

Connected Vehicle Pilot Deployment Program Phase 1

Participant Training and Stakeholder Education Plan – New York City

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Chapter 1. Introduction

The New York City (NYC) Connected Vehicle (CV) Pilot Deployment will be the largest deployment of connected vehicle technology to date. This project brings New York City another step towards reaching the Vision Zero goal of eliminating the injuries and fatalities due to traffic crashes. Training of the pilot participants is an important component to the success of this pilot project.

The objective of the NYC pilot is to deploy CV applications (Phase 2) on a significant number of vehicles composed of taxis, buses, commercial fleet delivery trucks, and other City vehicles, and approximately 230 signalized intersections along 1st, 2nd, 5th, and 6th Avenues and the FDR Expressway in Manhattan and Flatbush Avenue in Brooklyn to reduce the number of vehicle crashes and pedestrian injuries which is consistent with the City's **Vision Zero** program. Table 1-1 identifies the City's needs to be satisfied by the CV application and how this specific need and CV application support the Vision Zero program.

Table 1-1. NYCDOT Needs Summary

NYCDOT Needs	CV Application	Support for Vision Zero
Manage Speed On Surface Streets - 25 mph Regulatory Speed Limit	Speed Compliance	Notify the drivers when their speed exceeds the speed limit
Manage Speeds on Curves - Regulatory Speed Limit	Curve Speed Compliance	Advise drivers to comply with the speed limit on curves, thus reducing the potential of a rollover and subsequent major traffic incident
Manage Speeds in Work Zones - Speed Limit	Speed Compliance/Work Zone	Facilitate widespread adherence to the NYC speed limit. Additional time-of-day reductions, such as those associated with school zones or moving construction (e.g., pothole repair) zones
Reduce Crashes between Vehicles	Forward Crash Warning (FCW)	Warn drivers in case of an impending rear-end crash with another vehicle ahead in the same lane and direction of travel
Reduce Crashes between Vehicles	Emergency Electronics Brake Light (EEBL)	Notify drivers when a vehicle ahead generates an emergency brake event
Reduce Crashes between Vehicles	Blind Spot Warning (BSW) + Lane Change Warning/Assist (LCA)	Warn the driver of the vehicle if the blind-spot zone is occupied by another vehicle traveling in the same direction during a lane change attempt and when it is not attempted

NYCDOT Needs	CV Application	Support for Vision Zero
Reduce Crashes between Vehicles	Intersection Movement Assist (IMA)	Warn the driver of a vehicle when it is not safe to enter an intersection because of high crash probability with other vehicles at stop-controlled and uncontrolled intersections
Reduce Crashes between Vehicles	Vehicle Turning Right in Front of Bus Warning	Warn bus drivers of vehicles pulling up behind a stopped bus, making a lane changes to pass around the bus, and exhibiting a path to cross directly in front of the bus
Reduce Crashes between Vehicles	Red Light Violation Warning	Advise drivers if a vehicle is on an approach that is likely to result in the vehicle violating the red light.
Reduce Crashes between Vehicle and Infrastructure	Oversize Vehicle Warning	Provides warnings to vehicle drivers to avoid entering a height-restricted facility and imminent low clearance location
Reduce Crashes between Vehicles and Pedestrians/Bicyclists	Pedestrian in Signalized Crosswalk Warning	Provide in-vehicle indication of pedestrian / bicyclists at intersections equipped with CV technologies
Reduce Crashes between Vehicles and Visually/Audibly-Impaired Pedestrians	Mobile Accessible Pedestrian Signal System (PED-SIG)	Allows for an automated call from the smartphone of a visually impaired pedestrian to the traffic signal and notify approaching drivers of the pedestrian's presence
Inform drivers of serious incidents	Evacuation Notification	Provides notification that an area is to be avoided and why (subset of Emergency Communications and Evacuation concepts)
Provide Mobility Information Heavily Congested Areas	Intelligent Traffic Signal System (I-SIGCVDATA)	Integration of CV movements with NYC's award winning Mid-town In Motion (MIM) adaptive traffic signal system

1.1 Purpose of the Report

The purpose of the training and education plan is to identify the roles that participants will take during the pilot deployment, including a rough description of their activities and responsibilities, and likely training requirements needed to ensure as-planned execution of the pilot deployment in the operational phase.

1.2 Organization of the Report

This section, Section Chapter 1, provides an introduction to the plan.

Section Chapter 2 identifies the participants and the training goals for each group of participants.

Section Chapter 3 provides high level information regarding participant eligibility and selection.

Section Chapter 4 describes the training methodologies that will be employed to train the participant groups.

Cost, schedule, and procurement of facilities and equipment are outlined in Section Chapter 5.

The final section, Section Chapter 6, addresses how the effectiveness of the training will be assessed.

