Intelligent Transportation Systems
Joint Program Office

ITS Program Advisory Committee Meeting

March 31, 2016
Agenda

8:00 – 8:20  Continental Breakfast

8:20 – 8:25  Welcome Remarks

8:25 – 8:30  Opening Remarks / Agenda Review

8:30 – 9:00  Connected Vehicle Pilots Update

9:00 – 10:00 FAST Act / 2016 ITS Research Program Budget

10:00 – 10:15 Break

10:15 – 12:00 Proposed 2016 Advise Memorandum Topics
  • Automation
  • Scenario Planning
  • Traffic Safety Culture
  • Vehicle Hacking
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  • Traffic Safety Culture
  • Vehicle Hacking
CONNECTED VEHICLE PILOT
Deployment Program

Kate Hartman, Program Manager

ITS Joint Program Office
CV PILOT DEPLOYMENT PROGRAM GOALS

- Spur Early CV Tech Deployment
- Measure Deployment Benefits
- Resolve Deployment Issues

Wirelessly Connected Vehicles
- Safety
- Technical

Mobile Devices
- Mobility
- Institutional

Infrastructure
- Environment
- Financial
Phase 1: Concept Development *(Current Phase)*
- Creates the foundational plan to enable further design and deployment
- **Progress Gate:** Is the concept ready for deployment?

Phase 2: Design/Deploy/Test
- Detailed design and deployment followed by testing to ensure deployment functions as intended (both technically and institutionally)
- **Progress Gate:** Does the system function as planned?

Phase 3: Maintain/Operate
- Focus is on assessing the performance of the deployed system
- Post Pilot Operations (CV tech integrated into operational practice)
## Sites Selected – 2015 Awards

**ICF/Wyoming**
- Reduce the number and severity of adverse weather-related incidents in the I-80 Corridor in order to improve safety and reduce incident-related delays.
- Focused on the needs of commercial vehicle operators in the State of Wyoming.

**New York City**
- Improve safety and mobility of travelers in New York City through connected vehicle technologies.
- Vehicle to vehicle (V2V) technology installed in up to 10,000 vehicles in Midtown Manhattan, and vehicle to infrastructure (V2I) technology installed along high-accident rate arterials in Manhattan and Central Brooklyn.

**Tampa (THEA)**
- Alleviate congestion and improve safety during morning commuting hours.
- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.
# Overview of Pilot Deployment Proposed CV Applications

<table>
<thead>
<tr>
<th>ICF/Wyoming</th>
<th>New York City (NYC)</th>
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<tbody>
<tr>
<td>Work Zone Warnings</td>
<td>Curve Speed Warning</td>
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<tr>
<td>Spot Weather Impact Warning</td>
<td>Pedestrian in Signalized Crosswalk Warning (Transit)</td>
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<td><strong>Situational Awareness</strong></td>
<td>Red Light Violation Warning</td>
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<td>Freight-Specific Dynamic Travel Planning</td>
<td>Reduced Speed/Work Zone Warning</td>
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<td>Automatic Alerts for Emergency Responders</td>
<td>Blind Spot Warning (BSW) *</td>
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<td>CV-enabled Weather-Responsive Variable Speed Limits</td>
<td>Emergency Electronic Brake Lights (EEBL) *</td>
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<td>Road Weather Advisories for Trucks and Vehicles</td>
<td>Forward Crash Warning *</td>
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<td>Truck Parking Availability for Freight Carriers</td>
<td>Intersection Movement Assist (IMA) *</td>
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<td><strong>Tampa (THEA)</strong></td>
<td>Lane Change Assist (LCA) *</td>
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<td>Emergency Electronic Brake Lights (EEBL)</td>
<td>Advanced Traveler Information System</td>
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<td>Forward Collision Warning (FCW)</td>
<td>Emergency Communications and Evacuation (EVAC)</td>
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<td>Intersection Movement Assist (IMA)</td>
<td>Freight-Specific Dynamic Travel Planning and Performance Measurement (F-ATIS)</td>
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<td>Vehicle Turning Right in Front of Bus Warning (Transit)</td>
<td>Intelligent Traffic Signal System (I-SIG)</td>
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<td>Mobile Accessible Pedestrian Signal System (PED-SIG)</td>
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<td>Eco-Speed Harmonization</td>
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<td>Transit Signal Priority (TSP)</td>
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<td>Probe-enabled Traffic Monitoring</td>
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*Deployment of applications is dependent upon Final ConOps and funding*
## Concept Development Activities and Public Events

