US 33 CORRIDOR ATCMTD SCOPE OF WORK, SCHEDULE, and BUDGET

June 22, 2017

Contents

1. Background

This scope of work describes the program elements which will be achieved by the US 33 Innovation Corridor Council of Governments, using funding from the US Department of Transportation, Federal Highway Administration Advanced Transportation and Congestion Management Technologies Deployment Initiative (ATCMTD) grant.

1.1. Federal Program Description

Section 6004 of the Fixing America's Surface Transportation (FAST) Act (PL. 114-94) created new Section 503(c)(4) of the United States Code: Advanced transportation technologies deployment. This section established the ATCMTD initiative to provide grants to eligible entities to develop model deployment sites for large scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment.

$60,000,000 was made available for the program, for fiscal years 2016 to 2020.

The federal share of the program is capped at no more than 50% of the project cost.

The US Department of Transportation issued a Notice of Funding Opportunity for the ATCMTD program on March 22, 2016, with applications due on June 3, 2016.

On October 13, 2016, the US Department of Transportation announced a $5.9 million ATCMTD grant to the NW 33 Innovation Corridor Partnership to implement a variety of intelligent transportation system technologies in the US 33 corridor, in state-owned right-of-way from I-270 northwest through Marysville, ending at the Transportation Research Center (TRC) near East Liberty; within the cities of Dublin and Marysville; and unincorporated areas.

1.2. NW 33 Smart Mobility Corridor Grant Application

The NW 33 Smart Mobility Corridor grant application, which provided the broad outline of proposed vision, goals, projects, performance measures, budget and schedule, is included at Attachment 1. This scope of work reflects the grant application, while refining the vision, goals, projects, and performance measures. This scope of work has a companion budget and schedule document.

1.3. US 33 Innovation Corridor Council of Governments and Program Partners

The NW 33 Smart Mobility Corridor ATCMTD grant application identified six program partners. Since the grant application was submitted, the US 33 Innovation Corridor Council of Governments (COG) was formed to manage the program, which added partners to the effort. The COG includes:

- City of Dublin, Ohio*
- City of Marysville, Ohio*
- Union County, Ohio*
- Marysville – Union County Port Authority*
- Logan County
- Honda Research & Development Americas
- Battelle
- The Ohio State University/Transportation Research Center
- State of Ohio/Ohio Department of Transportation

- Mid-Ohio Regional Planning Commission
  * *Denotes COG Membership*

1.4. NW 33 Smart Mobility Corridor Vision

As outlined in the NW 33 Smart Mobility Corridor grant application, the vision of the corridor initiative is to demonstrate how smaller cities can leverage intelligent transportation technology to improve congestion, safety, and employment access.

The NW 33 corridor is unique in its concentration of automotive manufacturing and technology employment centers. Moreover, there are two important nodes of automotive research and C/AV testing at both ends of the corridor: the Transportation Research Center at one end, and Smart Columbus at the other.

The Columbus region is a unique test market and opportunity that will have contained testing at TRC, on-the-road testing on US 33, and city street testing in the cities of Columbus, Dublin and Marysville. This ATCMTD grant along with the Smart City grant will result in one of the largest smart mobility infrastructure investments in the world.

The NW 33 corridor offers an unprecedented opportunity to deploy and test smart vehicle technology in an urban, suburban and rural setting; all within multiple jurisdictions—state, county and municipal. The diverse setting highlights the complexity of project and level of collaboration needed to achieve it.

2. Scope of Work

The scope of work to execute this grant agreement includes both physical projects, consisting of the construction and/or installation of C/AV components and supporting infrastructure; and services, which include software and systems integration, development of software applications, and project management activities.

Physical projects will be procured via US DOT and ODOT-approved procurement procedures, such as through construction contracts or purchase orders. Construction contracts will typically follow one of two methods:

- Design-bid-build, where the COG will develop a set of plans and specifications, which will be released for bid by qualified construction contractors.
- Design-build, where the COG develops a bid package, which will be released for design and construction by a unified design-build team.

