

University of Maryland College Park



Request for Proposal (RFP) No. 83794

To Provide Real-Time Traffic Data and Associated Products to I-95 Coalition Organizations and Affiliates

Issue Date:	TUESDAY 19 NOVEMBER 2013
Pre-Proposal Conference:	WEDNESDAY, 04 DECEMBER 2013 1:00 P.M. E.T.
Deadline for Questions:	WEDNESDAY 11 DECEMBER 2013 5:00 P.M. E.T.
Proposal Due Date:	WEDNESDAY 08 JANUARY 2014 4:30 P.M. E.T.

WARNING: Contractors who have received this document from a source other than the Issuing Office should immediately contact the Issuing Office and provide their name and mailing address in order that amendments to the RFP or other communications can be sent to them. Contractors who fail to notify the Issuing Office with this information assume complete responsibility in the event that they do not receive communications from the Issuing Office prior to the closing date.

Contractors are cautioned not to make changes to any of the terms and conditions in this solicitation. Doing so may render a Contractor's proposal unacceptable and subject to rejection. Questions and comments must be addressed to the point of contact identified in Section A-1, Item 9 of this document.

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**PART I – THE SCHEDULE
SECTION A-1 – SOLICITATION / CONTRACT FORM**

1. CONTRACT NUMBER	2. SOLICITATION NUMBER 83794N	3. TYPE OF SOLICITATION NEGOTIATED (RFP)	4. DATE ISSUED	5. REQUISITION NUMBER
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6. ISSUED BY UNIVERSITY OF MARYLAND DEPARTMENT OF PROCUREMENT AND SUPPLY 2113-R CHESAPEAKE BUILDING COLLEGE PARK, MARYLAND 20742	7. ADDRESS PROPOSAL TO University of Maryland Department of Procurement & Supply Attn.: RFP Number 83794N 2113-R Chesapeake Building College Park, Maryland 20742-3111 (www.purchase.umd.edu)
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SOLICITATION

8. Sealed proposals in original plus number of copies specified in Section A-2, Subsection D for furnishing the supplies or services in the Schedule will be received at the location specified in Item 7 (if no location is specified in Item 7, then the location specified in Item 6) until the date and time specified in Section A-2, Subsection E.

CAUTION – LATE Submissions, Modifications, and Withdrawals; see Section A-2, Subsection F entitled "Late Proposals". All offers are subject to all terms and conditions contained in this solicitation.

9. FOR INFORMATION CALL	A. NAME Bruce D.Brewer	B. TELEPHONE (NO COLLECT CALLS) AREA CODE 301	NUMBER 405-5829	C. E-MAIL ADDRESS bbrewer@umd.edu	D. FAX NUMBER 301-314-9565
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OFFER (Must be fully completed by Contractor)

10. In compliance with the above, the undersigned agrees, if this offer is accepted within the time period specified in Section A-2, Subsection G, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the Schedule.

11. ACKNOWLEDGEMENT OF AMENDMENTS
The Contractor acknowledges receipt of all amendments to the SOLICITATION.

This contract incorporates the Solicitation/Request for Proposal and any amendments thereto, as well as Contractor's proposal and amendments thereto. In the event of a discrepancy between the terms of this contract, including amendments and modifications made thereto, and Contractor's proposal and amendments thereto, the discrepancy shall be resolved by giving precedence in the following order:

- This Contract, including the Solicitation/Request for Proposal and amendments and modifications made thereto
- Contractor's proposal, including amendments and modifications made to the proposal.

This contract, including the documents incorporated by reference and any negotiated changes prior to contract award, contains the entire agreement of the parties and supersedes all prior agreements and understandings, oral or otherwise, between the parties.

12. NAME, ADDRESS AND FEI NUMBER OF CONTRACTOR	13. CONTRACTOR REMIT-TO ADDRESS	14. NAME TITLE AND E-MAIL OF PERSON AUTHORIZED TO SIGN OFFER (Print or Type)
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15. TELEPHONE NUMBER AREA CODE NUMBER	EXT.	16. SIGNATURE	17. OFFER DATE
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AWARD (To be completed by University)

18. ACCEPTED AS TO ITEMS LABELED	19. AMOUNT	20. FRS ACCOUNT NUMBER
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21. ADMINISTERED BY (If other than Item 6)

22. NAME OF PROCUREMENT OFFICER (Type or Print)	23. UNIVERSITY OF MARYLAND (Signature of Procurement Officer)	24. AWARD DATE
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IMPORTANT – Award will be made on this Form or by other authorized official written notice.

Section A-2 -- Instructions, Conditions and Notices to Contractors

The University of Maryland, on behalf of the I-95 Corridor Coalition, is issuing this RFP to engage one or more Contractors to provide real-time traffic data and associated products (hereafter referred to as Traffic Data) to Coalition Organizations. It is the intent of the Coalition to provide funding support and coordination with Coalition Organizations for the purpose of sustaining a regional traffic monitoring system. An initial three year contract award is anticipated. The contract may be renewed, if desired by the Coalition, up to a maximum contract life of eight years.

A. ISSUING OFFICE

The sole point of contact at the University of Maryland, College Park (hereinafter “University” or “University of Maryland”) for purposes of this Request for Proposal (RFP) is the Issuing Office. The location of the Issuing Office is contained in Part I, Section A-1, Item 6 of this document. Point of contact information is listed in Part I, Section A-1, Items 9(a) through 9(d) of this document.

B. PRE-PROPOSAL CONFERENCE

Note: Address can be changed to reflect another site as required. An optional pre-proposal conference will be held on **WEDNESDAY, 04 DECEMBER 2013 at 1:00 P.M. ET.**

University of Maryland
Center for Advanced Transportation Technology
5000 College Avenue
College Park, MD 20742

Firms should estimate a duration of a maximum 2 Hours. Contractors who are attending the pre-proposal conference are requested to bring written copies of any questions they may have to the conference. Answers will be provided in accordance with paragraph 2 of Section A-2, C below. Any and all dialogue at the meeting is unofficial; questions must be submitted in writing by Contractors for official response.

In order to help plan meeting room size, any Contractor planning to send a representative should contact the Issuing Office at least three (3) working days prior to the conference. While attendance at the pre-proposal conference and walk-through is not mandatory, all interested Contractors are encouraged to attend to be able to better prepare acceptable proposals. Contractors desiring to send more than two representatives to the pre-proposal conference must obtain the prior approval of the Procurement Officer.

C. QUESTIONS

Each Contractor is responsible for reading carefully and understanding fully the terms and conditions of this RFP. All contact between Contractors and the University will be formally made at scheduled meetings or in writing through the Issuing Office. Requests for clarification or additional information must be made in writing to the Procurement Officer and received at the Issuing Office no later than **WEDNESDAY December 11, 2013.** Such requests should contain the following: **“QUESTIONS: RFP #83794N”**. Only written communications relative to the procurement shall be considered. Hard

copy, facsimile and electronic mail are acceptable methods for submission of questions. It is incumbent upon the Contractor to verify University receipt of their questions.

All questions will be answered in writing. Both questions and answers will be distributed, without identification of the inquirer(s), to all Contractors who are on record with the Procurement Officer as having received this RFP. No oral communications can be relied upon for proposal purposes.

To the extent that a question causes a change to any part of this RFP, an amendment shall be issued addressing such.

D. SUBMISSION OF PROPOSALS

Proposals must be:

- (1) submitted in the format set forth herein,
- (2) made in the official name of the firm or individual under which Contractor's business is conducted (including the official business address),
- (3) signed by a person duly authorized to commit Contractor to the proposal,
- (4) submitted in envelopes clearly marked with the assigned RFP number,
- (5) separated into Technical and Financial volumes, and
- (6) addressed to the Procurement Officer identified in Section A-1, Item 9 and sent to the address shown in Section A-1, Item 7.

The Contractor must submit **ONE (1) original (marked "original") and TWENTY-FIVE (25) paper copies and 1 electronic copy (on CD or Memory Stick) of the Technical volume, and ONE (1) original and FOUR (4) paper copies of the Financial volume** sealed under separate cover.

Commingling of technical and financial information or failure to submit the two volumes **separately** and sealed may result in the proposal being deemed **NON-ACCEPTABLE** and thereby rejected. The volumes, which contain original documents, should be clearly identified as the **ORIGINAL Technical or the ORIGINAL Financial Volume**.

NOTE: PROPOSALS CONVEYED BY TELEFAX OR E-MAIL WILL NOT BE ACCEPTED

E. CLOSING DATE

Proposals must arrive at the location identified in Section A, Item 7 of this **document ON OR BEFORE WEDNESDAY 08 JANUARY 2013, 4:30** p.m. Eastern Time, in the format set forth herein.

Contractors mailing proposals should allow sufficient mail delivery time to insure timely receipt by the Issuing Office. Proposals, amendments to proposals, or requests for withdrawal of proposals arriving after the closing time and date shall not be considered. There shall be no public opening of the proposals. The names of Contractors will not be released until after award.

F. LATE PROPOSALS

Any proposal, request for withdrawal, or modification of a proposal including a Best and Final Offer (BAFO) that is not received at the designated location, time and date set forth herein will be considered

late and shall not be considered. Delivery of the proposal to the specified location by the prescribed time and date is the sole responsibility of the Contractor. Exceptions may be authorized, at the sole discretion of the Procurement Officer, when the reason for the late proposal, late request for withdrawal, late modification of a proposal or BAFO is due to the action or inaction of the University. A record of the late proposal, request for withdrawal, modification of a proposal or BAFO shall be made in the appropriate procurement file.

G. DURATION OF PROPOSAL OFFER

Proposals shall be valid for a minimum of 120 days following the closing date of this RFP. If an award is not made during that period, the proposal shall automatically extend for another 120 days, unless the Contractor gives specific written notice to the Procurement Officer at least 15 days before the expiration of the then current 120 day period. Proposals shall automatically renew for an additional 120 days until such time as an award is made or proper written notice is given to the University of Contractor's intent to withdraw its proposal. By submission of a proposal, Contractor guarantees that its offer shall be firm for the period specified above.

H. AMENDMENTS TO THE RFP

If it becomes necessary to revise any part of this RFP, notice of the revision will be given in the form of an amendment to Contractors who are on record with the Procurement Officer as having received this RFP. All amendments shall become a part of this RFP. Each Contractor must acknowledge receipt of amendments, and the failure of a Contractor to acknowledge any amendment shall not relieve the Contractor of the responsibility for complying with the terms thereof.

I. ALTERNATE PROPOSALS

In the mutual interest of receiving the best proposal, the University will consider alternate price and technical proposals. In order to submit an alternate proposal, however, a Contractor must also submit a proposal in the exact format required herein.

J. ECONOMY OF PREPARATION

Each proposal should be prepared simply and economically, providing a straightforward, concise description of the Contractor's offer and capabilities to satisfy the requirements of this RFP. Emphasis should be on completeness and clarity of content.

K. UNABLE TO PROPOSE

If Contractor is unable or unwilling to submit a proposal in response to the requirements, Contractor must indicate such in writing to the Procurement Officer on or before the proposal due date. Hard copy, facsimile and electronic mail are acceptable. Please include a brief explanation of the rationale for non-submission of a proposal.

L. PUBLIC INFORMATION ACT NOTICE

Contractors shall specifically identify those portions of their proposals that they deem to contain confidential, proprietary information or trade secrets and shall provide specific justification, with respect to each separate portion identified, why such materials, upon request, should not be disclosed by the State under the Access to Public Records Act, State Government Article, Title 10, Subtitle 6, Annotated Code of Maryland.

In order for such claims of confidentiality to be considered, Contractors must clearly identify and provide individual justification for each and every section that is claimed to contain confidential, proprietary information or trade secrets. It is **NOT** sufficient to preface your proposal with a proprietary statement, or to use a page header or footer that arbitrarily marks some or all pages as confidential. General claims of confidentiality or similar blanket designations shall not be effective.

M. TWO VOLUME PROPOSAL

The selection procedure for this procurement requires an independent evaluation of the technical and financial proposals. This separation allows for evaluation of technical proposals on their technical merit only. Consequently, Contractor shall submit its proposal in two separately sealed volumes as indicated below. No pricing information is to be included in the technical proposal.

See Part IV, Section L for additional details pertaining to the evaluation process.

1. VOLUME I - TECHNICAL

This volume should be prepared in a clear and concise manner with pages numbered. The technical volume shall not contain any price information. If such is included in the technical volume, it may not be evaluated by the financial evaluation committee. Volume I must contain the following sections:

a. EXECUTIVE / MANAGEMENT SUMMARY

The Executive/Management Summary should contain a brief synopsis of how the Contractor's proposal meets the needs of the University.

b. REFERENCES

Contractors must provide at least two references that validate the Contractor's ability to provide real-time traffic data, preferably similar in size, scope and complexity as the requirements defined in this RFP. **Reference information is to be incorporated in the form provided in Section C/Subsection 4.0.** Cited references must be able to confirm, without reservation, the Contractor's ability to perform as mandated in this solicitation. The Contractor shall provide, at a minimum:

- Name of the company or institution
- Name of primary contact
- Address

- Telephone number
- E-mail address
- Annual Dollar Value of Contract
- Start Date
- Completion Date
- Description of the project/service

The University reserves the right to take any or all of the following actions: to reject a proposal based on an unsatisfactory reference, to contact any person or persons associated with the referenced site, to request additional references, to contact organizations known to have used in the past or currently using the products supplied by the Contractor or the Contractor's subcontractors, to contact independent consulting firms for additional information about the Contractor or the Contractor's subcontractors and to visit any or all of the reference sites for demonstrations.

c. THE TECHNICAL PROPOSAL

Contractors may propose on Traffic Flow, Traffic Volume/OD or Both. Mandatory requirements in Section “C” pertain solely to the provision of Traffic Flow Data.

Each Contractor’s Proposal for Traffic Flow data must meet the Mandatory Requirements. Multiple technical proposals (corresponding to varying degrees of meeting *highly desirable* and *desirable* requirements-NOT Mandatory requirements) may be submitted. Each proposal must be completed as specified. Corresponding price proposals must be submitted for each technical proposal.

Contractors are urged to read the specifications very carefully and to submit their questions, in writing, by the due date for questions. Misinterpretation of specifications by the Contractor shall not relieve the Contractor of responsibility to accurately address the requirements of this RFP or to perform the contract, if awarded.

