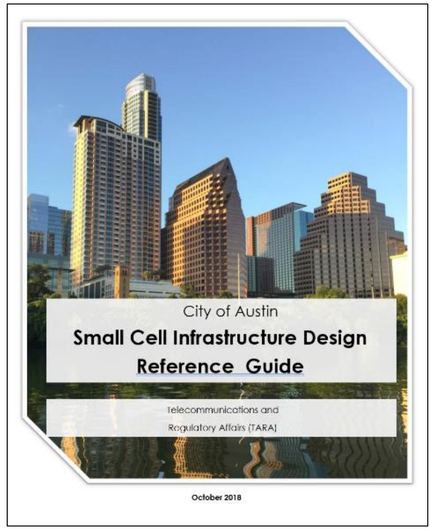



# Establish Design Guidelines – Supports Expediting Small Cell Deployments




- Public-facing review process including Districts, City Departments, Neighborhood Orgs
- Policy for co-location first
- Notification of adjacent property owner
- Restricting new pole density through min 250' spacing
- Restricting placement (along parks, historic & residential frontages)
- Restricting placement in front of residential & valuable sight lines
- Requiring camouflage and concealment
- Limiting height and equipment size
- Opportunity to coordinate fiber conduit

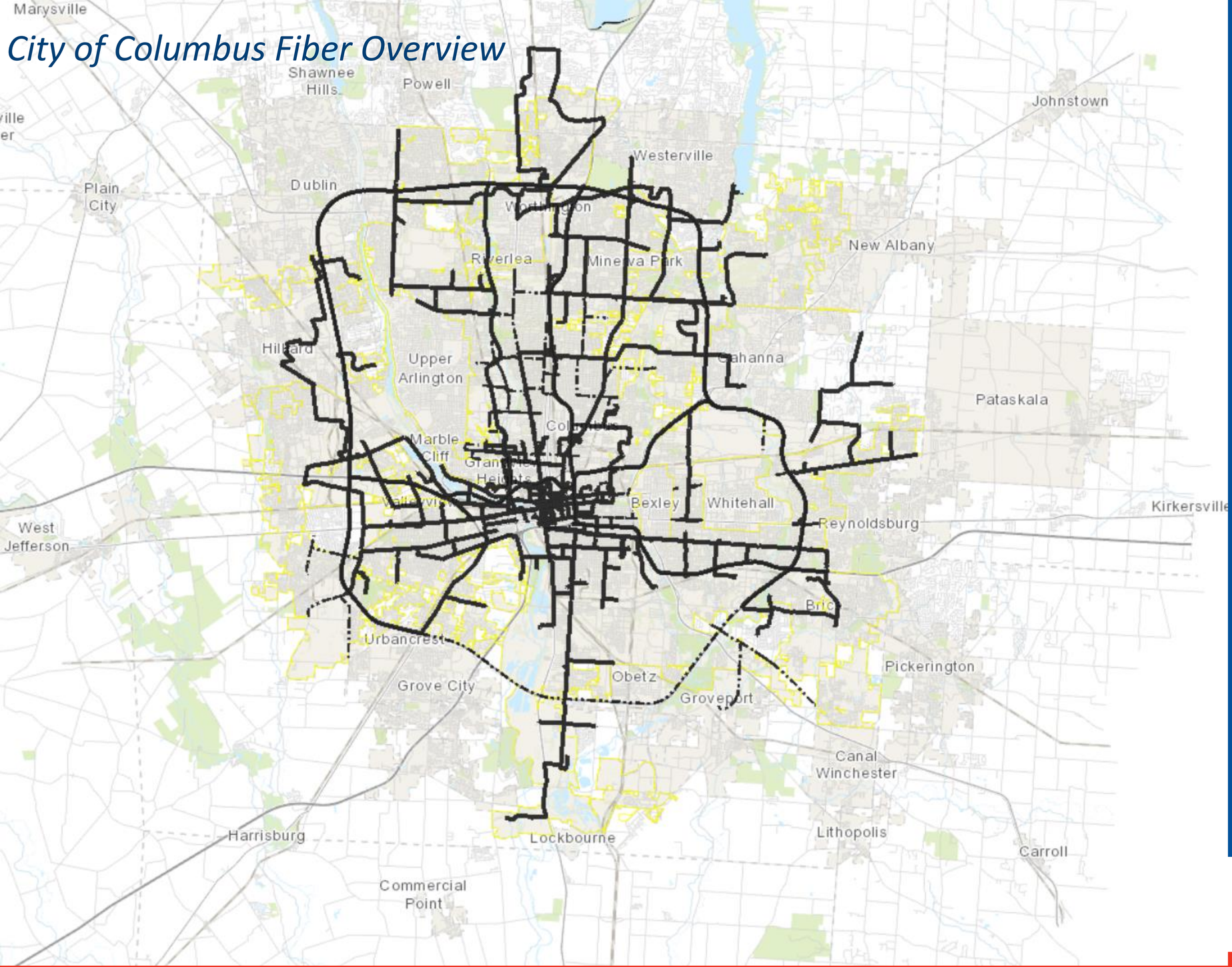
*Detailed PROCESS Guidance*




Each Municipality is Unique, and Each Should Create its Own Plans Informed by the Local Stakeholders