Purchase orders can be used for the acquisition of technology components, typically with little or no associated construction or installation effort included in the cost. The COG will develop a set of specifications, for which suppliers will bid.

Services will be procured via US DOT and ODOT-approved procurement procedures, which can include a request for proposal or sole-source, depending on the number of vendors, suppliers or consultants who are available to fulfill the requirements of the scope of work.

2.1. Program Overview

The US 33 Smart Corridor will be an interconnected system of IT and smart vehicle technology, inclusive of a communications network, physical sensors and components, and software applications. This technology infrastructure will form a testbed for emerging connected and automated vehicle technology and applications. A significant benefit will be the attraction of high-tech information technology, and research and development activities, which will spur investment and economic development in the corridor. As a going concern, the program will be governed and operated by the newly formed US 33 Innovation Corridor Council of Governments (COG), which will administer the individual projects, operate the system, govern access and testing programs, and maintain the system.

2.2. Discrete Projects, Technology, and IT Deployments

The following is a discrete list of elements which will combine to form the physical infrastructure of the US 33 Smart Corridor.

1. Automated/Connected Vehicle Infrastructure in US 33 Corridor

    a. Installation of conduit and fiber optic cable on county/municipal right-of-way paralleling US 33 on Industrial Parkway and other local roadways; approximately 35 miles between the Dublin Metro Data Center and Transportation Research Center. This fiber line will form a redundant loop with the cable being installed by ODOT in the US 33 right-of-way. This project will include installation of conduit, pullboxes, fiber optic, splicing and tie-ins at demarcation points. Part of this system will consist of conduit financed by the Union County Community Improvement Corporation and installed by Zayo Group, from the Marysville City

Limits (south of Scottlawn Road-at Scotts Park driveway) to Weldon Road along the Industrial Parkway, a distance of 8.92 miles.

b. The fiber optic network will connect with ramp terminal signals and city fiber networks; the system will include road-weather systems one mile prior to major interchanges, curve warning at interchange loop ramps, and wrong way warning DSRC at major interchanges.

c. Purchase and installation of 62 DSRC roadside units in the US 33 right-of-way and in the cities of Dublin and Marysville, connected to and integrated with the fiber optic communications system. ODOT will develop a project via design-build, or design-bid-build, to purchase, install, and acceptance test DSRC units.

d. Roadside video equipment and sensors to support autonomous vehicle tracking and open road testing—CCTV cameras at major interchanges in the corridor, such as US 36, SR 31, and NW Parkway; fisheye cameras at all signalized intersections. This equipment will be installed in coordination and cooperation with ODOT.

2. Dynamic Signal Phasing and Timing

DSRC technology will be installed at approximately 32 intersections—five in the city of Dublin and the balance in Marysville. In addition to relying on preset timing and loop detectors, traffic signals will be connected to DSRC detectors that will communicate directly with connected vehicles. Signals will be able to respond dynamically to traffic based on the detection of equipped vehicles, altering signal phase and timing to optimize intersection safety and mobility. Additionally, dynamic signals will be able to support pre-emption for emergency vehicles. The scope of work will include:

- retiming corridors to have solid data on which to base testing and future adaptive signal timing plans
- Installation / upgrade of all necessary equipment for DSRC compatibility
- Installation/upgrade of vehicle detection to determine performance improvements of DSRC and how it impacts motoring public
- Explore possibilities of using DSRCs in snow plows, emergency vehicles, etc. to initiate signal pre-emption
- A pool of up to 1200 test vehicles
- SPaT Challenge at all signalized intersections (Signal Phasing and Timing)
- Upgrade of signals will include installation of radar detection, which can provide immediate benefits to the traveling public

a. Marysville: The city of Marysville uses Econolite traffic signal controllers throughout the city. The COG will work with the Marysville traffic engineer to identify locations for deployment of DSRC units. Depending on location, controller equipment may or may not have to be replaced, which will affect the overall implementation cost. Using sample plans and specifications developed for Smart Columbus, a design-bid-build procurement will be used to purchase, install and test the DSRC equipment at 27 intersections.

b. Dublin: The city of Dublin uses Siemens traffic signal controllers throughout the city. The COG will work with the Dublin traffic engineer to identify five locations for deployment of DSRC units. Depending on location, controller equipment may or may not have to be replaced, which will affect the overall implementation cost. Using sample plans and specifications developed for Smart Columbus, a design-bid-build procurement will be used to purchase, install and test the DSRC equipment at five intersections.