The information/items specified herein must be addressed in the technical proposal.

The proposal must expressly indicate that it can or cannot satisfy each point of the RFP requirements and specifications contained in Section C, subsection 3.1. Simple YES or NO responses to stated requirements are insufficient. Rather, the Contractor must describe in detail how the proposed products and/or services meet or exceed the stated requirements. The Contractor must explain any exception or deviation from the requirements. Subsection 3.1 uses priority and response codes that serve as a guide to the responder. The requirements and specifications in subsection 3.1 are structured in a matrix format. Contractors are to respond to the requirements and specifications using the same matrix format shown. Responses requiring supporting information may be entered directly into the matrix or may reference the information located elsewhere in the RFP response including the Executive / Management Summary. Provide, if available, full objective evidence of the Contractor’s ability to meet the data quality requirements such as independent verifications, validations, studies or reports.

Contractors must provide a full risk analysis as requested in section C, subsection 3.3.

Contractors must provide response indicating support for Data Ownership and Data Licensing provisions in section C, subsection 6.0.

The I-95 Corridor Coalition seeks to procure Traffic Data on freeways (both urban and rural), high-volume arterials and state highways with AADT above 20,000 (referred to as **Major Arterials**), low-volume arterials and state highways with AADT between 5,000 and 20000 (referred to as **Minor Arterials**), major interchange ramps, and special use lanes. Based on the **Coverage Area** at the time of issuance of the RFP (which include the geographic boundaries state members from Maine to Florida, the District of Columbia, and affiliate member Tennessee), the proposal should indicate the following:

- Any variations or limitations between the coverage capabilities of the Contractor and the roadway network within the Coverage Area.
- Any regions within the Coverage Area for which real-time traffic data can and cannot be provided.
- If coverage is dependent on parameters such as type of roadway, volume of traffic, density of traffic lights, length of roadway segment, proximity to communications infrastructure, or any other attribute, provide a full explanation.

Multiple technical proposals (corresponding to varying degrees of meeting *highly desirable* and *desirable* requirements) may be submitted. Each proposal must be completed as specified. Corresponding price proposals must be submitted for each technical proposal.

Contractors are urged to read the specifications very carefully and to submit their questions, in writing, by the due date for questions. Misinterpretation of specifications by the Contractor shall not relieve the Contractor of responsibility to accurately address the requirements of this RFP or to perform the contract, if awarded.

Proposals must be:

- (1) submitted in the format set forth herein,
- (2) made in the official name of the firm or individual under which Contractor's business is conducted (including the official business address),
- (3) signed by a person duly authorized to commit Contractor to the bid,
- (4) submitted in envelopes clearly marked with the assigned MS-IFB number,
- (5) separated into independent Technical and Financial Proposal Volumes
- (6) addressed to the Procurement Officer identified in Section A-1, Item 9 and sent to the address shown in Section A-1, Item 7.
- (7) The Contractor's Technical Proposal shall include the following documents:
 - The Contractor must submit one original (marked "original"), 25 paper copies, and one (1) electronic copy (on CD or Memory Stick) of the technical volume
 - The volume which contain original documents, should be clearly identified as the **ORIGINAL Technical Volume**

- Technical Proposal must contain:
 - Contractors must complete Items 11, 12, 13, 14, 15, 16 and 17 of the Solicitation / Contract Form (Section A-1) of this document and include TWO signed originals as part of Contractor's Technical proposal, in the original Technical Volume. Failure to submit these signed documents may cause the Contractor's proposal to be rejected, at the sole discretion of the University.
 - Technical Responses including/addressing:
 - Executive/Management Summary
 - References
 - Response to Technical Specifications (Section C, subsection 3.1)
 - Risk Analysis (Section C, subsection 3.3)
 - Response to Data Ownership and Licensing (Section C, subsection 6.0)
 - Contractors ability to provide data on Freeways, Major and Minor Arterials, Ramps, and Special Use Lanes within the Coverage Area
 - Any additional support documentation required.
 - Small Business Certificates (if required)
 - Affidavits/Certifications/MBE Compliance forms as follows:
 - Completed and signed Maryland Proposal Affidavit
 - Completed and signed Conflict of Interest Affidavit and Disclosure
 - Completed and signed Federal Certifications,
 - Small Business information as may be required in Sections U/V,
 - Maryland Affidavit of Living Wage
 - Completed Minority Subcontracting Forms, etc).
 - Required Economic Benefits to Maryland Information
 - Any additional support documentation required.
- (8) The University may make a final determination regarding a proposal's acceptability solely on the basis of the proposal as submitted.

(9) RESERVED

(10) TOTAL PAGE COUNT

The total page count of Volume I shall not exceed 75 pages, excluding inclusion of the RFP. Each double-sided page shall count as TWO pages. Except as stated below in this paragraph, Volume I shall be presented in 12 point font or larger. The 75-page limit includes bibliographical summaries and any resumes. The 75-page limit also includes all figures, tables, appendices and all other ancillary materials. Subject to the exception stated in the next sentence, the dimensions of each page shall be no greater than 8 ½ by 11 inches. Up to 10 of the 75 maximum pages in Volume I may be "fold-out" pages having dimensions not exceeding 11 inches by 18 inches – provided that any such larger pages are bound into Volume I. Footnotes, legends or labels associated with the tables or diagrams, and other information which is ancillary to the main text, may be presented in a font size smaller than 12 point font –

provided that any such smaller font is fully legible. (Biographical summaries and resumes are not considered ancillary material and must therefore be presented in 12 point font or larger.)

2. VOLUME II - FINANCIAL

This volume consists of and must contain the following items. Contractors shall not include any technical information or specifications in the financial volume. If such are included in the financial volume, they may not be evaluated by the technical evaluation committee.

a. PRICING SECTION

This volume shall be in accordance with Section B – Pricing.

b. FINANCIAL VIABILITY

The University reserves the right to require, during proposal evaluation, that the Contractor provide a copy of its most current Annual Report or audited Statement of Financial Condition to include a Balance Sheet, Income Statement and Cash Flow Statement or other acceptable financial information. These documents may be relied on in any determination regarding Contractor financial responsibility.

c. RESERVED

d. NOTICES INFORMATION

Contractors must complete Section G.5 and submit this information as part of their financial proposal.

N. CANCELLATION OF THE RFP

The University may cancel this RFP, in whole or in part, or reject all proposals submitted in response to the RFP when such action is determined to be fiscally advantageous to the University and/or the State or otherwise in the best interest of the University and/or the State.

O. ORAL PRESENTATIONS/DEMONSTRATIONS

Contractors who submit proposals initially judged by the Procurement Officer to be reasonably susceptible of being selected for award may be asked to discuss their proposals with the University to facilitate arrival at a contract most advantageous to the University. .

- 1.0 The University reserves the right to waive the Oral Presentation/Product Demonstration, in which case the technical evaluation will be based on the written technical proposal submittal alone. Proposers are therefore encouraged to submit the best possible proposal at each opportunity for submittal

- 2.0 The due date and time of the oral presentation/product demonstration will be determined by the University upon evaluation completion of Technical Proposals. The actual date will be verified with the applicable Proposers at the time the presentation is requested. Refer to the Solicitation Schedule for tentative dates. Proposers are advised to set these dates aside so as to avoid a conflict
- 3.0 The oral presentation will be informal, as the University is not interested in a marketing presentation, rather, it will be a casual and informal format in which to view the Proposers presentations, etc.
- 4.0 The purpose of the oral presentation/product demonstration will be to clarify the proposers proposal as requested by the Evaluation Committee.
- 5.0 The criteria and format of the demonstration will be provided with the written request to conduct an oral presentation.

P. SOLICITATION, PROPOSAL ACCEPTANCE, AWARD AND DISCUSSIONS

This RFP creates no obligation on the part of the University to award a contract or to compensate Contractors for proposal preparation expenses. The University reserves the unilateral right to cancel this solicitation at any time and to accept or reject any and all proposals, in whole or in part, received in response to this RFP; to award one or more Indefinite Delivery, Indefinite Quantity (IDIQ) contract(s) under which task orders will be issued to authorize work. In the event of multiple awards, the University intends to create a Traffic Data marketplace for Coalition Organizations corresponding to multiple levels of capability, quality, pricing and demonstrated ability to deliver. Levels of capability and quality are defined in highly desirable and desirable specifications of Traffic Data.

Discussions may be conducted with those Contractors who submit proposals initially judged by the Procurement Officer to be reasonably susceptible of being selected for award. However, the University reserves the right to award a contract based upon the proposals received without further discussions.

Q. EVIDENCE OF RESPONSIBILITY

Prior to the award of a contract pursuant to this RFP, the Procurement Officer may require Contractor to submit such additional information bearing upon Contractor's ability to perform the contract as the Procurement Officer deems appropriate. The Procurement Officer may also consider any information otherwise available concerning the financial, technical, and other qualifications or abilities of the Contractor.

R. ELECTRONIC FUNDS TRANSFER (EFT)

By submitting a response to this solicitation, the Offeror agrees to accept payments by electronic funds transfer (EFT) unless the State Comptroller's Office grants an exemption. The selected Offeror shall register using the COT/GAD X-10 Vendor Electronic Funds Registration Request Form, which may be

found on the following website:

http://compnet.comp.state.md.us/General_Accounting_Division/Vendors/Electronic_Funds_Transfer/

Any request for exemption must be submitted to the State Comptroller's Office for approval at the address specified on the COT/GAD X-10 form and must include the business identification information as stated on the form and include the reason for the exemption.

See Payment of University Obligations clause in PART II, Contract Clauses, Section I for additional information.

S. FORMATION OF AGREEMENT/CONTRACT WITH SUCCESSFUL CONTRACTOR

This Contract shall also include any other forms or documents deemed necessary by the Procurement Officer.

This RFP and any resulting contract shall be governed by the University System of Maryland Procurement Policies and Procedures, and University of Maryland Procurement Policies and Procedures. These policies and procedures may be viewed at the following web site:

www.purchase.umd.edu From the main menu, select the category "Policies and Procedures".

T. DEBRIEFING OF UNSUCCESSFUL PROPOSORS

A debriefing of an unsuccessful proposer shall be conducted upon written request submitted to the Procurement Officer within ten (10) days of the date on which the proposer knew, or should have known, its proposal was unsuccessful. The debriefing shall be limited to a discussion of the proposer's unsuccessful proposal. The debriefing will be oral and shall provide information on areas in which the proposal was deemed weak or insufficient. The debriefing may NOT include discussion of a competing offeror's proposal or discussion, thoughts, notes or ranking from an individual evaluation committee member. A summarization of the procurement officer's rationale for the selection may be given. Debriefings shall be conducted at the earliest feasible time.

U. CONTRACT IMPLEMENTATION MEETING

Contractor receiving an award under this solicitation may be required to attend a Contract Implementation Meeting to be held after contract award, as scheduled by the Procurement Officer. The location and agenda for this meeting will be communicated to the Contractor by the Procurement Officer.

V. RESERVED

W. RESERVED

X. ECONOMIC BENEFITS TO THE STATE OF MARYLAND

Economic Benefit Factors:

The Offeror shall submit in their Technical Proposal, Section C/ Subsection 3.1, a description of the benefits that will accrue to the Maryland Economy during the term of this contract, as a direct or indirect result of the Offeror's performance of this contract.

NOTE: Because this submission is part of the Offeror's Technical Proposal, it must not contain any statement of actual or estimated dollar amounts for any of the sub-factors shown below. Instead, the Offeror is instructed to quantify the economic benefit as a percentage of the Offeror's total Price Proposal (wherever so indicated in brackets): **Contractor is NOT to include any details of their price proposals with this information.**

Proposals will be evaluated to assess the benefit to Maryland's economy specifically offered. Offerors shall take into consideration the following factors.

- (1) The estimated percentage of contract dollars to be recycled into Maryland's economy in support of the contract, through the use of Maryland subcontractors, suppliers and joint ventures partners. Be as specific as possible. Provide a breakdown of expenditures in this category.
- (2) The number and types of jobs for Maryland residents resulting from the contract indicate job classifications, number of employees in each classification and the aggregate payroll to which the contractor has committed at both prime and, if applicable, subcontract levels.
- (3) Tax revenues to be generated for Maryland and its political subdivisions as a result of the contract. Indicate tax category (sales taxes, payroll taxes, inventory taxes and estimated personal income taxes for new employees). Provide a forecast of the total tax revenues resulting from the contract.
- (4) Estimated Percentage of Subcontract/Supplier dollars committed to Maryland small business and MBEs. (There are also included under the first category (a) above.)
- (5) Estimated percentage of Subcontract/Supplier dollars committed to "local" Maryland businesses. For purposes of this proposal, a "local" Maryland business is a business with its primary base of operations located in the same county as the job site for this project, or a Maryland business located within twenty five (25) miles of the job site.

Other benefits to the Maryland economy which the offeror promises will result from awarding the contract to the offeror. Describe the benefit, its value to the Maryland economy (in terms of percentages), and how it will result from the contract award

Y INDEFINITE DELIVERY/INDEFINITE QUANTITY (IDIQ) CONTRACT

Under this IDIQ contract, Contractor shall be paid **only** for the data /products contracted, via Task Orders placed by authorized individuals, at the quantities and pricing structure contained herein. The price discount structure in the pricing sheet shall apply to all products.

Z Items Ordered and Delivered

The contractor is authorized to provide only those Items/Services covered by the contract and specifically identified via orders placed by authorized individuals. If a review of orders placed by the Contractor reveals that Items/Services other than that covered by the contract has been ordered and delivered, such delivery shall be a violation of the terms of the contract and may be considered by the Procurement Officer as a basis to terminate the contract and/or as a basis not to award the contractor a subsequent contract/renewal. The Procurement Officer may take such steps as are necessary to have the items returned by the University, regardless of the time between the date of delivery and discovery of the violation. In such event, the contractor shall reimburse the University the full purchase price.