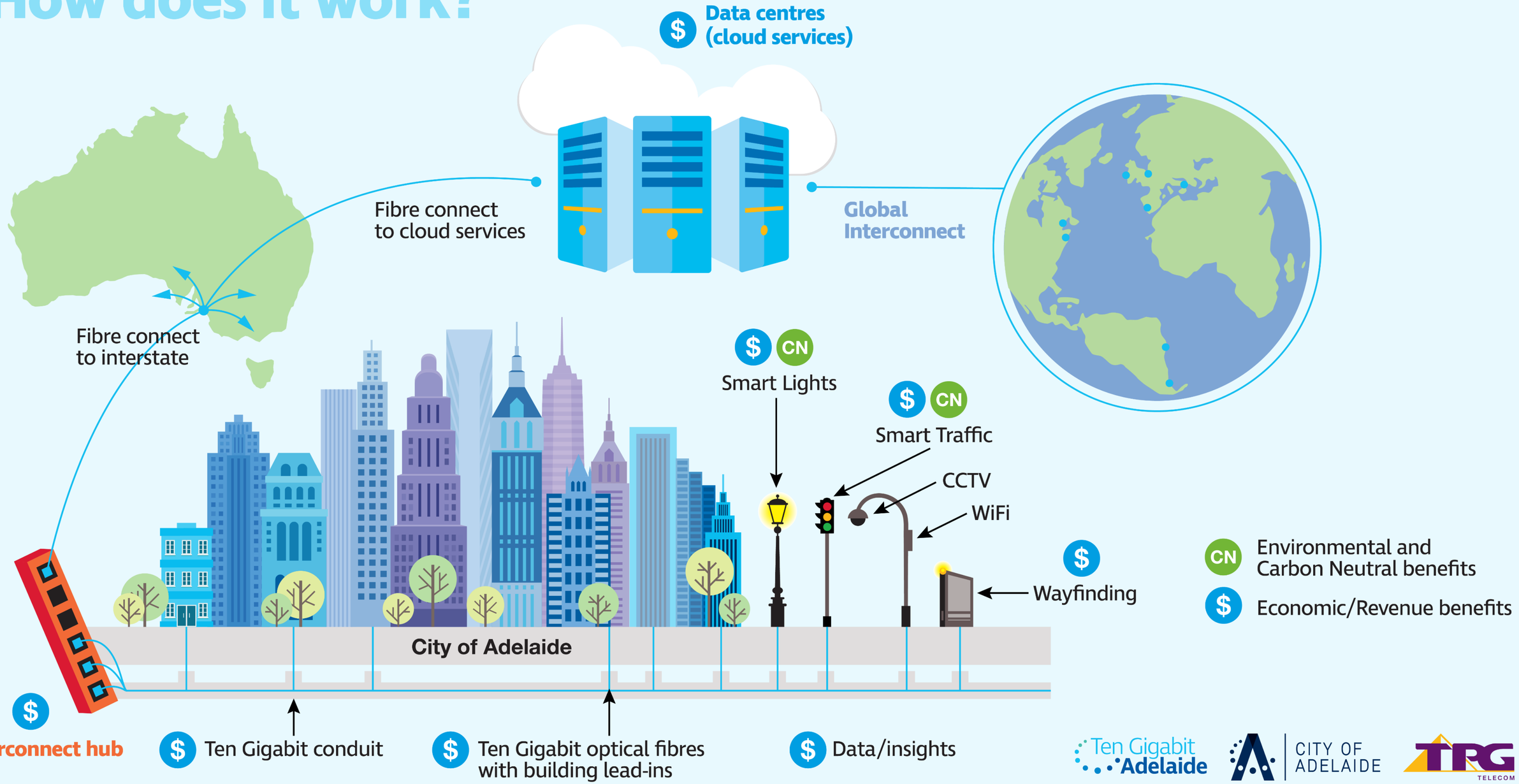
The Important Part: There's a Plan

# *City of Columbus Fiber Overview*




- Starting in 2015, the City offers excess capacity in its wholly owned 750 route-mile fiber optic network.
- Columbus program is currently a dark fiber program
- The City makes this capacity available through the use of an Indefeasible Right of Use (IRU)
- Customers include governments, higher education institutions, corporations and broadband providers and start-ups in Central Ohio
- Connected to multiple commercial data-centers across the region
- ~ 1,000 miles of fiber

