

New York City Department of Transportation

Request for Expression of Interest (RFEI)

To Develop, Furnish, Maintain:

After Market Safety Devices for Connected Vehicle Applications

for the

New York City Connected Vehicle Pilot Deployment Project

April 21, 2017

Version 2.3

Responses due _____

Demonstrations to be performed the on the following dates:

5/17/2017 through 5/24/2017

1 Introduction

This is a Request for Expression of Interest (RFEI) for furnishing Connected Vehicle (CV) technology to the City of New York. New York City Department of Transportation (NYCDOT) is the prime contractor for this project which is funded by USDOT and NYCDOT. This technology primarily consists of Dedicated Short Range Communications (DSRC) based Aftermarket Safety Devices, Roadside Units and other infrastructure equipment, and the software applications performed by these devices. This document describes the project background, the purpose of this solicitation, the role of this solicitation in the procurement process, and describes specific information of interest. It then describes the anticipated schedule for the procurement. Based on the response to the RFEI, selected vendors will be asked to conduct a demonstration of their current product with some of the applications required for the NY project as shown in Section 8.

Additional: This is an RFEI for supplying the in-vehicle **Aftermarket Safety Devices** (ASD) including all applications pre-installed and ready for in vehicle installation as well as the installation kits complete with all necessary cables, connectors, antennas, speakers, and connections to the vehicle data bus and power.

The specifications: *[5.9 GHz DSRC - AFTERMARKET SAFETY DEVICE (ASD) – PROCUREMENT SPECIFICATION, Version 2.1, April 2017]* has been included with this RFEI for reference. It sets forth the requirements for the ASD which are still undergoing design refinement with respect to message content and specific application requirements. As noted below, the City intends to enter into a contract with one or more vendors depending on the results of this RFEI and demonstrations to execute a contract for the deliverables identified in this contract. Since selected aspects are still in “flux”, the selected vendor shall be required to work with NYCDOT and the RSU vendor and the equipment installers to modify their design and operation as necessary for the success of the project.

2 Background

New York City (NYC) is one of three Connected Vehicle (CV) pilot sites selected by USDOT to be initial “production” deployment sites of the CV technology. The program is divided into three phases; the first was devoted to the project planning including a concept of operations, system requirements, safety plan, benefits evaluation plan, security management plan, and deployment plan. Phase 1 (12 months) was completed in October of 2016. All documents generated during that phase are available for review on the USDOT web site: https://www.its.dot.gov/pilots/cv_pubs.htm.

The second phase (20 months) started in September 2016, and includes the detailed design, software development, field equipment development and procurement, and integration including the installation of the in-vehicle devices, the roadside infrastructure, and the back office support systems. The third phase is an 18 month operating period during which the systems will collect data to evaluate the benefits of the deployment and document the lessons learned. The USDOT anticipates that the project’s ongoing benefits justify the sustainability of the operation and will encourage others to deploy CV technology, thus increasing the benefits to all.

The New York City deployment is primarily focused on safety applications (both Vehicle-to-Vehicle and Vehicle-to-Infrastructure) as tools to help the City reach its Vision Zero goals to eliminate traffic related deaths, reduce crash related injuries, and reduce damage to both the vehicles and infrastructure. As part of the pilot project, the City is planning to install the CV technology in approximately 8,000 vehicles which frequent the streets of Manhattan and Brooklyn; the exact number and type of vehicles is still uncertain but is expected to include approximately 700 MTA buses, 400 UPS local delivery trucks, 500 NYCDOT vehicles, 500 Sanitation vehicles, and 6,000 taxicabs. Note that these taxis represent approximately one-third to one-half of the yellow taxicabs that service Manhattan and are the only taxis that can pick up “hail fares” throughout the City including and lower Manhattan (below 96th street) and at the major airports. This number of vehicles will provide an opportunity to experience a significant density of DSRC equipped vehicle interactions.

