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SMART C RRIDOR

GPA
Fall Conference
October 3, 2019

Aerotropolis
ATLANTA
Community Improvement Districts

MODERN MOBILITY
partners

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INTRODUCTIONS

Study Team

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MODERN MOBILITY partners

Subconsultant KCI TECHNOLOGIES

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AGENDA

- Study Overview
- Corridor Context
- Screening of Technologies
- Final Recommendations
- Implementation Plan

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STUDY OVERVIEW

STUDY OVERVIEW

Study Funding

Livable Centers Initiative (LCI) Grant (80%)

Local Match (20%)

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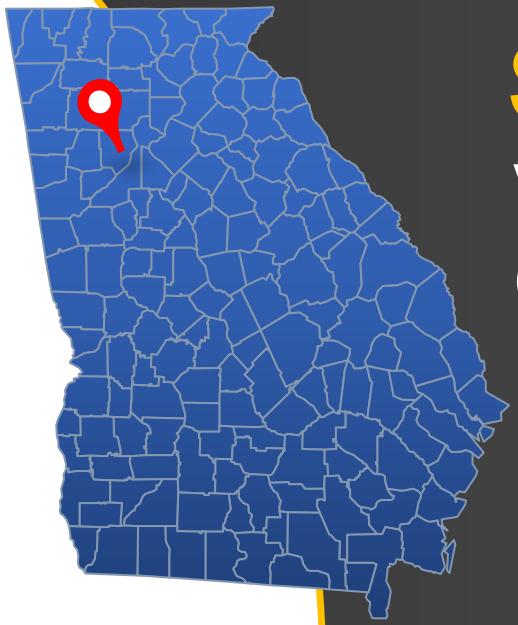

STUDY OVERVIEW

Virginia Ave. from Main St./US 29 to South Central Ave.

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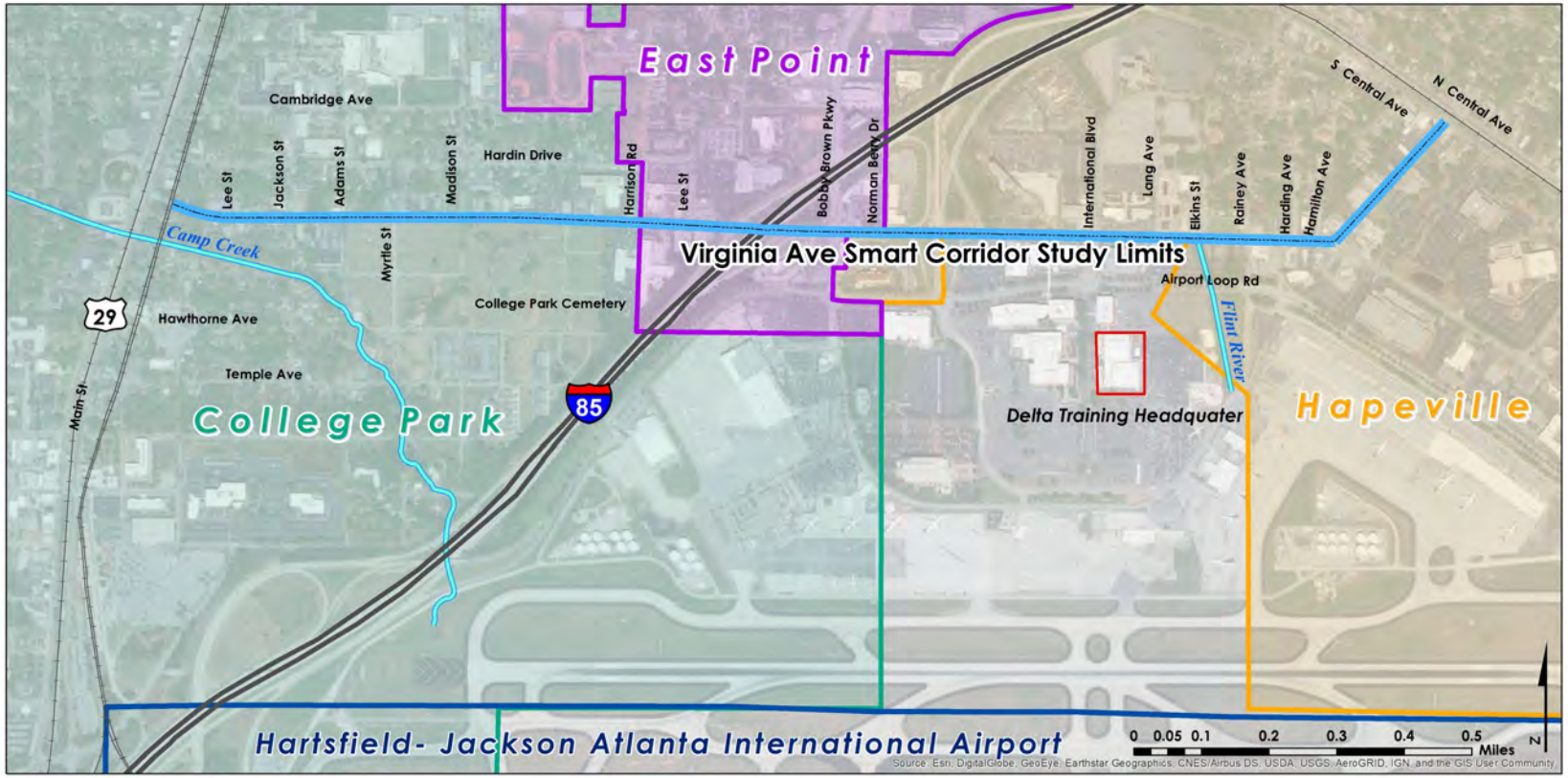
Virginia Ave Smart Corridor Study Limits



Legend

- Virginia Ave Smart Corridor Study Limits
- Railroads
- Water Body
- East Point
- Hapeville
- College Park
- Airport

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STUDY OVERVIEW

What Are We Trying to Improve with Technology?

Safety

Mobility

Walkability

WHAT TYPES OF SOLUTIONS DID WE REVIEW?

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- Signals
- Bikes/ Pedestrians
- Transit
- Street Lights
- Pavement/ Sidewalks
- Wayfinding
- Parking
- EV Charging
- Video Surveillance
- Wi-Fi
- Curbside
- Apps
- Data Exchange


172 3MINS

STUDY OVERVIEW

Schedule

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Jan-Feb '19

Existing Conditions & Needs Assessment

Update Project Prioritization Framework & Develop Menu of Strategies

Mar-Apr

Public Meeting

May-Jul

Best Practices and Trends & Strategy Evaluation

Jul-Aug

Preliminary Recommendations

Sept

Public Meeting

Sept '19

Final Recommendations & Implementation Plan

STUDY OVERVIEW

Public Engagement

By the Numbers…

- **2** Public Meetings
- **66** Attendees
- **2** Facebook Lives
  - **687** Reaches
  - **329** Views
  - **124** Engagements
- **1** Online Survey
  - **76** Responses
- **1** Flyover Video
- **1** Digital Billboard

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CORRIDOR CONTEXT

CORRIDOR CONTEXT

Demographics

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11,000 | People Within 1 Mi. of Virginia Ave.

Data Source: Population within 1 mile buffer of Virginia Avenue; EPA EJSCREEN Report, Version 2018

CORRIDOR CONTEXT

Demographics

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Data Source: Population within 1 mile buffer of Virginia Avenue; EPA EJSCREEN Report, Version 2018