# How does it work?

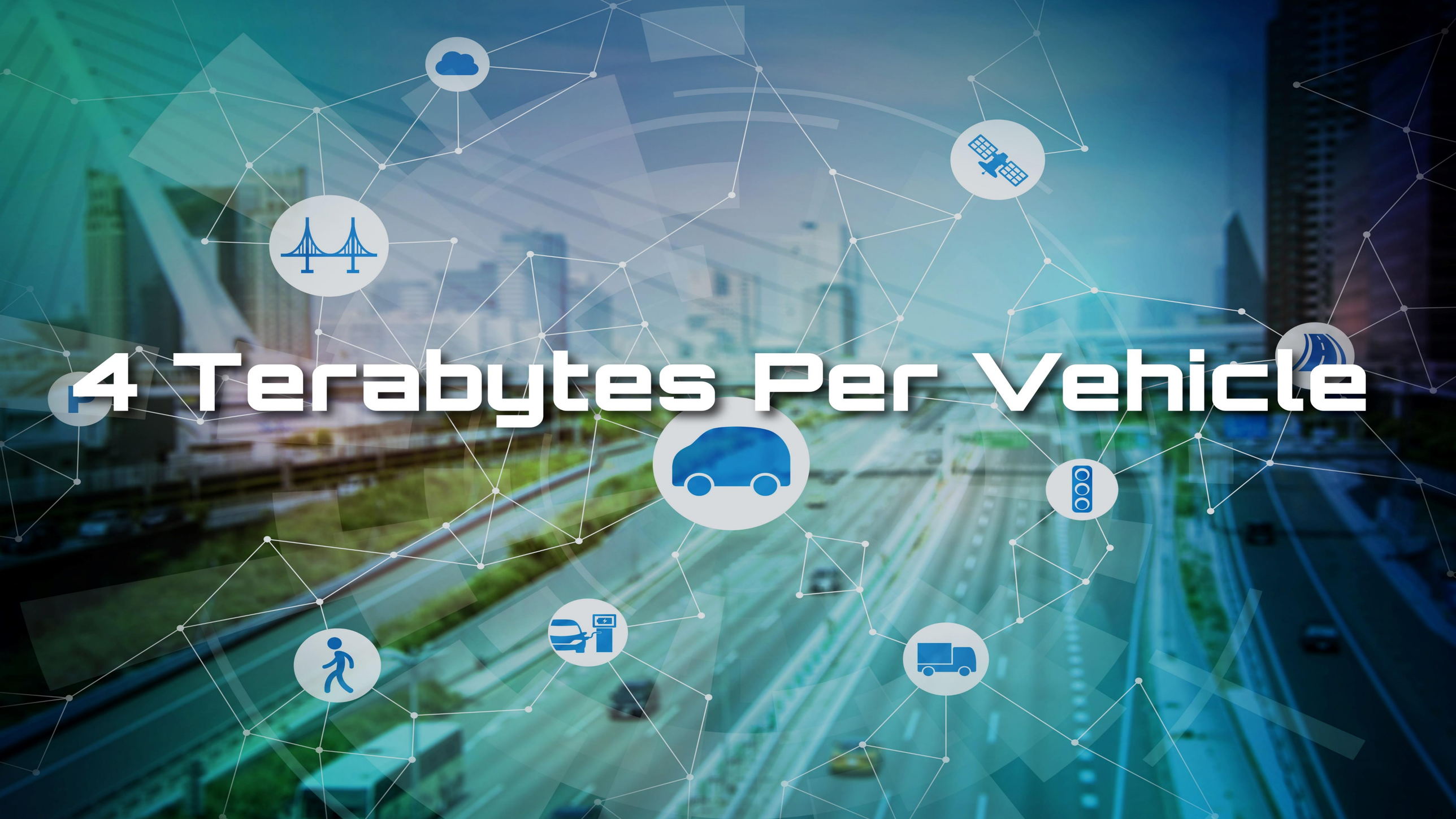



Ten Gigabit Adelaide

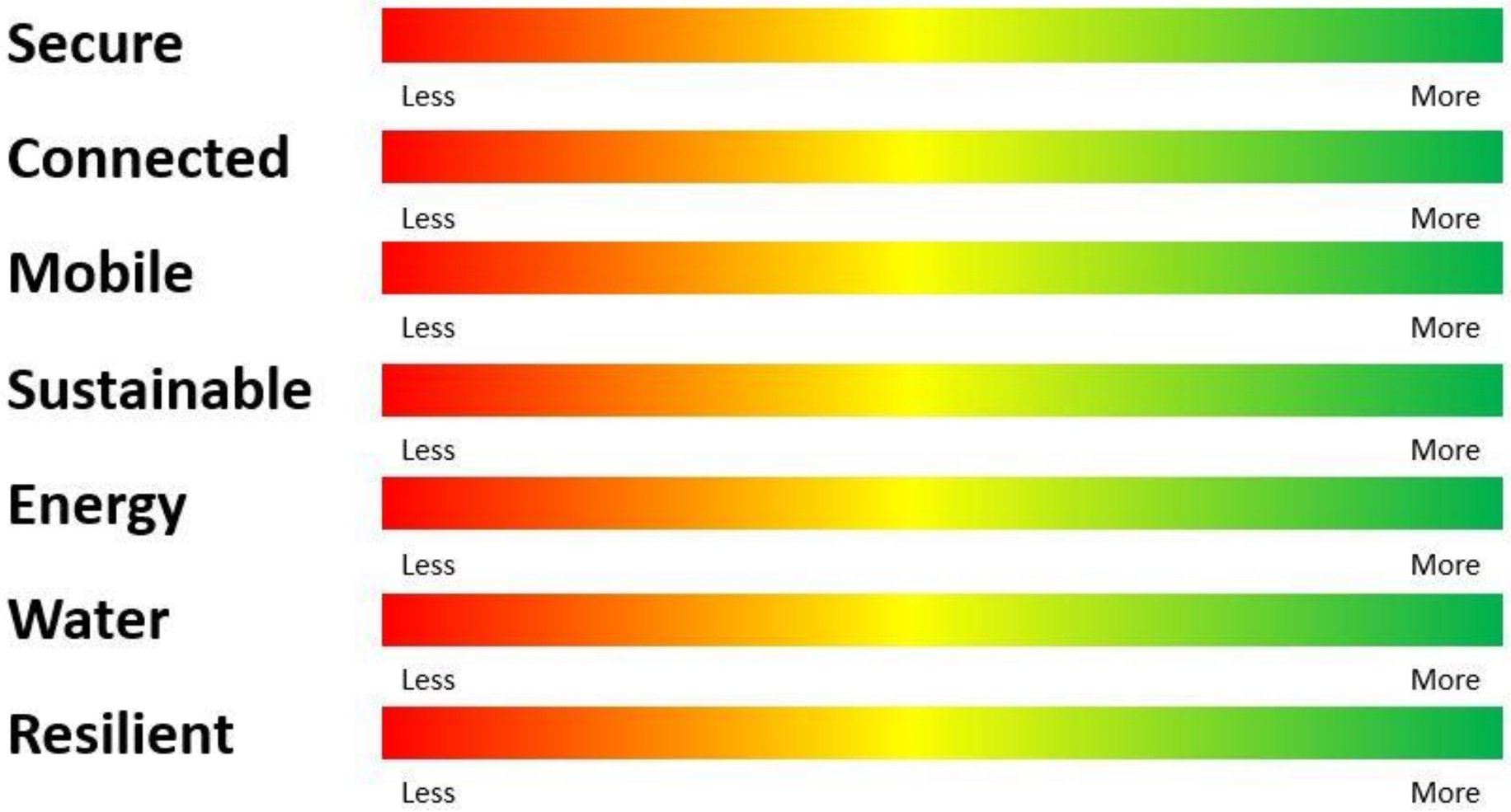
CITY OF ADELAIDE

TPG TELECOM
OFFICIAL NETWORK PROVIDER

# 2019


4 Terabytes Per Vehicle

# OUC Approach



# Smart Community Ideas: Secure

| | Apartments | Master Planned Residential | Office & Retail | Industrial | Hospitality/ Community |
|---|---|---|---|---|---|
| Smart Streetlights | ● | ● | ● | ● | ● |
| Incident Detection | ● | ○ | ● | ◑ | ● |
| Real-time Surveillance | ◑ | ◑ | ● | ● | ● |
| Crowd Monitoring | ○ | ○ | ◑ | ◑ | ● |
| Wearables | ◑ | ◑ | ○ | ○ | ◑ |
| Real-time Recognition | ○ | ○ | ◑ | ◑ | ● |

Less

More



OUC The Reliable One®

A Smart Miami is:

- *Connected*
- *Equitable*
- *Resilient*
- *Sustainable*
- *Transparent*
- *Self-Aware*

# The Digital Divide Defined

A **digital divide** is an economic and social inequality in the access to, use of, or impact of information and communication technologies (ICT). The divide within countries (such as the digital divide in the United States) may refer to inequalities between individuals, households, businesses, or geographic areas, usually at different socioeconomic levels or other demographic categories. The divide between differing countries or regions of the world is referred to as the global digital divide, examining this technological gap between developing and developed countries on an international scale.

# Alison Barlow

## Executive Director

## St. Pete Innovation District


Connected City
Smart City

# Alison Barlow

## Executive Director

## St. Pete Innovation District

# Public-Private Partnership

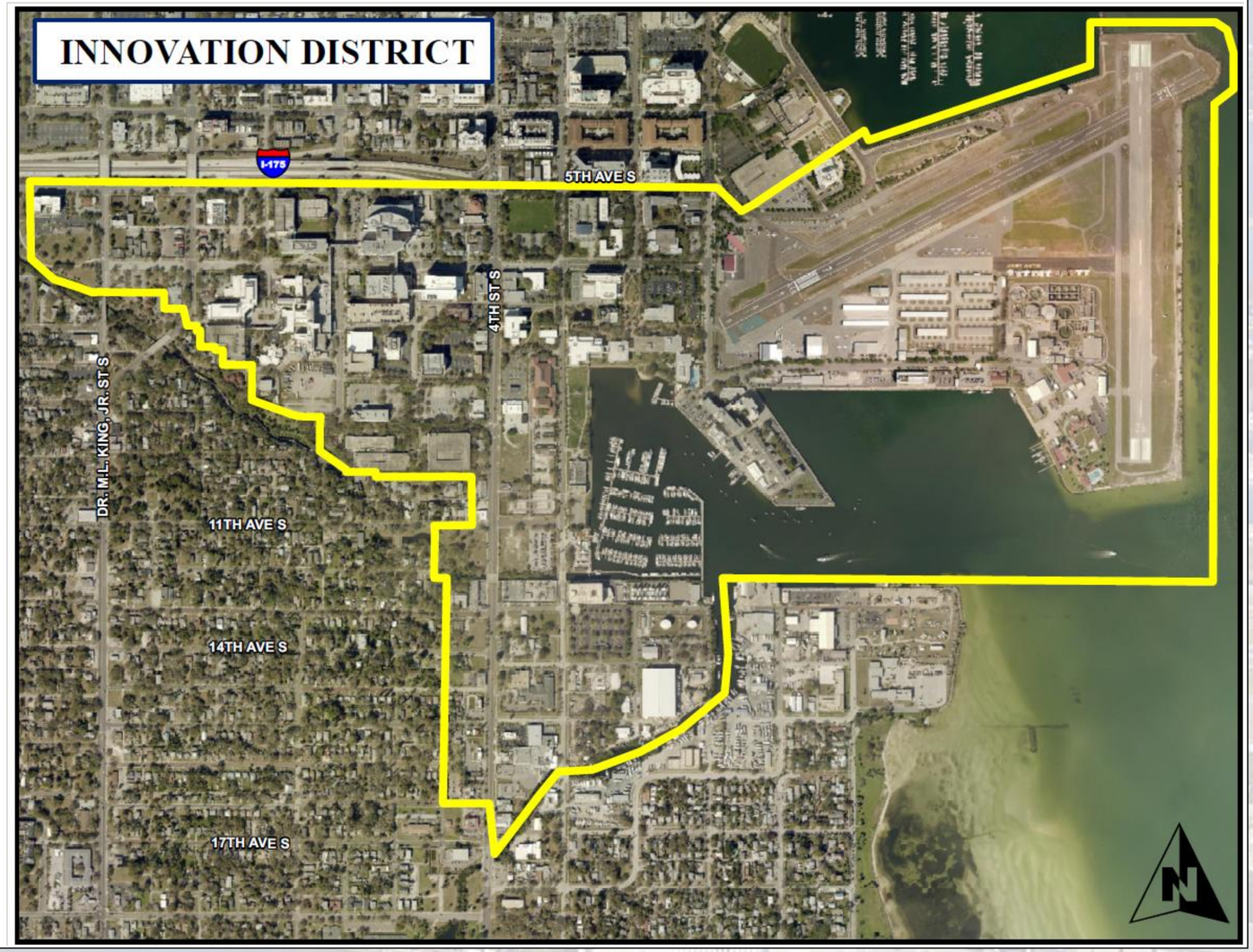
**7** anchor institutions

**40+** organizations

(nonprofit, for profit, education, state & federal govt)

**60%** are in the District

**40%** are outside the District



# Patti Zullo
# Sr. Director, Smart Cities
# Spectrum

CREATING SMART AND
CONNECTED COMMUNITIES

# Future of Fiber

Fiber Broadband Association

**Lisa R. Youngers**
President and CEO
Fiber Broadband Association

# About the Fiber Broadband Association

- **Fiber Broadband Starter Kit & Workshop** for companies, organizations, communities to learn how to build **all-fiber networks**.
- **Thought leadership** on all things fiber through our **Optics** online magazine.
- **Collaborate** with industry allies to propel fiber deployment forward for a **broadband future** here and around the **globe**.
- **Connect** vendors, manufacturers, contractors, network operators, engineering firms and all contributors to fiber deployment **– “the Fiberverse”**.
- **Remove barriers** to deployment while supporting pro-fiber policies in all forums.