NYCDOT will also be installing approximately 380 RSUs in mid-town and lower Manhattan, at the vehicle “barns” (bus, taxi and fleet depots), along Flatbush Avenue in Brooklyn, at the taxi holding facilities at JFK and LGA airports, and at other strategic locations throughout the City. In addition, the City will be installing a number of RSU’s along portions of FDR drive to support applications such as curve speed warning and over dimension vehicle warnings (overheight and prohibited commercial vehicles).



The New York Deployment will include the following V2V safety applications on all vehicles:

- Vehicle Turning Right in Front of Bus Warning – intended to reduce the number of vehicle-bus crashes.
- Emergency Electronic Brake Light
- Lane Change Warning/Assist
- Forward Collision Warning
- Blind Spot Warning
- Intersection Movement Assist – to reduce crashes from cross traffic

The deployment will also include the following V2I/I2V safety applications:

- Red Light Violation Warning – to warn drivers when it appears that the vehicle will enter the intersection on red
- Over Dimension (height) and prohibited vehicle warnings to commercial vehicles along selected roadways
- Pedestrian in Roadway warning (determined by PED detection equipment located at the intersection)
- Over Speed warnings when the vehicle is exceeding the speed limit for such locations as work zones, curves, and selected school zones
- Emergency Communications for such situations as emergency evacuation routes, detours and major situations needing immediate changes in the traffic pattern.
- Prohibited Turn audio alert to the taxi driver based on time-of-day restrictions.

Because of the number of vehicles and roadside units involved, and the need to be able to update and adjust the operation of the various safety applications to meet the needs of the urban environment, the project has added a number of additional applications to be supported by the CV infrastructure (ASD and RSU). This includes a standardized mechanism for secure over-the-air (OTA) software updates, real time RF monitoring of the vehicles and the infrastructure, OTA changes to the application operating parameters to be able to adjust thresholds and warnings, and traffic data collection to support the City’s adaptive control system – Midtown-in-Motion.

The City is also working with a number of pedestrian advocacy groups and will be deploying two pedestrian oriented applications; the first is to support the visually challenged by using the Signal Phase and Timing (SPaT message) information transmitted by the intersection and the geometric information

(MAP message) about the intersection to assist the pedestrian in determining their orientation and the status of the pedestrian signals to assist them in crossing the street. At selected intersections, the City will also be installing traditional ITS pedestrian detection technology which will be able to determine if there is a pedestrian in a pedestrian walkway and include that information in the SPaT message such that an approaching CV equipped vehicle can determine if there is a potential conflict and alert the driver.

Finally, the City's deployment will include number configurable data collection applications that will be used to evaluate the benefits of the system and allow USDOT to perform additional evaluations of the overall system operation.

The City is confronting a number of challenges to the deployment of the CV technology in the dense urban environment. First, the ranges of the RSU infrastructure will overlap in all directions; the block spacing is approximately 70 meters for streets and as much as 200 meters for the avenues. Since the DSRC range is approximately 300 meters and far greater ranges have been observed in some previous projects, we expect that operational adjustments will be needed. In addition, where the density of equipped vehicles for other projects has been relatively low, we are expecting that the percentage of instrumented vehicles is likely to approach 20% or more depending on the time-of-day and location since a large portion of the vehicles are taxicabs. All of the fleets that will be participating in this project service the mid-town and lower section of Manhattan; hence one of the goals of the project is to foster frequent interactions amongst vehicles, the City plans to run the full complement of safety applications and measure the benefits.

Second, NY City is known for its urban canyons which provide a challenging environment for GPS technology; as a result, additional techniques will need to be included in the positioning algorithms to provide the accuracy needed for many of the V2V and V2I safety applications. Continuous access to GPS positioning data is expected to be difficult in the urban canyons and therefore additional means of augmenting vehicle positioning are anticipated so that the safety applications can continue operating while the vehicle passes under bridges, elevated roadways, through tunnels, and navigate the typical Manhattan streetscapes and traffic environment. We expect the vendors to address this by extending their location determination mechanisms to include inertial guidance, map matching, and direct connection to the vehicle's data bus.