AA Commercial Nondiscrimination Clause

A. "As a condition of entering into this Agreement, Contractor represents and warrants that it will comply with the State's Commercial Nondiscrimination Policy, as described under State Finance and Procurement Article, Title 19, Annotated Code of Maryland. As part of this compliance, Contractor may not discriminate on the basis of race, color, religion, ancestry or national origin, sex, age, marital status, sexual orientation, or disability or other unlawful forms of discrimination in the solicitation, selection, hiring, or commercial treatment of subcontractors, vendors, suppliers, or commercial customers, nor shall Contractor retaliate against any person for reporting instances of such discrimination. Contractor shall provide equal opportunity for subcontractors, vendors, and suppliers to participate in all of its public sector and private sector subcontracting and supply opportunities, provided that this clause does not prohibit or limit lawful efforts to remedy the effects of marketplace discrimination that have occurred or are occurring in the marketplace.

Contractor understands that a material violation of this clause shall be considered a material breach of this Agreement and may result in termination of this Agreement, disqualification of Contractor from participating in State contracts, or other sanctions. This clause is not enforceable by or for the benefit of, and creates no obligation to, any third party.

B. The Contractor shall include the provision in §A of this regulation in all subcontracts to the State contract.

C. The following provision is mandatory for all State contracts: As a condition of entering into this Agreement, upon the request of the Maryland Commission on Human Relations, and only after the filing of a complaint against Contractor under State Finance and Procurement Article, Title 19, Annotated Code of Maryland, as amended from time to time, Contractor agrees to provide within 60 days after the request a complete list of the names of all subcontractors, vendors, and suppliers that Contractor has used in the past 4 years on any of its contracts that were undertaken within the State of Maryland, including the total dollar amount paid by Contractor on each subcontract or supply contract. Contractor further agrees to cooperate in any investigation conducted by the State pursuant to the State's Commercial Nondiscrimination Policy as set forth under State Finance and Procurement Article, Title 19, Annotated Code of Maryland, and to provide any documents relevant to any investigation that is requested by the State. Contractor understands that violation of this clause is a material breach of this Agreement and may result in contract termination, disqualification by the State from participating in State contracts, and other sanctions."

Section B – Pricing

Traffic Flow Data Price Proposals

For the purposes of Pricing, the following requirements within this section pertain to Traffic Flow Data, and are not applicable for Volume and/or OD Data (Section C §3.1.4).

Data shall be rendered to the University of Maryland (UMD or University) through the issuance of firm fixed price task orders for Traffic Data based on the cost model extrapolation for the scope defined in the individual task order.

Contractor shall provide a full cost model to procure real-time traffic data. The cost model shall provide any startup/mobilization fees and data subscription fees. The cost model shall provide any adjustments for contract years. The cost model must be of sufficient clarity such that the University has a complete and clear understanding of how the Contractor will cost task orders for building and expansion of the system. Any data used in the cost model must be fully referenced. For example, if the cost model is based on Vehicle Miles Traveled (VMT), the model should cite the official source of VMT data. The cost model must be consistent with the estimated cost of the Sample Data Regions. Prices calculated from the model will be the contract prices.

For the purpose of consistency, firms shall apply their price model to the three (3) sample data regions defined below utilizing the Excel pricing sheet provided with this Request for Proposals. The Contractor shall enter the required information in the blocks highlighted in “Yellow”. The Excel spreadsheet is structured as a simple cost/mile subscription price model for each roadway type with a one-time startup/mobilization fee which is to remain fixed for the full eight (8) year projected contract term. Pricing per mile remains fixed for the base three (3) year term of the contract. Per-Mile Pricing for also remains fixed for option renewal period one 1 (3-years) and for option renewal period two (2-years), with each renewal term pricing entered in the yellow shaded box for each term for each of the three data regions.

If offeror’s price model differs from that afforded within the Excel spreadsheet, offeror may alter spreadsheet to reflect another cost model, however, the Contractor’s price model must be sufficiently detailed to enable the University to replicate the price for each of the three sample data regions.

The price proposal form shall be fully incorporated as part of the Contractor’s response, and any resulting contract. Evaluation will be based on firm fixed price data rates (as established by the sample data regions), totaled over each year/term of the eight (8) year contract. Evaluation will be based on information entered on the Excel price proposal form.

Real-Time Traffic Data Services for the Samples Data Regions

The Contractors Price Proposal shall provide the following itemization for the Sample Data Regions for the anticipated initial three-year funding and subsequent option years:

- Startup/mobilization fees (if applicable)
- Data subscription fee for the base contract term years 1 through 3.

- Data subscription fees for continuing coverage for option renewal term 1 (3-years) and 2 (2-years).

Three (3) Sample Data Regions are defined reflecting varying levels of geographic extents and complexity. Each Sample Data Region is purely hypothetical, and its sole purpose is clarification and comparison of pricing models. Sample Data Region 1 (SDR1) reflects a state or multi-state network comprised of Freeways, and Major and Minor Arterials. Sample Data Region 2 (SDR2) reflects a regional network comprised Freeways, and Major Arterials indicative of a major metropolitan area. Sample Data Region 3 (SDR3) reflects a corridor comprised of a Freeway and Major and Minor Arterials. The quantity and proportion of each type of roadway for each Sample Data Region is enumerated below. All mileage refers to bi-directional centerline miles.

Sample Data Region 1 (SDR1): A network within a State or Multi-State boundary that contains all Freeways, Major and Minor Arterials. The network represents all roadway mileage within the region.

The composition of the roadway network within the SDR 1 consists of 600 miles of Freeway, 1000 miles of Major Arterials, and 1000 miles of Minor Arterials. The Freeway portion is comprised of both urban (1/3) and rural (2/3) freeway. (Rural Freeway is defined as falling outside any Metropolitan Statistical Area (MSA) boundary.) There exists within the urban portion of the network 30 miles with reversible-flow center lanes, 50 miles with HOV lanes, another 25 miles with local/express lanes, and 20 miles of a recently opened bypass for which TMC codes have not been defined. There are 12 major interchanges (freeway to freeway) in the Freeway network. The Major and Minor arterials interconnect the Freeway. Five (5) percent of the Major and Minor arterial roadways lack TMC codes.

Sample Data Region 2 (SDR2): A contiguous network representing roads within a Metropolitan Planning Organization's or county's jurisdictional boundaries containing Freeways, Major and Minor Arterials.

The composition of the roadway network within the SDR 2 consists of 150 miles of Freeway and 240 miles of Major Arterials. The Freeway portion of SDR 2 contains 20 miles with some form of special use lands and 10 miles of a roadway for which TMC codes have not been defined. There are 5 major interchanges (freeway to freeway) in the Freeway network. Of the Major arterial network, 10 miles lack TMC codes. No Minor arterials are selected for real-time traffic in SDR2.

Sample Data Region 3 (SDR3): A corridor consisting of a primary Freeway, a Major Arterial running parallel to the primary Freeway, and several miles of cross-linking portions of other Freeways, Major and Minor Arterials.

The composition of the roadway network within the SDR 3 consists of 60 miles of Freeway, 70 miles of Major arterials, and 30 miles of minor arterials. There are two major freeway interchanges. All roadways have TMC codes defined, and there are no special use lanes.

Multiple price proposals, corresponding to multiple technical proposals, may be submitted. Each technical/price proposal must be completed as specified herein.

Contractors may also provide pricing for Ancillary Products related to the Traffic Data as a menu of options, with documented pricing. Ancillary Products are considered items associated with the use or integration of the Traffic Data that may benefit Coalition Organizations, but are not specified in this RFP. Such elements are considered optional, and will not be an element of the selection process. Possible examples include commercial map layers, and archive data sets (for roadways not under real-time coverage). Such pricing schedules for Ancillary Products may be added to the selected vendor's or vendors' contract.

Volume and/OD Data Price Proposals

For the purposes of Pricing, the following requirements within this section pertain to real-time Volume and/or OD products as specified in Section C §3.1.4.

Data shall be rendered to the University of Maryland (UMD or University) through the issuance of firm fixed price task orders for Traffic Data based on the cost model extrapolation for the scope defined in the individual task order.

Pricing for Volume and/or OD products may be included in the above Traffic Flow price model or priced separately. If pricing for Volume and/or OD is included as part of the Traffic Flow price model, offeror should indicate if the Volume and/or OD products are included at no additional cost to Traffic Flow data, or if Volume and/or OD represents a portion of the subscription charge, and if so, what portion.

If Volume and/or OD products are priced separately from Traffic Flow data, Contractor shall provide a full cost model to procure real-time traffic data. The cost model shall provide any startup/mobilization fees and data subscription fees. The cost model shall provide any adjustments for contract years. The cost model must be of sufficient clarity such that the University has a complete and clear understanding of how the Contractor will cost task orders for building and expansion of the system. Any data used in the cost model must be fully referenced. Prices calculated from the model will be the contract prices.

Section C – Description/Specifications/Statement of Work

1.0 BACKGROUND

The University of Maryland in College Park is a major public research university located on 1,250 acres of rolling land along the Baltimore-Washington, D.C. hi-tech corridor. Founded in 1856, the University has already attained national distinction as one of the top twenty national public universities. To realize its aspirations and fulfill its mandates, the University advances knowledge, provides outstanding and innovative instruction, and nourishes a climate of intellectual growth in a broad range of academic disciplines and interdisciplinary fields. It also creates and applies knowledge for the benefit of the economy and culture of the State, the region, the nation and beyond.

1.1 The I-95 Corridor Coalition Partnership

The I-95 Corridor Coalition (the “Coalition”) is a partnership of state departments of transportation, regional and local transportation agencies, toll authorities, and related organizations, including law enforcement, transit, port and rail organizations from Maine to Florida (including the District of Columbia), with affiliate members in other states and in Canada. Coalition members work together to reduce congestion, increase safety/security and to assure that the entire transportation network supports economic vitality throughout the region. The Coalition pursues a wide range of projects and activities related to providing reliable and timely travel information, coordination of incident response and freight movement within the Corridor and across different modes of travel, and electronic systems to make payment of tolls and transit fares easier. Recognizing that the efficiency of passenger and freight movement through the region is not limited to one mode or facility, the work of the Coalition encompasses all modes and highway facilities, with an emphasis on facilitating long distance transportation that traverses state jurisdictional boundaries. By leveraging resources, sharing information and coordinating programs, the Coalition adds value to the individual member organization's activities, and provides a synergy for more dynamic and seamless transportation solutions throughout the Corridor.

Detailed information about the I-95 Corridor Coalition can be found at the following web site: www.i95coalition.org.

1.2 History

The Coalition began as an informal group of transportation professionals working together in the early 1990's to more effectively manage major highway incidents that impacted travel across jurisdictional boundaries. In 1993, the Coalition was formally established to enhance transportation mobility, safety and efficiency in the regions. Over the years, the Coalition's program evolved from studying and testing intelligent transportation systems (ITS) technologies to a broader perspective that embraced integrated deployments and coordinated system operations and management. The Coalition's perspective evolved from a concentration on highways to one that encompasses all modes of travel and focuses on the efficient transfer of people and goods between modes.

Moving forward, the Coalition will become more engaged with its members and with the private sector to identify solutions to critical bottlenecks, including the challenging issue of financing these improvements. The Coalition will also become more engaged in deploying and operating its information sharing system, engaging the resources of its members and the private sector in providing

as much quality and real-time information to as many people as possible through numerous delivery methods.

1.3 Members

The Coalition brings to the table the key decision and policy makers that have or will influence the operation of the Corridor including:

- State and Local Departments of Transportation,
- Transportation Authorities,
- Transit and Rail Agencies,
- Port Authorities
- Motor Vehicle Agencies,
- State Police/Law Enforcement,
- Regional Transportation Organizations
- Metropolitan Planning Organizations
- US Department of Transportation,
- Canadian Provinces Departments of Transportations
- Intercity Passenger and Freight Transportation Providers, and
- Transportation Industry Associations.

Geographic membership in the Coalition currently includes the boundaries of:

Maine

- New Hampshire
- Vermont
- Massachusetts
- Rhode Island
- Connecticut
- New York
- New Jersey
- Pennsylvania
- Delaware
- Maryland
- District of Columbia
- Virginia
- North Carolina
- South Carolina
- Georgia
- Florida
- New Brunswick and Quebec (Canada) and Tennessee (USA) – Affiliate members

1.4 Partnership with the University of Maryland Center for Advanced Transportation Technology

The Center for Advanced Transportation Technology (CATT) at the University of Maryland (UMD) department of Civil Engineering (CE) provides technical and administrative assistance to the I95 Corridor Coalition to realize the Coalition's mission. The role of the UMD CATT in the procurement for the VPP is in accordance with the CATT's mission:

The Center for Advanced Transportation Technology (CATT) at the University of Maryland, College Park was created in order to respond to the significant changes brought about by increasing use of advanced technologies in the transportation field. A permanent staff of Intelligent Transportation System (ITS) professionals and affiliated faculty of the Department of Civil Engineering supports the CATT. All offer extensive knowledge and experience in the areas of ITS technology, traffic engineering and control, systems analysis, and operations research. The CATT provides a bridge between the intelligent transportation systems (ITS) community, the information technology community, and other disciplines essential to the successful application of ITS. CATT's mission is to foster the development and application of innovative approaches to existing and emerging transportation needs through research, education, and deployment assistance. Excerpts taken from <http://www.catt.umd.edu/about>

In conducting this procurement on behalf of the Coalition, the role of the CATT falls within the broader mission of the UMD:

... To realize its aspirations and fulfill its mandates, the University advances knowledge, provides outstanding and innovative instruction, and nourishes a climate of intellectual growth in a broad range of academic disciplines and interdisciplinary fields. It also creates and applies knowledge for the benefit of the economy and culture of the State, the region, the nation and beyond.

The University of Maryland shares its research, educational and technological strengths with businesses, government and other educational institutions. With productive scholars and researchers of the highest caliber, the University will continue to raise the entire level of business and commerce throughout the State. Because of the depth of knowledge possessed by the faculty across many disciplines, the University of Maryland is uniquely positioned to forge relationships with corporations, non-profit organizations, other educational institutions, local school districts, and major federal agencies, laboratories, and departments. Because of the breadth of strength in many disciplines, the University of Maryland is at the forefront in advancing knowledge in areas that increasingly depend on multi-disciplinary approaches.

Excerpts taken from http://www.provost.umd.edu/Strategic_Planning/Mission2000.html

1.5 Definitions

1.5.1 **Absolute Speed Error** is the absolute value of the difference between the mean speed reported from the data service and the mean speed provided by validation procedures for a specified time period or polling interval.