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CORRIDOR CONTEXT

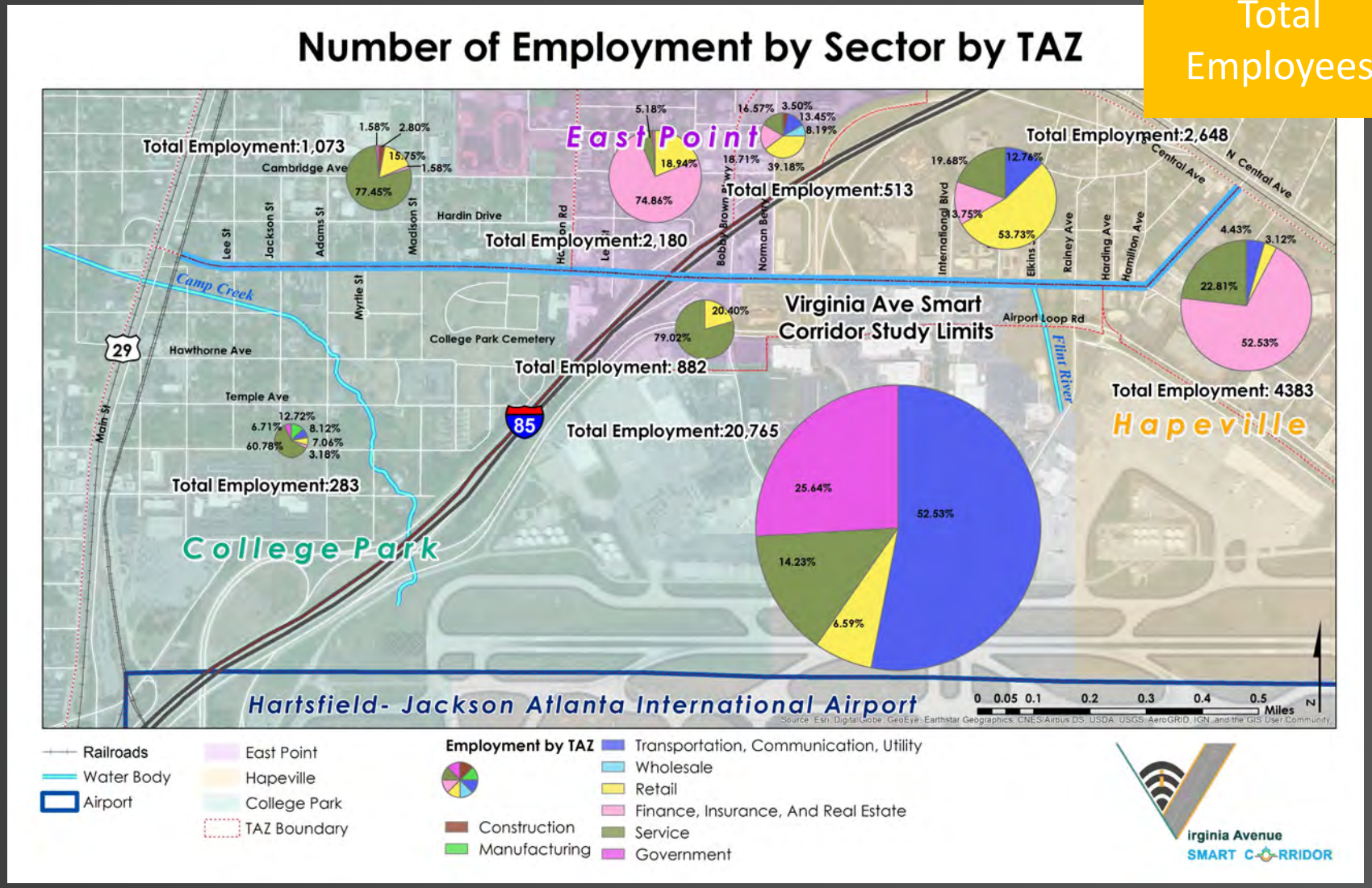
Demographics

Data Source: ESRI Tapestry

CORRIDOR CONTEXT

Demographics

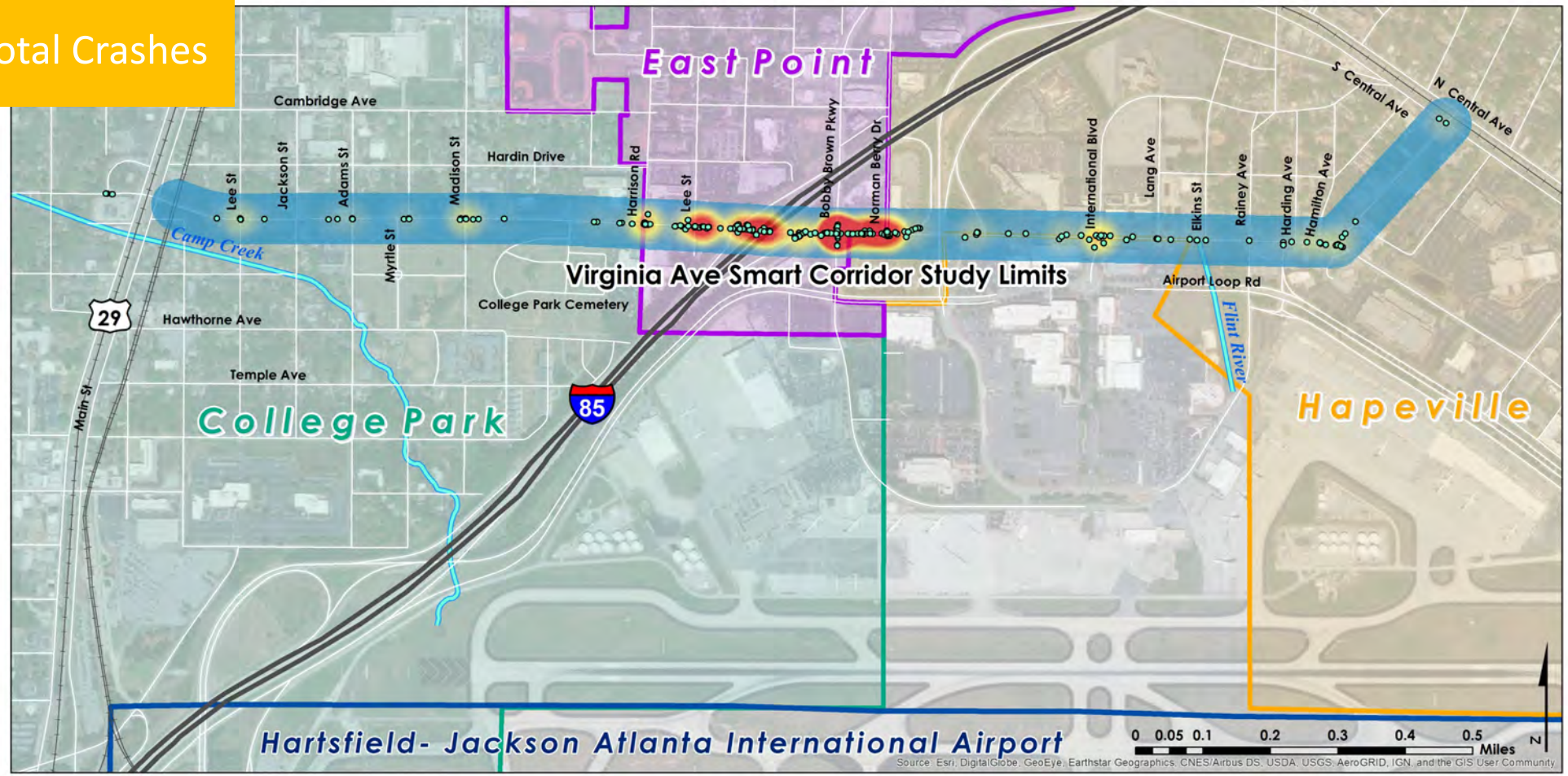
12,000
Total Employees



SAFETY

588
Total Crashes

Vehicle Crash (2014-2017)



- Crash Event
- Railroads
- Airport
- Water Body
- East Point
- Hapeville
- College Park
- High Number of Crash Events
- Low Number of Crash Events

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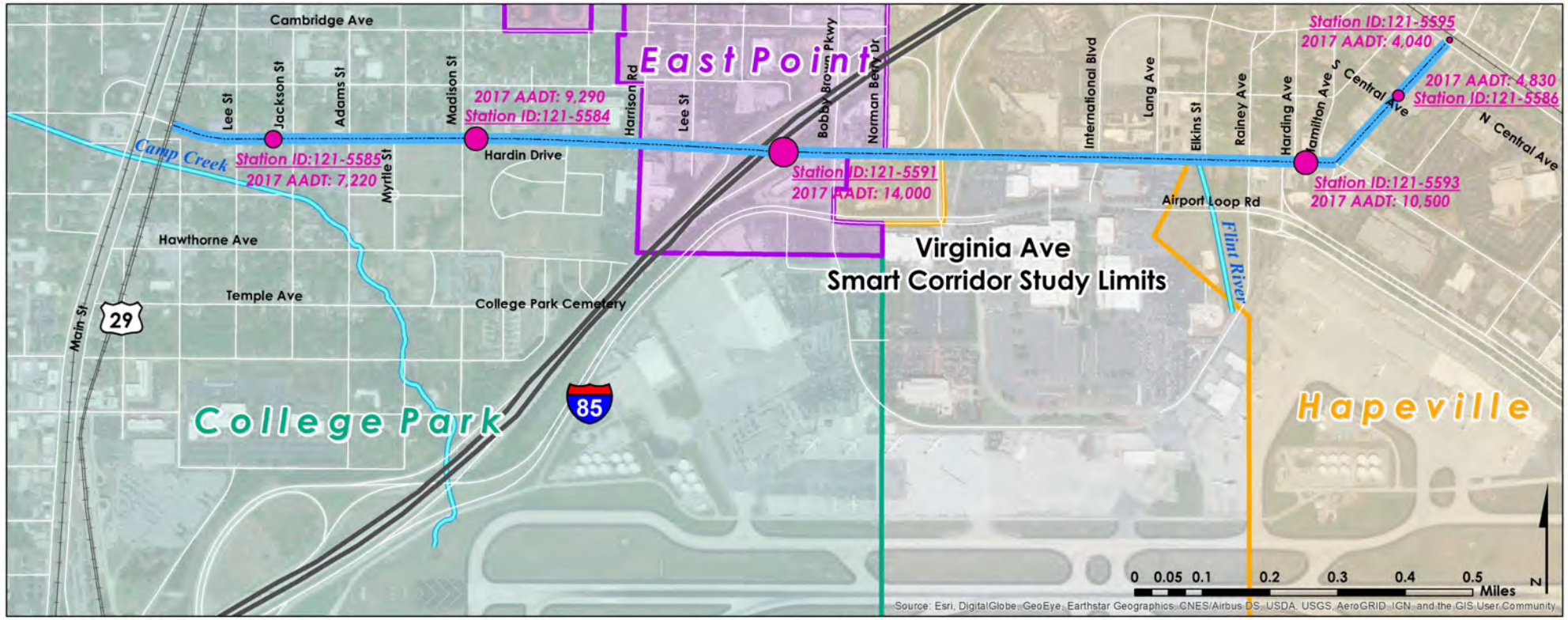
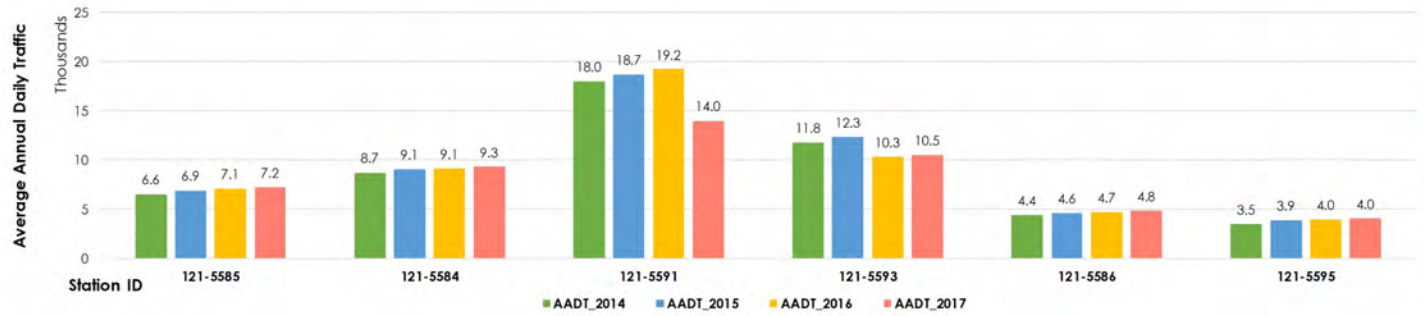
SAFETY

Virginia Ave.
Area Crime
4-5x
National
Crime Index

MOBILITY

Average Annual Daily Traffic





- Traffic Count Station
- Railroads
- Water Body
- Virginia Ave Smart Corridor Study Limits
- East Point
- Hapeville
- College Park

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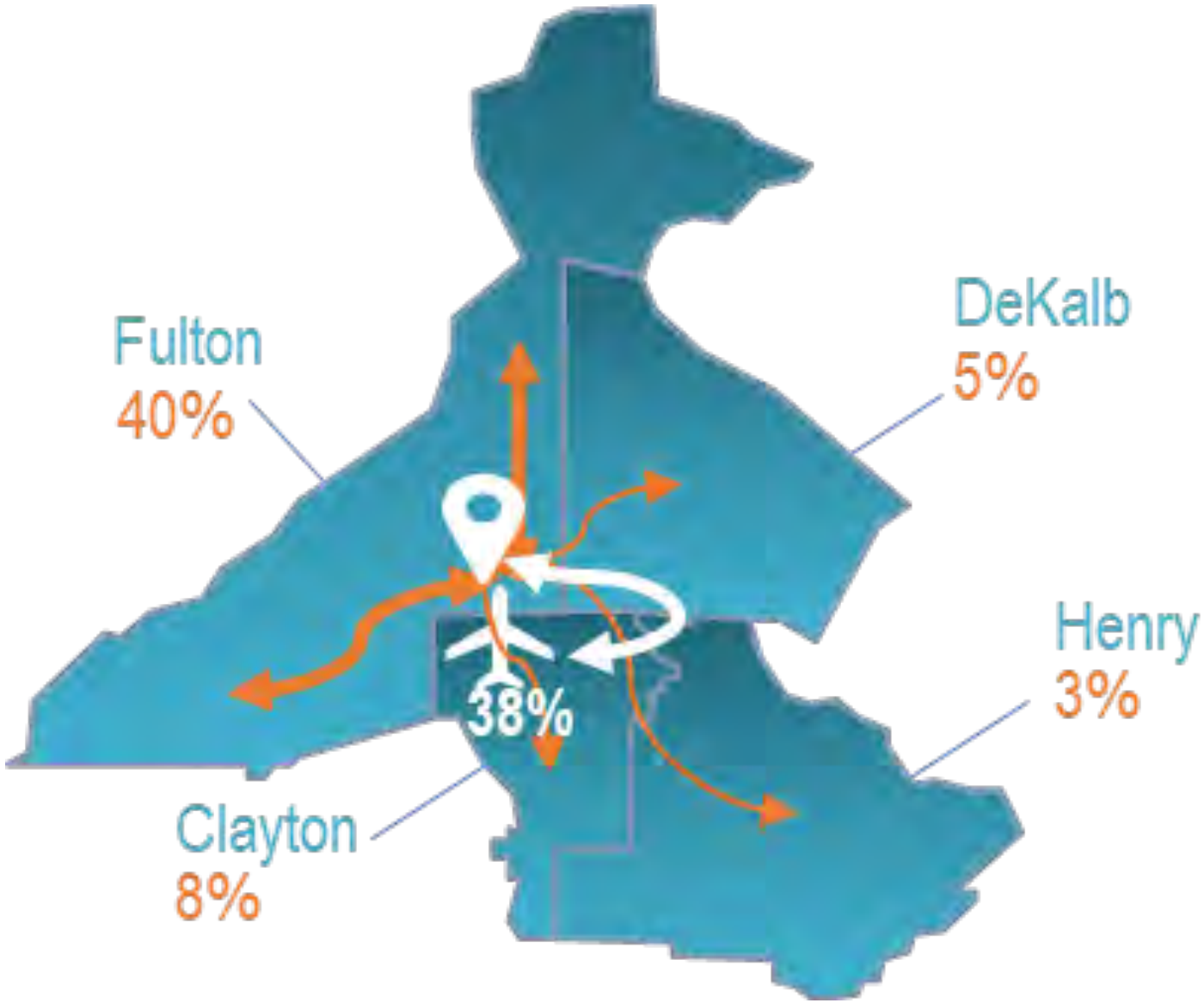
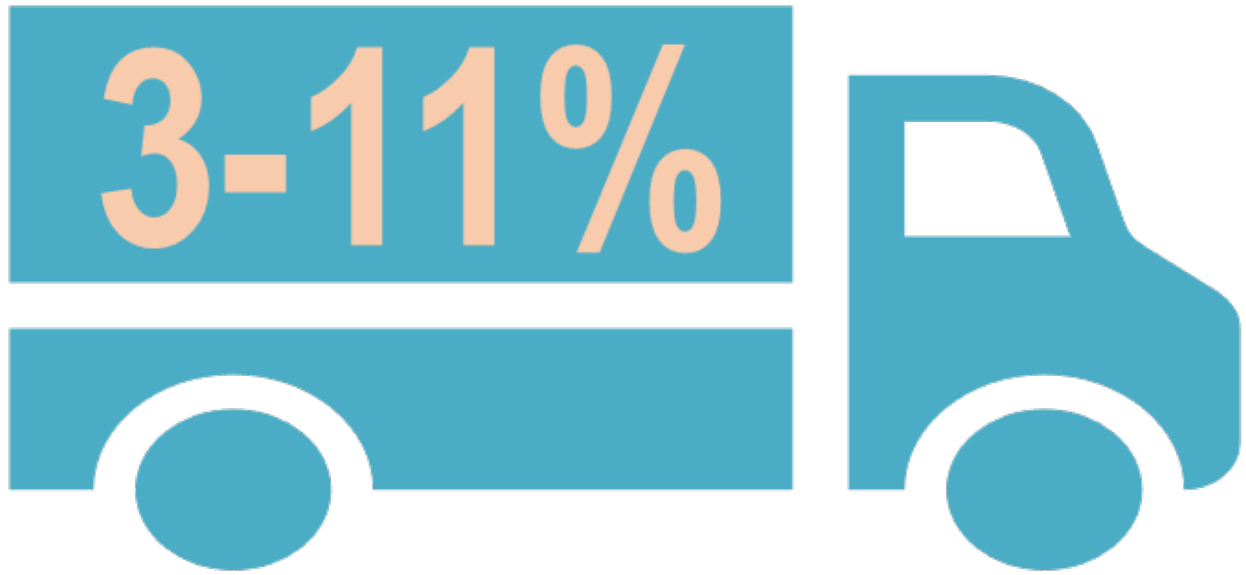
MOBILITY



MOBILITY



Trucks Along Virginia Ave.