3. Local Smart Network

To develop AV/CV testing in an urban environment, the local transportation system will be outfitted with smart infrastructure technology. This will include traffic signal equipment at all signalized intersections, pedestrian warning equipment at pedestrian crossings, and supporting IT and communications equipment including fiber optic cable and conduit and network devices. ODOT and Honda are working closely with the City of Marysville to explore the best opportunities to deploy this system in Marysville as part of plan to develop the first rural smart mobility community in the United States.

4. Connected Fleets: DSRC Vehicle Installation

To test Automated/Connected Vehicle technology and applications, DSRC units will be installed in up to 1200 vehicles that use the corridor. This will include state, city, county, transit, school board, and private fleet vehicles consisting of passenger, first responder, public service, and other heavy vehicles (such as trash/recycling, snow plows, and heavy maintenance trucks). Honda committed a grant of $3,746,000 to the region for advanced transportation initiatives. Honda will use its purchasing and acquisition processes to procure and install the DSRC units on their vehicles for testing.

For the public fleet participants, the following procurement method(s) is envisioned:

- The COG will develop technical specifications for the purchase of DSRC units. There are at least five current manufacturers of this type of equipment.
- The purchase order can specify purchase only, or purchase/testing/installation of the units in city fleet vehicles (cars, light and heavy trucks, emergency response vehicles).
- Each city, or individual departments in each city, will use the COG's technical specifications to issue purchase orders to acquire the DSRC units for their fleets.

5. Pedestrian in Crosswalk Warning System

A Pedestrian in Crosswalk Warning (PCW) system will be deployed at eight intersections in the cities of Dublin and Marysville. A prototype system was developed by the US DOT under a two year research project to develop and demonstrate vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) safety applications on transit buses to determine the effectiveness of these applications at reducing crashes and to show how real-world drivers will respond to these safety applications in their vehicles. PCW utilizes both the pedestrian call signal and an infrared pedestrian detection system to provide warnings to drivers when they are about to make a turn where a pedestrian may be present in the crosswalk. PCW utilizes a tiered warning system in which the pedestrian call button elicits an “inform” alert and the physical presence of a person in the crosswalk issues a “warning.” The proposed system would initially be made available to the deployed connected vehicle fleet, followed by the development of an application for after-market safety devices.

a. Marysville: The COG will work with the city of Marysville to locate, design and procure a Pedestrian in Crosswalk (PCW) system. This will include detection/sensor equipment installed, maintained and operated by the city, with software/systems integration developed by a consultant/vendor. At a minimum, these will be tested at Marysville intersections designated by ODOT as numbers *9, 11, 12, 13, 14, 15, 15, 17, 18, 19, and 20.*

b. Dublin: The COG will work with the city of Dublin to locate, design and procure a Pedestrian in Crosswalk (PCW) system. This will include detection/sensor equipment installed, maintained and operated by the city, with software/systems integration developed by a consultant/vendor.

6. Connected Vehicle Applications

The underlying infrastructure-based technology will support the connected vehicle applications proposed for this deployment to combat the end of queue safety and mobility issues present at both ends of the proposed NW 33 Innovation Corridor.

a. In accord with ODOT Statewide Managed Lanes Feasibility Study, there are two traffic flow applications which will be tested in the corridor:

   i. Queue Warning: as referenced in the funding application, Q-WARN is one system which has been developed by US DOT and can be deployed as an after-market safety device (ASD) to detect queues and alert drivers of queue presence, distance and traffic speed ahead. Municipal and State vehicles will be equipped to test queue safety information—including ramp queue warning—sent from DSRC’s on US 33.
   ii. Speed Harmonization: ODOT is implementing a speed harmonization program as a pilot program on the I-670 corridor in Columbus. As envisioned on I-670, an infrastructure-based system will detect speed and use overhead message signs to change the speed limit in order to increase corridor throughput. The same or different software could be used in the US 33 corridor.