# Rebecca Hunter, VP
# Aero Smart Communities

Aero *Wireless Group*

- **20 years – Innovative Wireless Infrastructure**
- **Smart Pole Concealment Solutions**
- **Wireless Infrastructure Planning Product Solutions**
- **Professional Engineering Services**
  - Municipalities
  - Wireless Operators
  - Public and Private Utilities

Aero *Smart Communities*

CityPole by Comptek

Comptek

# Daryl Sullivan
# Sr, Director
# Hitachi Social Innovations

# Hitachi Video Analytics Delivers Digital Insights

NEXT 2018

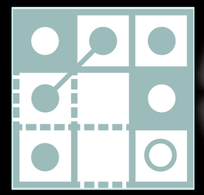
## Operational & Business Intelligence


People Counter

Traffic Analyzer

Queue Detector


License Plate Recognizer



Activity Visualizer


Parking Space Analyzer

Direction Controller

Camera Health Monitor

## Security

Intrusion Detector

Facial Recognition

Object Detector

Video Enhancer

## Privacy

Privacy Protector


European Privacy Seal

EP-P-F9LDTM / Valid till 2017-10

Police • Hospitals • Campuses • City Agencies • Retail • Financial Services • Transportation • Utilities

# Our Smart City Premise

Use technology and data analytics to

- Solve Community Challenges -

- Incubate Entrepreneurs -

- Foster Economic Development -

# Obstacles to Smart City Implementation

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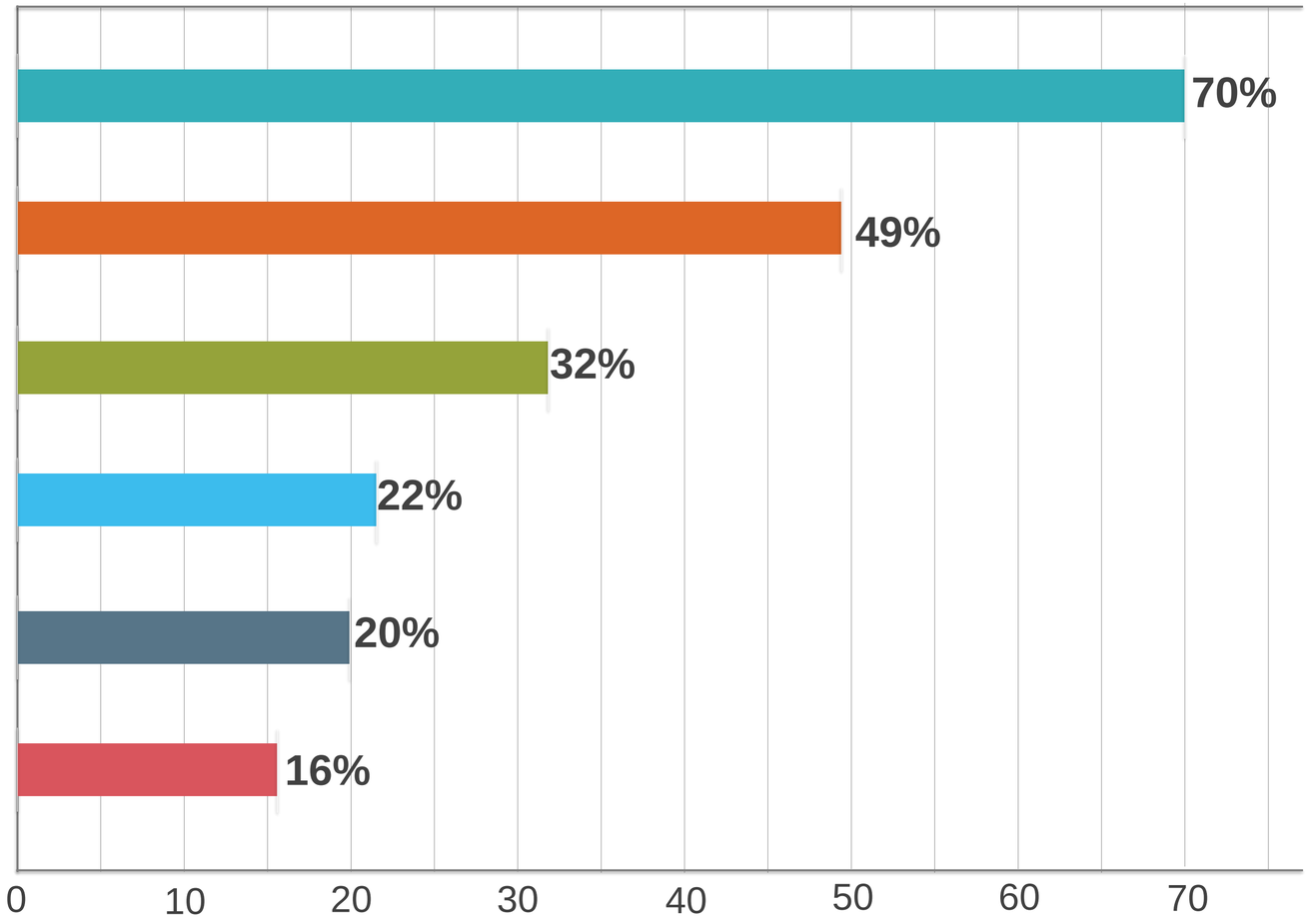
Feedback from city leaders in the US to identify key barriers.

1. Budget constraints
2. Lack of resources/ expertise
3. Policy hurdles – Legislation
4. Ownership across departments
5. Gaining stakeholder support
6. Short-term mindset




Source: Black & Veatch, 2015, BI Intelligence
Posted on BI INTELLIGENCE, DEC 14, 2016
https://cdn.ampproject.org/c/www.zdnet.com/google-amp/article/australian-government-agencies-testing-but-not-implementing-emerging-tech-accenture

# Community Challenges - Technology Could Help Solve

1. Increase understanding of our youth of coastal issues
2. Elevate our schools thru STEM tools/education
3. Improve our infrastructure
4. Increase bike and pedestrian safety
5. Address the digital divide
6. Grow small businesses and entrepreneurs (access, data)
7. Improve wayfinding (particularly for visitors)
8. Improve transportation

# A DIVERSE NETWORK INFRASTRUCTURE IS THE KEY TO UNLOCKING CITY INITIATIVES

## SEPARATE AND INTEGRATED

### WiFi

Prevalent throughout the city providing a network for large scale communication, data collection and data analysis to be leveraged to react in real-time and can be used to help plan for population growth and shifting urbanization.

### 5G

Many smart city use cases, ranging from connected cars to smart parking and intelligent transportation will be enhanced by 5G deployments.

### Low-power wireless

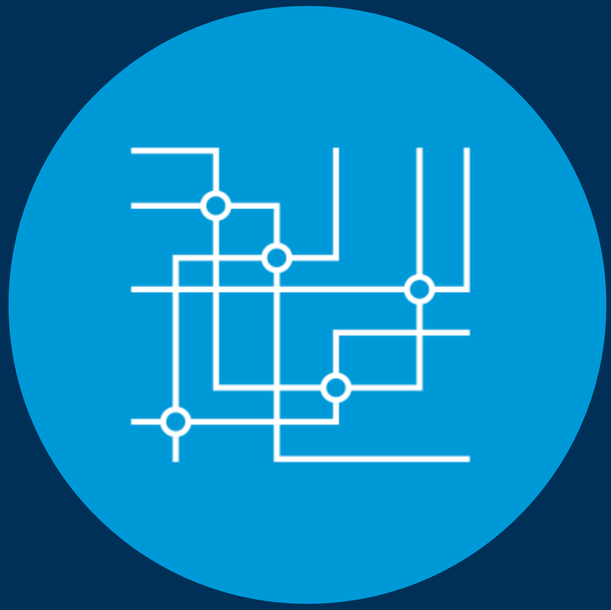
Sensors can utilize existing low-power wireless networks to relay data to existing network infrastructure.

