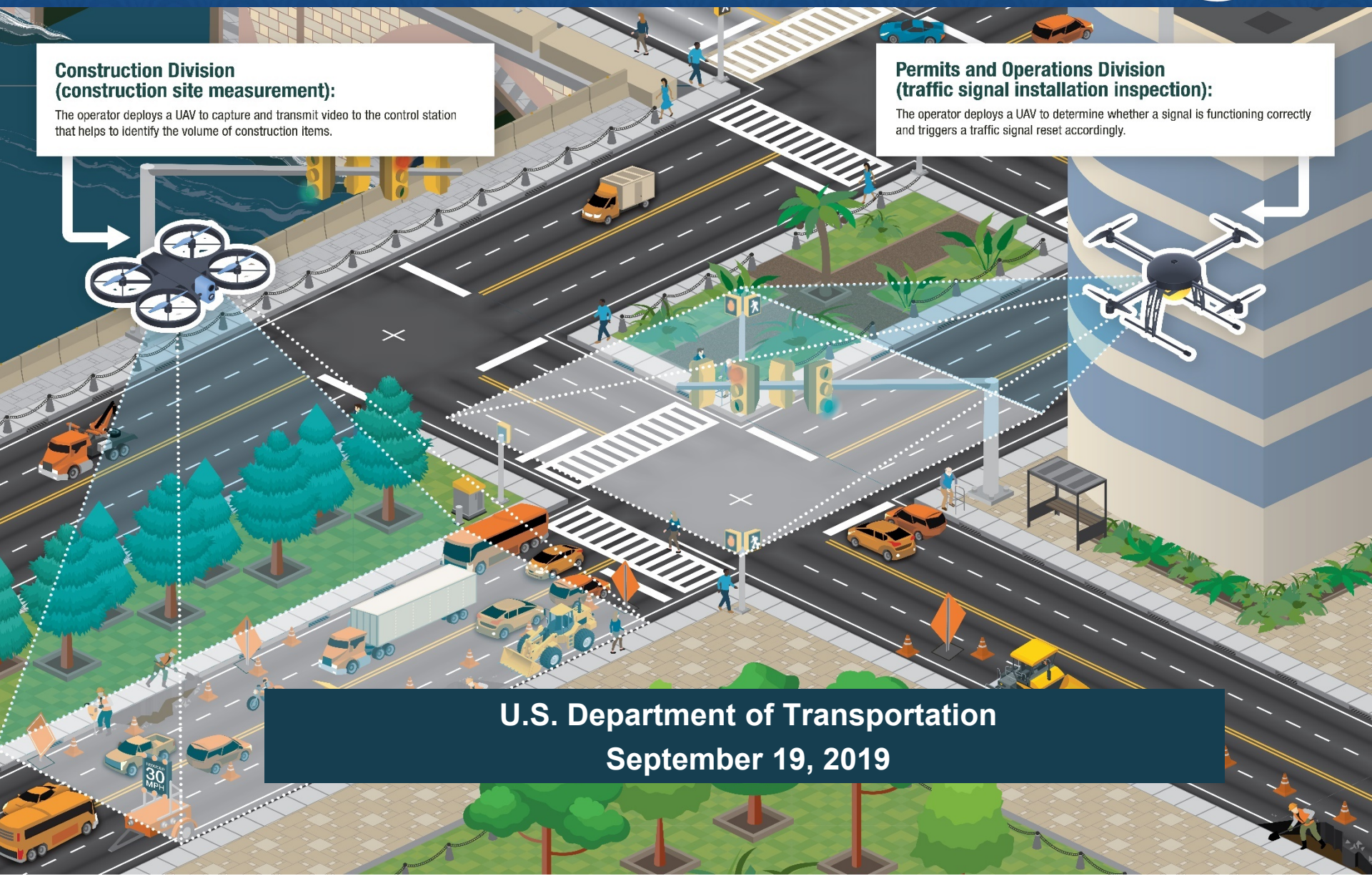
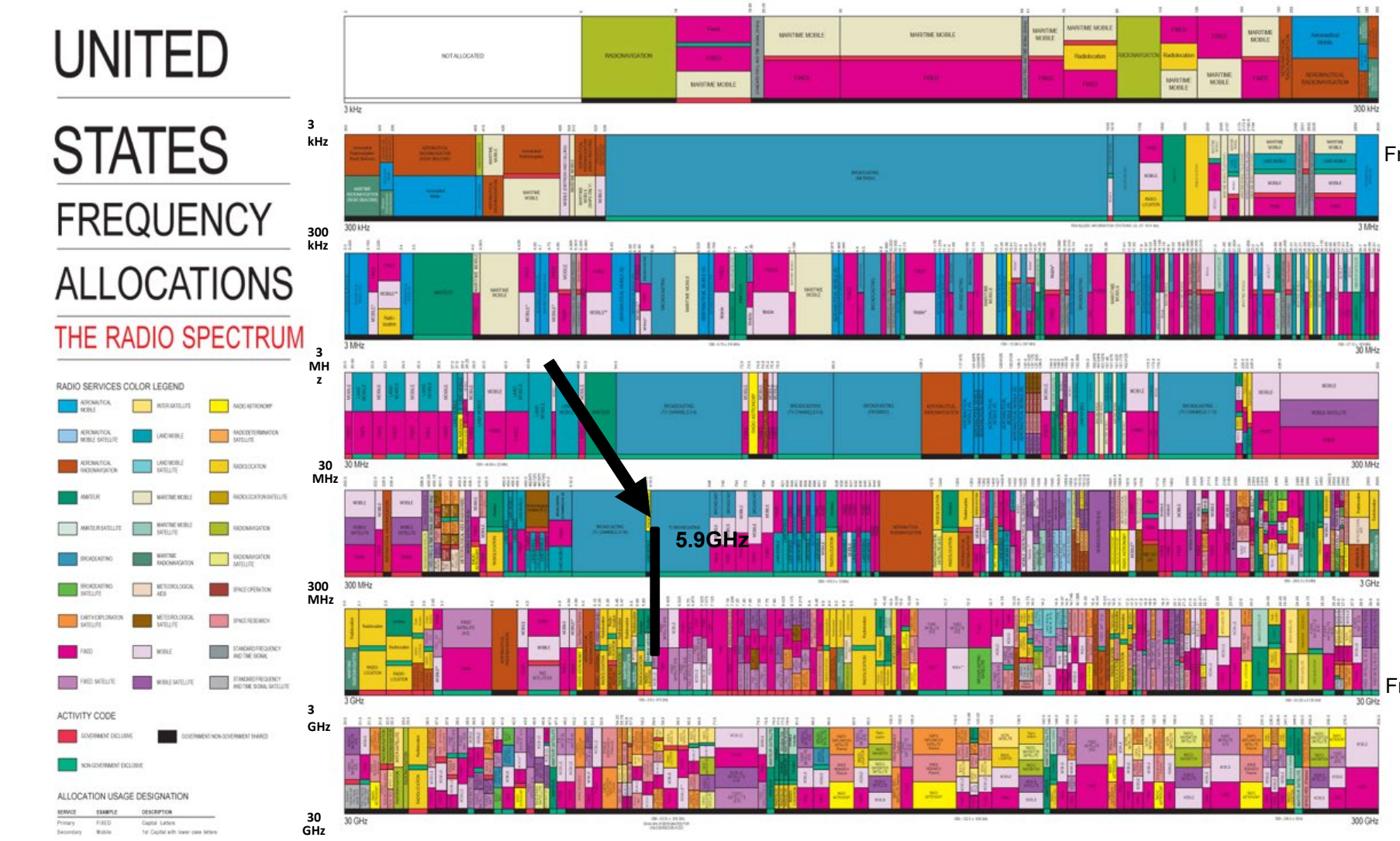
Importance of the Safety Band for Connected and Automated Vehicles