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Public webinars to share the concept development activities from the three sites (see website for exact dates and times)
<table>
<thead>
<tr>
<th>CV Application</th>
<th>WYDOT Snow Plows</th>
<th>WYDOT Maintenance Fleet Vehicles</th>
<th>Emergency Vehicles</th>
<th>Private Trucks/Commercial Vehicles</th>
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<tbody>
<tr>
<td>1. Road Weather Advisories for Trucks and Vehicles</td>
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<td>5. Work Zone Warnings</td>
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<td>6. Situational Awareness</td>
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<td>7. Truck Parking Availability for Freight Carriers</td>
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<td>8. Freight-Specific Dynamic Travel Planning</td>
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</table>
ICF/WYOMING PILOT DEPLOYMENT OVERVIEW

Objective:
- Reduce the number and severity of adverse weather-related incidents (including secondary incidents) in the I-80 Corridor in order to improve safety and reduce incident-related delays.
  - Focused on the needs of the commercial vehicle operator in the State of Wyoming

Approach:
- Equip fleet vehicles (combination of snow plows, maintenance fleet vehicles, emergency vehicles, and private trucks) that frequently travel the I-80 corridor to transmit basic safety messages (BSMs), collect vehicle and road condition data and provide it remotely to the WYDOT TMCs
- Deploy DSRC roadside equipment (RSE) to supplement existing assets and initiatives
- Road weather data shared with freight carriers who will transmit to their trucks using exiting in-vehicle systems

Deployment Team:
- Prime Consultant: ICF International; Partner State: Wyoming DOT
- Sub Consultants: Trihydro Corporation, National Center for Atmospheric Research, University of Wyoming, Catt Laboratory and McFarland Management
ICF/WYOMING PILOT DEPLOYMENT SITE:
HIGH PRIORITY CORRIDOR

Wyoming I-80 Corridor – Connected Vehicle Map

Legend
- High Profile Wind Warning Area
- AVL/Tablet
- Snow Plows
- STIP Areas 2015-2016

Wyolink - Signal Strength
- Good
- Spotty
- Unreliable

- I-80, Wyoming
- Possible Locations Roadside DSRC
- (Going into/out of town off I-80 for supporting VSL Application. These include locations with mm labels)
- WiFi Locations (9 within 500 ft of I-80)
- VSL Devices (122 on I-80)
- Truck Parking (55 on I-80)

Map Extent

Source: Wyoming CV Pilot Deployment Team
New York City
Objective:

- Improve safety and mobility of travelers in New York City through connected vehicle technologies
  - Aligned with the NYC’s Vision Zero initiative, which seeks to reduce crashes and pedestrian fatalities, and increase safety of travelers in all modes of transportation

Approach:

- Equip up to 10,000 vehicles (taxis, buses, commercial fleet delivery trucks, and City-owned vehicles) that frequently travel in Midtown Manhattan and Central Brooklyn to transmit and receive connected vehicle data
- Install V2I technology at high-accident rate arterials:
  - Upgrade 239 traffic signals along 1st, 2nd, 5th, and 6th Avenues in Manhattan and Flatbush Avenue in Central Brooklyn (emergency evacuation route)
  - Deploy Roadside equipment (RSE) along FDR Drive

Deployment Team:

- Prime Consultant: NYC DOT
- Sub Consultants: JHK Engineering, Battelle, Cambridge Systematics, KLD Engineering, Security Innovation and Region 2 University Transportation Research Center
Manhattan Grid
- Closely spaced intersections (600’ x 250’)
- Day vs. Night conditions
- Residential/commercial mix
- High accident rate (red dot) (2012-2014)
  - 20 fatalities
  - 5,007 injuries
- 204 intersections