### Cable

No need to wait for 5G to start smart and connected community projects. Most cities have existing connectivity ready to support smart community and IoT initiatives.

### Fiber

By associating big data with people or situations, city leaders can provide services that apply predictive and prescriptive capabilities to anticipate unfolding events in real time.



Spectrum

# Why Fiber: Smart Communities

According to 2018 research from RVA, LLC:

## Fiber Cities are more likely to be Smart Cities

- Cities with fiber have, on average, 37% more deployed small cells and just over 35% more smart city applications
- 33% of cities without fiber report small cell activity, versus 60% of cities with fiber to the residence

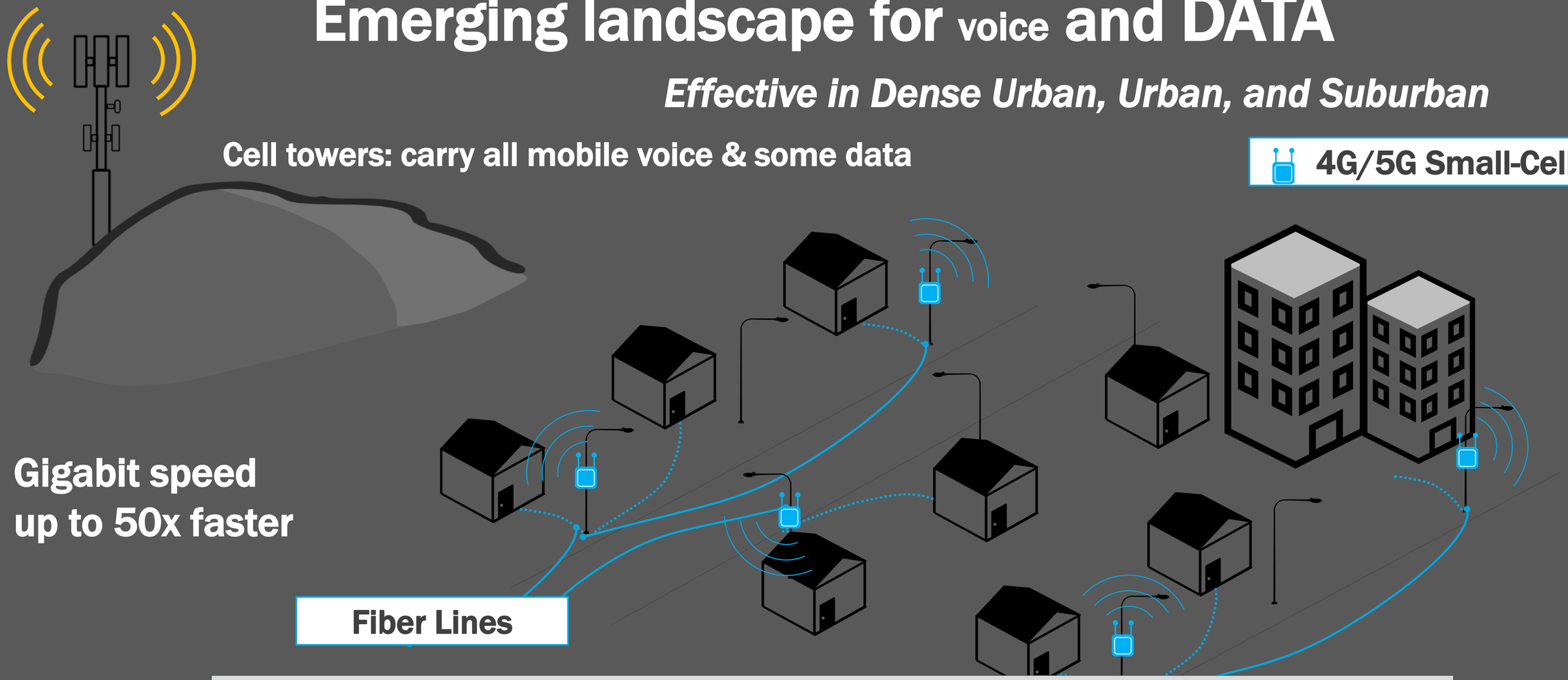
# Broadband Strategy

## Emerging landscape for voice and DATA

***Effective in Dense Urban, Urban, and Suburban***

**Cell towers: carry all mobile voice & some data**

**4G/5G Small-Cells**



**Gigabit speed**
**up to 50x faster**

**Fiber Lines**

*Light pole is most valuable asset for broadband*

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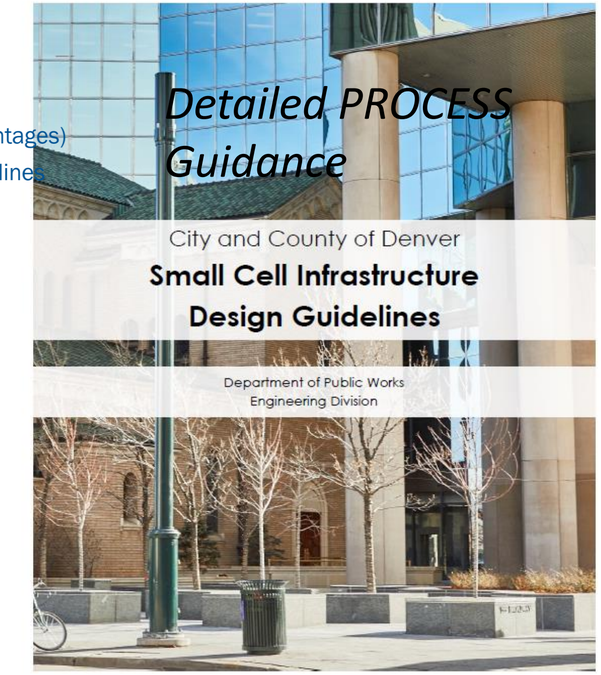



Each Municipality is Unique, and Each Should Create its Own Plans Informed by the Local Stakeholders

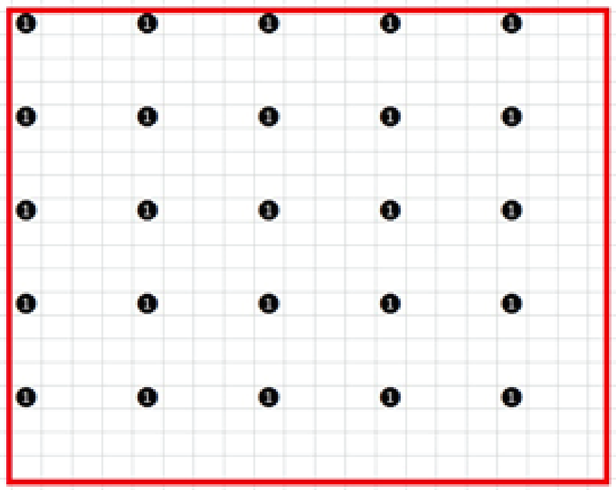
The Important Part: There’s a Plan

# Why Fiber: 5G Densification

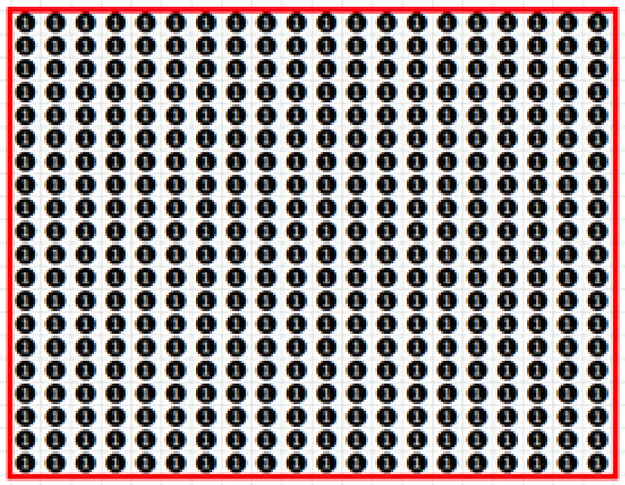
## *To go to 4G requires 25X more fiber*