MOBILITY

Hartsfield-Jackson
Atlanta International Airport®

7th

Top Uber Destination in the WORLD

MOBILITY

Virginia Ave Smart Corridor - Existing Transit

Legend

- Bus Stop
- Bus Route 172
- Gold Line
- Red Line
- Railroads
- Virginia Ave Smart Corridor Study Limits
- Water Body
- East Point
- Hapeville
- College Park
- Airport

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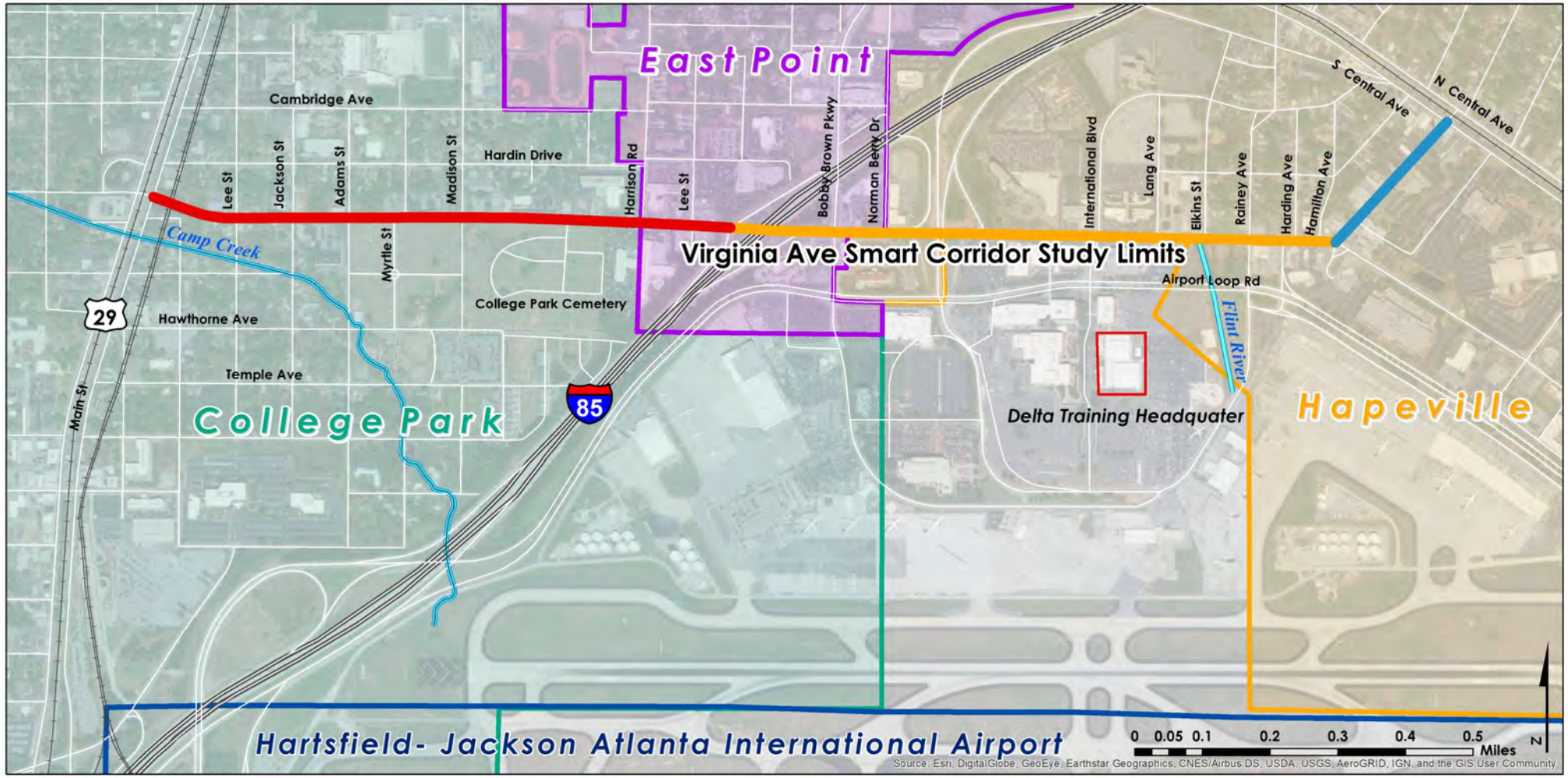
MOBILITY

Biking / Walking Risk Level Map



Legend

- East Point
- Hapeville
- College Park
- Airport
- Virginia Ave Smart Corridor
- Railroads
- Water Body
- Low Biking/Walking Risk
- Medium Biking/Walking Risk
- High Biking/Walking Risk

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CURRENT SIGNALS

Signalized Intersections

Legend

- Railroads
- Water Body
- East Point
- Hapeville
- College Park
- Airport
- Traffic Signal

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CURRENT SIGNALS

10 Total Intersections

4 Maintaining Agencies

2 Up to Current GDOT Software & Equipment Standards

8 Operating w/Older Software and Signal Equipment

1 Includes communication capabilities

9 Include pedestrian signal heads and push buttons

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SCREENING OF TECHNOLOGY APPLICATIONS

Screening of Technology Applications

Full Universe of Applications (32)

Technology applications to address safety, walkability and mobility.

21 Applications Further Evaluated

Technology applications not eliminated due to high cost and/or maintenance requirements or redundancy.

28 Applications Within Scope of Corridor

Technology applications not part of larger regional context.

15 Applications Recommended in Tiers 1 & 2

Moved forward to recommended phasing plan based on expected outcomes, project readiness, sustainability technology, tec.

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4 APPLICATIONS OUTSIDE THE SCOPE OF THE CORRIDOR

APPLICATIONS OUTSIDE THE SCOPE OF THE CORRIDOR

Strategy	Requires Larger Regional Conversation
Real-time transit data and systems coordination	The ATL Authority cleaning up GTFS feed data first
Mobility as a Service (MaaS)	The ATL Authority may lead a pilot after GTFS feed data cleaned up
Integrated system and data exchange	Requires larger regional conversation
Extreme weather alert systems	Requires larger regional conversation

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7 APPLICATIONS ELIMINATED FROM FURTHER EVALUATION

APPLICATIONS ELIMINATED FROM FURTHER EVALUATION

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Strategy	Reason for Elimination
Gunshot detection sensors	High cost and unproven effectiveness to date
Solar pavement	High cost and maintenance requirements
Countdown pedestrian signals	Do not provide advanced warning to vehicles and not accessible to the visually impaired
Detector-based adaptive signal control technologies (ASCT)	Requires vehicle to drive over detector; high installation and maintenance cost
Roadside sensors	High cost; desired outcomes can be achieved with other technologies
Navigation assistance for the visually impaired	Devices worn by the visually impaired and do not require any infrastructure improvements
Artificial Intelligence (AI) Conversation Agent	Requires daily maintenance

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21 APPLICATIONS MOVED FORWARD FOR FURTHER EVALUATION

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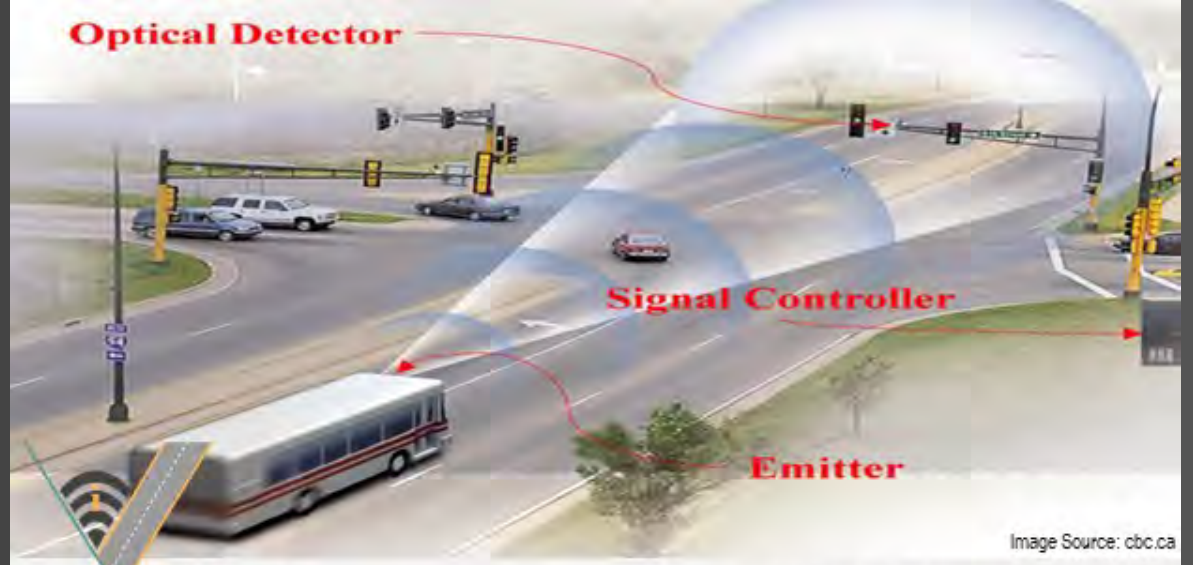

Image Source: cbc.ca

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TRANSIT SIGNAL PRIORITY

APPLICATION DESCRIPTION:
Traffic signal priority is an operational strategy to reduce the delay to transit vehicles at signalized intersections. This requires communication between the transit vehicles and the traffic signals to alter the signal timings to favor the transit operations.

TELECOMMUNICATION REQUIREMENTS:
- 4G LTE Cellular

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Corridor-wide at all signalized intersections.

DEPLOYED IN OTHER CITIES:
- Candler Road and Buford Highway in Metro Atlanta
- City of Los Angeles

PROJECT PRIORITIZATION:

PROJECT SCORE: 80.5

APPROXIMATE COST:
- **Cost per Location:** $13,500 per intersection for detection and equipment.
- **Total Cost:** $135,000 for 10 signalized intersections
- **Other Cost Considerations:** $75 per transit vehicle for transponders

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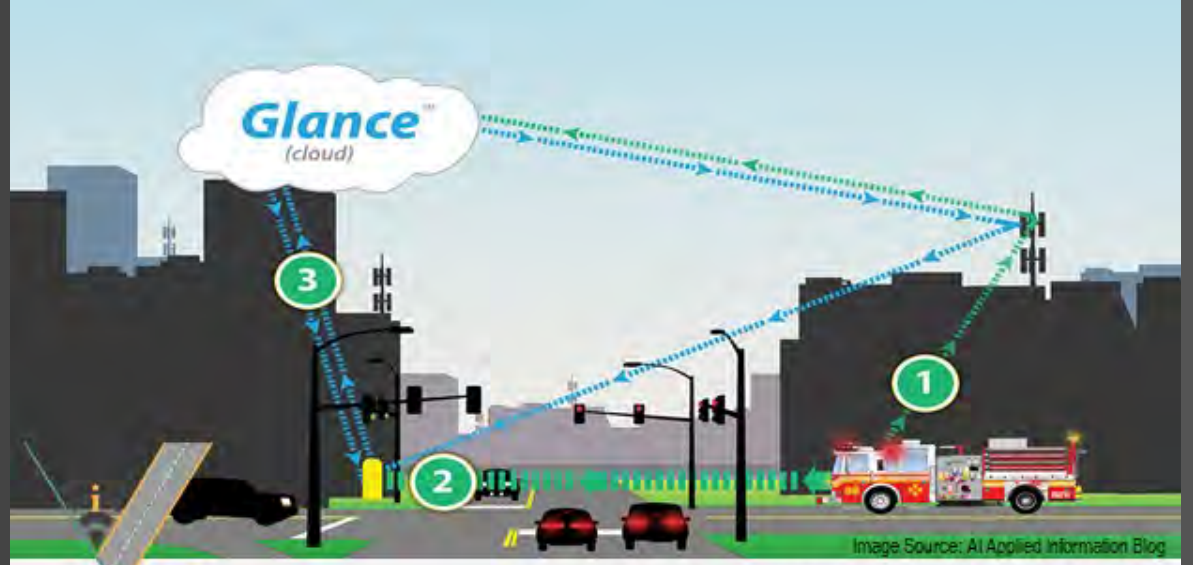

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EMERGENCY VEHICLE SIGNAL PRE-EMPTION

APPLICATION DESCRIPTION:
Traffic signal pre-emption or prioritization is a system that allows the normal operation of traffic signals to be deterred. The Manual on Uniform Traffic Control Devices (MUTCD) defines traffic signal pre-emption as "the transfer of normal operation of traffic control signal to a special mode of operation".

TELECOMMUNICATION REQUIREMENTS:
- 4G LTE Cellular

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Corridor-wide at all signalized intersections

DEPLOYED IN OTHER CITIES:
- Intersection and corridor deployments throughout Metro Atlanta (Alpharetta, Dunwoody, Gwinnett County, and Marietta).