b. The NW 33 Smart Mobility Corridor ATCMTD funding application also contemplated a ridesharing application (D-RIDE) which was developed under sponsorship from the US DOT. Since development of the D-RIDE prototype, commercial applications have been developed to serve this market need. The program sponsors still endeavor to test a mobile application in the corridor, designed to connect people to jobs, while decreasing single occupant vehicle trips in the corridor.

The COG will contract for the development of in-vehicle applications which use the US 33 smart infrastructure provide in-vehicle safety and congestion information. Queue warning and speed harmonization are two applications which are envisioned for deployment in the corridor. The other application envisioned for development will be a shared ride system to link travelers to shared rides using crowdsourcing techniques, thus reducing vehicle trips in the corridor.

7. Program Management, Operations and Maintenance Distributed Data Network, Systems and Software; Program Management; Operations and Maintenance

   In addition to the physical components of the US 33 Smart Corridor, the final program scope item is program management, operations and maintenance.

   Program management is a discrete work element, to be performed by a combination of the COG and potentially consultant resources.

   A distributed data network is being created and managed as part of this program. This work element consists of the information technology and resources that will manage the real time data, and make that data available for sharing between agencies and with the applications that will be developed with this program. Open source data is a key requirement.

   Operations and maintenance refers to the ongoing cost of systems operations, including staff time for data network management and other scope items; IT storage costs; utility costs; and component replacement due to failure, natural disaster, or human error/vehicle crashes.

2.3. Delineation of Tasks and Deliverables

Section 2.2 above outlines the project elements that make up the physical manifestation of the US 33 Smart Corridor program. This section describes the tasks required for implementation, testing, operations and maintenance.

2.3.1. Physical Installations

As outlined in Section 2.2, there will be a number of discrete projects that involve the installation of smart technology/intelligent infrastructure, such as communications, sensors, and related equipment.

2.3.2. Program Management

The COG will implement a Program Management Plan (PMP) with best practice processes to deliver the individual program elements on time and on budget. Program management will be a joint responsibility of the COG and a consultant program management firm—any consultant program management firm will have familiarity with FHWA guidance regarding intelligent transportation systems, including https://ops.fhwa.dot.gov/int_its_deployment/sys_eng.htm. The program management regime will include the following elements:

- Scope Management. Scope management will create baseline scope items and change management process that documents scope changes and interfaces with schedule and budget management processes. It will include control processes to monitor scope adherence and scope modifications, with documentation.
- Schedule Management. A detailed project schedule will be developed as a baseline, in coordination with the baseline scope and budget for work activities. Schedule management includes continuous monitoring of adherence to schedule, and management of changes to schedule, with attendant effect on scope and budget. Schedule management includes identifying, analyzing, documenting, prioritizing, approving or rejecting, and publishing all schedule-related changes. The Project Schedule shall describe the following:
    - o Name of the work activity;
    - o Expected start and end dates;
    - o Name of the individual with the primary responsibility for accomplishing the work;
    - o Dependencies with other work activities in the Project Schedule; and
    - o All deliverables, procurements, or milestones resulting from the work activity.
- Budget Management. A detailed program budget will be established as a baseline, in coordination with the scope and schedule. Budget management will track the baseline and provide approval process for changes; change management will interface with scope and schedule management processes to trace impacts of budget changes throughout the program, with requisite documentation of changes.
- Quality Management. A quality management plan will be created for the program, including Quality Control (QC) and Quality Assurance (QA) processes for each program element. QA/QC compliance will follow ISO 9001 standards.
- Configuration Management. This includes managing how items to be placed under configuration control are identified, when they are identified, and when they are placed into a configuration control process or system. Configuration management may include establishing a Configuration Control Board (CCB) and include procedures for handling proposed changes to items under configuration control, and the role of the USDOT in configuration control.
- Risk Management. A risk management plan will be created and updated cyclically to identify, prioritize, and manage program risks in a timely and efficient manner. A risk register will track risks that may impact the schedule, scope, or costs of activities performed under the program. The risk register will also identify impacts and mitigation.
- Communication and Meetings: The COG will set up communication processes to include, at a minimum, a web-based file sharing system with access to the program partners, along with email communication capability. The COG will hold bi-monthly and quarterly progress meetings which will be open to the public, and meeting minutes recorded and posted to the shared file system. Project-specific meetings will be held as necessary, with meeting minutes recorded and posted to the shared file system.
- Reporting: The COG will provide Quarterly Progress Reports and Briefings. Quarterly Progress Reports shall include:

- Status report of accomplishments in the previous quarter, and those anticipated for the next quarterly period.
- Update on status and changes to scope, schedule and budget.
- Risk management update, including issues that require attention from the COG, ODOT, US DOT, or other partners.
- Summary of subcontractor coordination and management activities to include status of key procurements, status of key subcontract awards,

For Quarterly Progress Briefings, the COG will present the information contained in Quarterly Progress Reports. Briefings will be conducted at one of the COG members' offices, with audio meeting capability.

Deliverables

- Kick-off, monthly, quarterly, and subject-specific meetings
- Program Management Plan (PMP)
- Web-based file sharing and communication system
- Quarterly Progress Reports and Briefings

2.3.3.Systems Engineering

As required by all US DOT-funded intelligent transportation system deployments, the COG will use a systems engineering approach to develop the framework and individual projects for the US 33 Smart Mobility Corridor. This approach will still allow for other incremental and iterative development concepts, such as iterative and agile software development, to deliver applications.

The COG will develop a Systems Engineering Management Plan (SEMP), which will describe what systems engineering process the COG plans to follow during the execution of the project's work and how the COG plans to manage the specific systems engineering activities that will be performed during the project.

The components of the SEMP will include:

- A Concept of Operations (ConOps) serves as the foundation document that frames the overall US 33 Smart Mobility Corridor and sets the technical course for a project. It conveys a high-level view of the system to be developed. The ConOps will describe the holistic, integrated solution to be deployed for the corridor, and how operational practice should be altered based on the introduction of new applications. Among other elements, the ConOps will include a set of proposed high-priority "needs" through structured stakeholder interaction, a context diagram, discussion of enhancements to operational practices, and use cases or scenarios. The ConOps will describe how the COG interfaces with all proposed partners.

- A Demonstration Site Map and Installation Schedule will be developed to identify the specific geographic area and indicate locations related to key issues, current and proposed roadside technology locations, connected automated vehicle operations, and other explanatory features to support strategies that align with the COG's proposed strategies. During the course of the effort, the Demonstration Site Map will be updated to reflect any changes decided during the demonstration effort. In addition, the COG will create a Site Installation Schedule that identifies infrastructure installation activities. For each type of infrastructure element to be installed, this schedule will indicate:

  - The type of infrastructure element to be installed;
  - Planned installation start and end dates for each infrastructure element;
  - Organization or individual responsible for the installation;
  - Milestone(s) identifying when the installation of each type of infrastructure element is completed; and
  - Planned start and end dates for unit testing the operation of each infrastructure element (by type).

- A Systems Requirements Specification (SyRS) will be developed to define what the system will do. Working with stakeholders, requirements will be elicited, analyzed, validated, documented, and baselined. The SyRS will identify what the systems must accomplish; identify the subsystems; and define the functional and interface requirements among the subsystems. The role of each subsystem in supporting system-level performance requirements will be identified, including associated subsystem functional, interface, performance, security, data, and reliability requirements. The SyRS will include:
  - Functional Requirements, including communications, security, and safety requirements.
  - Interface Requirements, including identification of relevant standards (where appropriate),
  - Data Requirements, including data-sharing requirements.
  - Performance Requirements, including system performance targets and performance requirements.
  - Security Requirements, including limits to physical, functional, or data access, by authorized or unauthorized users.