U.S. Department of Transportation
September 19, 2019

The Safety Band: 5.9 GHz



Importance of the Safety Band

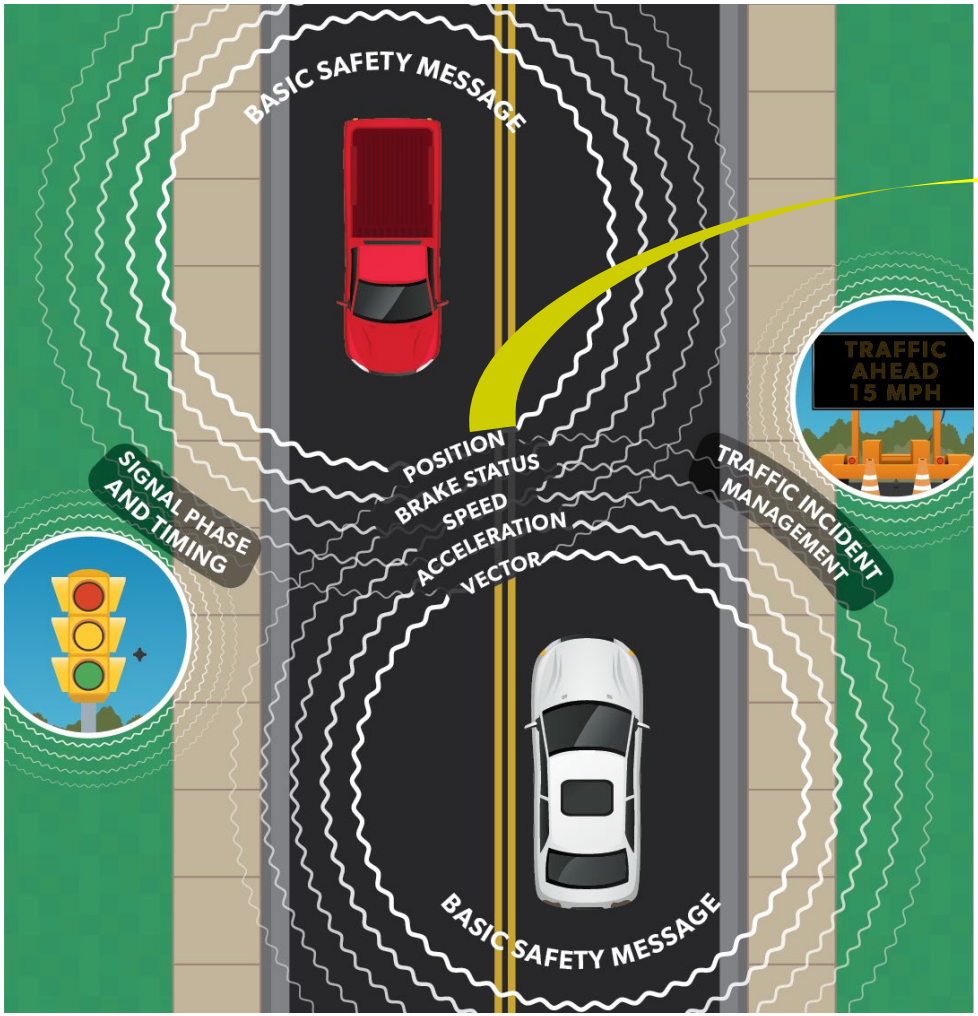
WHAT THE SAFETY BAND IS USED FOR:

- Traffic light control;
- Traffic monitoring;
- Travelers' alerts;
- Automatic toll collection;
- Traffic congestion detection;
- Emergency vehicle signal preemption of traffic lights;
- Electronic inspection of moving trucks via data transmissions with roadside inspection facilities;
- Red-light violation warnings;
- Reduced speed zone and curve speed warnings; and,
- Spot weather-impact warnings and other safety-critical applications.

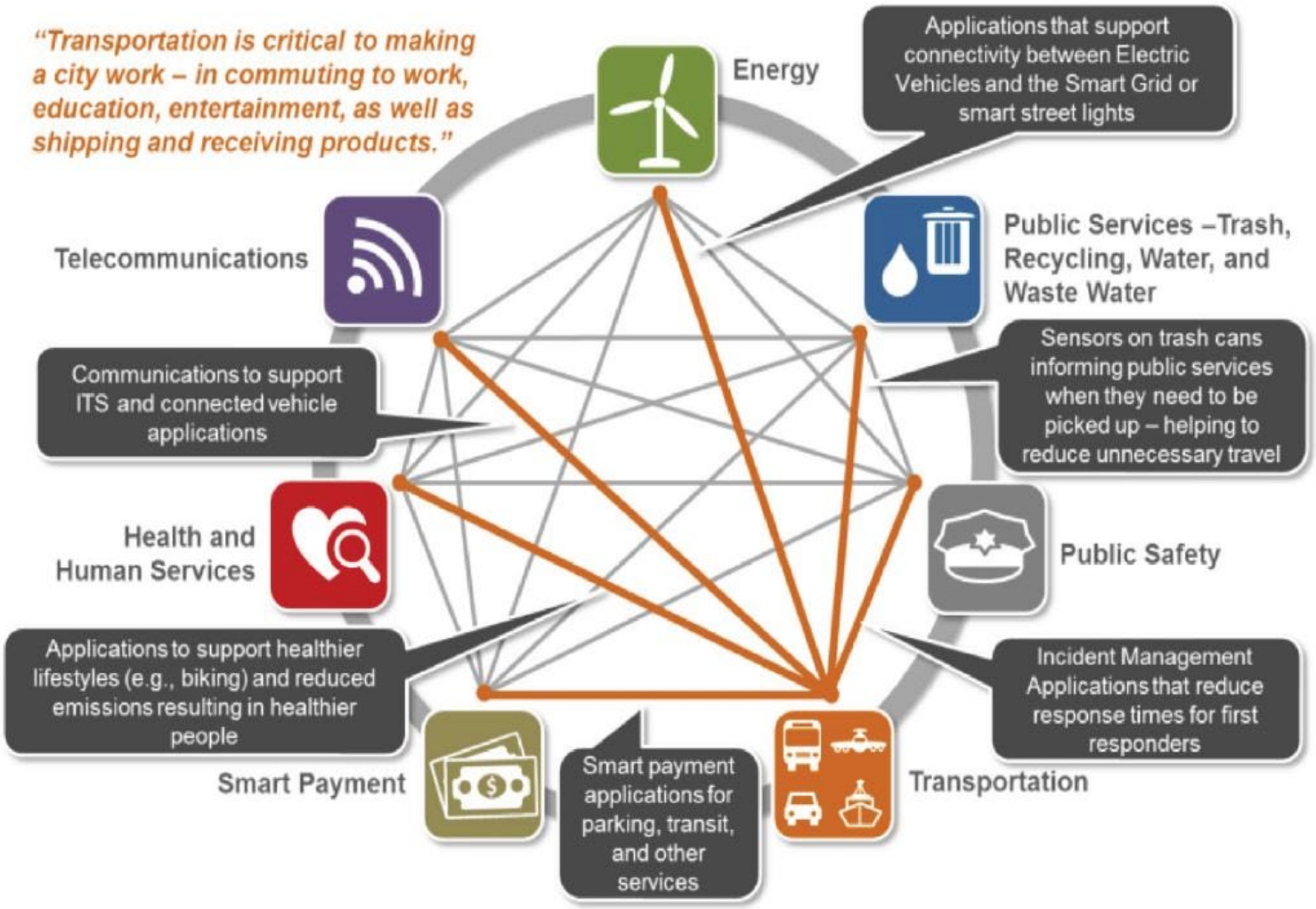
<u>Interoperability</u> is central to enabling universal, nationwide and regionwide V2X capability and benefits.