PROJECT PRIORITIZATION:

PROJECT SCORE: 73.0

APPROXIMATE COST:
- **Cost per Location:** $5,000 per intersection for equipment
- **Total Cost:** $50,000 for 10 signalized intersections
- **Other Cost Considerations:** $2,500 per emergency vehicle

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Image Source: BikePed Images

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BIKE SIGNAL DETECTION

APPLICATION DESCRIPTION:

Bicycle detection is used at actuated signals to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push-buttons or by automated means.

TELECOMMUNICATION REQUIREMENTS:

- 5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Bobby Brown Parkway (East Point Path #6)
- N & S Central Avenues, International Blvd/Delta Blvd, and Madison Street

DEPLOYED IN OTHER CITIES:

- Atlanta, GA; Austin, TX; Portland, OR; Berkley, CA; Washington, DC; Denver, Co; Minneapolis, MN; San Francisco, CA; Seattle, WA; Vancouver, BC

PROJECT PRIORITIZATION:

PROJECT SCORE: 67.5

APPROXIMATE COST:

- **Cost per Location:** $2,000 - $20,000
- **Total Cost:** $20,000 - $200,000 (4 locations)
- **Other Cost Considerations:** additional costs depending on detection technology and/or existing controller capabilities

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Image Source: Herbert, Rowland & Grubic, Inc.

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CV-BASED ADAPTIVE SIGNAL CONTROL TECHNOLOGIES

APPLICATION DESCRIPTION:
CV-based ASTC systems can provide real-time spatial information (such as, position, speed, and acceleration and other traffic data) necessary for evaluating traffic conditions on a road network. Communications between a vehicle and infrastructure enables the intersection controller to obtain much more detailed information of the surrounding vehicle states within the transmission range.

TELECOMMUNICATION REQUIREMENTS:
- 5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Corridor-wide at all signalized intersections

DEPLOYED IN OTHER CITIES:
- North Ave Smart Corridor, Atlanta, GA
- Portland, ME
- Quincy, MA

PROJECT PRIORITIZATION:

PROJECT SCORE: 67.0

APPROXIMATE COST:
- **Cost per Location:** $25,000 per signalized intersection for equipment and engineering for controller set-up
- **Total Cost:** $250,000 for 10 signalized intersections

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IN-PAVEMENT ILLUMINATED CROSSWALKS

APPLICATION DESCRIPTION:

In-pavement illuminated pedestrian crosswalks are crosswalks that are embedded with amber lights on both sides of the crosswalk and oriented to face oncoming traffic. The warning lights could produce a bright, daytime-visible light focused directly in the driver's line of sight clearly indicating the curve, hazard, crosswalk, variable lane, or lane edge.

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Anywhere near bus stops with intersection crosswalks

DEPLOYED IN OTHER CITIES:

- Rock Island Rail Trail, Amarillo, TX
- Pasco, Washington

PROJECT PRIORITIZATION:

PROJECT SCORE: 66.3

APPROXIMATE COST:

- A system with 10 In-Roadway Warning Lights, 2 signs, A/C power and push button activation starts at cost of $11,800, price could go higher for system upgrade and more functions.

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SOLAR BUS SHELTERS

APPLICATION DESCRIPTION:

Solar bus shelters are bus shelters powered by the sun to provide shelter, air conditioning, USB charger ports, digital transit maps, and/or in some areas, free Wi-Fi.

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Retrofit the existing bus shelter to solar-powered bus shelter
- Install two new solar bus shelters along the corridor, possibly one located at the eastern side of the corridor (near hotels and restaurants) and one located in the western side of the corridor (in the center of residential area)

DEPLOYED IN OTHER CITIES:

- Hialeah, FL
- Miami, FL
- Corona, CA
- Dubai, UAE

PROJECT PRIORITIZATION:

PROJECT SCORE: 66.0

APPROXIMATE COST:

- The estimated cost for an air-conditioned shelter is about $65,000 per unit;
- The costs for open-air shelters with rooftop solar panels could vary according to different manufacturers and different technological standards.

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RRFB/PHB
WITH AUTOMATED OPTIONS FOR ACTIVATION

APPLICATION DESCRIPTION:
A RRFB (Rectangular Rapid Flashing Beacon) or PHB (Pedestrian Hybrid Beacon) is a pedestrian-activated signal that uses flashing and solid lights to improve roadway crossing safety. When activated, the signal immediately flashes yellow to alert drivers before changing to a red stop light. When vehicles are stopped, pedestrians are given a Walk signal.

TELECOMMUNICATION REQUIREMENTS:
- 5G Cellular
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Between Harrison Rd and I-85 On/Off Ramps
- Between Northbound I-85 Ramp and Delta Blvd

DEPLOYED IN OTHER CITIES:
- Atlanta, Brookhaven, Chamblee, & Doraville, GA
- Tucson, AZ; Detroit, MI; Columbus, OH

PROJECT PRIORITIZATION:

PROJECT SCORE: 65.3

APPROXIMATE COST:
- **Cost per Location:** $80,000 - $130,000 (PHB), $4,500-52,000 (RRFB)
- **Total Cost:** $160,000 - $260,000 (2 PHB locations)
- **Other Cost Considerations:** median/refuge island construction, additional signage, and/or striping

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TRANSIT-PEDESTRIAN WARNING SYSTEM

APPLICATION DESCRIPTION:

Vehicle to Pedestrian (V2P) warning systems are used to detect pedestrians as well as bicycles, wheelchairs and other items in the area surrounding a bus. They include warning systems that send alerts to drivers, and to pedestrians via their smartphones. Buses have to be equipped with On-Board Units and Road-Site Unites and sensors are also required.

TELECOMMUNICATION REQUIREMENTS:

- 5G Cellular;
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Insert specific location 1
- Insert specific location 2
- Or indicate if corridor-wide, including x intersections or x bus stops, etc.

DEPLOYED IN OTHER CITIES:

- Adelaide, Southern Australia

PROJECT PRIORITIZATION:

PROJECT SCORE: 64.8

APPROXIMATE COST:

- The cost of a MobileEye installation (including all equipment and cabling) is about $6,000 per vehicle (average).

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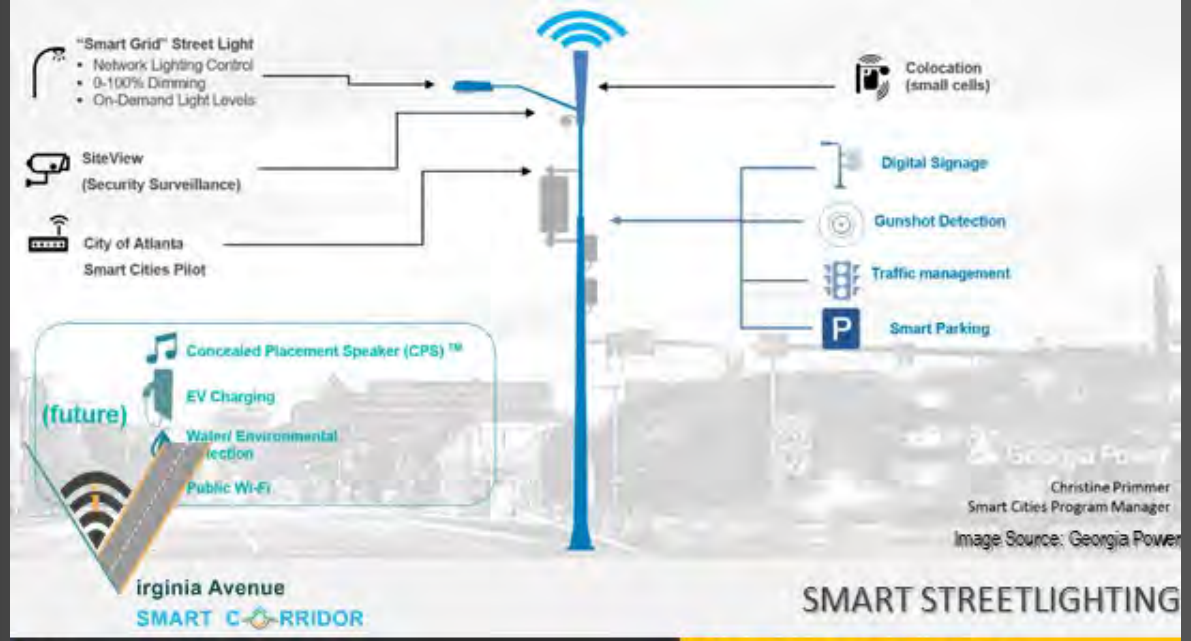

APPLICATION DESCRIPTION:
Smart streetlights implement multiple technologies at one location, including sensors for on-demand lighting, audio systems for public alerts, accident and traffic monitoring, and potential electric car charging, security cameras, parking assistance, signal management, and public Wi-Fi access. Sensors and Road-Side Units are necessary for smart streetlights.

TELECOMMUNICATION REQUIREMENTS:
- 4G LTE/5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Insert specific location
- Or indicate if corridor-wide, including x intersections or x bus stops, etc.

DEPLOYED IN OTHER CITIES:
- Sydney, Australia
- Dubai, UAE
- London, England
- Cardiff, Wales, England

PROJECT PRIORITIZATION:

PROJECT SCORE: 64.8

APPROXIMATE COST:
- Cost varies significantly based on functions and whether it is retrofitting an existing streetlight or installing a new streetlight;
- Retrofitting traditional streetlights could cost from $200 to $2,000 each, with another $150 for internet and network connections

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DIGITAL WAYFINDING KIOSK

APPLICATION DESCRIPTION:

Digital wayfinding kiosks are means for replacing traditional printed signage with interactive digital screens and methods. They are commonly used to automate the direction of pedestrians to their destinations, assist them with questions, and provide other essential information. They could be customized to provide specific services.

TELECOMMUNICATION REQUIREMENTS:

- 4G LTE Cellular

POTENTIAL LOCATIONS ALONG CORRIDOR:

- At the eastern side of the corridor, near the hotel and restaurant zone (Harrison Road and Bobbi Brown Parkway)

DEPLOYED IN OTHER CITIES:

- H-JAIA, Atlanta, GA
- Georgia World Congress Center, Atlanta, GA
- Emory University Hospital Midtown, Atlanta, GA
- Big Bang Pizza, Brookhaven, GA
- Munich Airport, Germany

PROJECT PRIORITIZATION:

PROJECT SCORE: 64.8

APPROXIMATE COST:

- Costs vary depending on level of intelligence and different functions and services provided;
- Digital wayfinding kiosks can cost from $20,000 for a single exterior wayfinding sign to $200,000 for an interior system. Soofa signs have been free in the Atlanta region with paid advertising covering installation and maintenance.

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Image Source: GIZMODO

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PUBLIC WIFI

APPLICATION DESCRIPTION:
Wi-Fi connectivity is foundational to Smart City and Corridor deployments. Lack of Internet access has implications for providing wide-spread services and addressing digital equity.

TELECOMMUNICATION REQUIREMENTS:
- WiFi 6 (IEEE 802.11ax)

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Approximately every 1000 ft. along the corridor and other selected sites as needed

DEPLOYED IN OTHER CITIES:
- Downtown Decatur, GA
- New York, NY
- Boston, MA

PROJECT PRIORITIZATION:

PROJECT SCORE: 49.8

APPROXIMATE COST:
- **Cost per Location:** $3,400 per WiFi Access Point
- **Total Cost:** $ 54,000 for estimated 16 AP sites plus the other costs below
- **Other Cost Considerations:** $ 25,000 for network equipment and ISP interconnection

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Image Source: Government Technology

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CAMERAS/LICENSE PLATE READERS

APPLICATION DESCRIPTION:

Automatic license plate readers (ALPRs) are stationary units attached to poles along the street to monitor traffic, enforce parking, and monitor crimes, in addition to other uses. They capture images of passing license plates, vehicles, and sometimes the driver and passengers, along with location and a time and date stamp. The information is stored in databases accessible by law enforcement, as well as the private companies that collect the data.

TELECOMMUNICATION REQUIREMENTS:

- 4G LTE/5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Insert specific location
- Or indicate if corridor-wide, including x intersections or x bus stops, etc.

DEPLOYED IN OTHER CITIES:

- As of July 2012, it was being used in 38 states in the U.S., including the state of Georgia.

PROJECT PRIORITIZATION:

PROJECT SCORE: 49.3

APPROXIMATE COST:

- License plate reader cameras costs can vary due to different manufacturers and different technological standards, which could vary from approximately $200 to $1,000, as a higher resolution camera would cost more.

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Image Source: WhatNow Atlanta

DRIVERLESS SHUTTLE

APPLICATION DESCRIPTION:

Autonomous shuttles are vehicles that move small amounts of passengers (6-12) approximately 1 mile on a set route, and without a driver. Autonomous shuttles use guidance and detection systems using a combination of sensors, cameras, and deep learning programs.