## *To go to 5G requires at least 16X more fiber*

3G
1 site every 10 km
Cell density=1 cell/100 km2



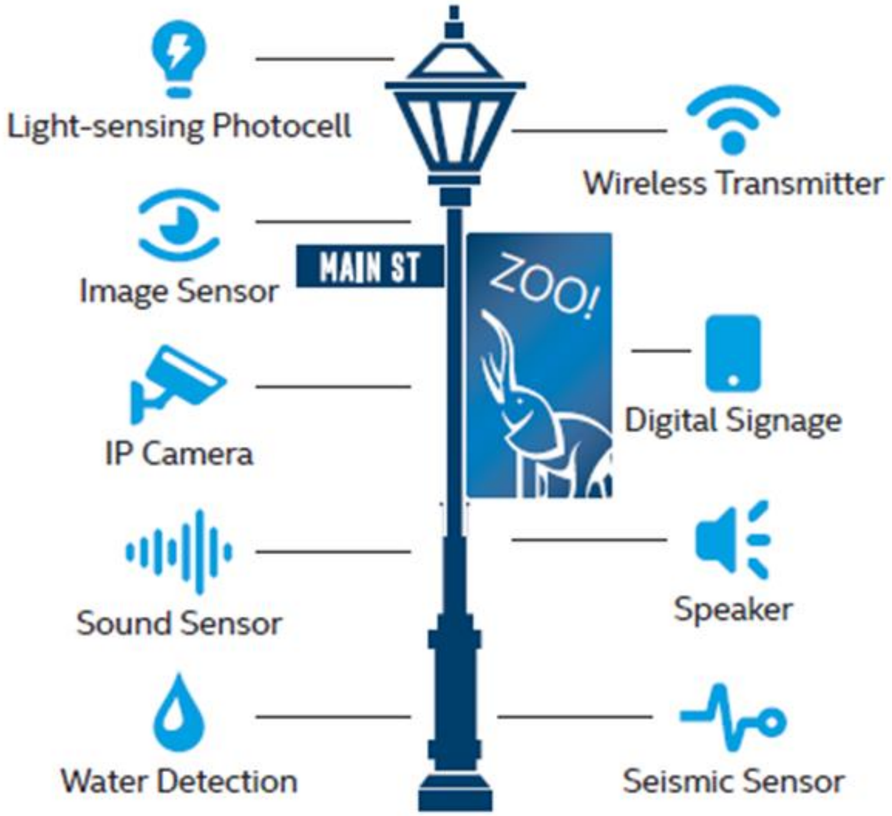
4G
1 site every 2km
Cell density= 5 x 5
= 25 cells/100 km2



5G
1 site for every 0.5 km
Cell density= 20 x 20
= 400 cells

# Living Lab: Smart Street Lights & Traffic

St. Pete INNOVATION DISTRICT
Discover, Imagine, Do



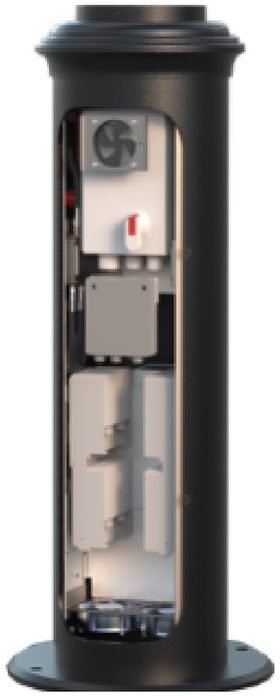

- Autonomous Infrastructure

# Public Infrastructure Network Node (P

AIRE - RAAS CERTIFIED PLATFORM

**Unified City Infrastructure:**

- Radio Access Networks (5G)
- Edge Computing
- Situational Awareness (Radar, cameras, sensors)
- Precision Navigation
- Intelligent Transportation Systems



**Base**

intel

Edge AI

Hardened

**Edge Supercomputing:**

- Machine Learning
- Algorithm Processing
- RF Processing
- Sensor Fusion

**Pole**

Tr

PHI

NUVOT

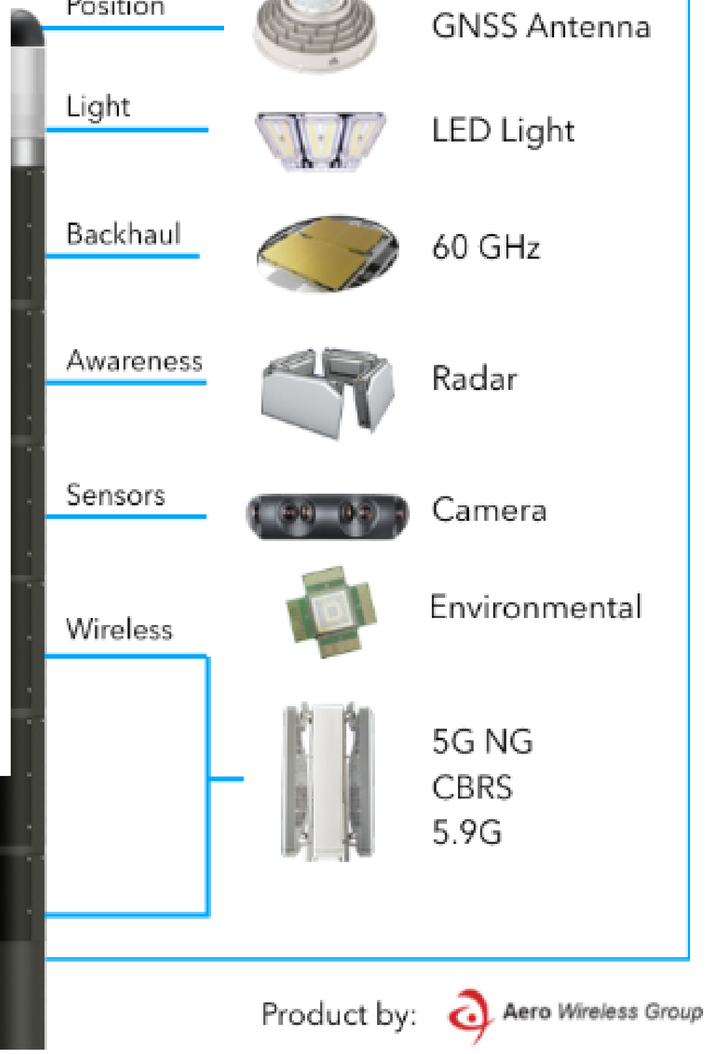
FOR

MOB

ERIC

NOKIA

SAMSUNG



Position



GNSS Antenna

Light



LED Light

Backhaul



60 GHz

Awareness



Radar

Sensors



Camera



Environmental

Wireless



5G NG
CBRS
5.9G



Product by: Aero Wireless Group

# Future Proof Poles - Interchangeable Equipment Modules

Flex Space for Multiple Equipment Loadouts.