<u>With over 37,000 deaths</u> on our Nation's roads every year, it is critical that efforts to free up additional spectrum do not come at the expense of life-saving technologies.

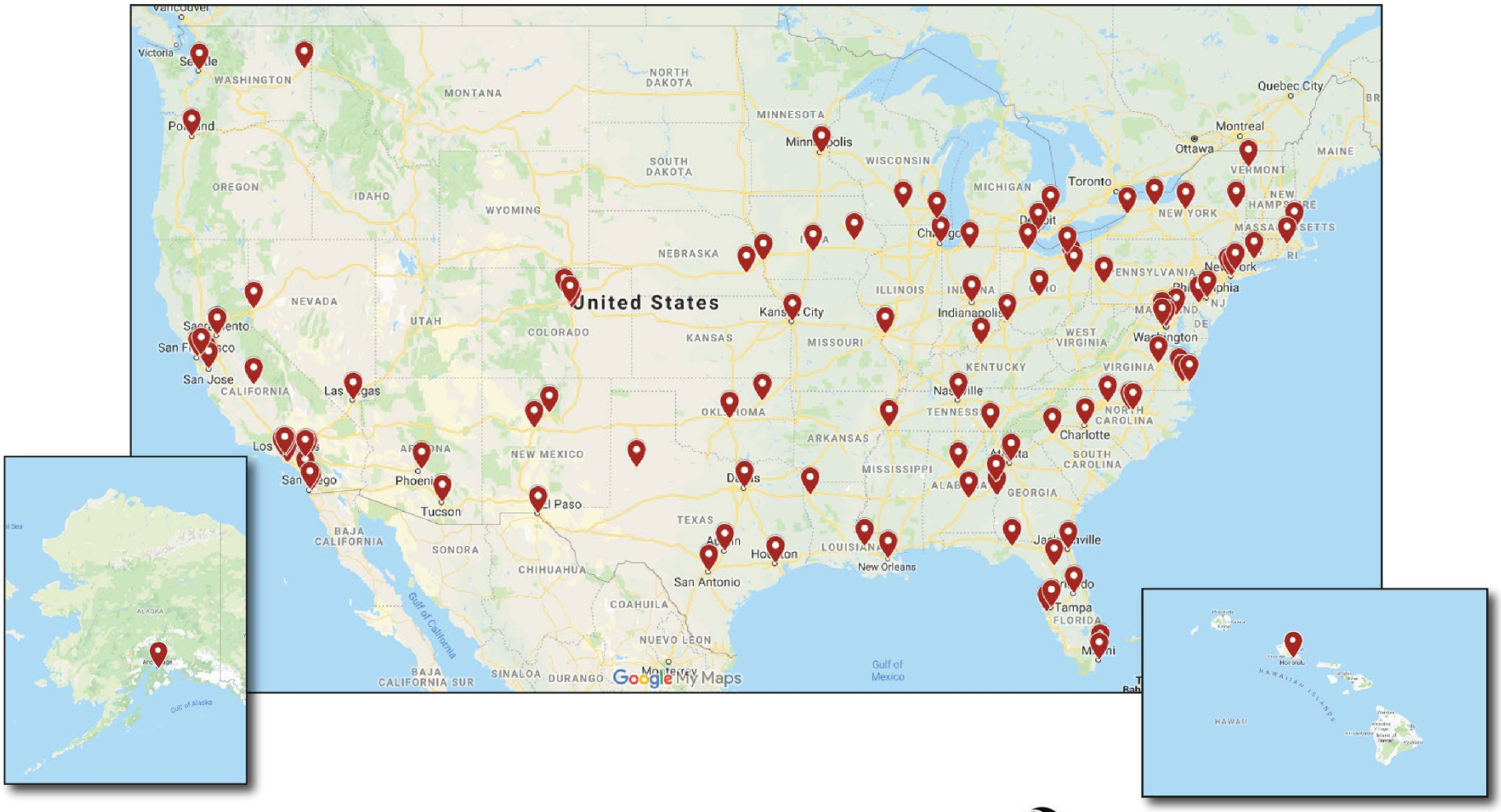
Criticality of Spectrum Availability



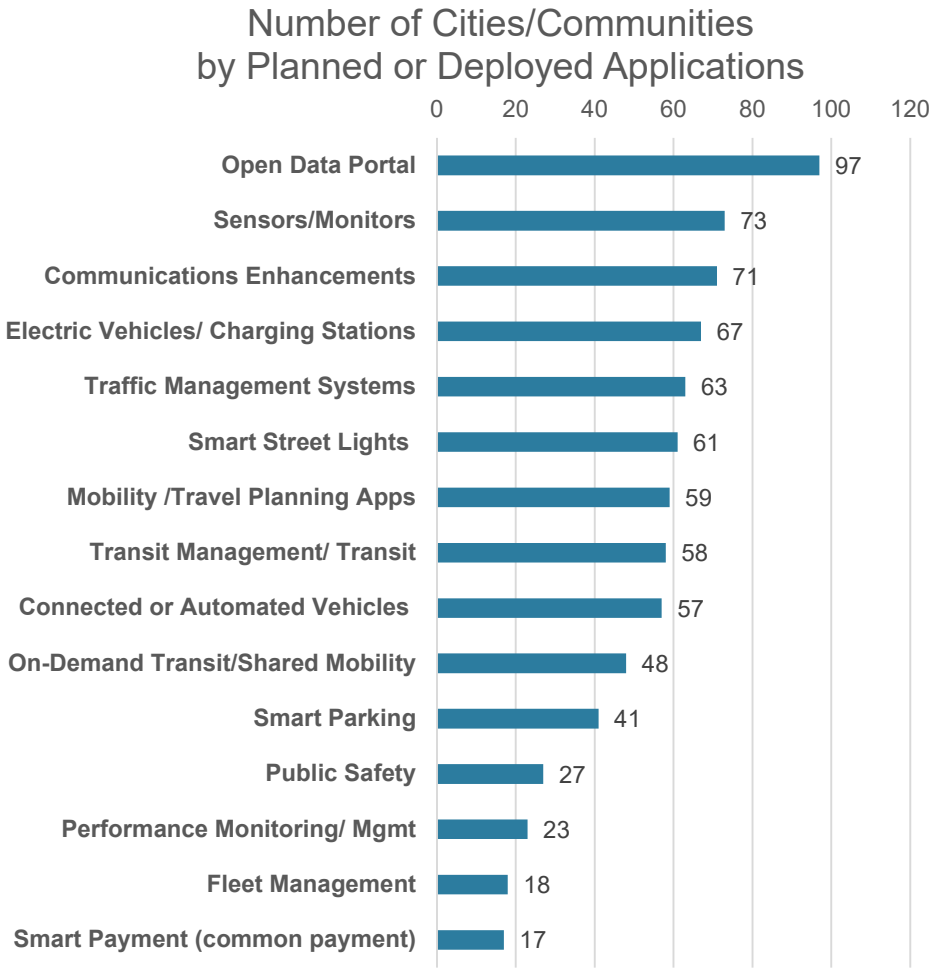
Transportation in the Context of Smart Cities