Third, privacy is also a major consideration; although the vehicles involved are regulated fleet vehicles, the City will be implementing a number of measures to protect the privacy of the participants and to make sure that the data collected and used for the evaluation of the benefits and for maintenance support cannot be disaggregated and analyzed or merged with other data (e.g. police accident records) to determine the exact actions and location history of any specific operator or vehicle. The system will make use of the Security Credential Management System (SCMS) being developed by USDOT and the data will be encrypted, normalized, and obfuscated as soon as the analysis of the benefits has been determined. All communications will contain security certificates that will allow the receiver to authenticate the origin of the information. In some instances, the data will be encrypted on the ASD prior to buffering and in other instances the data will not be encrypted either in storage or transmission. The project Data Management Plan (still undergoing updates) is available for consideration and review.

The New York connected vehicle deployment will only utilize DSRC (WAVE) technology (5.9 GHz) for all functions and applications listed above – including the security credentials distribution, data collection, and OTA application updates and parameter adjustments. The system will be using 6 of the 7 DSRC channels allocated for CV use. All field devices including both the RSU and the in-vehicle unit ASD will contain 2 radios; one will be dedicated to monitoring or transmitting on channel 172 where it can “hear” the Basic Safety Message (BSM) from all vehicles within range of the radio communications; this is critical for the V2V applications. In addition, it will be able to receive the SPaT, MAP, RTCM, and TIM messages and use this information to support the V2I safety applications. Channel 178 will be used as the control channel to inform approaching vehicles of available services Wave Service Announcement (WSA) and indicating which channel and protocol should be used for the service. The other channels

(174, 176, 180, and 182) will be used to support the OTA software updates, application parameter management, and data collection from the in-vehicle event logs.

Finally, because of the size of the system and the number of vehicles and roadside locations, a number of maintenance support functions have been added to the system and hence must be added to both the ASD and the RSU. This will allow the City to monitor the operational reliability of all components, and track the range of all transmitters and receive levels for the DSRC receivers. This data will be used to assist the City in identifying where both preventative maintenance and corrective maintenance may be required.

The NYC project has also modified the performance data collection approach. Previous deployments focused on research and analysis of the technology and attempted to collect virtually every message generated, transmitted, and received by all devices; this information was collected on removable media and periodically retrieved for the data analysis. Such an approach is not practical for the New York City (NYC) deployment project; hence, the NYC system limits the data collection to short periods of time before [configurable] and after [configurable] an “event” which might be a warning, alert, or some other triggering parameter within the vehicle. This allows us to evaluate the state of the vehicle before, during, and after the “trigger” and such data is collected whenever the vehicle passes an RSE advertising the event collection service; thus, the volume of data is manageable for both the RSE processing and the backhaul bandwidth to the TMC. The triggers will be configurable and will include BSM data, alarms and alerts, and parameters internal to the ASD.

The NYC project will be using the City’s private wireless network, NYCWiN, for all communications to/from the RSE as well as continuing to use this media for communications to the traffic controllers. The traffic controllers will have their firmware updated to support the CV applications; the previous procurement specification for the traffic controllers included sufficient processing power and available memory for these additional tasks; as soon as the NTCIP working group finalizes the 1202 standard with the CV data elements, we will be ready to update the controller firmware.

It is our intent that the RSU and ASD (V3 – as modified) conform to the USDOT standards where they exist as closely as reasonably possible and that all messages conform (where applicable) to the latest versions of SCMS, SAE J2735, SAE 2945/x, IEEE 802.11p, IEEE 1609.x, NTCIP 1202, NTCIP 1103, ISO 19091, and related standards. While we recognize that some of these are still being developed, all of these standards are expected to be stable by the middle of the 3Q2017 which is the planned start of the production units for this project. The vendors are expected to work with the City to determine the appropriate version for each standard that has been accepted for general use. The City is requesting that the vendors use the recently updates version of the NTCIP 1202 and NTCIP 1103 for the interface between the traffic controller and the RSU.

Finally, while the above is a brief summary, the details of the NYCDOT pilot deployment are available on the USDOT web site – or are available on request from the NYCDOT project team.