Allows New Pole Configurations with minimal impact.

Flex-Rail System to simplify mounting.

Thermal Management System and remote monitoring.

# SPECTRUM SMART CITY SOLUTIONS

## ECONOMIC DEVELOPMENT & CIVIC ENGAGEMENT

- Connected communities
- Digital government
- Open data
- Smart kiosks

## UTILITIES AND INFRASTRUCTURE

- Smart lighting
- Smart waste management
- Smart water management
- Smart grid
- Smart buildings
- Digital Twin

## INTELLIGENT TRANSPORTATION

- Intelligent traffic management
- Connected vehicles
- Autonomous Vehicles
- Smart parking

## PUBLIC SAFETY

- Video surveillance
- Critical infrastructure monitoring
- Situational awareness
- Police wearables
- Environmental monitoring
- Drone monitoring

**INFRASTRUCTURE**

### SENSORS / DEVICES

Surveillance
Traffic
Kiosk
Lighting
Environmental
Water meter

### NETWORK

Fiber
Coax
Wi-Fi
LoRa
LTE
NB-IoT

### ANALYTICS AND VISUALIZATION

Artificial intelligence
Citizen engagement
Reporting
Dashboard
Open data

Spectrum

# Data-Driven Operations and Safety Optimization

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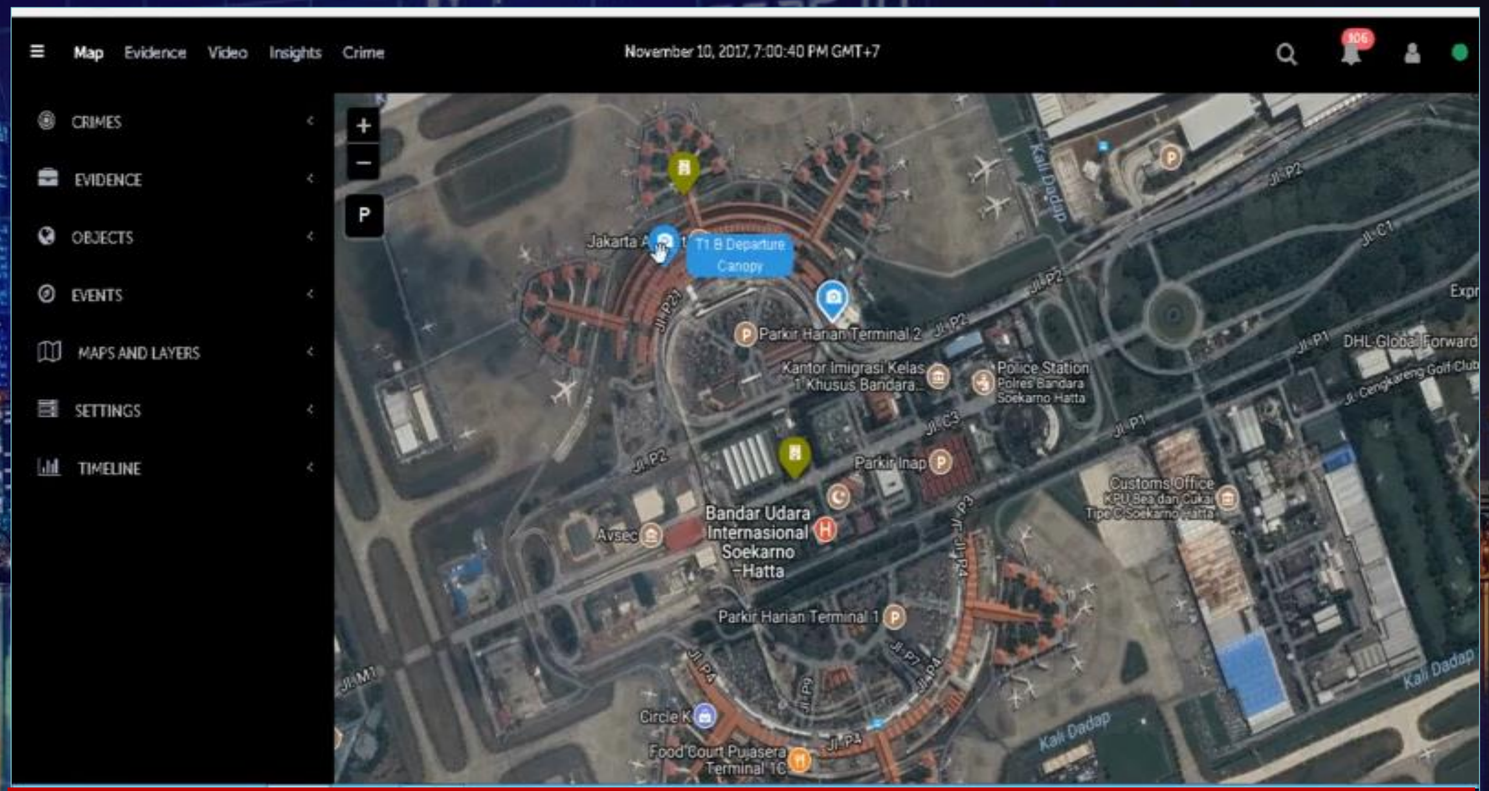
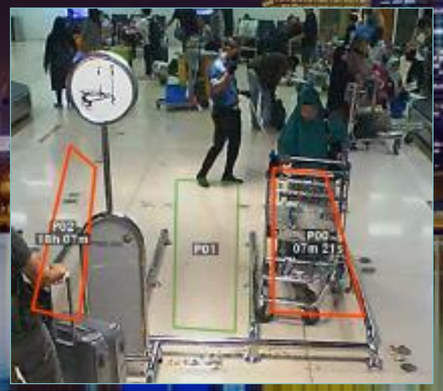
Curbside Management