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Specific routing would be developed as part of future transit planning efforts to tie into AACIDs' Transit Master Plan and Automated Driving System (ADS) grant application if successful
- Likely located on eastern end of corridor near hotels

DEPLOYED IN OTHER CITIES:

- Las Vegas, NV
- Ann Arbor, MI
- Detroit, MI
- Denver, CO
- Columbus, OH

PROJECT PRIORITIZATION:

PROJECT SCORE: 48.3

APPROXIMATE COST:

- Costs vary greatly based on whether the equipment is leased or purchased, the number of vehicles, whether infrastructure already exists, and related research costs.
- One pilot program in Arlington, TX, leasing 2 shuttles for a period of 6 months, costs around $270,000.

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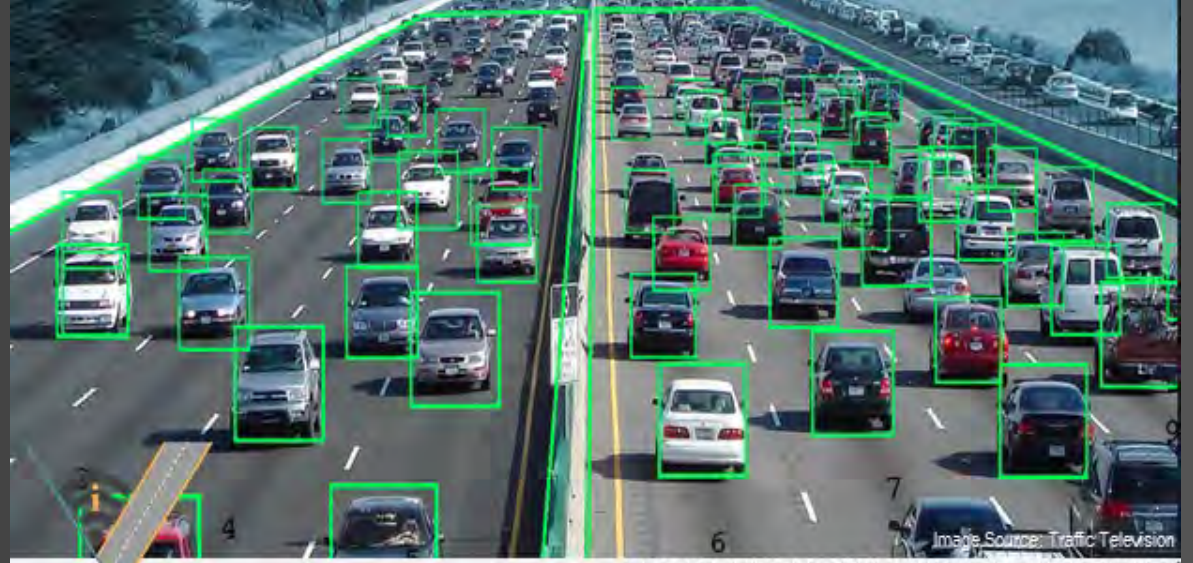

AUTOMATED TRAFFIC MONITORING/ OBJECT DETECTION

APPLICATION DESCRIPTION:
Traffic monitoring software is technology that can be added to existing camera surveillance to automatically record traffic flow, accidents, and incidents in real time and extract data using set parameters. Using intelligent sensors and algorithms, these systems can also send out immediate alerts which are visually verifiable.

TELECOMMUNICATION REQUIREMENTS:
- 4G LTE/5G Cellular; and/or
- DSRC

DEPLOYED IN OTHER CITIES:
- Arizona is using thermal imaging cameras to detect wrong-way traffic;
- Ontario, Canada temporarily used it prior to the 2015 Pan American Games
- San Paolo, Brazil

PROJECT PRIORITIZATION:

PROJECT SCORE: 47.0

APPROXIMATE COST:
- The pilot program in Arizona for detecting wrong way costs $3.7 million to install 90 thermal cameras along a 15-mile road;
- ITSJPO in USDOT provides detailed cost information on traffic cameras, which is about $5000 for capital cost and $2000 for operation and management cost per unit.

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SMART C-RRIDOR

Image Source: Inhabitat

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SOLAR BENCH

APPLICATION DESCRIPTION:

Smart solar benches are new urban furniture pieces that will help cities, universities, retail, or business centers to create better, safer, and more user-friendly environments. They are powered by solar and it could offer functions such as charging, advertisement and information display.

TELECOMMUNICATION REQUIREMENTS:

- Not required

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Near bus stops with no bus shelters

DEPLOYED IN OTHER CITIES:

- First list if deployed anywhere in Atlanta region
- Then indicate if anywhere in U.S. and where
- If none, indicate if international and where
- If none, indicate "no known deployments domestically or internationally"

PROJECT PRIORITIZATION:

PROJECT SCORE: 46.8

APPROXIMATE COST:

- Approximately $3,000 per unit

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SMART C-RRIDOR

Image Source: Streetline

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PARKING AVAILABILITY APP

APPLICATION DESCRIPTION:

Real-time parking availability apps serve to inform drivers of available parking spaces based on street-level sensors that detect when a space becomes available.

TELECOMMUNICATION REQUIREMENTS:

- Satellite

POTENTIAL FUNCTIONS:

- Parking space availability, rates, and hours of operation
- Curb space availability
- Plan, ticket, and pay across modes, operators, and jurisdictions (Mobility as a Service)

POTENTIAL APPS TO COORDINATE WITH:

- Publicly Owned:
  - MARTA On the Go
  - OneBusAway
  - ATL MaaS pilot expected in 2020
- Privately Owned:
  - Park Mobile
  - BestParking
  - ParkMe
  - ParkWhiz

PROJECT PRIORITIZATION:

PROJECT SCORE: 46.0

APPROXIMATE COST:

- Developing an app which include GPS and map, drive planning, carpooling options and some other functions usually requires up to thousand hours of work of productivity, and the average cost of developing could be around $30,000 to $40,000.

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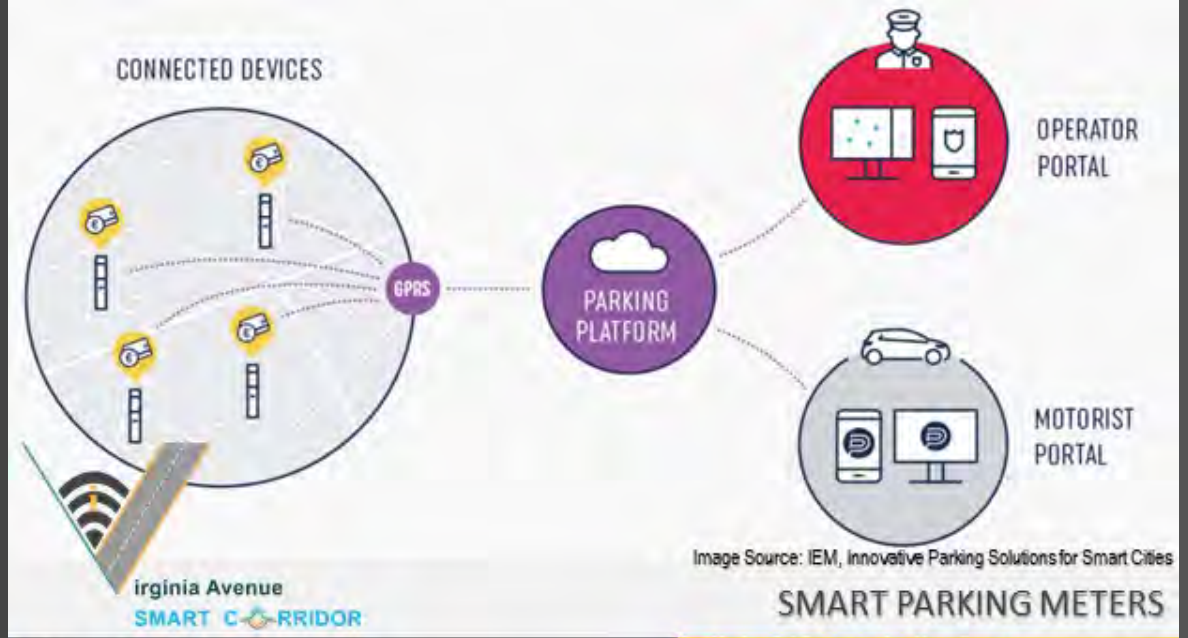

Image Source: IEM, Innovative Parking Solutions for Smart Cities

SMART PARKING METERS

APPLICATION DESCRIPTION:
Smart parking meters are automated parking systems which allow for a self-parking, paperless system aimed at making parking easier for cities and drivers. They work in conjunction with parking apps, street sensors and/or mounted cameras.

TELECOMMUNICATION REQUIREMENTS:
- 4G LTE/5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Near restaurant and hotel zone with higher volume of traffic

DEPLOYED IN OTHER CITIES:
- Smart parking meters are located in almost every major U.S. city, with 78.9 million smart meters installed throughout the United States, as of 2017.

PROJECT PRIORITIZATION:

PROJECT SCORE: 42.0

APPROXIMATE COST:
- Smart parking meters typically cost between $250 - $500 per meter per space.

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Image Source: Flickr

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EV CHARGING STATIONS

APPLICATION DESCRIPTION:

Electric vehicle (EV) charging stations are infrastructures that can charge the battery of electric vehicles. At present there are three levels of EV charging stations:

- Level 1 delivers 2 to 5 miles of range per hours of charging (low efficiency; usually used at home)
- Level 2 delivers 10 to 60 miles of range per hour of charging (for both residential and commercial use)
- Level 3 delivers 180 to 300 miles of range per hour of charging (only for commercial and industrial use)

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Eastern end of corridor near hotels and restaurants

DEPLOYED IN OTHER CITIES:

- In Georgia State, there are almost 800 charging stations and over 2,400 charging outlets;
- In United States, there are almost 22,000 charging stations and over 63,000 charging outlets;
- In Hounslow, London, there are EV charging outlets installed in light poles along the curb.

PROJECT PRIORITIZATION:

PROJECT SCORE: 40.8

APPROXIMATE COST:

- For Level 2 charging stations, the station cost vary from $500 to $700, with parts and labor coting $1,200 to $2,000.
- For Level 3 charging stations, the station cost vary from $1,000 to $2,000, with parts and labor coting $2,300 to $6,000.
- There would be an increase in costs and installation fee if service panels need to be updated.

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Image Source: easyparking.cz

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AUTOMATED PARKING SYSTEMS

APPLICATION DESCRIPTION:
Automated parking systems (APS) serve to park automobiles automatically so as to lessen the surface area needed for parking vehicles and to maximize convenience and safety.

TELECOMMUNICATION REQUIREMENTS:
- Not required

POTENTIAL LOCATIONS ALONG CORRIDOR:
- Eastern end of corridor near hotels and restaurants

DEPLOYED IN OTHER CITIES:
- New York, NY (Parkmatic Quadstackers System)
- Honolulu, HI (Parkmatic 10-Car Rotary System (Carousel) with outer turntable)
- San Francisco and Oakland, CA
- Germany
- Japan
- China

PROJECT PRIORITIZATION:

PROJECT SCORE: 36.5

APPROXIMATE COST:
- Total costs for stand-alone, above-grade automated parking stall is about $26,000;
- Total costs for below-building, above-grade automated parking stall is about $30,000;
- Total costs for below-building, below-grade automated parking stall is about $35,000

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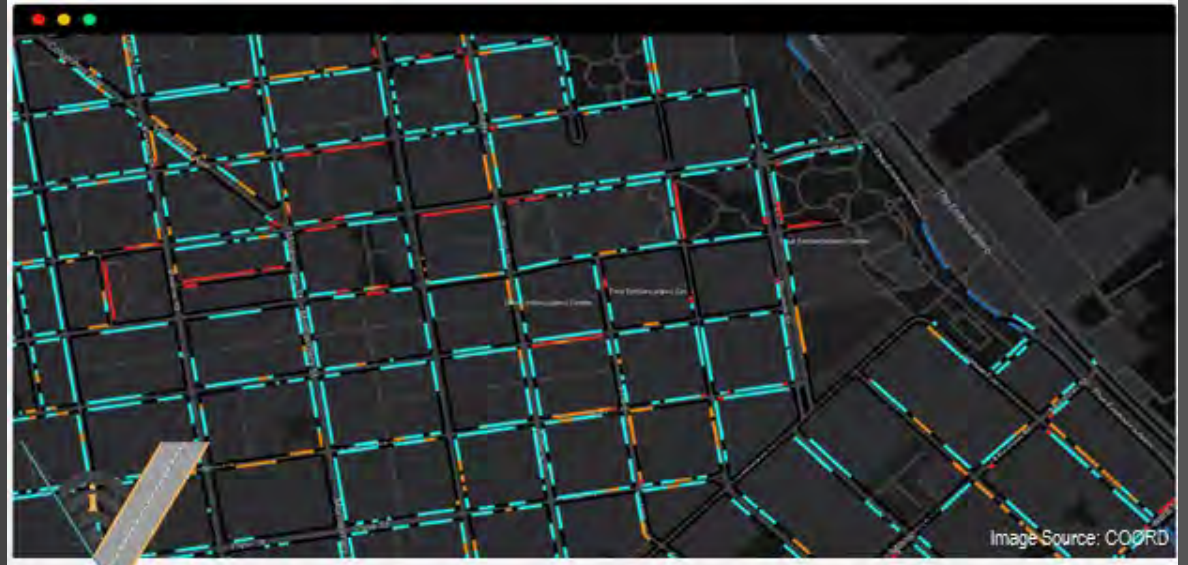

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CURBSIDE OCCUPANCY SENSORS

APPLICATION DESCRIPTION:

Curbside occupancy sensors can be installed in the pavement along the curb to determine if the curb is occupied. Coupled with the sensors, over time, large data streams could enable apps and platforms to inform users if a specific space is open or occupied and predict when it would become available if it's occupied. Information could be displayed and sent to users and drivers through a web-based or mobile-based platform to give suggestions on real-time parking decisions.