The NYCDOT has also been experimenting with the deployment of a location enhancement product developed by 5D Robotics as a possible approach to the urban canyon location accuracy issues. This is only one alternative and the vendors are asked to address this as an option if they feel it is necessary for the location integrity of their ASD. If required, NYCDOT will provide the 5D robotics infrastructure as needed but this represents a considerable expense to the City. Vendors are encouraged to consider alternatives such as triangulation from the RSUs or alternative location technology due to the cost of installing the 5D Robotics infrastructure.

3 Purpose of RFEI

This Request for Expressions of Interest (“RFEI”) is issued as a briefing document to stimulate and assess interest in providing equipment and services to New York City Department of Transportation (“NYCDOT” or the “agency” or the “City”) for the CV Pilot Deployment and to solicit useful information from interested parties for the supply of elements of this system. The responses to the RFEI will be used by the City to begin negotiations with one or more vendors for the supply of the ASDs and installation kits.

The attached specification should be sufficient for the vendors to develop a cost estimate for the ASD, services, and location options. The goal is to select 2 vendors each supplying about ½ of the ASDs for the project and to demonstrate interoperability between the vendors as well as interoperability with the RSU infrastructure.

This RFEI seeks vendor expression of interest in the delivery of ASDs to be mounted in a number of different vehicle types. The vendor will be responsible for providing a turnkey solution which satisfies the overall needs and requirements of the project as noted in the phase 1 deliverables and the preliminary design documents such as the ASD specification and the data management plan.

- Goal 1 of the RFEI is to advertise the opportunity and establish an incentive that motivates aggressive pursuit of commercial development and delivery of the CV devices and applications. This project will be the largest connected vehicle project attempted by anyone to date.
- Goal 2 of this RFEI is to verify the deployment state of the equipment and applications identified above and to evaluate the vendor’s readiness to deploy and develop the additional applications which are being customized for NYC.
- Goal 3 of this RFEI is to identify vendor commitment to interoperability.
- Goal 4 of this RFEI is to seek vendor insight into some of the challenges expected with the planned deployment in NYC. This includes such issues as location accuracy, DSRC message and channel saturation, and DSRC channel usage.
- Goal 5 of this RFEI is for NYCDOT to review the state of each vendor’s commitment to and completion of equipment and applications which are commonly used for the CV safety applications.
- Goal 6 of this RFEI is to identify the vendor’s proposed approaches to equipment certification such that the project can connect to and use the security credentials provided by the Security Credential Management System (SCMS) being developed by USDOT.
- Goal 7 of this RFEI is to gain a better understanding of the installation requirements, packaging options, the complexity of the application modifications, and help identify tuning parameters for the various applications.
- Goal 8 of this RFEI is to establish realistic project schedules for the procurement, installation, and testing of the ASDs and RSUs.

These are crucial aspects of the City’s plans for the detailed design and procurement of the various CV devices for the pilot deployment project.

4 Vendor Demonstrations

Selected responders will be offered the opportunity to demonstrate their product(s); we also encourage the vendors to demonstrate the effectiveness of the products or systems currently both under development or available for purchase. NYCDOT will make available a “test location” which may be used by the responders to demonstrate their current applications. All vendors are required to demonstrate several of their V2V and V2I applications as described in the **Concept of Operations (ConOps)** for the NYC project and the procurement specifications for the ASD (V2.1). The project has evolved since the initial ConOps such that the vendor needs to also review the current contents of the procurement document.

Note that the test location does not offer power or intersection hardware of any sort. If the vendor requires any equipment to demonstrate their application such as an RSU broadcasting SPaT, MAP, and RTCM for location correction, it must be provided by the vendor. Each selected vendor will be provided 1 day on the test facility – including setup, demonstration, and tear down.

The vendor will also be required to establish a test configuration in Manhattan along a street and intersection selected by the City for the demonstration of the V2I/I2V applications. This is to evaluate the performance in the dense urban environment.