- A Systems Architecture Document and Standards Plan will be developed that documents the architecture for systems associated with the US 33 Smart Mobility Corridor and associated standards that will be used. The architecture document will include:
  - Enterprise Architecture. Describes the relationships between organizations required to support the overall system architecture.
  - Functional Architecture. Describes abstract functional elements (processes) and their logical interactions (data flows) that satisfy the system requirements.
  - Physical Architecture. Describes physical objects (systems and devices) and their application objects as well as the high-level interfaces between those physical objects.
  - Communications Architecture. Describes the communications protocols between application objects.

While the US 33 Smart Mobility Corridor has its own unique users and benefits, the COG recognizes and appreciates the neighboring Columbus Smart City demonstration project, and its development of systems architecture and standards. The COG plans to implement the Columbus Smart City systems architecture to the extent possible, both to minimize development costs, and maximize interoperability, which is the purpose and intent of the federal program.

The National ITS Architecture is a mature architecture that provides a common framework for the ITS community to plan, define, and integrate ITS solutions. The Connected Vehicle Reference Implementation (CVRIA) was developed to extend the National Architecture to include detailed information to support development of fully interoperable regional connected vehicle architectures. The CVRIA and the associated SET-IT software tool will be fully integrated into a comprehensive National ITS Architecture and single comprehensive software toolset to support development of interoperable regional architectures including complete ITS infrastructure and connected vehicle capabilities along with interface information needed for standards selection. Prior to integration into a single comprehensive ITS architecture with a single integrated software tool, the CVRIA (and associated SET-IT tool) and the National ITS Architecture (and the associated Turbo Architecture Tool) will be available to support systems architecture efforts. The COG will use the CVRIA, the National ITS Architecture, and published and under-development ITS standards to demonstrate interoperable ITS capabilities which are nationally extensible.

- A <u>System Design Document (SDD)</u> will be created based on the system requirements specification (SyRS) including a high-level design that defines the overall framework for the system. Subsystems of the system are identified and decomposed further into components. Requirements are allocated to the system components, and interfaces are specified in detail. Detailed specifications are created for the hardware and software components to be developed, and final product selections are made for off-the-shelf components.

- A <u>System Test Plan</u> will be developed to demonstrate that the system satisfies all of the requirements. The System Test Plan will identify what methods (i.e., analysis, demonstration, inspection, and testing) will be used to ensure that the developed system satisfies the system's requirements.

- <u>Interface Control Documents</u> (ICDs) will be developed so that all parties can build components of the system that will work together. ICDs inform different organizations building parts of the system that must interact with each other what the specific elements of that interface are and how those elements must be expressed. ICDs could be as simple as specifying what types of connecting wires must be used to couple two manufacturers' devices together; or as complex as specifying the protocol suites and standards that must be used to ensure that two different computer devices can communicate over some form of telecommunications infrastructure.

- Integration Unit Testing and Documentation will take place to ensure that individual components meet their specifications. Integration will confirm that all interfaces have been correctly implemented and that all requirements and constraints have been satisfied. System testing will verify that the developed system satisfies the system's requirements. The following elements are part of the testing and documentation protocol:
  - Test Descriptions include written descriptions of the individual verification and validation processes that will occur as part of the effort to ensure that the system was built correctly and that the correct system was built.
  - Test Cases. Each test case includes a set of test inputs, execution conditions, and expected results developed for a particular objective, such as to exercise a particular path within a system or a software application or to verify compliance with a specific requirement or set of requirements.
  - Test Procedures. Test Procedures specify how one verifies and validates that the component of the system undergoing integration actually functions as intended and as desired.
  - Test Data will include scripts used to execute software operations, data that must be entered by someone as part of the process of verification and validation of the system and its component integration, or a description of what system-generated data will flow through different components of the system to accomplish a system function.
  - Test Results. Documents that describe the results of each test conducted.