Central Brooklyn – Flatbush Ave
- Over-Height restrictions
  - Tillary St.; Brooklyn Bridge
- High accident rate (red dots) (2012-14)
  - 1,128 injuries
  - 8 fatalities
- Average AM speed 15 mph
- 35 intersections

Manhattan – FDR Drive
- Limited access highway
- Excludes trucks/buses
- Short radius of curvature
- Over-Height restrictions
- $1,958,497 in Over-Height incident delay costs (2014)
  - 24% of City-wide total
# NYC Pilot Deployment Proposed CV Application-Fleet Distribution

<table>
<thead>
<tr>
<th>CV Application</th>
<th>Taxi &amp; Limousine</th>
<th>NYC DOT/ Sanitation</th>
<th>MTA/ NYCTA Buses</th>
<th>Commercial Vehicles</th>
<th>Pedestrian</th>
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<td>1. Mod. Eco-Speed Harmonization</td>
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<td>2. Red Light Violation Warning</td>
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<td>3. Ped. in Signalized Crosswalk Warn.</td>
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<td>4. RT Vehicle in Front of Bus Warning</td>
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<td>5. Mobile Accessible Ped Signal Sys.</td>
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<td>6. Curve Speed Warning</td>
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<td>7. Freight Dynamic Travel Planning</td>
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<td>8. Reduced Speed/Work Zone Warn.</td>
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<td>10-15. V2V Applications (6)</td>
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<td>16. EVAC In-Vehicle Information</td>
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Tampa (THEA)
Tampa Hillsborough Expressway Authority
Data exchange will use DSRC (Dedicated Short Range Communications) or other wireless media. SCMS (Security Credential & Management System) will be used where appropriate.
TAMPA (THEA) PILOT DEPLOYMENT OVERVIEW

Objective:

- The primary objective of this deployment is to alleviate congestion and improve safety during morning commuting hours.
  - Deploy a variety of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) safety, mobility, and agency data applications to create reinforcing benefits for motorists, pedestrians, and transit operation.

Approach:

- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the following transportation challenges:
  - Morning peak hour queues, wrong-way entries, pedestrian safety, bus rapid transit (BRT) signal priority optimization, trip time and safety, streetcar trolley conflicts, and enhanced signal coordination and traffic progression.

Deployment Team:

- Prime Consultant: Tampa Hillsborough Expressway Authority (THEA)
- Sub Consultants: HNTB Corporation, Siemens Industry, Inc., Booz Allen Hamilton, Center for Urban Transportation Research at University of South Florida and Global-5 Communications
Join us for the *Getting Ready for Deployment* Series

- Discover more about the 2015 CV Pilot Sites
- Learn the Essential Steps to CV Deployment
- Engage in Technical Discussion

**Website:** http://www.its.dot.gov/pilots  
**Twitter:** @ITSJPODirector  
**Facebook:** https://www.facebook.com/USDOTResearch

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Kate.hartman@dot.gov

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- Jonathan Walker, NYC Site COR  
  Jonathan.b.Walker@dot.gov  
- Govind Vadakpat, THEA Site COR  
  G.Vadakpat@dot.gov
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   • Vehicle Hacking
FAST Act General Information

- Five Years (FY 16 – 20)
- Increase in Top-Level Funding of 11%
- No Increase for OST-R (94% of all funding)
- Major New/Revised Programs
  - Nationally Significant Freight and Highway Projects
  - Surface Transportation Block Grant Program
  - National Highway Freight Program
  - Nationally Significant Federal Lands and Tribal Projects Program
FAST ACT – ITS JPO

- Advanced Transportation and Congestion Management Technologies Grants (w/FHWA)
- Determine Authorization Levels
- Figure Out “Administered by FHWA”
- Support National Freight Goals
- Support Cybersecurity Research for Connected Vehicles
- Incorporate Technical Corrections
ITS Strategic Plan 2015 to 2019