In addition to the applications indicated above, the vendor will be required to perform a “street drive” on a route provided by the City immediately prior to the demonstration for each vendor. This route will be within the active project area – but will not be revealed until the demonstration. During the “street drive”, the vendor shall collect and record vehicle location information at 10 Hz intervals (note that this is expected to be the **vehicle location** after the application of all correction algorithms and adjustments for additional instrumentation) – not the GPS signal. The vendor shall explain what is being done to improve the GPS location and timing information to meet the needs of the CV applications.

The vendors must be prepared to demonstrate that they can achieve the required location accuracy in the urban setting and the operation of the safety applications on a primarily continuous basis throughout the project area.

5 Other Information

The following information is provided to assist the responders in understanding the environment for the demonstration project. NYCDOT does not expect to see demonstrations of the all of the completed applications described in the ConOps/specification. However, the bid specifications were structured around the concept of purchasing “turn-key” solutions where the application firmware is embedded in the device (ASD) to support all of the applications. The bidder will be responsible for providing the ASD complete with all firmware, a Hardware Security Module with enrollment certificates, and installation kits.

5.1 ASD

The ASD will rely only on DSRC communications and the Driver Interface shall be all audio using words and/or tones or a combination of tones and words to alert/warn the driver. The ASD is expected to connect to the CAN or J bus of the vehicle as outlined in the ConOps. The demonstration shall include a mixture of tones and words; the vendor shall describe their approach(s) and options for including a longer message for the emergency message using the TIM message. Examples may include wave files, MP3 files, text to voice or a mixture.

Note that selected applications have been modified to provide warnings based on the regulatory or advisory speed and are not required to deal with the vehicle kinematics.

The nature of the additions and modifications to the ASD are largely due to the need for benefits analysis and operations/maintenance support.

Since some of the vendors may have developed other applications, responders are requested to highlight such additions if they feel they may be relevant to the NYC CV deployment project or evidence of their capability to complete the required applications within the schedule.

5.2 Certification

For the production system, NYCDOT expects that the vendor will conduct and verify all certifications necessary to show that their device fully complies with the requirements of the standards invoked for this product. How this is to be performed has not been determined, therefore, the vendors are encouraged to address their intended certification process for security, message handling, conformance to SAE 2735, 2945/x, IEEE 1609.x, IEEE 802.11p, NTCIP, automotive environmental specifications or NEMA traffic controller specifications, and FCC type acceptance. It will be the responsibility of the vendor to satisfy the SCMS registration authority (and USDOT) that their device meets their certification requirements.

For the RFEI demonstration, only FCC certification is required.

5.3 Security

For the production system, all messages shall support authentication (verification) using certificates provided by the SCMS. All certificates will only have a 1 week (8 days) life, and each device will only be provided with one week's supply of certificates.

Selected data collected in the vehicle must be encrypted when stored (logged) and will be sent in encrypted format to the TMC where it will be decrypted and analyzed (in real time) and then normalized, obfuscated, and aggregated to develop the benefits analysis and stored for future use or exported to the Research Data Exchange (RDE) or the independent evaluator. A sequence for these actions is shown in the specification.

Note that there are a large number of security requirements including general conformance to FIPS 140 2 Level 2 including secure Boot, verification of all firmware, and all communications.

The vendor shall discuss how these security requirements will be addressed in their units/devices including the impact on their hardware design (processing time) and software structures, but security is not a requirement for the demonstrations.

The vendor shall discuss how they are currently involved in the implementation of the security measures required for CV deployment.

5.4 Communications

DSRC channel usage planned is shown below. This is preliminary and consistent with the recent SAE discussions of channel usage and power limitations. The RSU will broadcast the Wave Service Announcement (WSA) that will indicate any available firmware updates, application parameter updates, IP address of the server where the updates may be retrieved, the IP address of the TMC server where the performance data is to be stored, and the channel (for the subject RSU) to be used for the information transfer – which includes access to the SCMS.

This project plans to use 6 of the 7 channels, and all radios shall be able to operate on 2 channels:

Channel	Intended uses
172	SPaT, MAP, RTCM, BSM, TIM
174	OTA updates and application parameter changes, SCMS
176	log file uploads to the TMC
178	WSA for the control channel
180	log file uploads to the TMC
182	OTA updates and application parameter changes, SCMS
Note that the PSM, SSM, SRM, TIM have not been assigned; of these only the TIM message is expected to be used in NYC.	