1.5.2 **Coalition:** The I-95 Corridor Coalition. See Section C, subsection 1.1

- 1.5.3 **Confidential Information:** Confidential Information means University Data and other information, whether in written, oral, graphic, electronic or physical form, including but not limited to scientific knowledge, know-how, processes, inventions, techniques, formulae, data, plans, and business practices, that are not generally known to the public and that, if tangible, is clearly marked by the disclosing party as Confidential Information at the time of disclosure and which, if oral, is summarized and identified in a writing as Confidential Information that is submitted to the receiving party within ten (10) days of initial disclosure.
- 1.5.4 **Coalition Organizations:** For the purpose of this RFP, a **Coalition Organization** is defined as an organization that either owns or operates a major regional transportation system, and is either a member or an affiliate member of the I-95 Corridor Coalition or is an agency of the United States Department of Transportation (U.S. DOT). Member organizations come from member states as listed in Section C, subsection 1.3. Affiliate membership is open to organizations in any state that elects to partner with the I-95 Corridor Coalition to extend its mission. Organizations may include transportation planning agency/organization, state DOT's or like organizations, metropolitan planning organization, and city or county DOTs or like organizations. Any such organization must have applied for and been accepted for membership or affiliate membership in the I-95 Corridor Coalition.
- 1.5.6 **Coverage Area:** The combined geographic areas defined by the boundaries of the Coalition Organizations. At the time of issuance of the RFP, Coalition Organizations includes state members from Maine to Florida, the District of Columbia, and affiliate member Tennessee.
- 1.5.7 **Data availability:** The percentage of measurement intervals (combination of space and time) when traffic data estimates are delivered.
- 1.5.8 **Error bias:** The average speed error (not the absolute value) in each speed range.
- 1.5.9 **Freeways:** Limited access roadways consisting of four or more lanes.
- 1.5.10 **Latency:** Latency is the difference between the time the traffic flow is perturbed as a result on an incident and the time that the change in speed is reported in the traffic data.
- 1.5.11 **Link definition:** Link Definition is based on logical breaks in facilities where one would expect the potential for differing traffic conditions, such as at an interchange or major at-grade intersection
- 1.5.12 **Major Arterials:** Roadways with greater than 20,000 AADT, but do not qualify as Freeways.

- 1.5.13 **Minor Arterials:** Roadways with less than 20,000 AADT but greater than 5000 AADT, and do not qualify as Freeways.
- 1.5.14 **Origin – Destination (or OD):** For the purposes of this RFP, origin-destination (or simply OD) data refers to any data feed that estimates or measures traffic between nodes or segment pairs in a network. At the smallest scale, OD may reflect turning movements at an intersection, at a medium scale OD may reflect the on/off movements along a major corridor, and at the largest scale OD may reflect traffic movement between zones or regions.
- 1.5.15 **Probe-based Technologies:** Probe based technologies encompass all methods of traffic data collection that do not require roadside infrastructure, but rather relies on harvesting data from other systems that can be used to infer traffic flow. Examples (but not an exhaustive list) of probe based technologies include GPS fleet data, crowd sourcing, and cellular switching data.
- 1.5.16 **Proposer:** The legal entity submitting a proposal under this Request for Proposals to whom a contract award can be effected. Sometimes Proposer may be referred to as Contractor or Offerer.
- 1.5.17 **Reliability:** The ability of the system to produce traffic data estimates consistently for each link at all times.
- 1.5.18 **Roadways:** All types of roadways within this procurement for which traffic data is requested. This includes Freeways, Major Arterials, Minor Arterials, Ramps and Special Use Lanes.
- 1.5.19 **Special Use Lanes:** Encompasses High-Occupancy Vehicle (HOV) lanes, High-Occupancy Toll (HOT) lanes, reversible flow lanes, express lanes, local lanes, and shoulder lanes.
- 1.5.20 **Speed:** For the purposes of this RFP, speed is explicitly defined as the space mean speed over the specified segment or link.
- 1.5.20 **Traffic Data:** For the purposes of this RFP, Traffic Data encompasses real-time traffic data and associated products as described and specified in this RFP.
- 1.5.21 **Traffic Flow Data:** For the purposes of this RFP, Traffic Flow Data refers to real-time traffic data as specified in Section C, subsection 3.1.1 through 3.1.11, but not including specifications for Volume/OD data in subsection 3.1.4.
- 1.5.22 **University:** The University as noted in this Document, shall mean the University of Maryland, College Park.
- 1.5.23 **University Data:** All data, unless otherwise excluded, residing on or flowing through servers used by or in the conduct of, the effort described in the Scope of Work.

1.5.24 **Volume:** For the purposes of this RFP, volume is defined as the hourly rate of vehicle flow per direction (not per lane) for the specified segment or link.

2.0 Objective of this Procurement

The mission of the I-95 Corridor Coalition is to “work together to improve Multimodal transportation services in the region through information sharing and coordinated management and operations.” In order to achieve this mission, the Coalition created a regional traffic monitoring system that acts as a continuous source of real-time transportation system status information within the I-95 corridor in July 2008. This regional traffic monitoring system, which is known as the Vehicle Probe Project, serves as a rich source of traveler information and provides invaluable inputs to existing and future management tools that support operations and planning, whose effectiveness is completely dependent on the quality of the data being supplied. In 2008, the VPP began by providing data on approximately 1500 centerline miles of freeway and 1000 centerline miles of non-freeway roadways. As of January 2013, the VPP had grown so that it reported on over 7000 freeway centerline miles and over 27,000 non-freeway centerline miles.

As a result of the success of the Vehicle Probe Project (VPP), it is the intent of the Coalition to continue to provide coordination with Coalition Organizations for the purpose of continuing a common set of procedures for data acquisition and dissemination – called the Vehicle Probe Project.

Successful Proposers will be responsible for providing real-time traffic data and associated products in support of the mission of sustaining and expanding the I95 Corridor Coalition’s regional traffic monitoring system known as the Vehicle Probe Project. **A three year initial project is anticipated, with up to five (5) separately exercisable optional contract renewals , if desired by the University/Coalition, to a maximum contract life not to exceed eight (8) years.**

The University of Maryland, on behalf of the Coalition, is issuing this RFP to engage one or more Contractors to provide **Traffic Data** to the Coalition, its members and affiliate members. The Contractor will report to the University’s Center for Advanced Transportation Technology Point-of-Contact (UMD-POC), working in conjunction with the Coalition’s Executive Director and Coalition staff.

3.0 Contracting Approach & Work Scope

Data shall be rendered to the University through the issuance of firm fixed-priced task orders utilizing the rates contained in Section B of this indefinite delivery/indefinite quantity (IDIQ) Contract.

The scope of the procurement encompasses the provision of quality traffic data and associated products on the system of freeways and arterials within the Coverage Area for the continuance and growth of the Vehicle Probe Project and the applications which it supports.

- Traffic Data includes travel time, speed, volume and origin-destination, accompanying complimentary metrics, and associated products delivered in a timely fashion to support

transportation agency applications. The Coalition desires to contract for Traffic Data only-No services. Equipment, software, hardware or other infrastructure associated with the collection of traffic data is the responsibility of the contractor. **Probe-based Technologies** are encouraged and preferred. Integration of data from existing compatible sources is encouraged. It is the intent of the Coalition to encourage innovative, non-invasive detection technology, while taking advantage of existing data where available. Technical approaches requiring access to agency right of way are unacceptable.

Real-time traffic data will support the development of seamless networks of traveler information systems, provide data for the calculation of facility and network performance measures for operations and planning purposes, and facilitate and support the coordination and implementation of interagency efforts in response to major incidents and special events of regional significance. Timeliness and accuracy of data are paramount to the success of these efforts.

- Roadways of interest include Freeways, Major Arterials, and Minor Arterials as defined in Section C, subsection 1.5. On Freeways, data is requested for both mainline segments as well as freeway to freeway ramps and special use lanes.
- Technical specifications within section 3.1 provide for quality, timeliness and consistency of travel time and speed data provided to insure it meets the needs of the Coalition's applications. Quality and accuracy requirements are specified separately for freeways and arterials.
 - Freeway data quality specifications follow the framework established in the original VPP, in which accuracy specifications are categorized in four separate speed ranges. Data quality will be periodically validated, and payment for data provided will be based on validation results. Data for which minimum quality specifications are fully met as determined by validation will receive full payment as determined by fix-priced task order. Payment for freeway data that falls below minimum specifications is subject to the policy defined in the Coalitions validation program, details of which are contained in '*I95 VPP Data Validation Program*' (attachment 2), provided as an appendix to this this RFP.
 - Arterial data quality specifications are still under research by the Coalition. As with freeways, any arterial data provided will be subject to open and published validation. An arterial validation program that includes policy for impact to payment for Major Arterials based on validation results is anticipated, to be negotiated with Vendor.
- This procurement seeks to expand the VPP to include volume and/or Origin/Destination (OD). Volume and/or OD is sought that address the use case needs communicated in the documented titled, '*Real-Time Volume and Origin-Destination Data for Operations, Concepts, Definitions and Use Case Scenarios, version 3.4*', conveyed as an attachment to this RFP. Proposals that address the needs and applications cited in this referenced document will be considered for award.

- Associated data products encompass various derivative products that enhance the usability and value of the base traffic data. Such products include (but are not limited to) data delivery in electronic mapping format, alternative data delivery formats, a web-based traffic monitoring sight, specific visualizations of data to assist operations, link segmentation definitions and attributes, alternative link definition methodology, specialized application program interfaces, and an archive of provided data. As with the base real-time data, specifications for associated data products (including mandatory, highly desirable, and desirable) are contained in Section C, subsection 3.1 of the RFP.

3.1 Real-Time Traffic Data Requirements

The following section contains the baseline system specifications in the form of a response matrix. Priority codes are given for each specification in the matrix. The definition of each priority code is defined below. Proposers are to provide information requested in their proposal in the matrix, as noted. If additional space is required for further explanation or supporting material is appended, directly reference the additional or supporting information within the corresponding cell within the matrix (for example: “see Attachment XX for a detailed explanation”), and the attachment should also explicitly refer to the section in the matrix to which it applies.

In the Contractor’s technical response, the following matrix columns should be completed for each listed item:

1. *Response Code* – Employ the response codes noted below, defining compliance with the requirement.
2. *Respondent Comments* – Explain how the Contractor’s solution meets the requirement and identify any exceptions taken to the requirements.

Functional Requirements & Features

In the contractors Technical response, the Contractor shall fill out the column “Respondent Comments”, explaining how the Contractor’s solution meets the requirement.

Priority Codes:

M = Mandatory

I = Information

HD = Highly Desirable

D = Desirable Requirement

/C = Contractor must Confirm agreement to this requirement (ie: M/C)

/E = Contractor must explain how their solution meets this requirement. (ie: M/E)

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Item	Description	Priority	Response Code	Respondent Comments
REAL-TIME TRAFFIC DATA REQUIREMENTS				
3.1.1. Base Data Elements for all Roadways				
3.1.1.1	Mean travel time and speed. Units for travel time shall be seconds to the nearest whole second and the units for speed shall be miles per hour to the nearest 1 mph.	M/E		
3.1.1.2	Status flag to indicate normal operations, periods of low-traffic flow, inoperable status or unavailable data, etc. The categories for the status flag will be dependent on the type of technology used to generate traffic data. Vendor should specify flags appropriate to methodology. The current VPP uses scores of '30', '20' and '10' to indicate whether data feed is based on real-time data, or combinations of historical data and assumed freeflow.	M/E		
3.1.1.3	Quality indicator – provide a numerical score that reflects the confidence in the estimate of the mean travel time and speed. The intent is to provide a measure similar in concept to the standard error in the estimate of the mean. The method used to generate a numerical score for quality will be dependent on the type of technology and type of processing. Vendor should provide explanation of the quality metric.	HD/E		
3.1.1.4	Historic traffic data in the form of anticipated travel time/speed for the time of day and day of week.	HD/E		
3.1.1.5	Reference speed that reflects 85 th percentile or free flow conditions for the facility.	HD/E		
3.1.1.6	An indication of sample size (such as the number of base probes) for a given time frame, no greater than 15 minutes.	D/E		
3.1.2. Additional Data Feed Elements or Services for all Roadways				
3.1.2.1	Anticipated volume for time of day, day of week, and season based on factoring of Highway Performance Monitoring System data.	HD/E		
3.1.2.2	Posted speed limit for the roadway. This attribute may be provided as either part of the real-time data feed, or conveyed as part of the link definition.	HD/E		

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3.1.2.3	Travel time and/or speed for freight (trucks) reported separately from passenger cars, either in real-time or as an additional element of archived data.	D/E		
3.1.2.4	Congestion alerts/alarms – a configurable data feed to inform members when a specified segment or group of segment exceeds a defined maximum travel time or minimum speed.	D/E		
3.1.2.5	Incident alerts/reporting – a configurable data feed to inform members when roadways within a specified region are exhibiting abnormal travel characteristics (such as slowdowns or congestion) due to an incident, weather, or other cause.	HD/E		
3.1.2.6	Virtual Sensor: A configurable data feed to access traffic speeds on a road segment specified by a latitude, longitude and heading/direction. The response from the data feed will be identification of the roadway and traffic conditions (speed, congestion, etc.) on the nearest roadway to the specified point and heading.	HD/E		
3.1.2.7	Predictive travel time that provides anticipated roadway condition into the future. For example, data feed may provide anticipated travel time and/or speed for the roadway 15 minutes, 30 minutes, and/or 1 hour into the future.			
3.1.2.8	Other traffic data valuable for roadway operations as proposed by vendor.	D/E		
<p>3.1.3. Additional Data Feed Elements for Arterial Roadways</p> <p>These specifications were the by-product of ongoing research sponsored by the I95 Corridor Coalition for arterial monitoring. The following data elements have been identified as potential enhancements for effective monitoring and performance measurement. Although suggested specifically for arterials, these may be included for other roadway segments as well.</p>				
3.1.3.1	Units for travel time shall be seconds to the nearest whole second and the units for speed shall be miles per hour to the nearest 0.1 mph. The primary motivation for higher speed resolution arises from extremely slow arterial speed (<10 mph). At such speeds, 1 mph is inadequate. If travel time is calculated from speed, the resulting travel time resolution is limited by the speed resolution.	HD/E		
3.1.3.2	Reporting of 25 th and 75 th percentile travel times and speeds. These percentiles define the interquartile range, a common measure of data dispersion.	D/E		