Chapter 2. Identification of Participants and Necessary Training

2.1 Pilot Participants

The pilot participant groups, their role(s) in the pilot, and their specific training goals/objectives are provide in Table 2-1. The pilot participants can be loosely grouped into four main categories: Operational Support (including install and maintenance technicians), Fleet Owners/Drivers, Pedestrians, and Trainers.

Table 2-1. Roles and Training Objectives for Participant Groups

Participant Group	Role in Project	Training Goal/Objective
Installation and Maintenance Technicians	<ul style="list-style-type: none"> • Install Equipment in Vehicles • Maintain Equipment in Vehicles 	<ul style="list-style-type: none"> • Competent in installing equipment • Competent in troubleshooting/maintaining equipment • Procedures for reporting issues
Fleet Owners	Manage Fleet Driver Participants	<ul style="list-style-type: none"> • Gain a basic understanding of project goals • Ensure employees receive training and achieve competency • Procedures for reporting issues
Fleet Drivers	Application User	<ul style="list-style-type: none"> • Gain a demonstrable understanding of the meaning of warnings and alerts provided by applications • Receive instruction on how to report issues and feedback on applications • Procedures for reporting issues
Pedestrians	Application User	<ul style="list-style-type: none"> • Gain a demonstrable understanding of the meaning of warnings, alerts and direction provided by applications • Receive instruction on how to report issues and feedback on applications • Procedures for reporting issues
NYCDOT Trainers	Train the trainers	Thorough understanding of training materials
Participant Group Trainers	Train end users	<ul style="list-style-type: none"> • Broad understanding of project goals • Thorough understanding of training materials • Procedures for reporting issues

Participant Group	Role in Project	Training Goal/Objective
Training Material Developers	<ul style="list-style-type: none"> • Develop training materials • Develop training evaluation materials 	Prepare comprehensive training and assessment materials
TMC Operations and Data Analysts	<ul style="list-style-type: none"> • Compile, Analyze and Use the Information that Results from the Deployments 	This function will be completed by project team members for at least the first six months. A transition plan which includes training will be developed at the point that transition to other staff is planned.
Other Stakeholders	<ul style="list-style-type: none"> • General Support 	These stakeholders will not receive training. Outreach to these stakeholders is covered in the project's Outreach Plan.

A brief description of each of these groups is provided below:

2.1.1 Installation and Maintenance Technicians

This group of participants will be employees of the fleet owners. Each fleet owner will be provided with an overview of the skills needed for installing and maintaining the devices that will be installed in the vehicles. Each will identify at least one resource (and a backup resource) who will be responsible for these activities.

2.1.2 Fleet Owners

The term fleet owner identifies the responsible person within each fleet for interfacing with NYCDOT on this project. For the taxi fleets, this will most likely be the owner/manager of each medallion or garage. UPS and MTA will likely designate one fleet owner; one fleet owner will be designated for the NYC sanitation fleet.

The fleet owners will be responsible for training any new participants after the initial large-scale upfront training.

2.1.3 Fleet Drivers

The fleet drivers are the individuals who will be driving the fleet vehicles with devices installed. Drivers may operate multiple vehicles within a fleet. Therefore, it is expected that any driver who will drive any vehicle with a device installed will be a project participant and will need to be trained. Individual drivers within a fleet will not have the option to opt out unless the IRB requires this option at a later date.

2.1.4 Pedestrians

A group of about one hundred visually impaired pedestrians will be participants in this project and as such will need to be trained.

2.1.5 NYCDOT Trainers

A group of project team members and NYCDOT training professionals will be responsible for training for the trainer program. They will train the participant group trainers and they will train the pedestrian participant group. The project team members will bring the project knowledge and the NYCDOT training professionals will provide the expertise on training adults.

2.1.6 Participant Group Trainers

This group consists of fleet employees who are designated to train the drivers and/or installers. These individuals will be selected by the fleet owners. They will be responsible for the initial training, refresher training, and new employee training.

If new fleets are added after the initial large scale up-front training, NYCDOT will ensure that they receive the appropriate training so that they have the information needed to train their drivers and installers.

2.1.7 Training Material Developers

The project team will include team members with special skills such as video creation/editing and Captivate knowledge for online training development. They will be supported by the NYCDOT Information Technology group.

2.1.8 TMC Operations and Data Analysts

This is the group of transportation professionals who currently work in and support the Traffic Management Center. Eventually this group will take responsibility for the analysis of the CV data but it is not expected that this will occur until at least several months into Phase 3. Project team members will complete these first few months until a steady state is reached. At that point a transition plan will be developed and executed.