The existing NYCWiN wireless network will be used to connect the RSU to the TMC where the back office processing will take place. This network only supports IPv4. It will be the responsibility of the RSU vendor to work with NYCDOT and its suppliers and integrators to develop a solution for tunneling the IPv6 communications over this network as no changes will be made to the NYCWiN network devices or operation. While this is not a requirement for the demonstrations, the vendor shall indicate their approach to supporting IPv6.

5.5 Standards

We recognize that some of the standards are currently undergoing some modifications. The demonstration hardware and applications need not conform to the current versions, but must conform to an older version where appropriate. This project will not accept any product which declares that its protocol is proprietary and subject to a license agreement. All protocols, messages, and MIBs shall be open to the public for use by any supplier in perpetuity without license fees.

5.6 Location accuracy

One of the demonstration courses [driving routes] is specifically intended to evaluate the accuracy of the ASD's location tracking and timing mechanism. For this test, the device (ASD) is required to log its position ("bread crumbs") at least 10 times each second such that we can evaluate the accuracy of the location algorithms and hardware used by the device. During the vehicle "runs" as described above, the forward view shall be recorded continuously using a video recorder. Note that this will be for selected portions of the entire route.

The expectation is that the location accuracy is sufficient to operate all of the V2I and V2V applications – and we plan to use the J2945/1 location accuracy requirement – but require this in the urban canyon.

5.7 Over-the-Air (OTA) Software Updates

One of the most important aspects of the NYC project is that it will be for a large number of vehicles and it is expected that the applications may be incrementally available as the vendor completes the customization and extensions for data collection. The vendor is expected to develop a stable and robust "platform" for the ASD such that it will reliably accept OTA software updates to any and all of the firmware located on the ASD while it is in the vehicle and in motion without requiring physical intervention at the vehicle and without issuing false alerts and warnings or corrupting the operation or data stored on the device.

Once the equipment has been installed in the vehicle, there are consequential costs associated with needing to access the device because these vehicles are commercial vehicles and downtime for any reason has financial implications. Therefore, it is expected that the vendor will work with NYCDOT to demonstrate and verify that OTA updates to any and all software on the vehicle is reliable under all conditions.

The vendor is expected to address this capability in their response to this RFEI. The specifications describe a method for performing this operation and comments, suggestions, and alternate secure techniques will be entertained.

6 Submission Requirements

The following sections describe the information to be submitted for this RFEI.

6.1 Content

The RFEI response must be provided in PDF format not exceeding 50 pages.

The RFEI response shall contain:

- a. Contact information, including the legal name of the respondent, business address, name of contact, telephone number and email address.
- b. A summary of respondent's background and experiences related to the development and deployment of DSRC CV products (not more than 5 pages).
- c. Responses to the challenges or issues listed in Section 5 and any other information that would be informative and responsive to this RFEI.
- d. Responses to the information that is required with the vendors submission as noted in the attached specifications (NYCDOT ASD V2.2).

- e. A statement regarding the maturity of the applications listed [above] that will be used in NYC. Where they have been deployed (if any) and experience with their reliability.
- f. Note that USDOT requires that software developed with the funding of this project be placed in the public domain through the open source repository (OSADP) being developed for USDOT. In their responses, vendors shall indicate which software is considered prior intellectual property, and what is being developed with the funding of this project.
- g. Lead time after award (notice to proceed at risk), for developing and furnishing a production sample of 100 ASDs that will be used for preliminary test trials.
- h. Lead time after award (notice to proceed at risk), for developing and furnishing production quantities of the ASDs for large scale installation and testing after the test trials are completed.
- i. Any issues with the ConOps and/or specification with respect to technical approach, data collection, architecture, performance requirements, security requirements, and testing/certification.

6.2 Submission Details

Any inquiries related to this RFEI should be directed by e-mail, with the subject line “NYC CV RFEI for ASD” to the following email addresses: mtalas@dot.nyc.gov

The deadline for submission of written requests for clarification is 4/28/2017. NYCDOT will circulate questions and answers to respondents who provide e-mail addresses on 5/5/2017.