  Unit testing and documentation will be scalable to the subsystem and component being tested. For example, the 62 RSU's installed in the US 33 corridor will be checked and field tested, with minimal documentation, while new software will follow a more expansive testing and documentation process.

- An Operations and Maintenance (O&M) plan will describe policies and high-level procedures governing the COG's operation and maintenance of the system. Minimally, it will address the activities described in the project's Concept of Operations and any other activities needed to achieve the project's objectives.

Deliverables

- Systems Engineering Management Plan (SEMP)

2.3.4.Measures of Effectiveness (MOE) Plan

The COG will develop a plan to quantify the effectiveness of the US 33 Smart Mobility Corridor. One or more of the following performance measures will be addressed:

- Reduce traffic-related fatalities and injuries;
- Reduce traffic congestion
- Improve travel time reliability;
- Reduce transportation-related emissions;
- Improve public access to real-time integrated multimodal transportation information;

The MOE Plan will identify data collection and reporting methodologies. The plan will document proposed hypotheses as well as methodologies for collecting: (i) pre-demonstration data that can be used as a performance baseline, (ii) continuous data during life of the demonstration to support performance monitoring and evaluation, (iii) cost data including unit costs and operations and maintenance costs, and (iv) information on the timeframe that applications or other technology solutions are deployed during the course of the demonstration period.

Deliverables

- Performance Measurement Plan

2.3.5.Data Management

The Project Partners will develop a Data Management Plan that describes how data – including data across multiple project partners – will be collected, managed, integrated, and disseminated before, during, and after the federal grant funds are expended. This includes real-time and archived data that are inputs to and outputs from systems managed by the Project Partners and its partners. The document shall address the Project Partners plans for managing their data as a strategic asset and making open, machine-readable data available to the public – subject to applicable privacy, security and other safeguards – to fuel entrepreneurship and innovation to improve citizens' lives, create jobs, and spur economic development. The Data Management Plan shall also describe:

- The data the Project Partners plans to collect as part of the ATCMTD grant and how these data will be used by the COG, project partners, other agencies, and stakeholders to further address corridor challenges.
- Opportunities to integrate transportation data with other functions or services of public agencies (such as public safety, human services, transit, and public works) to improve their management and operations. Likewise, it shall describe how other data could be integrated with transportation data to improve transportation operations.
- The terms of existing and future data sharing agreements that will be put in place during the project period and the Project Partners approach to preserving project data for future use. If the Project Partners plans to partner with outside organizations (nonprofits, universities, corporations, etc.) it shall address whether and specify how (e.g., limitation on sharing or use) data from those organizations or interests will be collected, managed, and shared across sectors or with the public, if appropriate.
- The terms and conditions that exist or will be established and managed in partnership agreements, data or information sharing agreements, agency specific policies and operating procedures to establish and maintain the systems and interfaces to maintain the integrity of the data and share the information identified in the plan.
- Practices that safeguard data, privacy, and physical assets.

Required Deliverables

- Data Management Plan

2.3.6. Communication and Outreach

The US 33 Smart Mobility Corridor will have a communications and outreach program that covers both outreach activities and the accommodation of requests for site visits by media, researchers, and others. Communications and outreach activities can include the following:

- Media strategy for both local and national press;
- Web/social media presence;
- Outreach strategy to promote the demonstration locally;
- Interface with local K-12 educational facilities;
- Community awareness strategy;
- Crisis communications plan in case of unforeseen events, natural disasters, and other threats; and
- Accommodation of site visits and demonstration of capabilities.

Public relations and marketing could include news articles, press releases, brochures, fact sheets; photos; website content; videos; talking points, press events, PowerPoint slide decks; and trade show events.

<u>Deliverables</u>

- Communications and Outreach Plan
- Public relations and marking materials defined by the Recipient

2.3.7. ITS Architecture

The COG will assist in supporting activities of the ITS Architecture and Standards Programs where those activities are impacted by the project's initiatives. Making use of published and developmental ITS architectures and standards, the COG will encounter cases where additional needs become evident as well as cases where improvements or corrections to existing architecture and standards are warranted. The Recipient will take appropriate actions to assure that these lessons-learned are made available to support evolution of architecture and standards to improve suitability to support nationwide or greater interoperability of ITS as well as interoperability of ITS with other systems and architectures.