Chapter 3. Participant Eligibility and Selection

3.1 Institutional Review Board Summary

The purpose of the Institutional Review Board (IRB) process is to assure that research involving human participants is designed and conducted in an ethical manner and in accordance with applicable laws and regulations. Through this process, the IRB will confirm that any risks to participants are minimized, that the selection of participants is equitable, and participants are informed fully of what their participation will entail and of the potential risks and benefits. Issues of interest to the IRB include study design, the intended participant population, plans to identify and recruit participants, data collection procedures, privacy and data confidentiality procedures, informed consent procedures, and the identification of specific risks and benefits to participants. In particular, the safeguarding and protection of Personally Identifiable Information (PII; if such information is expected to be obtained) is of critical concern to the IRB.

At this time, the NYC Project Team has been developing and refining an IRB application since late 2015. An IRB application was submitted to the Battelle IRB in early June 2016; a preliminary Notice of Approval with recommendations for future IRB-related activities was provided to the team in late June 2016; and then the team submitted a draft Human Use Approval Summary Report to USDOT. Comments on this draft report from USDOT to the NYC project team were provided in early July 2016; the team is in the process of responding to these comments and revising the draft report.

3.2 Participant Qualifications

3.2.1 Fleet Drivers

The fleets that will participate in this pilot deployment were selected early in Phase 1 of the project. A Memorandum of Understanding (MOU) will be the governing document between the fleets and the NYCDOT. The only eligibility requirement for the fleet driver is to be an employee of the participating organization who drives a vehicle with a device installed.

3.2.2 Pedestrians

The pedestrian's qualifications to participate in the project are that the selected individuals be a visually impaired resident who regularly crosses the streets in the equipped study area. The number of participants has not yet been finalized at and no other pre-requisites have been determined.

3.3 Participant Recruitment

3.3.1 Fleet Drivers

Any fleet driver who is an employee of a participating organization and drives a vehicle with a device installed will be a pilot project participant. No recruitment or consent is required.

Fleet owners/managers will install (or coordinate with NYCDOT to install) the devices in their vehicles and require (via an organizational policy) any driver of that vehicle to utilize the information provided regarding safety warnings and alerts.

The devices will be provided to the fleet owners free of charge but there will be no monetary compensation for participating in the pilot project.

3.3.2 Pedestrians

The Mayor's Office for People with Disabilities (MOPD), in operation since 1972, works to ensure that New Yorkers with disabilities can lead happy, healthy, and productive lives. The MOPD staff work hand-in-hand with other City offices and over 50 agencies to ensure that the voice of the disabled community is represented and that City programs and policies address the needs of people with disabilities. The Office provides information on accessible programs, accessible transportation, employment, health services, activities, and other resources to the over 800,000 New Yorkers with disabilities and the millions of people with disabilities visiting New York City every year. In addition, the Mayor's Office for People with Disabilities works with organizations on specific issues affecting people with disabilities, and aims to bring about dialogue that leads to meaningful outcomes for those living with disabilities.

The NYCDOT team will work with the MOPD to recruit a diverse group of New Yorkers with disabilities. Each pedestrian participant will be consented via a consent mechanism approved by the project's IRB and the NYC legal team. Participants will be provided the application free of charge but there will be no monetary compensation for participating in the pilot project.

Chapter 4. Training Methodology

4.1 Training Programs

Table 4-1 provides an overview of the training methods anticipated for each of the participant groups in the pilot project.

Table 4-1. Training Methods by Participant Group

Participant Group	Training Methods
Installation and Maintenance Technicians	<ul style="list-style-type: none"> • Training video and/or PowerPoint presentations • Hands On Training • Classroom and/or online training • Reference Guide
Fleet Owners	<ul style="list-style-type: none"> • Project Brochure (Outreach Plan Output) • One on one or small group overview sessions
Fleet Drivers	<ul style="list-style-type: none"> • Classroom and/or online training • Quick Reference Guide
Pedestrians	<ul style="list-style-type: none"> • Hands on training • Instructions embedded in the application • Street ambassadors for support
NYCDOT Trainers	<ul style="list-style-type: none"> • Hands on training
Participant Group Trainers	<ul style="list-style-type: none"> • Training video and/or PowerPoint presentations • Classroom and/or online training • Reference Guide
Training Material Developers	<ul style="list-style-type: none"> • No training required as these are team members
TMC Operations and Data Analysts	<ul style="list-style-type: none"> • No training required. Any training requirements will be covered in a Transition Plan during Phase 3.
Other Stakeholders	<ul style="list-style-type: none"> • No training required. Outreach recipients only.

4.1.1 NYCDOT Trainers

The NYCDOT trainers will be a combination of Subject Matter Experts and Training Professionals. The SMEs will be project team members. The DOT Learning Center will provide the training professionals. The DOT Learning Center is a group of training professionals within NYCDOT. They provide training resources such as trainers, computers, and overall support for training initiatives.