RFEI responses are due by 5/10/2017 2:00 p.m. EST. PDF format of the response shall be submitted via email to mtalas@dot.nyc.gov . If the document is larger than 10 MB, then the respondent shall separate the document at convenient boundaries such that it can be reassembled after receipt. All emails, with or without attachment(s), shall not exceed 10 MB. The vendor is cautioned to verify receipt and the actual opening of the email.

Selected vendors will be asked to provide demonstrations of their CV applications and devices between 5/17/2017 and 5/24/2017. Vendors are asked to indicate their preferences for the Days for their demonstrations. Note that the safety demonstration site will be available for vendor setup and support starting Monday 5/15/2017 and be available over the weekend 5/20 & 5/21/2017. Vendors will be assigned times either AM or PM at the test site with 1 hour to setup and 2 hours to conduct demonstrations followed by 1 hour to “tear down” their demonstrations.

Time allocation for demonstration:

	Wednesday 5/17/2017	Thursday 5/18/2017	Friday 5/19/2017	SAT	SUN	Monday 5/22/2017	Tuesday 5/23/2017	Wednesday 5/24/2017
AM								
PM								

7 Additional Information

NYCDOT intends to enter into negotiations based on evaluations of the proposal, demonstrations, and cost information.

NYCDOT, the City and their officials, officers, agents and employees make no representation or warranty and assume no responsibility for the accuracy of the information set forth in this RFEI.

NYCDOT, and the City shall not be liable for any costs incurred by any Respondent in the preparation, submittal, presentation, demonstration, clarification or revision of its submission.

NYCDOT, and the City shall not be obligated to pay and shall not pay any costs in connection with the preparation of such submissions.

NYCDOT, at its sole discretion, without limitation, reserves the right to:

- withdraw the RFEI at any time;
- discuss various approaches with one or more Respondents (including parties not responding to the RFEI);
- use the ideas and/or submissions in any manner deemed to be in the best interests of NYCDOT and the City, including but not limited to soliciting competitive submissions relating to such ideas or proposals and/or undertake the prescribed work in a manner other than that which is set forth herein; and
- change any terms of the RFEI.

All submissions shall become the property of NYCDOT and the City and shall not be returned. Respondents acknowledge and understand that none of the information contained in the submissions shall be deemed confidential. Furthermore, information in the submissions will likely be shared with other governmental entities. Therefore, Respondents should not submit any information deemed to be proprietary information.

NYCDOT is subject to the New York State Freedom of Information Law, which governs the process for the public disclosure of certain records maintained by NYCDOT. (See: Public Officers Law, Sections 87 and 89). Individuals or firms that submit materials to NYCDOT may request that NYCDOT except all or part of such materials from public disclosure, on the grounds that the materials contains trade secrets, proprietary information, or that the information, if disclosed, would cause substantial injury to the competitive position of the individual or firm submitting the information. Such exception may extend to information contained in the request itself, if public disclosure would defeat the purpose for which the exception is sought. The request for such an exception must be in writing and state, in detail, the specific reasons for the requested exception. It must also specify the materials or portions thereof for which the exception is requested. If NYCDOT grants the request for exception from disclosure, NYCDOT shall keep such materials or portions thereof in secure facilities.

8 Required Demonstration and Evaluation

The demonstration evaluation criteria (Table 1) will be used along with additional weighting for cost and schedule.

Table 1 – Applications for RFEI Demonstrations – Evaluation Criteria

Application Title	Demo Req.	Evaluation Factor	Result Pass/Fail
1. Location Accuracy Demonstration	M	Accuracy of location (1.5 M and repeatable)	
2. Vehicle Turning Right in Front of Bus Warning	O	Warning in sufficient time to avoid crash	
3. Forward Collision Warning	M	Warning within lane and close enough to avoid a crash	
4. Emergency Electronic Brake Light	M	Warning within lane and close enough to avoid a crash	
5. Blind Spot Warning	O	Warning within lane and close enough to avoid a crash	
6. Lane Change Warning/Assist	O	Warning within lane and close enough to avoid a crash	
7. Intersection Movement Assist	M	Warning within lane and close enough to avoid a crash	
8. Red Light Violation Warning	M	Is warning sufficient to avoid intersection entry?	
9. Speed Compliance	M	Does it trip? Is setpoint accurate? Can set point change? Do parameters adjust the false alarms?	
10. Curve Speed Compliance	O	Does it trip? Is setpoint accurate? Can set point change? Do parameters adjust the false alarms?	