Such support will include participation in select Standards Development Organization (SDO) working groups/committees, including providing input to their work in the form of technical information (e.g., objectives, user needs, data requirements) about the US 33 corridor and lessons learned from US 33 corridor deployment activity. When appropriate, in- person participation in select meetings will be included.

<u>Deliverables</u>

- Attendance at and participation in ITS architecture and standards meetings

2.3.8. Reporting

The COG will develop interim progress reports each year discussing the progress to date and summarizing issues and opportunities. A final report for the US 33 Smart Corridor will provide a summary of accomplishments, benefits, costs, and lessons learned. This document will be developed to share publically. The final report shall describe:

- Deployment costs (i.e., systems and unit costs) and operational costs (i.e., operations and maintenance costs) of the project compared to the benefits and cost savings the project provides; and
- How the project addressed safety, mobility, and other challenges and met the original expectations defined in the COG's vision, such as —
    - Data on how the program improved safety and mobility;
    - Lessons learned and recommendations describing how the demonstration met the objectives identified by the USDOT for the ATCMTD grant program, and recommendations for other locations considering implementation of similar solutions.

<u>Deliverables</u>

- Interim Reports (annually)
- Final Report

US 33 ATCMTD GRANT BUDGET
22-Jun-17

	Function/ Activity	Total	Lead Agency	Schedule	Function/Activity Detail	#	Unit$	Total	ATCMTD Grant	ODOT	Honda	Battelle	Marysville/COG	Union County CIC
1	AV/EV Corridor Installation and Traffic Signal Upgrades	$ 8,880,000			AV/EV Corridor Installation and Traffic Signal Upgrades									
			ODOT	12/1/2017 - 4/1/2018	Roadside Units	62	$ 22,000	$ 1,364,000	$ 1,364,000					
			ODOT/COG	7/1/2017 - 5/1/2018	Fiber Optic Cable Install			$ 6,000,000	$ 1,916,150	$ 3,650,000				$ 433,850
			Marysville and Dublin	10/1/2017 - 12/31/2018	Traffic Signal Upgrades	32	$ 10,938	$ 350,000	$ -	$ 350,000				
			TBD	11/1/2017 - 3/1/2018	Local Smart Network	1	$ 750,000	$ 750,000	$ 750,000					
			Battelle	10/1/2017 - 12/1/2018	Pedestrian Warning Systems	8	$ 22,000	$ 176,000	$ 176,000					
			Battelle	10/1/2017 - 12/1/2018	Pedestrian Detection Systems	8	$ 30,000	$ 240,000	$ 240,000					
2	Vehicle Installation and Application Development	$ 3,283,000			Vehicle Installation and Application Development									
			Various	12/1/2017 - 3/1/2019	Vehicle Installation	1200	$ 2,500	$ 3,000,000	$ 718,350		$ 2,281,650			
			Battelle	7/1/2017 -8/31/2019	App Dev: INFLO	1	$ 283,000	$ 283,000	$ 183,000			$ 100,000		
3	Public Recruitment and Engagement	$ 300,000			Public Recruitment and Engagement									
			COG	7/1/2017 -8/31/2019	INFLO	1	$ 300,000	$ 300,000	$ 150,000				$ 150,000	
4	Program Management, Operations and Maintenance	$ 1,009,500			Protram Management, Operations and Maintenance									
			Battelle; COG	7/1/2017 - 12/31/2018	Distributed Data Network; Project Mgmt., O&M	1	$ 1,009,500	$ 1,009,500	$ 500,000				$ 509,500	
	Total	$ 13,472,500						$ 13,472,500	$ 5,997,500	$ 4,000,000	$ 2,281,650	$ 100,000	$ 659,500	$ 433,850
									45%	30%	17%	1%	5%	3%

US 33 ATCMTD GRANT SCHEDULE

22-Jun-17