TELECOMMUNICATION REQUIREMENTS:

- 4G LTE/5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Near the hotel and restaurant zone.

DEPLOYED IN OTHER CITIES:

- Curbside Flex Zones, Seattle, Washington
- Innovative Curbside Management, Washington, DC
- Curbside Management, San Francisco, CA

PROJECT PRIORITIZATION:

PROJECT SCORE: 38.3

APPROXIMATE COST:

- The costs of occupancy sensors could vary from $500 to $10,000 per sensor based on different detection standards. Programming occupancy sensors to specific requirements could add to the cost.

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SMART DOTS IN STREET CENTERLINES

APPLICATION DESCRIPTION:

Smart dots in centerlines are small devices installed at the centerline of roads to provide illumination and communication with vehicles and infrastructure in a connected transportation system to send a variety of crucial, basic alerts to drivers and passengers including fog, black ice, upcoming road incidents, and erratic drivers.

TELECOMMUNICATION REQUIREMENTS:

- 4G LTE/5G Cellular; and/or
- DSRC

POTENTIAL LOCATIONS ALONG CORRIDOR:

- Possibly along the whole Virginia Avenue

DEPLOYED IN OTHER CITIES:

- The Wattway's pilot project is located next to the Georgia Visitor Information Center on The Ray (I-85).

PROJECT PRIORITIZATION:

PROJECT SCORE: 35.8

APPROXIMATE COST:

- Cost not available

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FINAL RECOMMENDATIONS

FINAL RECOMMENDATIONS

Project Prioritization Framework

Stakeholder Input
Community and/or stakeholder priorities

Return on Investment & Economic Benefits
Jobs created, aesthetics, economic competitiveness

Safety
Anticipated crash and/or crime reduction, safe connections for schools and/or EMS.

Cost
Relatively lower cost projects which could be low-hanging fruit

Project Readiness
GDOT permit requirements, telecommunications availability, MUTCD-compliant, procurement

Mobility Options
Congestion, improves transit, bike, and/or pedestrian amenities and/or service

Environment & Public Health
Anticipated emissions reduction, active transportation

Sustainable Technology
Interoperability (communicates with most technologies); multi-functionality; maintenance requirements; not likely to be outdated within a few years

PRELIMINARY RECOMMENDATIONS

Multiple Weighting Scenarios

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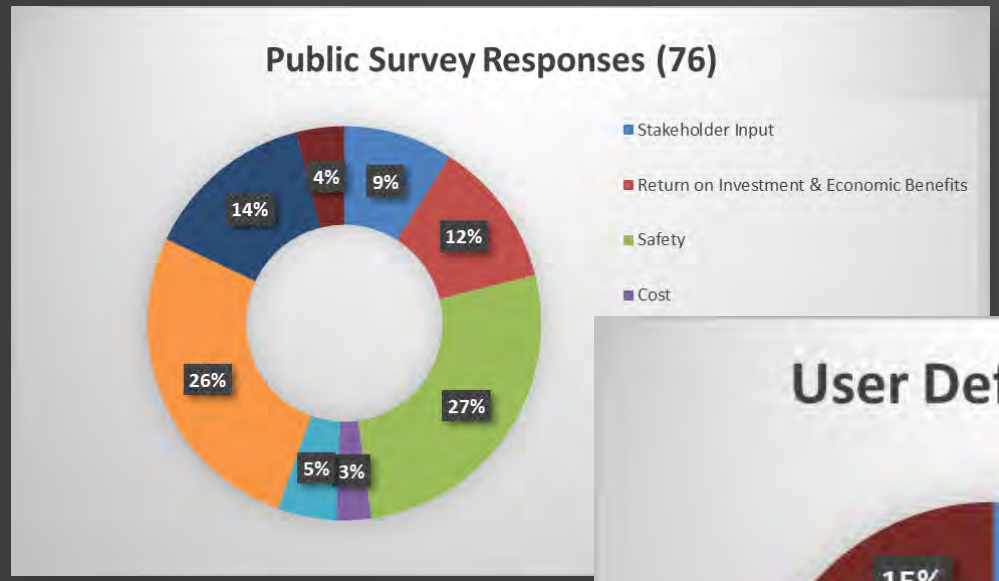

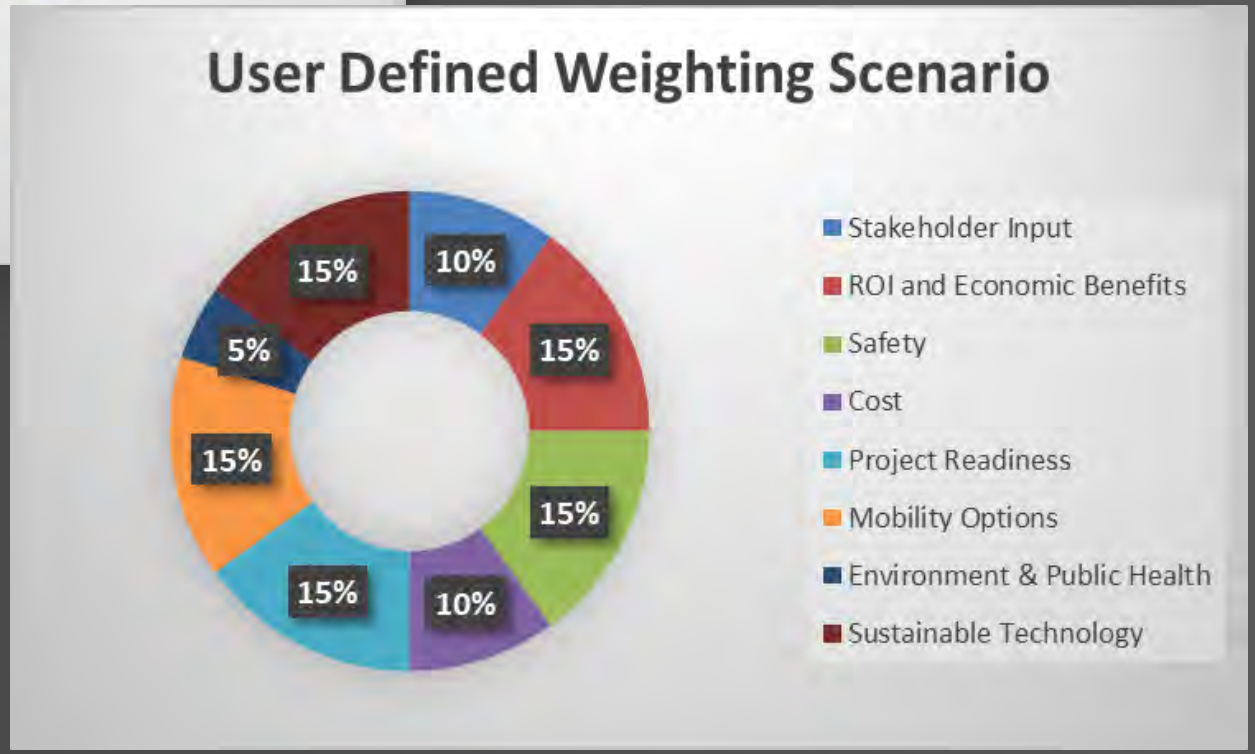

FINAL RECS

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Outside Scope of the Corridor

01 Real-time Transit Data
02 Mobility as a Service
03 Integrated System and Data Exchange
04 Extreme Weather Alert Systems

Eliminated from Further Consideration

01 Gunshot Detection Sensors
02 Solar Pavement
03 Countdown Pedestrian Signals
04 Detector-based Adaptive Signal Control Technologies
05 Roadside Sensors
06 Navigation Assistance for the Visually Impaired
07 Artificial Intelligence (AI) Conversation Agent

Included in Tier 3 to Revisit Later

01 Parking Availability/Availability App
02 Smart Parking Meter(s)
03 EV Charging Station(s)
04 Automated Parking System(s)
05 Curbside Occupancy Sensors
06 Smart Dots (Studs) in Street Centerlines

Recommended (Prioritized in Tier 1)

01 Transit Signal Priority
02 Emergency Vehicle Signal Pre-emption
03 Bike Signal Detection
04 Adaptive Signal Control Technology
05 In-Pavement Illuminated Crosswalks
06 Solar Bus Shelter(s)
07 RRFB/PHB with Automated Options for Activation
08 Transit - Pedestrian Warning System
09 Smart Streetlighting
10 Digital Wayfinding Kiosk(s)

Recommended (Prioritized in Tier 2)

11 Public Wi-Fi
12 Camera/License Plate Readers
13 Driverless Shuttle
14 Automated Traffic Monitoring/Object Detection
15 Solar Bench(es)

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15 APPLICATIONS INCLUDED IN FINAL RECOMMENDATIONS

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Tier 1

Projects

FINAL RECOMMENDATIONS

Tier 1 Projects

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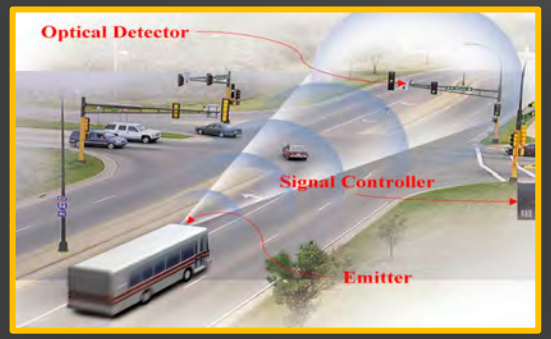
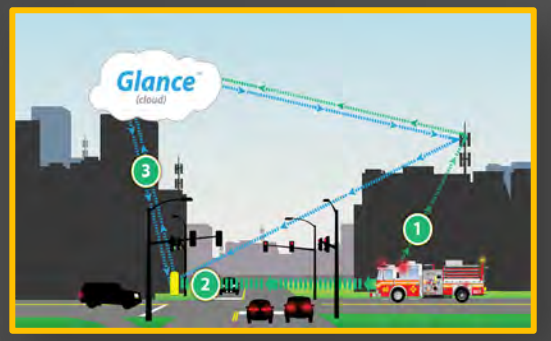


Transit Signal Priority



Emergency Vehicle Signal Pre-emption

Bike Signal Detection

Adaptive Signal Control Technology

In-Pavement Illuminated Crosswalks

Solar Bus Shelters

FINAL RECOMMENDATIONS

Tier 1 Projects

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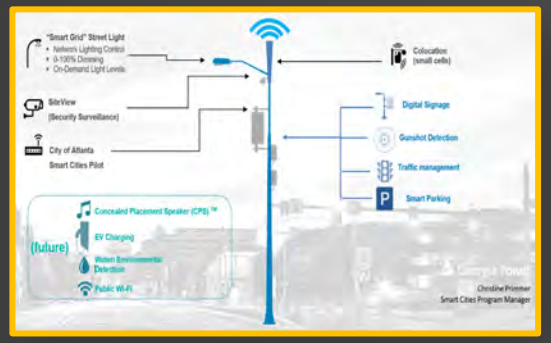
Rectangular Rapid Flashing Beacons for Mid-block Crossings

Transit-Pedestrian Warning System



Smart Streetlighting

Digital Wayfinding Kiosk(s)

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Tier 2

Projects

FINAL RECOMMENDATIONS

Tier 2 Projects

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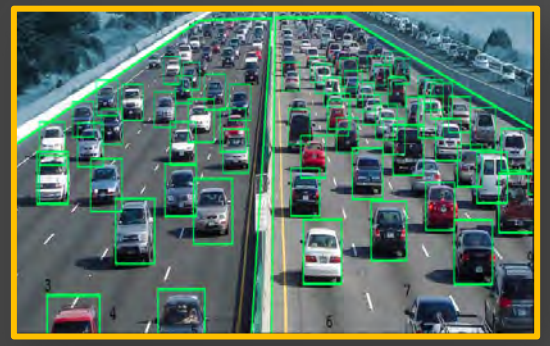
Public Wi-Fi

Cameras

Driverless Shuttle



Automated Traffic Monitoring/Object Detection

Solar USB Charging Bench(es)