Application Title	Demo Req.	Evaluation Factor	Result Pass/Fail
11. Speed Compliance /Work Zone	M	Does it trip? Is setpoint accurate? Can set point change? Do parameters adjust the false alarms?	
12. Oversize Vehicle Compliance	O	Does it trip? Is alarm point sufficient to warn? Can trigger point be set? Do parameters adjust the false alarms?	
13. Prohibited Facilities (Parkways)		Does it trip? Is alarm point sufficient to warn? Can trigger point be set? Do parameters adjust the false alarms?	
14. Over Height		Does it trip? Is alarm point sufficient to warn? Can trigger point be set? Do parameters adjust the false alarms?	
15. Evacuation/emergency notification	M	Is alert provided within the selected area? Is the message clear and distinct? Does it mix tones and words?	
16. RF Monitoring	O	Does the recorded value match the instrumentation?	
17. OTA Firmware Update	O	Does the process follow the specification? Does it work for all applications?	
18. Parameter Up/Down Loading	O	Does the process follow the specification? Does it work for all applications?	
19. Traffic data collection	O	Does it read the vehicle ID at the right location? Is the message transmitted within 1 second? Is information correct?	
20. Event History Recording	O	With trial vehicles surrounding the subject vehicle, do we record all of the required data? Can the parameters be changed? Is the log file encrypted? Does it decrypt for the owner?	
21. Event History Up Load	O	Can the TMC retrieve the log file information\	
22. ASD Software Operations Monitor	O	Are all tasks running? Can we halt a task and does the	
23. Prohibited Turn alert based on time-of-day restrictions.	O	This is optional and not currently included in the specifications or ConOps. It is intended to provide an alert to the taxi driver if he signals a turn onto a street that is currently prohibited. Criteria: does it provide the alert?	
24. PED Applications			
25. Pedestrian in Signalized Intersection Warning	M	Does the vehicle provide a warning to the driver in sufficient time to stop from striking the pedestrian?	
26. CV Data for Intelligent Traffic Signal System	O	Are the travel times accurate compared to the RFID readers? Does the RSU properly record the vehicle's time and speed at the center of the intersection?	

The vendor must pass all the required mandatory applications in order to be considered for this selection and contractual agreement.

The marked optional applications are required for the project deployment and will be evaluated separately during the appropriate milestone of the project. The vendor is free to demonstrate the optional elements which they have ready for operation for consideration by the City.

The vendor will be provided a 10 day notification of the time and place for the demonstration and shall be ready to start the demonstrations on the appointed day. The route to be used for application #1 will be provided at the start of the location test and not before and will include a portion of the deployment area.

NYCDOT reserves the right to enter into negotiations with vendors that demonstrate portions of the Mandatory applications depending on the negotiations with the initially selected vendors.

9 Pedestrian applications

Vendors wishing to participate in the Personal Information Device (PID) development for the pedestrian application described in the attached PID specification are encouraged to demonstrate their readiness

and proposal for the development and deployment of the pedestrian applications described therein. Such a demonstration must show the ability to receive the SPaT and MAP messages using DSRC and to provide guidance in an audio or haptic manner for the visually challenged. While it is not anticipated that the vendor has a completed “product” which meets the requirements of the PID specification, the demonstration needs to show the vendor’s capabilities in developing and packaging the pedestrian support application as described using the DSRC and carrier communications capability as described therein.

Vendors responding to the RFEI and seeking an opportunity to demonstrate their ASD product capabilities need to identify their intent to demonstrate the pedestrian application.