3.1.3.3	Real-time travel time and/or speed distribution reflecting rolling 15 minute window. The distribution may be conveyed as a percentile array. Ex: [5, 10, 15, ..., 85, 90, 95]	HD/E		
3.1.3.4	Historic travel time and/or speed distribution for hour of day, day of week, and season. The distribution may be conveyed as a percentile array. Ex : [5, 10, 15, ... 85, 90, 95].	D/E		
3.1.4. Real-Time Volume and O/D				
See accompanying document titled <i>Real-Time Volume and Origin-Destination Data for Operations : Concepts, Definitions and Use Case Scenarios</i> conveyed with the RFP				
3.1.4.1	Volume data	HD/E		
3.1.4.2	Origin/Destination Data	HD/E		
3.1.5. Travel Time and Speed Data Quality and Latency on Freeways				
See document <i>I95 VPP Data Validation Program</i> , conveyed with this RFP for additional detail.				
3.1.5.1	Average Absolute Speed Error (AASE) Speed data for Freeways shall have a maximum average absolute error of 8 MPH in each of the following speed ranges: 0-30 MPH, 30-45 MPH, 45-60 MPH and > 60 MPH.	M/E		
3.1.5.2	Speed Error Bias Error bias is defined as the average speed error (not the absolute value) in each speed range. Speed data for Freeways shall have a maximum average error of +/- 5 MPH in each of the following speed ranges: 0-30 MPH, 30-45 MPH, 45-60 MPH and > 60 MPH.	M/E		
3.1.5.3	Accuracy requirements will be in effect for vehicle flows exceeding 500 VPH for Freeways.	M/C		
3.1.5.4	Average Absolute Speed Error (AASE) Speed data for Freeways shall have a maximum average absolute error of 7 MPH in each of the following speed ranges: 0-30 MPH, 30-45 MPH, 45-60 MPH and > 60 MPH.	HD/E		
3.1.5.5	Average Absolute Speed Error (AASE)	D/E		

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	Speed data for Freeways shall have a maximum average absolute error as defined by the Proposer (but not to exceed 7 MPH) in each of the following speed ranges: 0-30 MPH, 30-45 MPH, 45-60 MPH and > 60 MPH.			
3.1.5.6	Maximum data latency shall be less than or equal to eight (8) minutes.	M/E		
3.1.5.7	Maximum data latency shall be less than or equal to five (5) minutes.	HD/E		
3.1.6. Travel Time and Speed Data Quality on Arterials				
3.1.6.1	Major Arterials (arterials with flow exceeding 20,000 AADT) will have an AASE of 10mph or less in the speed ranges defined as 0-15 MPH, 15-25 MPH, 25-35 MPH and > 35 MPH.	HD/E		
3.1.6.2	Major Arterials shall have a maximum speed error bias of +/- 5 MPH in each of the speed ranges defined as 0-15 MPH, 15-25 MPH, 25-35 MPH and > 35 MPH.	HD/E		
3.1.6.3	The Coalition, in accordance with current research on accuracy of performance measures and travel time distributions based on probe data for arterial roadways, will implement quality specifications based on the accurate characterization of travel time distribution using percentile measurements.	HD/E		
3.1.6.4	Accuracy requirements will be in effect for vehicle flows exceeding 500 VPH of through traffic for Major Arterials.	HD/E		
3.1.6.5	Maximum data latency shall be less than or equal to eight (8) minutes.	HD/E		
3.1.7. Temporal Reporting				
3.1.7.1	Traffic data shall be provided 24 hours per day, 7 days per week. Allowance will be made for up to 40 hours of scheduled system maintenance per year during off-peak hours.	M/C		
3.1.7.2	Traffic data will be reported/refreshed at least once every 2 minutes for Freeway segments.	M/E		
3.1.7.3	Traffic data will be reported/updated at least once every 1 minute for Freeway segments.	HD/E		
3.1.7.4	Traffic data will be reported/refreshed at least once every 5 minutes for Arterial segments.	M/E		
3.1.7.5	Traffic data will be reported/updated at least once every 2 minutes for Arterial segments.	HD/E		

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3.1.7.6	Traffic data will be reported/updated at least once every 1 minute for Arterial segments.	D/E		
3.1.8. Spatial Reporting and Link Definitions				
	Data may be requested for the defined roadway types anywhere within the Coverage Area. Procurement of data will be implemented via task orders. Based on the Coverage Area, Proposers should indicate the extents to which data can be provided on the roadway types listed below. Vendor may provide maps, direct UMD to electronic web resources, or describe in sufficient detail the extent of coverage for each roadway type.	M/E		
3.1.8.1	Freeways	M/E		
3.1.8.2	Major Arterials (arterials and state highways > 20000 AADT)	M/E		
3.1.8.3	Minor Arterials (arterials and state highways between 5000 and 20000 AADT)	HD/E		
3.1.8.4	Major Interchange Ramps	M/E		
3.1.8.5	Special use lanes	HD/E		
3.1.8.6	The initial VPP project standardized on Traffic Message Channel (TMC) codes for the distribution of traffic data. At a minimum, Proposers shall be able to provide traffic data compatible with TMC codes as defined by the Traveler Information Services Association (TISA), including both internal and external nodes reported separately.	M/E		
3.1.8.7	Proposers shall provide a method to define alternative link definitions. A flexible method for defining links is needed to obtain higher granularity (than afforded by TMCs) and to create custom link definitions. Anticipated maximum granularity needed on urban roadways is approximately 0.3 miles, and 1.0 miles for rural freeways. Examples of the need to create custom link definitions include: (1) a Dynamic Message Sign (DMS) may report travel time from its location to a major landmark. The location of the DMS and/or landmark may not coincide with the beginning or ending of an existing TMC segment. (2) A new facility opens to traffic for which a TMC segment has not been created. A custom segment may be used in the interim until the TMC codes are updated to include the new facility.	M/E		

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3.1.8.8	Provide traffic data for new or improved facilities within six (6) months of roadway open to traffic.	M/E		
3.1.8.9	Provide traffic data for new or improved facilities within four (4) weeks of roadway open to traffic.	HD/E		
3.1.8.10	Provide traffic data for new or improved facilities when roadway opens to traffic.	D/E		
3.1.8.11	Provide option for customize downloadable data sets. For example, a state may define a data set comprised of TMCs from a border city in an adjoining state.	D/E		
3.1.8.12	Ramps shall be reported as separate links.	M/E		
3.1.8.13	Special use lanes shall be reported as separate links.	HD/E		
3.1.8.14	Link definitions shall, at a minimum, contain beginning and ending latitude, longitude, heading, common name or route number, and a unique identifier. Latitude and Longitude shall identify the beginning and ending of the segment, marking the centerline of the lane (or group of lanes) being reported.	M/E		
3.1.8.15	Link definitions shall contain preceding and following segment/s	HD/E		
3.1.8.16	Provide a GIS shapefile of TMC segments	D/E		
3.1.9. Availability and Reliability				
3.1.9.1	<p><u>Reliability:</u> Reliability refers to the ability of the system to produce traffic data estimates consistently for each link at all times. Data reliability is measured simply as the percentage of measurement intervals (combination of space and time) when traffic data estimates are delivered.</p> <p>Note: Valid traffic data estimates occur only when sufficient base level data exists to support an estimate of the mean travel time or mean speed for a particular time period. Estimates based purely on imputation (for example, the historical average) are not considered a valid estimate in terms of the availability requirement. Periods of low flow (<500 VPH) are excluded.</p>	M/E		

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	Traffic data shall be provided for at least 98 percent of all links at all required time reporting intervals (see Temporal Reporting requirements).			
3.1.9.2	<u>Availability:</u> Data subscription services shall maintain at least 99 percent availability, determined as percent uptime of the data service excluding any scheduled system maintenance. Scheduled maintenance shall be limited to 40 hours per year and only during non-peak hours.	M/C		
3.1.10. Data Formatting, Packaging and Access				
3.1.10.1	Data shall be provided as XML-formatted content and made available through a web-based subscription service. The service will allow for appropriate access permissions to limit distribution only to authorized subscribers. The service shall allow for selective content subscription so that various states and road authorities may subscribe only to the geographic area of interest.	M/E		
3.1.10.2	The format of the data will conform to applicable TMDD standards or other comparable open and published standards. Vendors should provide a precise description of the processes and timing associated with their provision of the data.	M/E		
3.1.10.3	Hardware, software and network capacity shall be sufficient to initially support up to 50 concurrent data subscriptions, with the capability to scale to 200 data subscriptions as needed. It is the responsibility of the contractor to provide sufficient capacity to service all subscription demands.	M/E		
3.1.10.4	Proposers shall provide an archiving service for all data provided to the Coalition. Archive will be accessible via a web interface. Archive will contain all fields reported in the live data feed. Time granularity of the archive will be at least 5 minutes.	M/E		
3.1.10.5	Archive data will be maintained at the highest time resolution provided in real-time (either 1 minute or 2 minutes).	HD/E		
3.1.10.6	Provide monthly archive via CD, DVD, Harddrive (or similar medium) or FTP of all real-time reported data.	HD/E		
3.1.10.7	Provide archive data on roadways for dates and times prior to the activation of real-time traffic data. For example, if real-time data is	HD/E		

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	activated in Jan 2014, an archive of speed and travel time predating Jan 2014 is also made available.			
3.1.10.7	Graphical representations of travel speed, commonly referred to as web tile overlays, will be made available as an alternative data access method. User may specific color, pen width and speed ranges.	HD/E		
3.1.10.8	Graphical representations of historical speed, commonly referred to as web tile overlays, will be made available as an alternative data access method. User may specific color, pen width and speed ranges.	D/E		
3.1.10.9	Graphical representations of the comparative speed (current speed as compared to historical speed for time of day and day of week), commonly referred to as web tile overlays, will be made available as an alternative data access method. User may specify color, pen width and speed ranges.	D/E		
3.1.11. Website for Monitoring Traffic Data				
3.1.11.1	Proposers shall provide a web-based tool to view real-time traffic data by Coalition Organizations (not the general public). The monitoring service is for use only by the Coalition Organizations. The web site will be password protected.	M/E		
3.1.11.2	The website shall have the capacity to initially support up to 400 concurrent users with the ability to scale to 1000 concurrent users as needed.	M/C		
3.1.11.3	All data from the real-time traffic service can be viewed in real-time via the website.	M/C		
3.1.11.4	Archived traffic data can be accessed via the website.	M/C		
3.1.11.5	Routes and data can be selected and viewed in an electronic map-based interface.	M/E		
3.1.11.6	Monitoring sight shall display historic traffic data in a graphical map based format.	HD/E		
3.1.11.7	Monitoring site shall provide options for visual display of traffic data including color coding to reflect speed and congestion scales.	HD/E		
3.1.11.8	Monitoring site shall provide options for comparative speed and comparative congestion views.	HD/E		
3.1.11.9	Monitoring site shall provide visual display of traffic data for all roadways in Coverage Area. This includes roadways for which real-time	HD/E		

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	Traffic Data is under contract as well as non-contracted roadways in the Coverage Area.			
3.1.11.10	Monitoring site shall display optional data such as accidents, events, construction, congestion alerts, and traffic camera images.	D/E		
3.1.12. ECONOMIC BENEFITS TO MARYLAND				
	It is mandatory that the Contractor at a minimum respond to the items in this Section 3.1.12, even if no benefit is defined. Contractor is reminded NOT to include any details of their price proposals with this information.	M		
3.1.12.1	The estimated percentage of contract dollars to be recycled into Maryland’s economy in support of The contract, through the use of Maryland subcontractors, suppliers and joint ventures partners. Be as specific as possible. Provide a breakdown of expenditures in this category if possible.	D/E		
3.1.12.2	The number and types of jobs for Maryland residents resulting from the contract indicate job classifications, number of employees in each classification and the aggregate payroll to which the contractor has committed at both prime and, if applicable, subcontract levels.	D/E		
3.1.12.3	Tax revenues to be generated for Maryland and its political subdivisions as a result of the contract. Indicate tax category (sales taxes, payroll taxes, inventory taxes and estimated personal income taxes for new employees). Provide a forecast of the total tax revenues resulting from the contract	D/E		
3.1.12.4	Estimated Percentage of subcontract/Supplier dollars committed to Maryland small business and MBE’s. (These are also included under the first category (X.XX above).	D/E		
3.1.12.5	Estimated percentage of subcontract/Supplier dollars committed to “local” Maryland businesses. For purposes of this proposal, a “local” Maryland business is a business with its primary base of operations located in the same county as the job site for this project, or a Maryland business located within twenty-five (25) miles of the job site.	D/E		
3.1.12.6	Other benefits to the Maryland economy which the offeror promises will result from awarding the	D/E		

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	contract to the offeror. Describe the benefit, its value to the Maryland economy (in terms of percentages), and how it will result from the contract award			
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3.2 Reserved

3.3 Risk Analysis

Reliance on Outside Contractors:

If successful delivery of traffic information is dependent on contractual agreements between the vendor and an outside contractor, provide evidence of sustainable relationship such as copies of agreement or commitment letters. Also describe contingency measures that are planned if partners are lost. [M/E]

Offerers shall supply a project risk analysis as part of the technical proposal. The analysis shall identify ways in which the Coalition may decrease or mitigate project risk, ways that the contractor can decrease or mitigate project risk, identify risks that increase cost, and identify project requirements that are outside of the capabilities of available technology. [M/E]

4.0 REFERENCES

Each proposing contractor must provide at least two (2) references and ancillary information on the Vendor Reference Form provided below. References for active contracts within the last three (3) years, similar in size, scope and complexity as the requirements defined in this RFP, are preferred. References must be able to demonstrate the contractor’s capability to perform the requirements of this RFP. *Note: The contractor’s references must be able to verify the size and scope of referenced project/contract.*

<u>4.1. CONTRACT REFERENCE 1</u>	
Name of Client:	
Name of Contact:	
Address:	
Phone Number:	
E-Mail Address:	
Annual Dollar Value of Contract:	
Start Date:	
Completion Date:	
Description of Service	
Justification of Similar Size and Scope	

<u>4.1. CONTRACT REFERENCE 2</u>	
Name of Client:	
Name of Contact:	
Address:	
Phone Number:	
E-Mail Address:	

Annual Dollar Value of Contract:	
Start Date:	
Completion Date:	
Description of Service	
Justification of Similar Size and Scope	

4.1. CONTRACT REFERENCE 3	
Name of Client:	
Name of Contact:	
Address:	
Phone Number:	
E-Mail Address:	
Annual Dollar Value of Contract:	
Start Date:	
Completion Date:	
Description of Service	
Justification of Similar Size and Scope	

5.0 TASK ORDERS

5.1 Task Order Procedure

In accord with the IDIQ nature of this Contract, All requests for data shall be committed and payments effected, under individual firm-fixed-price task orders. Each task order will initiate the provision of data as defined in the individual task order. Subsequent increases/ decreases in capability will be implemented via subsequent task order modification.