- Strategic Priorities
  - Realizing Connected Vehicles
  - Advancing Automation

- Program Categories:
  - Connected Vehicles
  - Automation
  - Emerging Capabilities
  - Enterprise Data
  - Interoperability
  - Accelerating Deployment
2015 Accomplishments

Connected Vehicles (CV)
- Awarded CV Pilots to ICF-WY, NYCDOT, and Tampa/THEA
- Completed the development, research and evaluation of the Dynamic Mobility Applications (DMA) (FRATIS, INFLO, Enable ATIS, and R.E.S.C.U.M.E.)
- Developed AERIS and Road Weather CV Applications
- Completed initial research into Security Credential Management System (SCMS) Proof of Concept
- Completed research to enable the NHTSA V2V decision
- Completed Draft Spectrum Test Plan Report
2015 Accomplishments (cont.)

Automation
- Develop Automated Vehicle Policy Research Plan
- Published Human Factors Evaluation of Level 2 and Level 3 Automated Driving Concepts Report
- Delivered Report on Target Crash Populations for Automated Vehicles
- Convened 2015 Automated Vehicle Symposium

Emerging Capabilities
- Engaged Federal partners at ATTRI State of Science Roundtable and moved toward application selection
- Completed Smartcross Pedestrian Safety with Cell Phones project
2015 Accomplishments (cont.)

Interoperability
- Facilitated US-Mexico ITS Architecture workshop in cooperation with OST-X
- CVRIA v2.0 released, initial communications view completed
- Facilitated public CV Architecture Workshop in support of CV Pilots
- Completed Human Factors Final reports for DVI Design Guidance, Integration Architecture, and Multiple Sources for V2I and V2V

Enterprise Data
- Released new Version 2.2 of Research Data Exchange (RDE)
- Draft Final Report for Recommended Modifications and Additions to ITS Standards
- Continued to advance Smart Cities research
2015 Accomplishments (cont.)

Accelerating Deployment

- Released online CV101 eLearning course
- Continued PCB training courses with participation from over 36,000 participants in 2015
- Published the 2015-2019 ITS JPO Strategic Plan
- Continued to engage stakeholders at TRB, ITS America, the ITS World Congress and other venues
- Evolved SE Michigan Connected Vehicle Test Bed to support our Deployment and Technical Assistance program
- Awarded Integrated Corridor Management project
- Awarded MSAA Deployment Planning grants to selected local and regional organizations to plan coordinated mobility services
Participate in Concept Development Phase Webinars for the three Pilot Sites (see website for exact dates and times)

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<td>• Concept of Operations Webinars</td>
<td>• Performance Measurement Webinars</td>
<td>• Comprehensive Deployment Plan Webinars</td>
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Smart City Challenge

Vision
To demonstrate and evaluate a holistic, integrated approach to using advanced ITS technologies to improve surface transportation performance within a city.

Goals
- Identify the challenges and community needs
- Identify which technologies will solve the city’s challenges
- Encourage cities to integrate advanced technologies – including connected and automated vehicle technologies – into the management and operations of the city
- Demonstrate the impact of advanced technologies
- Identify technical, policy, and institutional issues, and work with partners to address them
1,400 local officials, companies, academics and non-profits joined our webinars.

800 people participated in our Smart City Forum.

300 companies have expressed interest in partnering.

78 applications received for the Smart City Challenge.

5 Smart City Challenge Finalists to be announced in March at SXSW.

1 Smart City Challenge Winner announced in June.

#DOTSmartCity
www.transportation.gov/smartcity
FAST Deployment Grants

- ITS JPO will support and provide partial funding for FAST Act’s Advanced Transportation and Congestion Management Technology Deployment grant program:
  - Provides grants to eligible entities to develop model deployment sites no later than 6 months after the date of enactment.
  - Funding for the program is set at $60 million with up to 2 million for program reporting, evaluation, and administrative costs each fiscal year from FY 2016 to FY 2020.
  - No more than 20 percent of the fiscal year award can be made to a single grant recipient.
  - Funded from Highway R&D, TIDP, & ITS Research
- May provide support for a number of ITS initiatives including Smart City study of digital technologies and information technologies, cybersecurity systems to help prevent hacking, spoofing, and disruption of connected and automated transportation vehicles, V2I deployment, etc.
2016 Research Activities