Smart Cities Research Underway

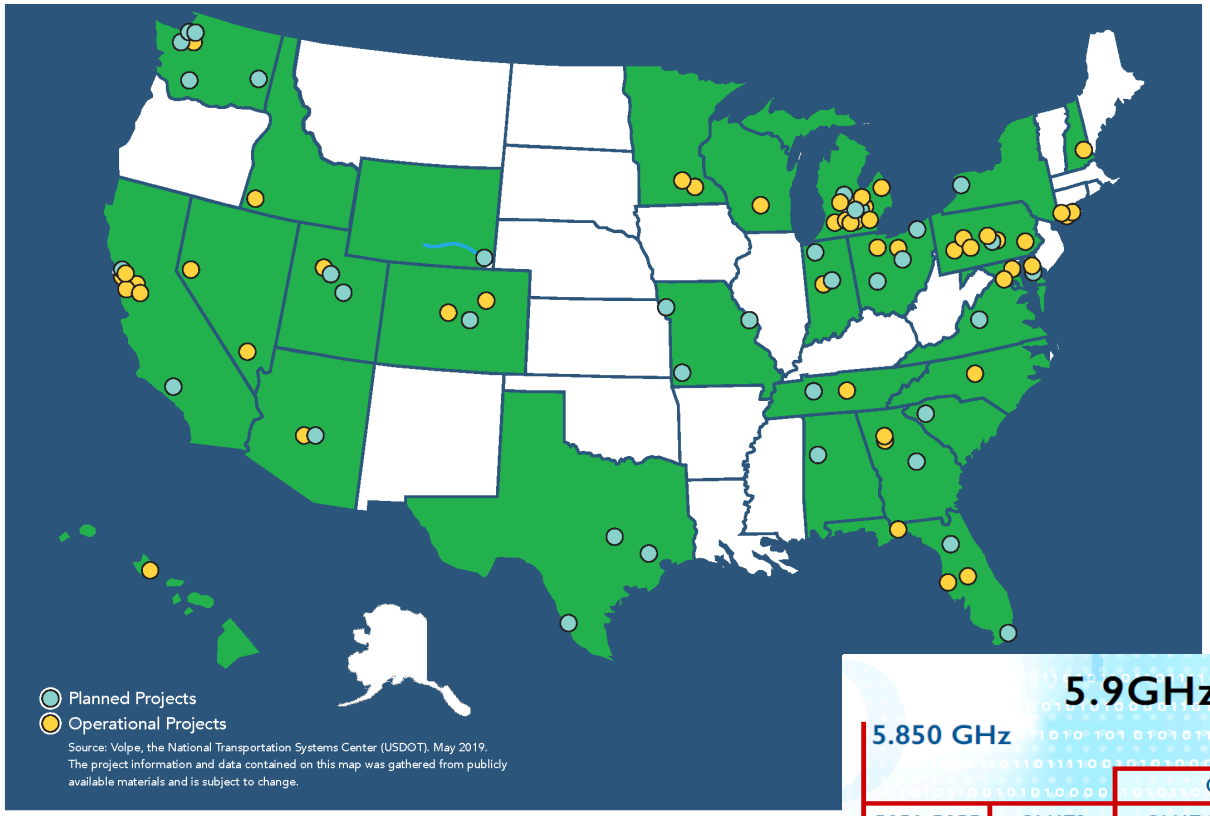


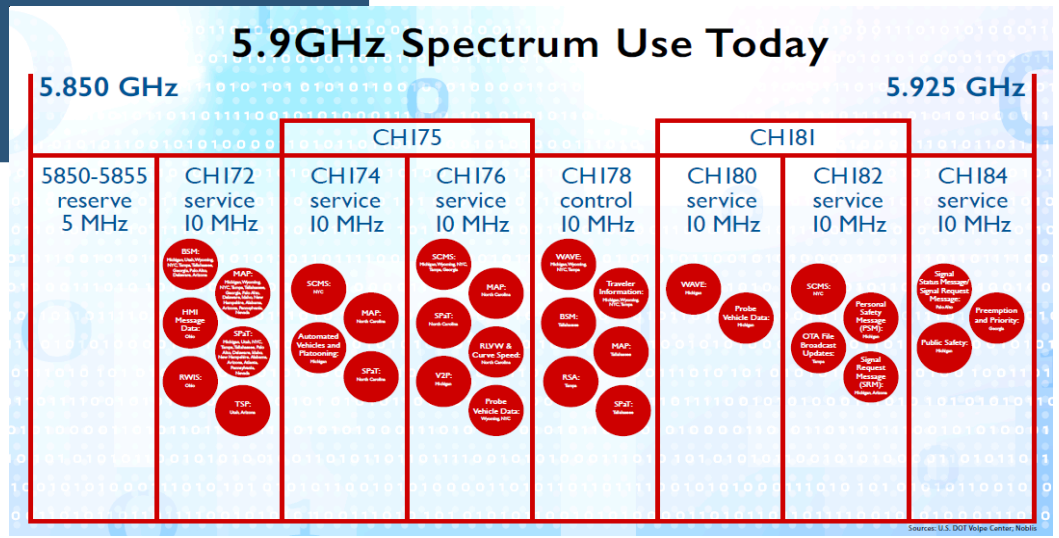
Smart City Scan: Transportation Applications



Note: Counts reflect self-reported information available on websites (e.g., planning documents) gathered through August 2019. Based on analysis of 110 cities/communities.