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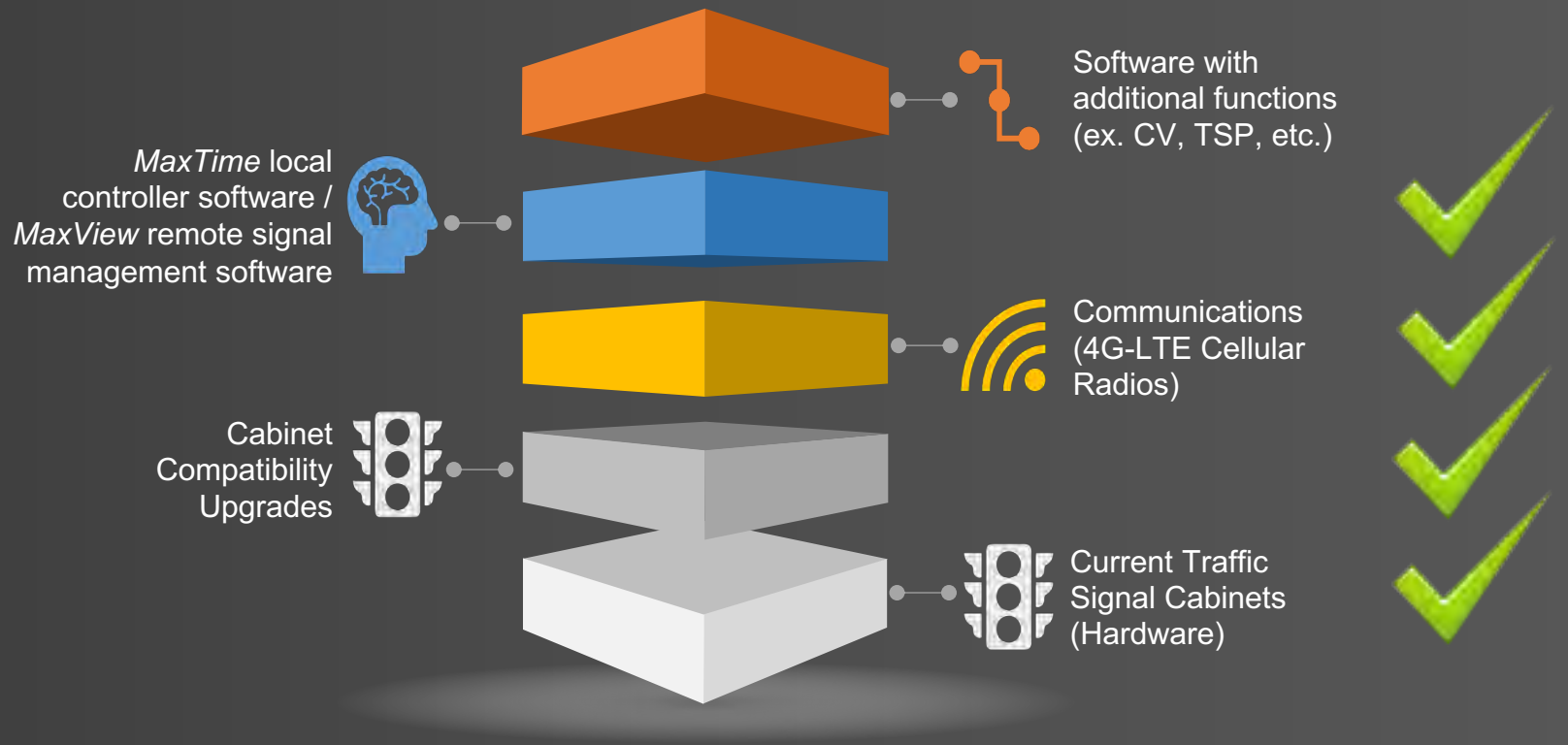
EARLY WINS!

GDOT Upgrade of Signals to MaxTime & Installation of 4G LTE Cellular Radios - COMPLETE!

Building the Foundation for Future Signal Enhancements



PHASING PLAN - EARLY WIN UPDATE

GDOT Upgrade of Signals to MaxTime & Installation of 4G LTE Cellular Radios

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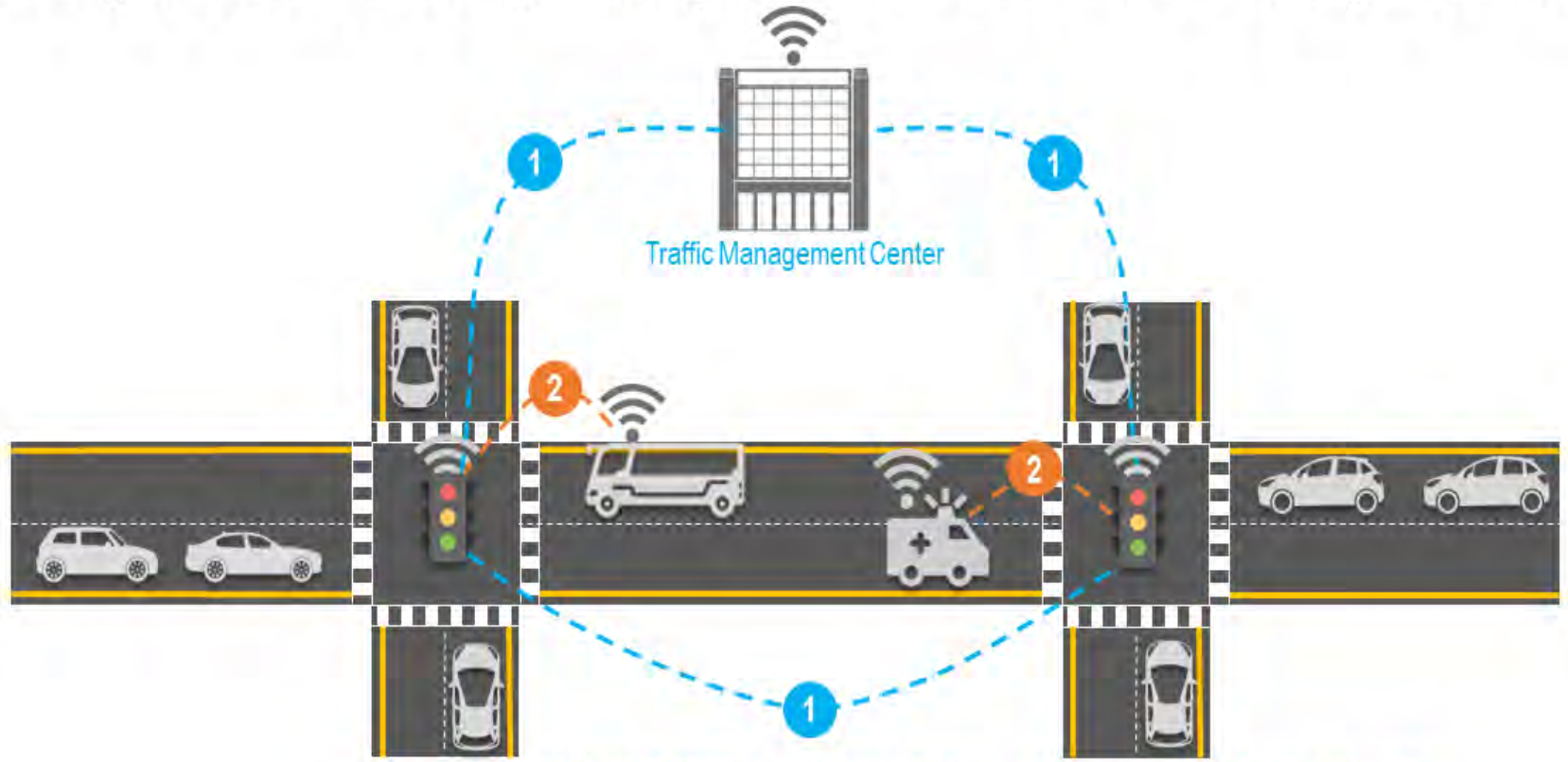

1 STEP 1: Install Communications between Signals and between Signals and Traffic Management Center

2 STEP 2: Install Communications between Signals and Transit (Signal Priority) and Emergency Vehicles (Signal Pre-emption)

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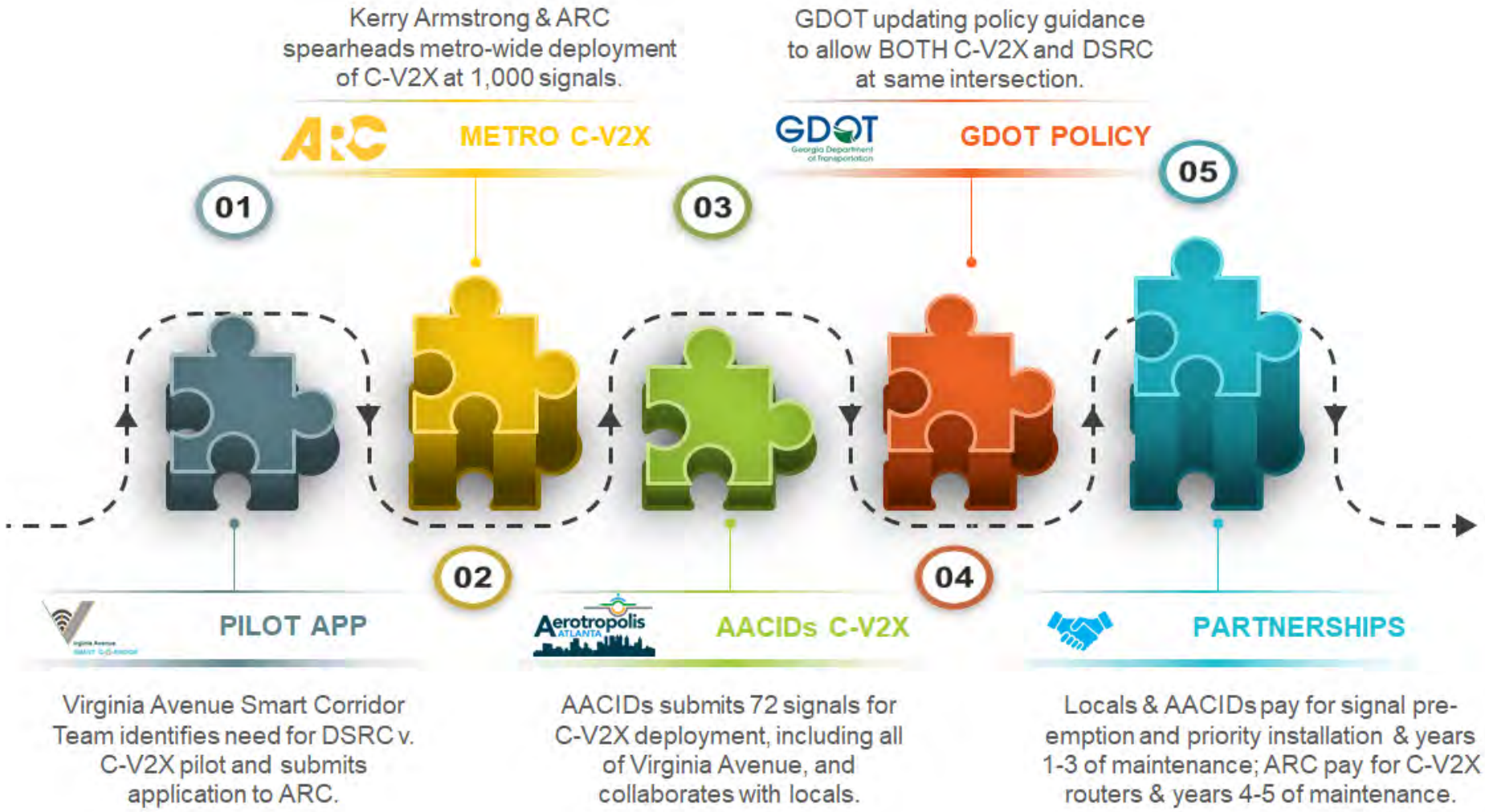
EARLY WINS!

C-V2X Cellular Radio Installation and Signal Priority / Pre-emption



EARLY WINS!

DSRC Radio Installations

- GDOT willing to consider donating and installing DSRC radios at 2-3 intersections along the corridor
  - I-85 ramp intersection
  - Other potential locations TBD

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EARLY WINS!