- PCB
- ITS Architecture and standards
- ATTRI
- MARAD ITS Assessment
- St Lawrence Seaway ITS Concept Technology
Constraints

- Vehicle Automation
- Mobility on Demand
- Human Factors
- AERIS
- Road Weather Management
- Cybersecurity
Agenda

8:00 – 8:20  Continental Breakfast

8:20 – 8:25  Welcome Remarks

8:25 – 8:30  Opening Remarks

8:30 – 9:00  Connected Vehicle Pilots Update

9:00 – 10:00 FAST Act / 2016 ITS Research Program Budget

10:00 – 10:15 Break

10:15 – 12:00 Proposed 2016 Advise Memorandum Topics
  • Automation
  • Scenario Planning
  • Traffic Safety Culture
  • Vehicle Hacking
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## ITS Advisory Committee Advice Memo Memo Timeline

<table>
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<th>Date</th>
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<tr>
<td>October 2, 2015</td>
<td>2015 Advice Memo Submitted</td>
</tr>
<tr>
<td>June 4, 2016</td>
<td>2014 – 2016 Term Expires</td>
</tr>
<tr>
<td>January 1, 2017</td>
<td>Advice Memo Due to ITS JPO</td>
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<td>ITS PAC Report Due to Congress</td>
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12:00 – 1:00 Lunch

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2:30 – 3:00 Smart City Challenge

3:00 – 3:30 NHTSA Update

3:30 – 4:00 Distracted Driving Discussion with Transunion

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Beyond Traffic: The Smart City Challenge
ITS Program Advisory Committee Meeting

31 March 2016
U.S. Department of Transportation (USDOT)
Encourage cities to put forward their best and most creative ideas for innovatively addressing the challenges they are facing.

The Smart City Challenge will address how emerging transportation data, technologies, and applications can be integrated with existing systems in a city to address transportation challenges.

Demonstrate how advanced data and intelligent transportation systems (ITS) technologies and applications can be used to reduce congestion, keep travelers safe, protect the environment, respond to climate change, connect underserved communities, and support economic vitality.
Phase 1 (Deadline February 4, 2016):

- Support concept development and planning activities
- Used to identify Smart City Challenge Finalists
- $100K each

Phase 2 (Deadline May 24, 2016):

- Smart City Challenge Finalists
- Support implementation of their proposed demonstration
- $50 Million
  - U.S. Department of Transportation: $40 Million
  - Vulcan Foundation: $10 Million
Beyond Traffic: The Smart City Challenge

Technology Elements (Highest Priority)

- Vision Element #1: Urban Automation
- Vision Element #2: Connected Vehicles
- Vision Element #3: Intelligent, Sensor-Based Infrastructure

Innovative Approaches to Urban Transportation Elements (High Priority)

- Vision Element #4: User-Focused Mobility Services and Choices
- Vision Element #5: Urban Analytics
- Vision Element #6: Urban Delivery and Logistics

- Vision Element #7: Strategic Business Models & Partnering
- Vision Element #8: Smart Grid, Roadway Electrification, & EVs
- Vision Element #9: Connected, Involved Citizens

Smart City Elements (Priority)

- Vision Element #10: Architecture and Standards
- Vision Element #11: Low-Cost, Efficient, Secure, & Resilient ICT
- Vision Element #12: Smart Land Use

U.S. Department of Transportation
Challenges Cities are Facing

1. Ensuring that all members of the community benefit from technological improvements
2. Providing first-mile and last-mile service for transit users
3. Combining and streamlining payment systems, including for those without smartphones
4. Integrating the sharing economy into a suite of mobility options
5. Enhancing trip planning services to help users make efficient choices
6. Determining the current state of travel conditions
7. Improving bicyclist and pedestrian safety
8. Facilitating the movement of goods into and within a city
9. Coordinating data collection and analysis across systems
10. Reducing inefficiency in parking systems and payment
11. Limiting the impacts of climate change and reducing carbon emissions
12. Improving traffic signal operations
13. Increasing avenues to partners & adapting to new business models
## Smart City Challenge Partners