Use of the Safety Band: Deployment Locations

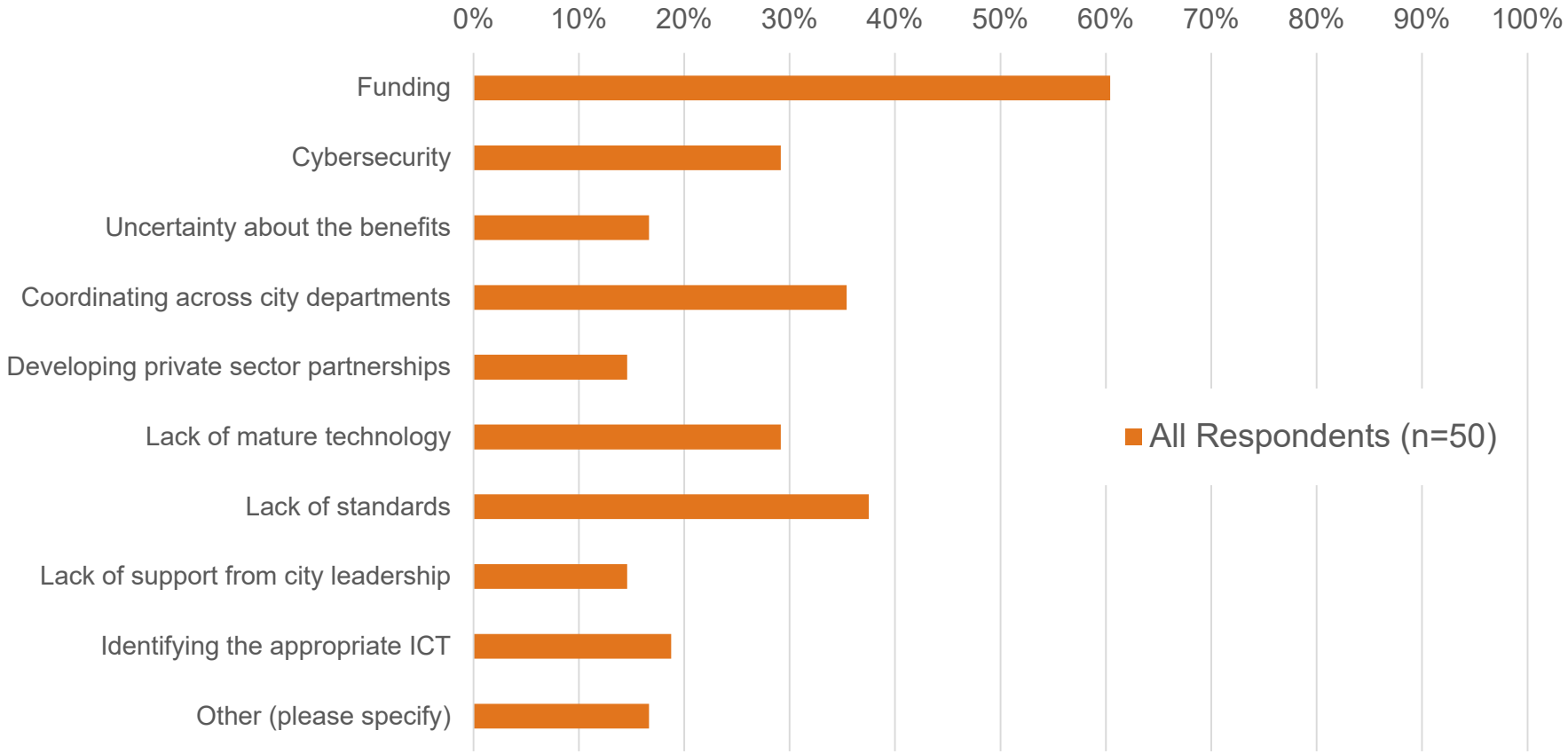




Survey of Smart Cities/Communities: Preliminary Results

- Survey administered to 107 Smart Cities in August 2019

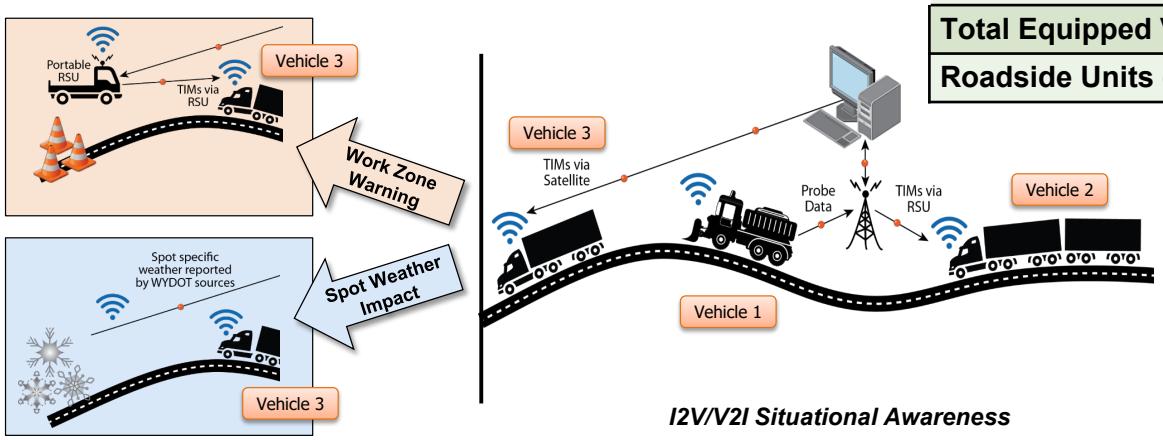
"What are the biggest challenges your city faces in planning for and/or deploying Smart City ITS technologies?"