MARTA Transit Vehicle Testing

- If we provide the technology, MARTA willing to provide:
  - Non-revenue service test vehicle (MARTA Mobility van) along Virginia Avenue
  - Revenue-service 3+ month pilot (Bus 172 is 1 of 140 buses serving 37 routes out of Hamilton Garage)

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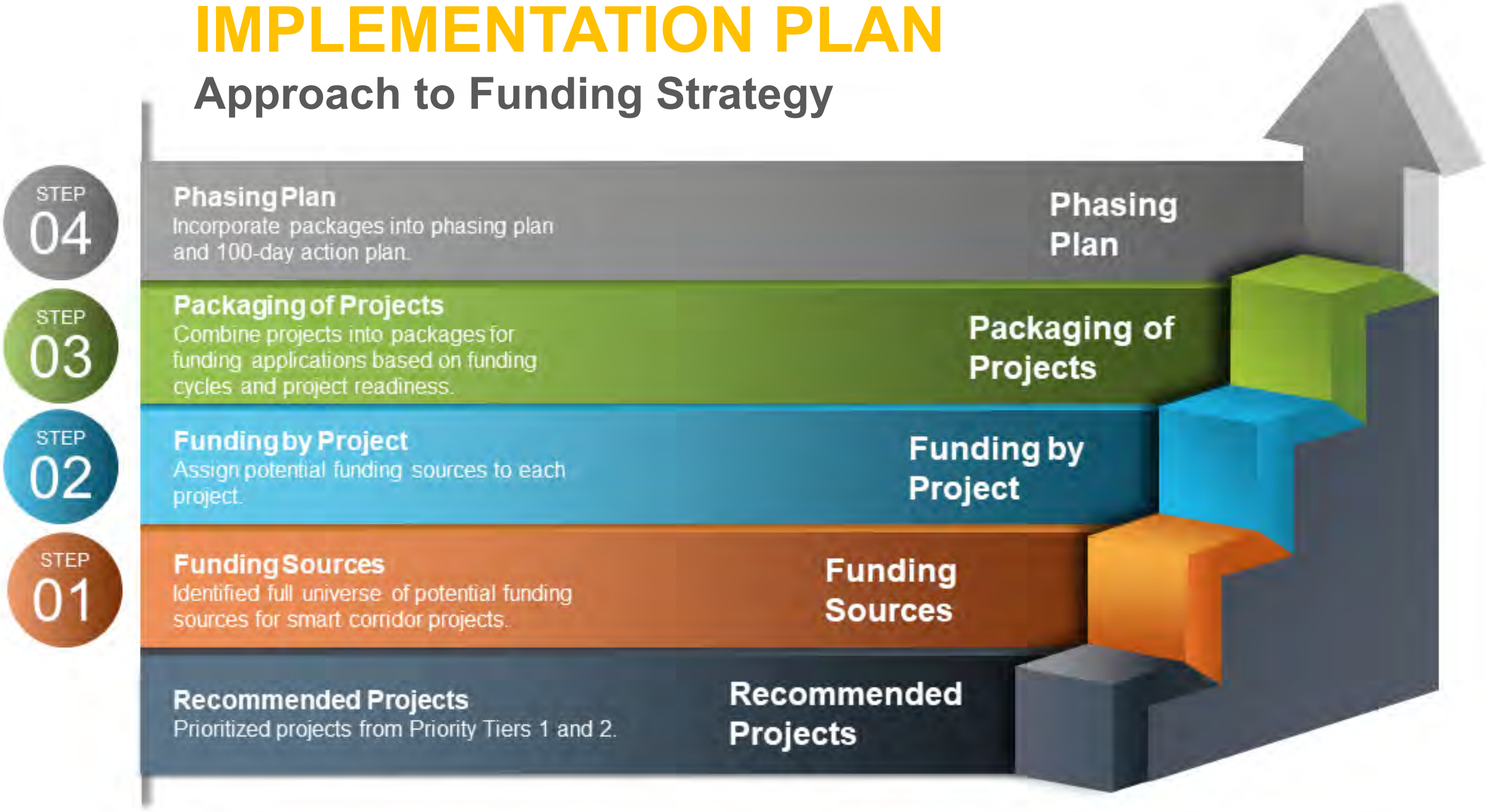
SMART CORRIDOR

IMPLEMENTATION PLAN

Funding, Phasing, Action Plan

IMPLEMENTATION PLAN

Approach to Funding Strategy



IMPLEMENTATION PLAN

Universe of Funding Sources

Potential Smart Mobility Funding Sources

Federal Competitive Grants
BUILD (FHWA/FTA); Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) (FHWA); Accelerated Innovation Deployment (AID) Demonstration (FHWA); Automated Driving Systems (ADS) Grant (FHWA); Safety Research & Demonstration (SRD) (FTA); Integrated Mobility & Innovation (IMI) Demonstration (FTA); Senior Corps RSVP Grants (Corp. for National & Community Service).

GDOT Grants & Funds
Off-System Safety (OSS) Improvement Grant; Quick Response (QR) Funds; Local Maintenance & Improvement Grant (LMIG); Safe Routes to School (SRTS).

Atlanta Regional Commission
Livable Communities Initiative (LCI); Community Development Assistance Program (CDAP); Smart Communities Challenge.

FAST Act - Federal Aid
National Highway Performance Program (NHPP); Surface Transportation Block Grant (STBG); Highway Safety Improvement Program (HSIP); Congestion Mitigation & Air Quality (CMAQ) Improvement Program.

SRTA
Georgia Transportation Infrastructure Bank (GTIB) Loan/Grant.

Local
Cities of College Park, East Point, and Hapeville; AWCID; TSPLOST; Hotel-Motel Excise Tax; PATH Foundation; Private Partnerships (ex. Delta, Technology Vendors, Georgia Power).

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IMPLEMENTATION PLAN

Packaging of Projects

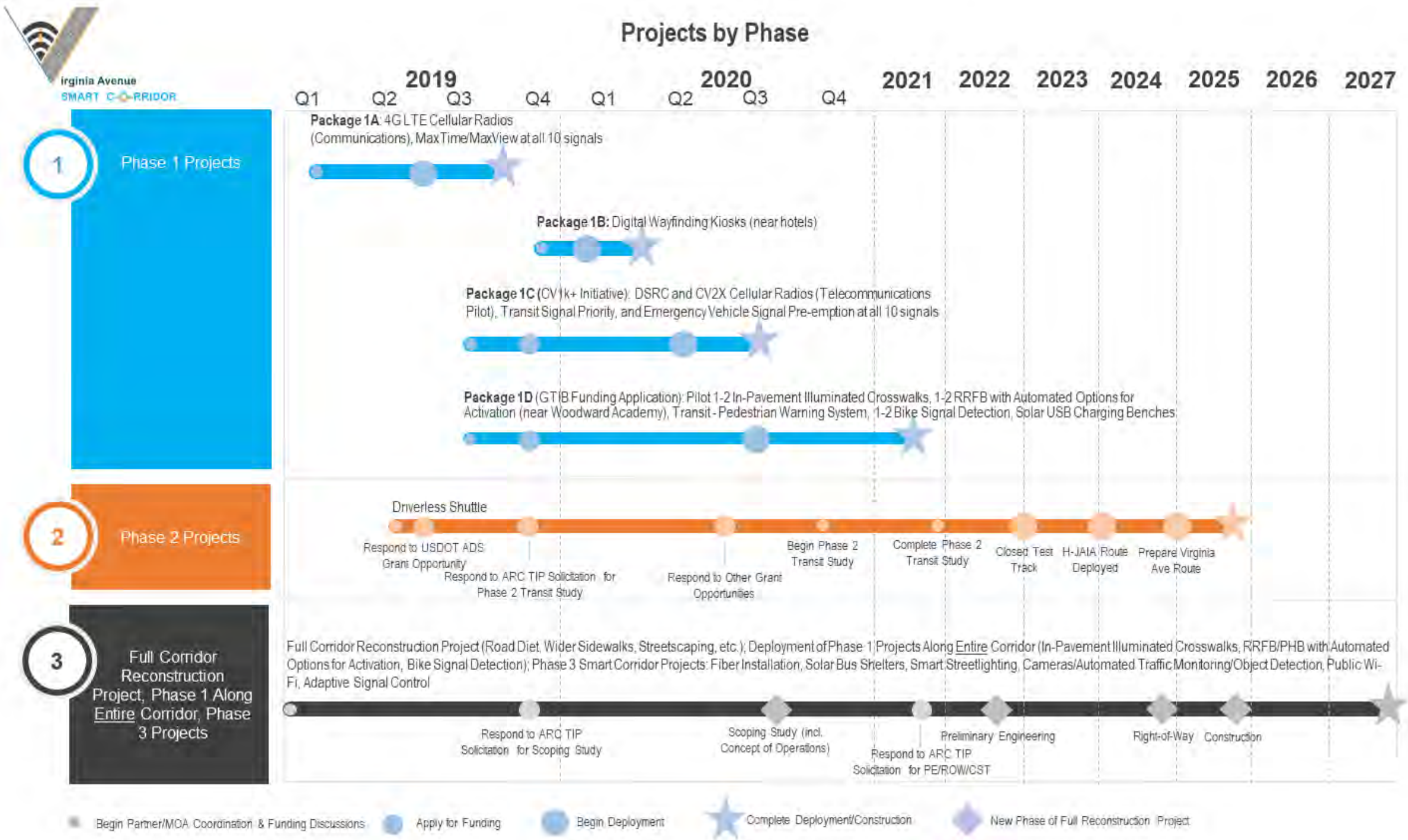
Package 1A:
Upgrade Signals with 4G LTE Routers and Install MaxTime/MaxView Software at All 10 Traffic Signals

Package 1B:
Digital Wayfinding Kiosks (near hotels)

Package 1C:
CV1k+ Initiative – Install DSRC/CV2X Routers, Transit Signal Priority, and Emergency Vehicle Signal Pre-emption at All 10 Traffic Signals

Package 1D:
GTIB Grant Application – Pilot 1-2 In-Pavement LED Illuminated Crosswalks (near hotels), 1-2 RRFP with Automated Options (near Woodward Academy), 1-2 Bike Signal Detection, Solar USB Charging Benches, Transit Pedestrian Warning System

Phasing Plan



100-DAY ACTION PLAN

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100-Day Action Plan

- [x] **Upgrade 10 Traffic Signals with Telecommunications and Synchronize.**
  Install 4G LTE routers and MaxTime/MaxView software and re-time signals.
- [ ] **Host MaxTime/MaxView Training for Cities.**
  Host training for Cities of College Park, East Point, and Hapeville (scheduled for 10/1/19 – 10/3/19).
- [ ] **Apply for Funding for Overall Corridor Scoping Study and Telecommunications Pilot Study.**
  Respond to ARC TIP Solicitation (applications due 10/11/19) to fund Scoping Study, including Concept of Operations, and Telecommunications Pilot Study (performance measures study; not equipment)..
- [ ] **Apply for Funding for Phase 1D Projects.**
  Respond to Georgia Transportation Infrastructure Bank (GTIB) Grant/Loan Program (applications due 10/15/19) to fund implementation of in-pavement LED illuminated crosswalks, rectangular rapid flashing beacons, transit pedestrian warning systems, bike signal detection, and solar USB charging benches.
- [ ] **Coordinate with Partners on Phase 1C Projects as part of CV1k+ Initiative.**
  Coordinate funding commitments, roles, and responsibilities and GDOT permits for 2020 deployment of Dedicated Short-Range Communications and cellular routers, transit signal priority, and emergency vehicle signal pre-emption.
- [ ] **Call/Meet with GDOT D7 to Discuss Permitting Process for Phase 1D Projects.**
  GDOT permits are required for the following projects within Phase 1D: In-pavement LED illuminated crosswalks, rectangular rapid flashing beacons, bike signal detection, solar USB charging benches.
- [ ] **Call/Meet with GDOT Operations to Discuss Process for Utilizing Contract Catalog for Eligible Phase 1D Projects.**
  The following projects within Phase 1D are included in GDOT's contract catalog: rectangular rapid flashing beacons and bike signal detection.
- [ ] **Call/Meet with GDOT D7 State Aid Coordinator to Discuss OSS Funding.**
  Locals are required to contact District Aid Coordinator by the end of the year (12/31/19) in order to potentially access OSS funds for current fiscal year (by 6/30/20). May be needed to supplement GTIB funding or as a back-up plan.
- [ ] **Meet with Vendor(s) and City of Hapeville for Phase 1B Project (Digital Wayfinding Kiosks).**
  Determine timeline for implementation, including any City permitting requirements (none required by GDOT), roles and responsibilities.
- [ ] **Determine Interoperability of On-Board Units.**
  Meet with vendor(s) for CV1k+ Initiative to determine if on-board unit for transit signal priority can also be used for transit pedestrian warning systems.

Available Online

https://aerocids.com/projects/the-smart-corridor/

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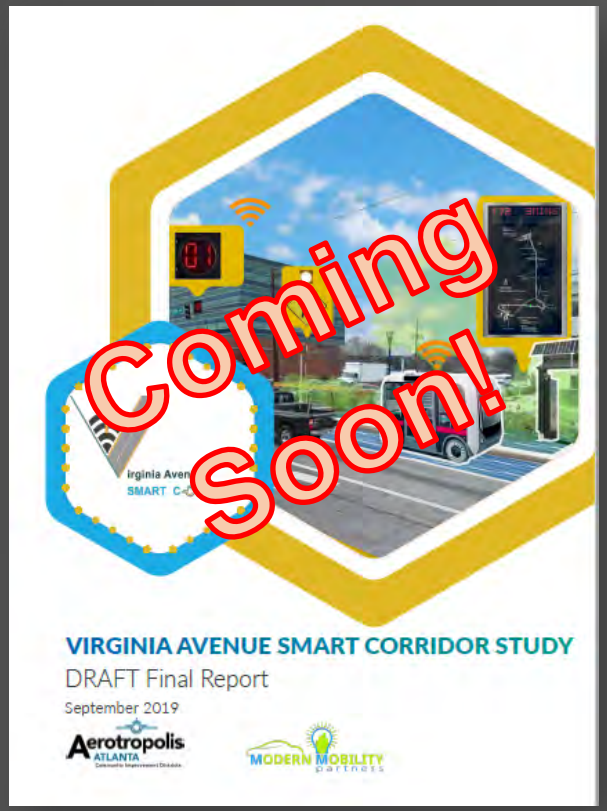

QUESTIONS?

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