<table>
<thead>
<tr>
<th>Partner Name</th>
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</thead>
<tbody>
<tr>
<td>Paul Allen’s Vulcan, Inc.</td>
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<tr>
<td>Mobileye</td>
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<tr>
<td>Autodesk</td>
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<tr>
<td>NXP</td>
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<tr>
<td>Amazon Web Services</td>
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<tr>
<td>Alphabet’s Sidewalk Labs</td>
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<tr>
<td>U.S. Department of Energy</td>
</tr>
</tbody>
</table>
Notice of Funding Opportunity (NOFO) #2

- **Issued:** March 25, 2016
- **Applications Due:** May 24, 2016
- **Scope Section**
  - Program Management
  - Systems Engineering Process
  - Performance Measurement
  - Data Privacy
  - Data Management and Support for Evaluation
  - Safety Management
  - Communications Plan
  - International Collaboration
  - Architecture and Standards
  - Interim and Final Reports
Proposal

- **Volume 1 – Technical Approach**
  - Technical Approach
  - Data Management
  - Management Plan
  - Staffing
  - Capacity and Capability

- **Volume 2 – Budget Application**
Kick-off Meeting: March 23, 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
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<tbody>
<tr>
<td>2:00 pm</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>2:05 pm</td>
<td>Smart City Challenge – Phase 2 Notice of Funding Opportunity (NOFO)</td>
</tr>
<tr>
<td>2:25 pm</td>
<td>Technical Assistance and Other Opportunities for Finalists</td>
</tr>
<tr>
<td>2:45 pm</td>
<td>Smart City Challenge Partners</td>
</tr>
<tr>
<td>3:15 pm</td>
<td>Nuts &amp; Bolts – Cooperative Agreement ($100,000)</td>
</tr>
<tr>
<td>3:30 pm</td>
<td>Required Deliverables:</td>
</tr>
<tr>
<td></td>
<td>- Kick-off Meeting</td>
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<td>- Progress Reports</td>
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<td>- Video</td>
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<td>- Final Report</td>
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<td>- Technical Meetings / Engagement</td>
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**April 4-5: Finalist Workshop (Washington DC)**

- *Sample Collaborative Sessions*
  - Creating Ladders of Opportunity
  - Advancing Safety in Smart Cities
  - Communications, Outreach, and Citizen Engagement

- *Sample City Team Workshops*
  - Building Mobility Options
  - Data and Evaluation
  - Electrification and Smart Grids
  - Automation: Moving People, Moving Things
  - Connected Vehicles

- *Introductions from USDOT’s Smart City Partners*
## Upcoming Workshops and Opportunities

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<td>April 17-24</td>
<td>International Trip to Europe (Copenhagen, Amsterdam and Oslo)</td>
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<tr>
<td>April 19-21</td>
<td>USDOT V2I Safety Applications Demonstrations and Connected Vehicle Technical Assistance in Fowlerville, MI</td>
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<td>April</td>
<td>USDOT Technical Assistance Meeting #2 – Connected Vehicle Boot Camp (webinar or in Washington, DC)</td>
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<td>April/May</td>
<td>Smart City Challenge Finalist Roundtable in City with Senior USDOT Officials</td>
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<tr>
<td>April/May</td>
<td>Startup Event for Finalist Cities</td>
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<td>May 3-4</td>
<td>USDOT Mobility on Demand Workshop in Denver, CO</td>
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<td>May 17</td>
<td>Live.Ride.Share Event in Denver, CO</td>
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<td>May 24</td>
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Brian Cronin
Team Lead Research and Demonstration
U.S. Department of Transportation, ITS Joint Program Office
Phone: (202) 366-8841
Email: Brian.Cronin@dot.gov
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