WYDOT Pilot CV Applications and Devices

Category	WYDOT – CV Application
V2V Safety	Forward Collision Warning (FCW)
V2I/I2V Safety	Situational Awareness
	Work Zone Warnings (WZW)
	Spot Weather Impact Warning (SWIW)
V2I and V2V Safety	Distress Notification (DN)

WYDOT – Devices	Estimated Number
WYDOT Maintenance Fleet Subsystem On-Board Unit (OBU)	90
Integrated Commercial Truck Subsystem OBU	25
Retrofit Vehicle Subsystem OBU	255
WYDOT Highway Patrol	35
Total Equipped Vehicles	**405**
Roadside Units (RSU) along I-80	**75**



I2V/V2I Situational Awareness

Tampa Hillsborough Expressway Authority (THEA) Pilot CV Applications and Devices

Category	Tampa (THEA) – CV Application
V2I Safety	End of Ramp Deceleration Warning (ERDW)
	Wrong Way Entry (WWE)
	Pedestrian Collision Warning (PCW)
V2V Safety	Emergency Electronic Brake Lights (EEBL)
	Forward Collision Warning (FCW)
	Intersection Movement Assist (IMA)
	Vehicle Turning Right in Front of a Transit Vehicle (VTRFTV)
Mobility	Intelligent Traffic Signal System (I-SIG)
	Transit Signal Priority (TSP)

Tampa (THEA) – Devices	Estimated Number
Vehicle Equipped with On-Board Unit (OBU)	1,080
HART Transit Bus Equipped with OBU	10
TECO Line Street Car Equipped with OBU	8
Total Equipped Vehicles	**1,100**
Roadside Units (RSU) at Downtown Intersections	**44**

Electronic Brake Lamp Warning

Exit Ramp Deceleration Warning

NYC Pilot CV Applications and Devices

VISION ZERO
"Traffic Death and Injury on City streets is not acceptable"

Category	NYCDOT – CV Application
V2I/I2V Safety	Speed Compliance
	Curve Speed Compliance
	Speed Compliance/Work Zone
	Red Light Violation Warning
	Oversize Vehicle Compliance
	Emergency Communications and Evacuation Information
V2V Safety	Forward Crash Warning (FCW)
	Emergency Electronics Brake Lights (EEBL)
	Blind Spot Warning (BSW)
	Lane Change Warning/Assist (LCA)
	Intersection Movement Assist (IMA)
	Vehicle Turning Right in Front of Bus Warning
V2I/I2V Pedestrian	Pedestrian in Signalized Crosswalk
	Mobile Accessible Pedestrian Signal System (PED-SIG)
Mobility	Intelligent Traffic Signal System (I-SIGCVDATA)

NYCDOT – Devices	Estimated Number
Taxi Equipped with Aftermarket Safety Device (ASD)	3,200
DCAS Fleet Equipped with ASD	3,200
MTA Fleet Equipped with ASD	700
NYCDOT Fleet Equipped with ASD	700
DSNY Fleet Equipped with ASD	170
Total Equipped Vehicles	**8,000**
Roadside Units (RSU) at Manhattan and Brooklyn Intersections and FDR Drive	**400**
Vulnerable Road User (Pedestrians/Bicyclists) Device	**100**
PED Detection System	**10**

Photo Source: MTA New York City Transit

Photo Source: NYCDOT

*MTA: Metropolitan Transportation Authority; DSNY: City of New York Department of Sanitation; * In addition, 600 spare ASDs will be purchased.*

We Document Deployment Experiences

- https://www.its.dot.gov/pilots/index.htm

- Success Stories
  - Keeping Stakeholders and the Public Informed
  - Bringing Local Agencies to Work Together
  - Promoting Interoperability
  - Providing Open Source CV Applications and Sharing Data
  - Accelerating Collaboration and CV Deployment
- Lessons Learned
  - Driving Towards Deployment: Lessons Learned from the Design/Build/Test Phase
  - Connected Vehicle Pilot Deployment Program Phase 1 Lessons Learned
  - Interoperability Testing amongst the three Connected Vehicle Pilots
  - NYC Pilot's demonstration at the ITS-NY Annual Meeting and Technology Exhibition
  - Integrating and Testing Large Disparate Systems

STAY CONNECTED

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- Jonathan Walker, NYCDOT Site AOR; Jonathan.B.Walker@dot.gov
- Govind Vadakpat, Tampa (THEA) Site AOR; G.Vadakpat@dot.gov
- Walter During, Evaluation COR, Walter.During@dot.gov

Visit CV Pilot and Pilot Site Websites for more Information

- CV Pilots Program: http://www.its.dot.gov/pilots
- NYCDOT Pilot: https://www.cvp.nyc/
- Tampa (THEA): https://www.tampacvpilot.com/
- Wyoming DOT: https://wydotcvp.wyoroad.info/

NYCDOT

Tampa (THEA)

WYDOT

Contact for Testing New Communications Technologies

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