5.3 Additional Task Order Provisions

The University may modify task orders in the same manner as they are issued. A modification request will be developed by the University and forwarded to the contractor. The contractor will propose a task order to address the modifications and all associated costs in accordance with subsection 5.1 above.

In the event that there is a conflict between the requirements of the Contract or the Task Order Scope of Work, the Contract shall prevail.

6.0 DATA OWNERSHIP AND DATA LICENSING

It is the intent of this contract to secure for the Coalition, its member and affiliate member organizations, and their officially designated representatives including subcontractors (collectively, Data Licensees) a nonexclusive license to reproduce, use, distribute and make derivative works based

on the traffic data provided by Contractor consistent with the Data Licensees' traffic management, operations and planning responsibilities. Paragraphs 6.1 through 6.7 further define the rights that Contractor must extend to Data Licensees. The Contractor's proposal should affirm the Contractor's ability and intent to grant the data rights presented herein. The Contractor may propose additional restrictions on Data Licensees beyond those presented herein to safeguard the commercial value of the Contractor's traffic data, but any such restrictions should not impede the use of the data for the Coalition's envisioned purposes. Any restrictions imposed by the Contractor will be assessed in the technical evaluation of proposals. Prior to receiving data, all Data Licensees upon evidence of contractual need-to-know will be required to sign a Data Use Agreement binding the entity, at a minimum, to the requirements defined herein.

6.1 The Contractor shall retain ownership of all traffic data it acquires and provides to the I-95 Corridor Coalition and Data Licensees as a result of this contract. Data Licensees shall have the perpetual right to use the traffic data provided under this contract for transportation planning and operational analyses, performance measures, service and data quality validation analyses, and all other internal organization applications and purposes and to archive all traffic data. Data Licensees shall not have the right to sell or otherwise transfer traffic data either (a) to other public entities that are not members or affiliate members of the Coalition, or (b) to any private entities for purposes not under contract with Data Licensees.

Data Licensees will cooperate with the contractor to protect the commercial value of traffic data by taking such measures as (a) retaining any proprietary or restricted use notices included on the traffic data as received, (b) not obstructing or modifying such notices, (c) ensuring that all copies also include all notices included on the traffic data as received; and (d) storing and disseminating traffic data using methods and communication mediums and technologies that provide reasonable protections against unlawful copying, access to and use of the traffic data by unauthorized persons and entities.

At a minimum, Data Licensees shall include the following notice on any copies of traffic data: "PROPRIETARY INFORMATION OF CONTRACTOR. USE BY ENTITIES OTHER THAN AUTHORIZED, LICENSED USERS PROHIBITED."

6.2 Data Licensees may disseminate real-time traffic data delivered by the Contractor to the public, subject to the following restrictions:

- Information may only be disseminated to the public using dynamic message signs (also known as variable message signs), portable message signs, highway advisory radio, 511 information systems, and Coalition and member and affiliate member organizations supported websites, web services, social media, and smart phone applications.
- Information disseminated to the public is restricted solely to travel times and speeds only for such media as dynamic message signs (also known as variable message signs), portable message signs, highway advisory radio, telephone-based 511 information systems.
- No restrictions are placed on the dissemination of data to the public utilizing Coalition and member and affiliate members organizations' supported websites, web services, social media, and smart phone applications, including web-based 511 information systems.

6.3 The license granted by the Contractor to the Data Licensees shall authorize Data Licensees to create visualizations and summary statistics of the archived traffic data (i.e., maps, graphs, charts, tables, etc.) for presentation and distribution to the general public. Data Licensees shall own the copyright in any such works to the extent those works are protected by copyright.

6.4 All Data Licensees, including subcontractors requiring access to traffic data supporting programs on behalf of the Coalition and its member and affiliate member organizations, shall be obligated to agree to the data use agreement and comply with its limitations and conditions. All subcontractor tiers requiring use of data shall be limited to “need to know” users through a directly issued contract vehicle from a Coalition member or direct 2nd tier subcontractor as evidenced by executed Data Use Agreements. Any Data Licensees and contracting organizations that desire access to the traffic data for purposes not funded or sanctioned by the Data Use Agreement must negotiate directly with the Contractor for access and rights to the traffic data.

6.5 Nothing in this contract shall prohibit Data Licensees from acquiring, displaying or otherwise presenting or sharing with external users information Data Licensees have obtained from sources other than the contractor. Nothing in this contract shall preclude Data Licensees from distributing, displaying or otherwise presenting any traffic data or derivative works deemed essential to the safety of the traveling public.

6.6 Data provided by the Contractor will be incorporated into the University of Maryland Center for Advanced Transportation Laboratory’s Regional Integrated Transportation Information System (RITIS). RITIS is an automated data sharing, dissemination, and archiving system that includes many performance measure, dashboard, and visual analytics tools that help agencies to gain situational awareness, measure performance, and communicate information between agencies and to the public. Access to Contractor traffic data and derivative works in RITIS requires active Data Use Agreement as discussed herein.

6.7 Data provided under any ensuing task order issued pursuant to this contract must be accessible to all Data Licensees at no additional cost, subject to these terms and restrictions. Data provided under any ensuing task order for a particular state, city or metro area may be shared with adjoining jurisdictions falling outside the geographical boundaries of the Coalition and its member and affiliate member organizations’ boundaries at no additional cost, provided that the respective jurisdiction is bound to these data ownership and licensing restrictions through execution of a separate data use agreement.

6.8 Under no circumstance will any Data Licensee be responsible for another Data Licensee’s breach of its duties under the Data Use Agreement. Each Data Licensee shall be individually liable for its own violations of the Data Use Agreement.

7.0 SERVICE DELIVERY TIMEFRAMES, FEES, AND SCHEDULE

Unless otherwise specified, Contractor will have three (3) months from the time that a task order for real-time traffic data is authorized to begin providing real-time traffic data to the Coalition consistent with the requirements in Section C of this contract.

Section D - Packaging and Marking

The following packaging and marking requirements are incorporated herein:

The packaging of real time traffic data is subject to the applicable requirements given in Section C, subsection 3.1.

Section E - Inspection and Acceptance

The following inspection, testing and acceptance requirements are incorporated herein:

It is the intent of the Coalition to independently validate that the accuracy, latency and availability requirements have been achieved. The Coalition intends to perform its initial validation within three months of the initiation of traffic data service and then perform periodic validations at a minimum of annually thereafter. The Coalition reserves the right to validate the traffic data service at any time and without warning or notice to the contractor. The Coalition's methodology for data quality validation and impact to payment is described in the attached document *I95 VPP Data Validation Program*.

In the event that the validation exercise indicates that traffic data fails to meet minimum specifications for accuracy or latency, the University shall have the right to reduce payment of invoices as outlined in *I95 VPP Data Validation Program. (Attachment 2)*

In the event that any validation exercise indicates that the traffic data does not meet minimum requirements as given herein, the University shall have the right to renegotiate coverage, costs, and/or requirements or terminate the task order or contract agreement with no further financial obligation to the Contractor.

Section F - Deliveries or Performance

Deliveries and performance specifications of real-time traffic data is subject to the applicable requirements given in Section C, subsection 3.1.

Section G - Contract Administration Data

1.0 Roles of the University of Maryland Program Manager and Procurement Officer

The Procurement Officer is the University of Maryland's authorized representative for all pre-contract matters related to this contract. Additionally, throughout the duration of the contract, the Procurement Officer shall be the only individual with authority to modify any provisions of this contract including, without limitation, the statement of work, pricing or any other sections.

The University of Maryland Program Manager (**Dr. Stanley Young at 301-405-3096, seyoung@umd.edu**) and designated staff shall be the principal interface on behalf of the University of Maryland for post-award technical matters, and shall have the authority to explain and provide further details regarding the University of Maryland's expectations concerning the work to be performed hereunder and/or the items to be provided herein. The Program Manager and designated staff shall have no authority to modify any provisions of this contract.

2.0 Invoicing

The Contractor shall provide the following invoicing services. Invoices shall reflect the price structure spelled out in Section B.

Throughout the duration of any resultant contract, the Contractor shall provide one paper copy of each invoice. The paper invoice must contain the following minimum information:

- Invoice Number
- Invoice Date
- The word ORIGINAL printed on the original copy of the document.
- The full company or corporate name and address; payment address if it differs from corporate address.
- The full nine (9) digit Federal Tax Identification number (for U.S. Contractors only) or Social Security Number.
- Task Order Number, Purchase order number and or contract number.

Direct invoices to the following address:

University of Maryland
Attn.: Accounts Payable Department
Chesapeake Building – Room 3101
College Park, MD 20742

Any invoice that is unclear, illegible or does not conform to these specific requirements shall be returned to the Contractor for re-issuance.

3.0 Schedule of Payments

3.1 The essence of this contract is the provision of data. Task orders will authorize the provision of real-time traffic data for specific roadways in a geographical area for a specified period of time. This coverage will include a certain defined linear

bidirectional mileage. The defined mileage will form a component of the payment terms.

- 3.2 Payment for any mobilization costs will be due upon authorization of the task order. Data subscription fees will be invoiced at the end of the calendar month for which the data was provided. Each monthly payment will be based on an agreed upon monthly data fee (I) and adjusted by the product of the percentage uptime of the system (T) and the percent of mileage for which data was delivered (M) in the following manner:

Monthly data fee = I

Percentage of uptime of the data service (availability) = T %

Percentage of total mileage reported through the data service (reliability) = M %

Payment = I*T*M

Notes:

1. Periods of low traffic flow (defined earlier) will be excluded from the coverage area calculation as appropriate.
2. The mobility payment shall not exceed 20% of the equivalent annual payment

For example:

The negotiated mileage to be covered is 1,000 miles for a monthly fee of \$50k. The data service availability was 98% of the time. Then:

$T = 0.98$

For this time when data was available for the 1,000 miles, if 100 miles of data was not provided for half of the month, then:

The average coverage is reduced by $100/1000*0.5 = 5\%$, thus $M = 0.95$

Hence: Payment = I*T*M = $50,000*0.98*0.95 = \$46,550$

- 3.3 The payment may be further reduced by failure to meet minimum quality and latency specifications as described in the attachment *I95 VPP Data Validation Program*. (Attachment 2)

- 3.4 Payment for Volume and/OD products procured to satisfy specifications under Section C, subsection 3.1.4 will follow a similar pattern based upon negotiated minimum specifications for product quality.

4.0 Assignment

No part of the work specified herein may be assigned or transferred to another Contractor without the prior written authorization of the Procurement Officer.

5.0 Notices

Notices under this contract shall be in writing and shall be considered effective upon personal delivery to the individual listed below or five calendar days after deposit in any U.S. mailbox, first class and addressed to the other party as follows:

For the University of Maryland:

Bruce D. Brewer
Procurement & Supply
University of Maryland
2113R Chesapeake Building
College Park, MD 20742-3111
Telephone: 301-405-5829
Facsimile: 301-314-9565
Email: bbrewer@umd.edu

For Contractor: (please complete the following)

Telephone: _____
Facsimile: _____
Email: _____

Section H - Special Contract Requirements

1. Term of Contract

The contract term shall commence on the date the contract is signed on behalf of the University or such later date as the University directs. The **contract term shall terminate three (3) years** after the beginning date unless extended or sooner terminated in accordance with the contract.

At the sole option of the University, the contract may be renewed for one **(1) additional separately exercisable one (3) -year term, and one (1) additional separately exercisable two (2) year term** under the same terms and conditions, with prices as quoted in Section B and accepted by the University of Maryland.

2. Reserved

3. Parking

If at any time Contractor shall be on the premises of the University of Maryland, then Contractor is responsible for acquiring a valid University of Maryland parking permit, obeying all parking regulations, and paying all fines assessed for violations of parking regulations. Contractor is responsible for ensuring this clause is included in Contractor's agreements with subcontractors.

4. Minority and Disadvantaged Business Enterprise (MBE) Notice

MBE firms are encouraged to respond to this solicitation.

5. Order of Precedence (within this contract)

In the event of a discrepancy within Sections A through L of this contract, such discrepancy shall be resolved by giving precedence in the following order:

- a) Section H – Special Contract Requirements
- b) Section C – Description/Specifications/Statement of Work
- c) Remaining Sections of Part I (Sections A, B, D, E, F and G)
- d) Part II – Contract Clauses (Section I)
- e) Part III – List of Documents, Exhibits and Other Attachments (Section J)
- f) Part IV – Representations and Instructions (Section K and Section L)

6. Reserved

PART II - CONTRACT CLAUSES

Section I - Contract Clauses

1. Scope of Work

The Scope of Work is defined in Section C of this document.

2. Compensation and Method of Payment

Total compensation is shown in Section A, Item 19 of this document. Method of payment is defined in Section G, Subsections 2 and 3 of this document.

3. Contract Term

The contract term is defined in Section H, Subsection 1 of this document.

4. University Work Rules

Employees and agents of Contractor shall, while on the premises of the University, comply with all University rules and regulations. Contractor shall acquaint itself with conditions governing the delivery, receiving and storage of materials at the work site if applicable to this work, as not to interfere with University operations. Contractor shall not stop, delay, or interfere with University work schedule without the prior approval of the University's specified representative.

5. Reserved

6. Reserved

7. Reserved

8. Reserved

9. Multi-Year Contracts Contingent Upon Appropriations

If the General Assembly fails to appropriate funds or if funds are not otherwise made available for continued performance for any fiscal period of this Contract succeeding the first fiscal period, this Contract shall be canceled automatically as of the beginning of the fiscal year for which funds were not appropriated or otherwise made available; provided, however, that this will not affect either the University's rights or the Contractor's rights under any termination section in this Contract. The effect of termination of the Contract hereunder will be to discharge both the Contractor and the University from future performance of the Contract, but not from their rights and obligations existing at the time of termination. The Contractor shall be reimbursed for the reasonable value of any non-recurring costs incurred but not amortized in the price of the Contract. The University shall notify the Contractor as soon as it has knowledge that funds may not be available for the continuation of this Contract for each succeeding fiscal period beyond the first.