4.1.2 Training Approach for Installers & Drivers

The two sections below provide information regarding the planned approach for training Fleet Trainers and for training individual drivers & installers.

4.1.2.1 *Training of Fleet Trainers*

A train the trainer approach will be used for training the installers and drivers. The NYCDOT project team will train designated fleet employees/contractors, the Fleet Trainers. These fleet trainers will then train the drivers and technicians. We anticipate training approximately 100 driver fleet trainers and approximately 20 installation fleet trainers.

The NYCDOT trainers, in conjunction with the NYCDOT Learning Center, will work with the project team to prepare the training materials. Sample training materials from the University of Michigan Transportation Research Institute (UMTRI) will be used to guide the training material preparation – particularly for installer training. Online training courses will be created for specific topics and be available to participants for refresher training.

Installation guides and other training materials will be specific to the four classes of vehicles participating in this pilot: heavy trucks (including UPS box trucks), buses, taxis, and City fleet vehicles.

Training materials and sessions will include information on both normal operating procedures and contingency plans to deal with situations where systems are not functioning properly.

Once the materials are produced, the trainers will train the fleet trainers. NYC facilities (both classroom and garage facilities) will be utilized for the training. The NYCDOT training team has extensive experience in training on topics similar to those that will be covered in these sessions.

Training materials will be posted on the project's website so that they are accessible for individual or group refresher sessions and for the fleet trainers use in their training sessions.

4.1.2.2 *Training of Fleet Employees – Drivers and Installers*

Each fleet owner will be responsible for providing training to both their installers and drivers. The project team will have no direct interaction with these participant groups. No personal information on drivers will be shared with the NYCDOT CV project team.

It is estimated that at least 10,000 drivers will be trained and less than 100 installers will be trained. It is expected that drivers will be trained on alert recognition and the appropriate actions for those alerts; installers will be trained on installing aftermarket devices.

4.1.3 Training Approach for Pedestrians

Pedestrian participants will be offered hands on training in a classroom environment. Instructions will be available within the application for ongoing reference. Street ambassadors will provide hands on real world support. We anticipate training approximately 100 pedestrians.

4.2 Training Material

The training materials that will be developed for this project include those listed below. All training materials will be stored on the project's website so that they are available to trainers and trainees.

- Quick Reference Guides
- Training Videos and/or PowerPoint Presentations
- Online Training Modules
- Trainer Guides
- Training Assessment Tools

4.2.1 Online Training Modules

Online training modules will be developed for those training participants who will be training others. These modules will be used in conjunction with classroom training and will include a certification section to ensure that the recipient gained the knowledge required. There will be time allotted within the overall session for completing these online modules. Computers will be available for training participants.

These modules will only be available within the NYCDOT training environment. The online training will only be available to the targeted recipients.

Chapter 5. Planning and Coordination of Training Activities

5.1 Cost and Schedule

NYCDOT is planning to follow a train the trainer approach for training. The DOT Learning Center will leverage their impressive training experience to train the participant group trainers who will then train the pilot project participants.

The NYCDOT CV Project team will work with the DOT Learning Center to develop a training schedule that meets the needs of the pilot deployment. Training will be scheduled as close to the time when the skills will be required so that the information is not forgotten. Therefore, the training schedule will be developed in conjunction with the deployment plan/schedule.

5.2 Procurement of Necessary Facilities and Equipment

Existing NYCDOT facilities and equipment will be utilized for the train the trainer sessions. The fleet owners will be responsible for securing training facilities for training their staff.

Chapter 6. Training Assessment

6.1 Evaluation of Training

The mechanisms used to evaluate the training received will vary based on the participant group. These are summarized in Table 6-1.

Table 6-1. Evaluation Methods by Participant Group

Participant Group	Training Evaluation Methods
Installation and Maintenance Technicians	Tests and quizzes may be incorporated into the training materials The QA/QC component of the installation and maintenance planning will have a feedback loop back to the training team. Patterns of installation or maintenance issues will result in an evaluation of the training program
Fleet Drivers	Tests and quizzes within material
Pedestrians	Tests and quizzes within material
NYCDOT Trainers	Training programs will be audited by project team members
Participant Group Trainers	Tests and quizzes within material Role Play Activities within curriculum
Training Material Developers	No evaluation is needed as they will not receive training.
TMC Operations and Data Analysts	No evaluation is needed as they will not receive training.
Other Stakeholders	No evaluation is needed as they will not receive training.

6.2 Soliciting Participant Feedback

A questionnaire will be utilized at the end of each training session to gather feedback on the session.

The project's website will be the focal point for collecting stakeholder feedback on the training program and pilot. Participants will be encouraged to provide feedback.

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