Object Left Behind

**+10 minutes** to wait time
= **30% reduction** in retail spend




Integrated Visualization – Augmented Video and IoT Insights




Cart and Vehicle Inventory

Passenger, Parking and Ops Analytics

# 3D Lidar
# Facility Movement and Journey Tracking

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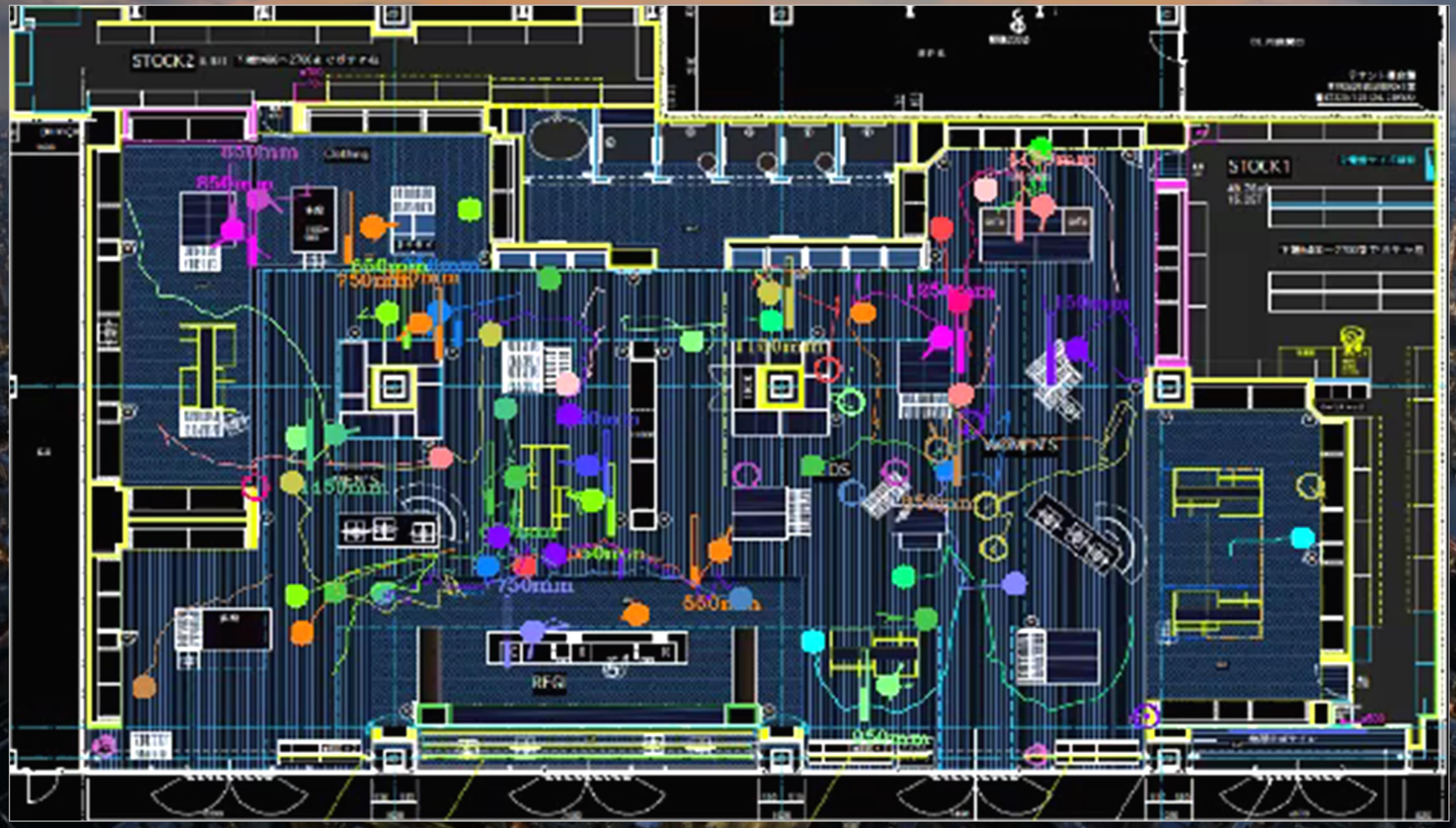

# Privacy Protection: Generating Rich Insights Without Personally Identifiable Information (PII)

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***Video Privacy Protection:***

- Detects people and pixelates or color-masks full body
- Additional analytics can analyze original images
- ***Transparency:***
- Original feed can be accessed for investigations, requiring a keycard and passcode; actions are tracked for GDPR readiness

***3D Lidar:***

- No personally identifiable information (PII) is captured
- Can be used in privacy-sensitive locations
- Privacy protected by design



Hospitals • Schools • Cities • Retail • Financial Services • Transportation

# Building a Smart Connected City

Alison Barlow

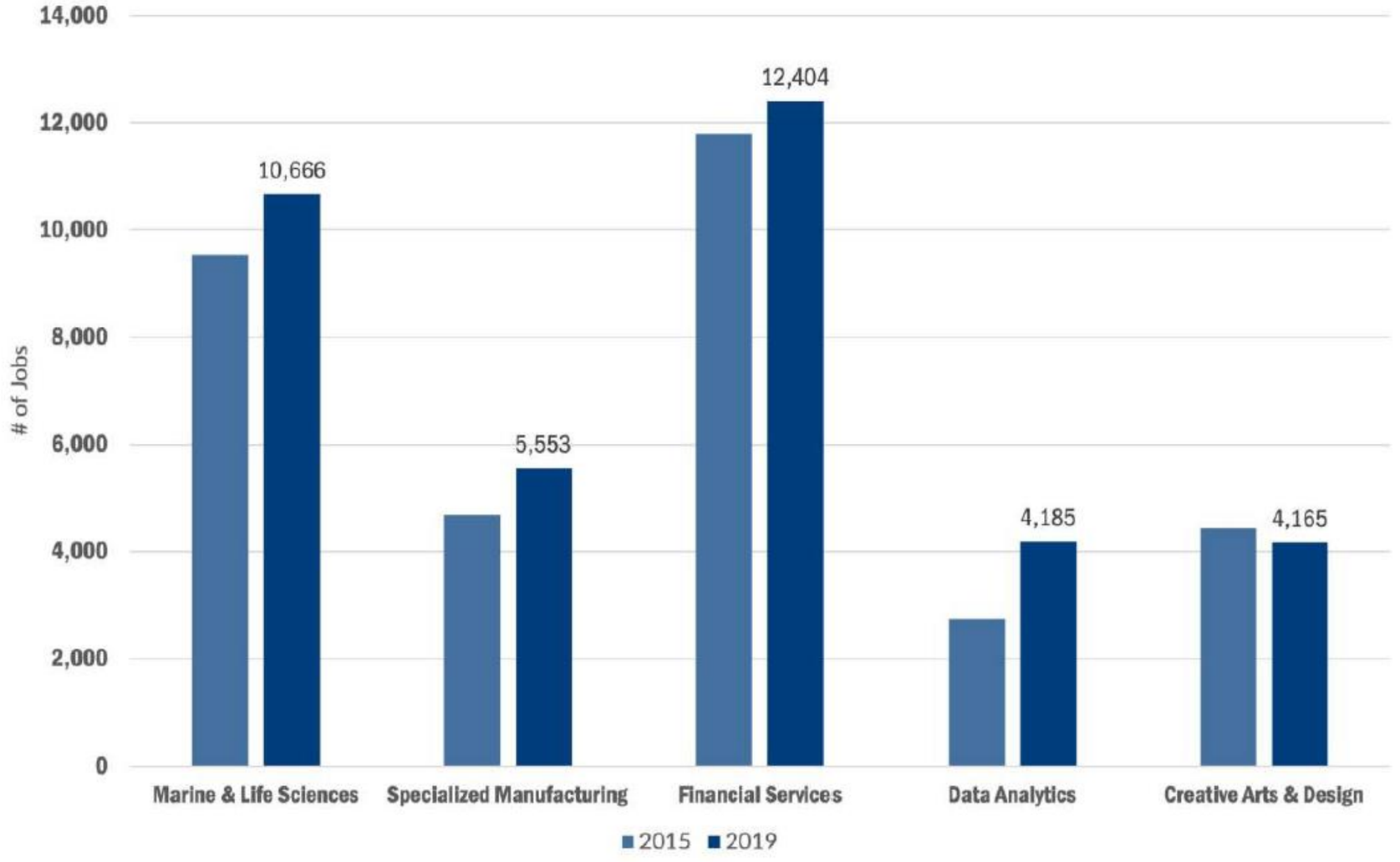
St. Pete INNOVATION DISTRICT

# Smart City Tools Can Connect & Accelerate Efforts

Economic Growth
+ Sustainability and Resiliency Planning
x Smart City Tools

_____
= Future of St. Petersburg

# GROW SMARTER INDUSTRIES (2015-2019)




## THE NUMBERS

2015: **29.8%** of total city employment in Grow Smarter industries (33,173 jobs)

2019: **32.0%** of total city employment in Grow Smarter industries (36,973 jobs)

2015-2019: overall increase of **11.5%** employment in Grow Smarter industry employment

Average wage of Accommodation & Food Services:
**$21,232**

Average wage of Finance & Insurance:
**$69,550**

Florida DEO Quarterly Census of Employment & Wages, 2018 data for Pinellas County

# Dr. Dean Bushey

Joins Dense Networks to Expand Focus
on Transportation and Public Safety

**Retired Air Force Colonel**

**Chief of Intelligence and Surveillance Operations,
US Air Force, Europe**

**Pioneer in Military Aerial Drone Technologies**

**Professor, US Air Force Academy**

**General Manager, Voyage, Autonomous Vehicles**