10. Variations in Estimated Quantities

The pricing shall remain firm and fixed at the dollar amounts or discount levels indicated in Section B for the duration of the contract. Quantity estimates are provided for informational purposes only and the University shall not be held to them. Any variation between actual quantities purchased hereunder and estimated quantities provided shall not entitle the Contractor to any type of equitable adjustment.

11. Reserved

12. Specifications

All materials, equipment, supplies or services shall conform to Federal and State laws and regulations, and to the specifications contained herein.

13. Cost and Price Certification

By submitting cost or price information the Contractor certifies that, to the best of its knowledge, the information submitted is accurate, complete, and current as of a mutually determined specified date prior to the conclusion of any price discussions or negotiations for:

- a. A negotiated contract, if the total contract price is expected to exceed \$100,000 or a smaller amount set by the Procurement Officer; or
- b. A change order or contract modification, expected to exceed \$100,000, or a smaller amount set by the Procurement Officer.

The price under this contract and any change order or modification hereunder, including profit or fee, shall be adjusted to exclude any significant price increases occurring because the Contractor furnished cost or price information which, as of the date agreed upon between the parties, was inaccurate, incomplete, or not current.

14. Delays and Extensions of Time

(1) The Contractor agrees to perform the work continuously and diligently and no charges or claims for damages shall be made by it for any delays or hindrances, from any cause whatsoever, during the progress of any portion of the work specified in this contract.

(2) Time extensions will be granted only for excusable delays that arise from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the State in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the State, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of either the Contractor or the subcontractors or suppliers.

15. Suspension of Work

The Procurement Officer unilaterally may order the Contractor in writing to suspend, delay or interrupt all or any part of the work for such period of time as he or she may determine to be appropriate for the convenience of the University.

16. Payment of University Obligations

Payments to the Contractor pursuant to this contract shall be made no later than thirty (30) days after the University's receipt of a proper invoice from the Contractor. Charges for late payment of invoices, other than as prescribed by Title 15, Subtitle 1, of the State Finance and Procurement Article, Annotated Code of Maryland, are prohibited. Electronic funds transfer (EFT) will be used by the State to pay Contractor(s) for Contracts with a value over \$200,000 and any other State payments due Contractor(s) unless the State Comptroller's Office grants Contractor(s) an exemption.

17. Delivery and Acceptance

Delivery shall be made in accordance with the solicitation specifications. The University, in its sole discretion, may extend the time of performance for excusable delays due to unforeseeable causes beyond the Contractor's control. The University unilaterally may order in writing the suspension, delay, or

interruption of performance hereunder. The University reserves the right to test any materials, equipment, supplies or services delivered to determine if the specifications have been met. The materials listed in the bid or proposal shall be delivered FOB the point or points specified prior to, or on the date specified in the bid or proposal. Any material or service that is defective or fails to meet the terms of the solicitation specifications will be rejected. Rejected materials or services shall be promptly replaced or re-performed, at the direction of the University. The University reserves the right to purchase replacement materials or services in the open market. Contractors failing to promptly replace materials or re-perform services lawfully rejected shall be liable for any excess price paid for the replacement, plus applicable expenses, if any.

18. Non-Hiring of Officials and Employees

No official or employee of the State of Maryland whose duties as such official or employee include matters relating to or affecting the subject matter of this contract, shall, during the pendency and term of this contract and while serving as an official or employee of the State become or be an employee of the contractor or any entity that is a subcontractor on this contract.

19. Nondiscrimination in Employment

The Contractor agrees: (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry, sexual orientation (added effective October 1, 2001) or physical or mental handicap unrelated in nature and extent so as reasonably to preclude the performance of such employment; (b) to include a provision similar to that contained in subsection (a), above, in any subcontract except a subcontract for standard commercial supplies or raw material; and (c) to post in conspicuous places accessible to employees and applicants for employment, notices setting forth the substance of this section.

20. Financial Disclosure

The Contractor shall comply with State Finance and Procurement Article, §13-221, Annotated Code of Maryland, which requires that every business that enters into contracts, leases or other agreements with the State of Maryland or its agencies during a calendar year under which the business is to receive in the aggregate \$100,000 or more, shall, within 30 days of the time when the aggregate value of these contracts, leases or other agreements reaches \$100,000, file with the Secretary of State of Maryland certain specified information to include disclosure of beneficial ownership of the business.

NOTE: The financial disclosure form is available under "Public Disclosures" on the following web site: www.sos.state.md.us

21. Political Contribution Disclosure

The Contractor shall comply with the provisions of Article 33, Sections 14-101 through 14-108, Annotated Code of Maryland, which require that every person that enters into contracts, leases, or other agreements with the State, a county, a municipal corporation or other political subdivision of the State, or their agencies, during a calendar year in which the person receives in the aggregate \$100,000 or more, shall file with the State Administrative Board of Election laws a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election. The statement shall be filed with the State Administrative Board of Election Laws:

- (1) prior to purchase, completion or execution of any sale or any lease or contract by the University, and shall cover the preceding two calendar years; and
- (2) if the contribution is made after the completion of a sale or purchase, or execution of a lease or contract, then, twice a year, throughout the contract term, on (1) February 5, to cover the 6-month period ending January 31; and (2) August 5, to cover the 6 month period ending July 31.

NOTE: The political contribution disclosure form is available as "Title 14" under "Campaign Finance and Campaign Fund Reporting" under the "Forms" heading of the following web site:
www.elections.state.md.us

22. Disputes

- (1) This contract is subject to the University System of Maryland (USM) Procurement Policies and Procedures, and the University of Maryland Procurement Policies and Procedures.
- (2) Except as otherwise provided by law, all disputes arising under or as a result of a breach of this contract that are not disposed of by mutual agreement shall be resolved in accordance with this section.
- (3) As used herein, "claim" means a written demand or assertion by one of the parties seeking, as a legal right, the payment of money, adjustment or interpretation of contract terms, or other relief, arising under or relating to this contract. A voucher, invoice, or request for payment that is not in dispute when submitted is not a claim under this section. However, if the submission subsequently is not acted upon in a reasonable time, or is disputed as to liability or amount, it may be converted to a claim for the purpose of this section.
- (4) Within thirty days of when the basis of the claim is known or should have been known, whichever is earlier, the claim shall be made in writing and submitted to the Procurement Officer for decision in consultation with the Office of the Attorney General, as appropriate.
- (5) When a claim cannot be resolved by mutual agreement, the Contractor shall submit a written request for final decision to the Procurement Officer. The written request shall set forth all the facts surrounding the controversy.
- (6) The Contractor, at the discretion of the Procurement Officer, may be afforded an opportunity to be heard and to offer evidence in support of his claim.
- (7) The Procurement Officer shall render a written decision on all claims within 180 days of receipt of the Contractor's written claim, unless the Procurement Officer determines that a longer period is necessary to resolve the claim. If a decision is not issued within 180 days, the Procurement Officer shall notify the Contractor of the time within which a decision shall be rendered and the reasons for such time extension. The decision shall be furnished to the Contractor, by certified mail, return receipt requested, or by any other method that provides evidence of receipt. The Procurement Officer's decision shall be deemed the final action of the University.
- (8) The Procurement Officer's decision shall be final and conclusive unless the Contractor mails or otherwise files a written appeal with the Maryland State Board of Contract Appeals within 30 days of receipt of the decision.
- (9) Pending resolution of a claim, the Contractor shall proceed diligently with the performance of the contract in accordance with the Procurement Officer's decision.

23. Termination for Convenience

- (1) The performance of work under this contract may be terminated by the University in whole or in part, in accordance with this section, whenever the University shall determine that such termination is in the best interest of the University or the State. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work is terminated and the time when such termination becomes effective.
- (2) After receipt of a Notice of Termination, and except as otherwise directed by the Procurement Officer, the Contractor shall:
 - (a) stop work as specified in the Notice of Termination;
 - (b) place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of the portion of the work under the contract as is not terminated;

- (c) terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;
 - (d) assign to the University, in the manner, at times, and to the extent directed by the Procurement Officer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the University shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;
 - (e) settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Procurement Officer, to the extent he may require, which approval or ratification shall be final for all the purposes of this section;
 - (f) transfer title and deliver to the University, in the manner, at the times, and to the extent, if any, directed by the Procurement Officer,
 - (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and
 - (ii) the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would have been required to be furnished to the University;
 - (g) use its best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Procurement Officer, any property of the types referred to in (f) above; provided, however, that the Contractor
 - (i) may not be required to extend credit to any purchaser, and
 - (ii) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Procurement Officer; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the University to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Procurement Officer may direct;
 - (h) complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and
 - (i) take any action that may be necessary, or as the Procurement Officer may direct, for the protection and preservation of the property related to this contract which is in the possession of the Contractor and in which the University has or may acquire an interest. The Contractor shall submit to the Procurement Officer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Procurement Officer, and may request the University to remove them or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the University shall accept title to these items and remove them or enter into a storage agreement covering the same; provided, that the list submitted shall be subject to verification by the Procurement Officer upon removal of the items, or if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made before final settlement.
- (3) After receipt of a Notice of Termination, the Contractor shall submit to the Procurement Officer his termination claim, in the form and with certification prescribed by the Procurement Officer. This claim shall be submitted promptly but in no event later than one (1) year from the effective date of termination, unless one or more extensions in writing are granted by the Procurement Officer, upon request of the Contractor made in writing within the one-year period or authorized extension thereof. However, if the Procurement Officer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after the one-year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Procurement Officer may determine the claim at any time after the one-year period or any extension

thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Procurement Officer may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

(4) Subject to the provisions of paragraph (3), the Contractor and the Procurement Officer may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this section, which amount or amounts may include a reasonable allowance for profit on work done; provided, that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph (5) of this section, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Procurement Officer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this section, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts that may be agreed upon to be paid to the Contractor pursuant to this paragraph.

(5) In the event of the failure of the Contractor and the Procurement Officer to agree as provided in paragraph (4) upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this section, the Procurement Officer shall pay to the Contractor the amounts determined by the Procurement Officer as follows, but without duplication of any amounts agreed upon in accordance with paragraph (4):

(a) for completed supplies or services accepted by the University (or sold or acquired as provided in paragraph (2) (g) above) and for which payment has not theretofore been made, a sum equivalent to the aggregate price for the supplies or services computed in accordance with the price or prices specified in the contract, appropriately adjusted for any saving of freight or other charges;

(b) the total of-

(i) the costs incurred in the performance of the work terminated, including initial costs and preparatory expense allocable thereto, but exclusive of any costs attributable to supplies or services paid or to be paid for under paragraph (5)(a) hereof;

(ii) the cost of settling and paying claims arising out of the termination of work under subcontracts or orders, as provided in paragraph (2) (e) above, which are properly chargeable to the terminated portion of the contract (exclusive of amounts paid or payable on account of supplies or materials delivered or services furnished by subcontractors or Contractors before the effective date of the Notice of Termination, which amounts shall be included in the costs payable under (g) above); and

(iii) a sum, as profit on (i) above, determined by the Procurement Officer to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed under this subdivision (iii) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

(c) the reasonable cost of settlement accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to this contract.

The total sum to be paid to the Contractor under (a) and (b) of this paragraph shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the University shall have otherwise expressly assumed the risk of loss, there shall be excluded from the

amounts payable to the Contractor as provided in (5) (a) and (b) (i) above, the fair value, as determined by the Procurement Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the University or to a buyer pursuant to paragraph (2) (g).

(6) Costs claimed, agreed to, or determined pursuant to (3), (4), (5) and (11) hereof shall be in accordance with USM Procurement Policies and Procedures in effect on the date of this contract.

(7) The Contractor shall have the right of appeal, under the section of this contract entitled "Disputes," from any determination made by the Procurement Officer under paragraph (3), (5), or (9) hereof, except that if the Contractor has failed to submit his claim within the time provided in paragraph (3) or (9) hereof, and has failed to request extension of the time, he shall have no right of appeal. In any case where the Procurement Officer has made a determination of the amount due under paragraph (3), (5), or (9) hereof, the University shall pay to the Contractor the following: (a) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Procurement Officer, or (b) if an appeal has been taken, the amount finally determined on such appeal.

(8) In arriving at the amount due the Contractor under this section there shall be deducted (a) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this contract, (b) any claim which the University may have against the Contractor in connection with this contract, and (c) the agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of this section, and not otherwise recovered by or credited to the University.

(9) If the termination hereunder be partial, the Contractor may file with the Procurement Officer a claim for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this section shall be asserted within ninety (90) days from the effective date of the termination notice, unless an extension is granted in writing by the Procurement Officer.

(10) The University may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Procurement Officer the aggregate of such payments shall be within the amount to which the Contractor shall be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this section, such excess shall be payable by the Contractor to the University upon demand, together with interest computed at the prime rate established by the State Treasurer for the period from the date such excess payment is received by the Contractor to the date on which such excess is repaid to the State; provided, however, that no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or a later date as determined by the Procurement Officer by reason of the circumstances.

(11) Unless otherwise provided for in this contract, or by applicable statute, the Contractor shall, from the effective date of termination until the expiration of three years after final settlement under this contract, preserve and make available to the University at all reasonable times at the office of the Contractor but without direct charge to the University, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or, to the extent approved by the Procurement Officer, reproductions thereof.

24. Termination for Default

(1) The University may, subject to the provisions of paragraph (3) below, by written notice of default to the Contractor, terminate the contract in whole or in part in any one of the following circumstances: (a) If the Contractor fails to perform within the time specified herein or any extension thereof, or (b) If the Contractor fails to perform any of the other provisions of this contract, or so fails to make progress as to endanger performance of this contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the Procurement Officer may authorize in writing) after receipt of notice from the Procurement Officer specifying such failure.

(2) In the event the University terminates this contract in whole or in part as provided in paragraph (1) of this section, the University may procure substitute performance upon terms and in whatever manner the Procurement Officer may deem appropriate, and the Contractor shall be liable to the University for any excess costs for substitute performance; provided, that the Contractor shall continue the performance of this contract to the extent not terminated under the provisions of this section.

(3) Except with respect to defaults of subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the Contractor. Such causes may include, but are not restricted to, acts of God or of the public enemy, acts of the University in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but in every case the failure to perform shall be beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a subcontractor, and if the default arises out of causes beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either of them, the Contractor shall not be liable for any excess costs for failure to perform unless substitute performance for the subcontractor was obtainable from another source in sufficient time to permit the Contractor to meet the performance schedule.

(4) If, after notice of termination of this contract under the provisions of this section, it is determined for any reason that the Contractor was not in default under the provisions of this section, or that the default was excusable under the provisions of this section, the rights and obligations of the parties shall, if the contract contains a section providing for termination for convenience of the University, be the same as if the notice of termination had been issued pursuant to such section. If, after notice of termination of this contract under the provisions of this section, it is determined for any reason that the Contractor was not in default under the provisions of this section, and if this contract does not contain a section providing for termination for convenience of the University, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a claim as defined in the section of this contract entitled "Disputes".

(5) If this contract is terminated as provided in paragraph (1) of this section, the University, in addition to any other rights provided in this section, may require the Contractor to transfer title and deliver to the University, in the manner, at the times, and to the extent, if any, directed by the Procurement Officer, (a) the fabricated or unfabricated parts, work in progress, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (b) the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would have been required to be furnished to the University; and the Contractor shall, upon direction of the Procurement Officer, protect and preserve property in the possession of the Contractor in which the University has an interest. Payment for completed supplies delivered to and accepted by the University shall be at the contract price. Payment for manufacturing materials delivered to and accepted by the University and for the protection and preservation of property shall be in an amount agreed upon by the Contractor

and Procurement Officer; failure to agree to such amount shall be a claim as defined in the section of this contract entitled "Disputes". The University may withhold from amounts otherwise due the Contractor hereunder such sum as the Procurement Officer determines to be necessary to protect the University against loss because of outstanding liens or claims of former lien holders.

(6) The rights and remedies of the University provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

(7) As used in paragraph (3) of this section, the terms, "subcontractor" and "subcontractors" mean subcontractor(s) at any tier.

25. Arrearages

By submitting a response to this solicitation, the proposer represents that it is not in arrears in the payment of any obligation due and owing the State of Maryland, including the payment of taxes and employee benefits, and that it shall not become so in arrears during the term of the contract if selected for contract award.

The proposer is also informed that the Comptroller (per State Finance and Procurement Article §7-222) may not, except under the conditions specified therein, issue a warrant for payment to a person if the person owes \$50 or more to the State, a unit of the State government, or any governmental entity under the control of the State. Therefore, applications for payment submitted by a contractor and approved by the University for payment may not be processed by the Comptroller for payment to the contractor if an arrearage in excess of \$50 exists.

26. Compliance with Laws

The Contractor hereby represents and warrants that: **A.** It is qualified to do business in the state of Maryland and that it will take such actions as, from time to time hereafter, may be necessary to remain so qualified; **B.** It shall comply with all federal, State and local laws, regulations, and ordinances applicable to its activities and obligations under this contract; and **C.** it shall obtain, at its expense, all licenses, permits, insurance and governmental approvals, if any, necessary to the performance of its obligations under this contract.

27. Retention of Records

The Contractor shall retain and maintain all records and documents relating to this contract for three (3) years after final payment by the University hereunder or any applicable statute of limitation, whichever is longer, and shall make them available for inspection and audit by authorized representatives of the University, including the Procurement Officer or designee at all reasonable times

28. Tax Exemption

The State is generally exempt from Federal Excise Taxes, Maryland Sales and Use Taxes, District of Columbia Sales Taxes and Transportation Taxes. Exemption certificates shall be completed upon request. Where a Contractor is required to furnish and install material in the construction or improvement of real property in performance of a contract, the Contractor shall pay the Maryland Sales Tax and the exemption does not apply.

29. Registration

Pursuant to §7-201 et seq. of the Corporation and Associations Article of the Annotated Code of Maryland, corporations not incorporated in the State of Maryland shall be registered with the State Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201 before

doing any interstate or foreign business in this State. Before doing any intrastate business in this State, a foreign corporation shall register with the Department of Assessments and Taxation.

NOTE: The registration form is available as "Combined Registration Application" under the "Businesses" heading of the following web site: <http://www.dat.state.md.us/sdatweb/sdatforms.html>

Questions about this requirement may be sent to the Department of Assessment and Taxation at Charterhelp@dat.state.md.us and a response should be forthcoming within 24 hours.

30. EPA Compliance

Materials, supplies, equipment or services shall comply in all respects with the Federal Noise Control Act of 1972, where applicable.

31. Occupational Safety and Health Act

All materials, supplies, equipment, or services supplied as a result of this contract shall comply with the applicable U.S. and Maryland Occupational Safety and Health Act standards.

32. Maryland Law Prevails

The provisions of this contract shall be governed by the laws of Maryland without reference to it's Conflicts of Laws rules.

33. Software Licensing

Licensor represents and warrants that the software, as delivered to the University, does not contain any program code, virus, worm, trap door, back door, timer, or clock that would erase data or programming or otherwise cause the software to become inoperable, inaccessible, or incapable of being used in accordance with its user manuals, either automatically, upon the occurrence of Licensor-selected conditions, or manually on the command of Licensor

34. MUCITA

The Maryland Uniform Computer Information Transactions Act (MUCITA), Maryland Code Annotated [Commercial Law] 22-101 through 22-816, does not govern this Agreement, except to the extent that section 22-104(2) of the Act applies. The parties further agree that this Agreement shall be governed by the common law of Maryland relating to written agreements and Maryland statutes other than MUCITA which may apply

35. Applicability of Federal Laws

If Federal contract and/or grant funds are utilized in any manner in the performance of this contract, then the University reserves the right to bind Contractor to all applicable clauses of the Federal Acquisition Regulation (FAR) and other FAR supplements, as well as all applicable provisions of the Office of Management and Budget (OMB) Circular A-110. Contractor agrees to promptly complete and return to the University any related forms and/or affidavits as may be required.

36. Protests and Claims

Any protest regarding the award of this contract or claim arising out of this contract shall be administered in accordance with the University System of Maryland Procurement Policies and Procedures, Section X - Protests and Claims. Detail is available by accessing the following web site: www.purchase.umd.edu Click on this web site, then select the category "Policies and Procedures", followed by "USM Procurement Policies and Procedures".

37. Intellectual Property

Intellectual Property Warranty and Indemnification.

The Contractor shall own all data it provides to authorized users under this contract. Contractor represents and warrants that all data it provides under this contract shall be original, not encumbered or in the public domain or if owned by someone other than Contractor that Contractor is authorized to release the data under this Contract. If data provided hereunder become the subject of a claim, suit or allegation of copyright, trademark or patent infringement, University shall have the right, in its sole discretion, to require Contractor to produce, at Contractor's own expense, new non-infringing data or obtain permission, at Contractor's cost, to provide the data as a means of remedying any claim of infringement in addition to any other remedy available to the University under law or equity. Contractor further agrees to indemnify and hold harmless the University, its officers, employees and agents from and against any and all claims, actions, costs, judgments or damages of any type alleging or threatening that any data materials, provided under this contract infringe any proprietary or intellectual property rights (copyright, trade secrets or patent) of any third party (Third Party Claims of Infringement). If a Third Party Claim of Infringement is threatened or made before Contractor receives payment under this contract, University shall be entitled, upon written notice to Contractor, to withhold some or all of such payment.

38. E-Maryland Marketplace

All vendors interested in conducting business with the University of Maryland must register at: <https://emaryland.buyspeed.com/bso/>. Registration is free. eMarylandMarketplace™ is the State of Maryland's Internet-based procurement system. Registered vendors can access bid solicitations and receive email notification when new solicitations are posted.

39. Eligibility to Purchase

By submitting a proposal, Contractor agrees to extend the proposed price structure and discounts to all University System of Maryland campuses and facilities, any public body/Agency, public or private health or educational institution or any University related foundation with the understanding that such utilization is in accord with the public body/Agency, public or private health or educational institution's policies and procedures.

40. Use of Agreement by Third Parties

It is the intent of this Agreement to allow for cooperative procurement. Accordingly, any public body/Agency, public or private health or educational institution, or any University related foundation may access the Agreement if authorized by the Selected Firm.

Participation in this cooperative procurement is strictly voluntary. If authorized by the Selected Firm, the Agreement will be extended to the entities above to purchase at fees in accordance with the terms of the Agreement. The Selected Firm will notify the University in writing of any such entities accessing the Agreement. No modification of the Agreement or execution of a separate agreement is required to participate. The Selected Firm will provide semi-annual usage reports for all entities accessing the Agreement. Participating entities will place their own orders directly with the Selected Firm and will fully and independently administer use of the Agreement to include contractual disputes, invoicing and payments without direct administration from the University. The University will not be held liable for any costs or damages incurred by any other participating entity as a result of any

authorization by the Selected Firm to extend the Agreement. It is understood and agreed that the University is not responsible for the acts or omissions of any entity accessing the Agreement under this section, and will not be considered in default of the Agreement no matter the circumstances.

Use of this Agreement does not preclude any participating entity from using other agreements or competitive procurement processes as the need may be.

41. Proposal Affidavit

The enclosed Proposal Affidavit shall be completed and submitted to the Procurement Officer as part of Contractor's proposal.

42. Changes

The Procurement Officer may at any time, by written order, make unilateral changes within the general scope of this contract in any one or more of the following:

- (1) Description of services to be performed.
- (2) Time of performance (i.e., hours of the day, days of the week, etc.).
- (3) Place of performance of the services.
- (4) Drawings, designs, or specifications when any supplies to be furnished are to be specially manufactured for the University in accordance with the drawings, designs, or specifications.
- (5) Method of shipment or packing of supplies.
- (6) Place of delivery.

The section entitled "Delays and Extensions of Time" prohibits the Contractor from making charges or claims for damages for any delays or hindrances from any cause whatsoever during the progress of any portion of the work specified in this Contract. If a change, as allowed above, causes an increase or decrease in the cost of the work which is not time-related, the University shall make an equitable adjustment in the contract price and shall modify the contract.

The Contractor must assert its right to an adjustment under this section within 30 days from the date of receipt of the written order. Any request for an adjustment must be submitted in writing to the Procurement Officer.

Failure to agree to any adjustment shall be a dispute under the Disputes section. However, nothing in this section shall excuse the Contractor from proceeding with the contract as changed.

43. Pre-Existing Regulations

The regulations set forth in USM Procurement Policies and Procedures in effect on the date of execution of this Contract are applicable to this Contract.

44. Indemnification

The Contractor shall defend, indemnify and save harmless the University System of Maryland, its officers, employees and agents, from any and all claims, liability, losses and causes of actions which may arise out of the errors, omissions and performance or non-performance by the Contractor, employees or agents, of the work covered by this contract. The University shall not assume any obligation to indemnify, hold harmless or pay attorneys' fees that may arise from or in any way be associated with the performance or operation of this agreement.

45. Reserved

46. Reserved

PART III - LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

Section J - List of Attachments

The Following attachments are included as Part of this Request for Proposals:

1. Excel Pricing spreadsheet
2. I95 Vehicle Probe Project Data Validation Program
3. Real-Time Volume and Origin-Destination Data for Operations : Concepts, Definitions and Use Case Scenarios

PART IV REPRESENTATIONS AND INSTRUCTIONS

Section K – Representations, Certifications and other Statements

BID/PROPOSAL AFFIDAVIT

A. AUTHORITY

I HEREBY AFFIRM THAT:

I, _____ (print name), possess the legal authority to make this Affidavit.

B. CERTIFICATION REGARDING COMMERCIAL NONDISCRIMINATION

The undersigned bidder hereby certifies and agrees that the following information is correct: In preparing its bid on this project, the bidder has considered all proposals submitted from qualified, potential subcontractors and suppliers, and has not engaged in "discrimination" as defined in §19-103 of the State Finance and Procurement Article of the Annotated Code of Maryland. "Discrimination" means any disadvantage, difference, distinction, or preference in the solicitation, selection, hiring, or commercial treatment of a vendor, subcontractor, or commercial customer on the basis of race, color, religion, ancestry, or national origin, sex, age, marital status, sexual orientation, or on the basis of disability or any otherwise unlawful use of characteristics regarding the vendor's, supplier's, or commercial customer's employees or owners. "Discrimination" also includes retaliating against any person or other entity for reporting any incident of "discrimination". Without limiting any other provision of the solicitation on this project, it is understood that, if the certification is false, such false certification constitutes grounds for the State to reject the bid submitted by the bidder on this project, and terminate any contract awarded based on the bid. As part of its bid or proposal, the bidder herewith submits a list of all instances within the past 4 years where there has been a final adjudicated determination in a legal or administrative proceeding in the State of Maryland that the bidder discriminated against subcontractors, vendors, suppliers, or commercial customers, and a description of the status or resolution of that determination, including any remedial action taken. Bidder agrees to comply in all respects with the State's Commercial Nondiscrimination Policy as described under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland.

B-1. CERTIFICATION REGARDING MINORITY BUSINESS ENTERPRISES.

The undersigned bidder hereby certifies and agrees that it has fully complied with the State Minority Business Enterprise Law, State Finance and Procurement Article, §14-308(a)(2), Annotated Code of Maryland, which provides that, except as otherwise provided by law, a contractor may not identify a certified minority business enterprise in a bid or proposal and:

- (1) Fail to request, receive, or otherwise obtain authorization from the certified minority business enterprise to identify the certified minority proposal;
- (2) Fail to notify the certified minority business enterprise before execution of the contract of its inclusion in the bid or proposal;
- (3) Fail to use the certified minority business enterprise in the performance of the contract; or

(4) Pay the certified minority business enterprise solely for the use of its name in the bid or proposal.

Without limiting any other provision of the solicitation on this project, it is understood that if the certification is false, such false certification constitutes grounds for the State to reject the bid submitted by the bidder on this project, and terminate any contract awarded based on the bid.

C. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business (as is defined in Section 16-101(b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, §6-220, Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other state or federal law, except as follows (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

D. AFFIRMATION REGARDING OTHER CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies, has:

(1) Been convicted under state or federal statute of:

(a) A criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract; or

(b) Fraud, embezzlement, theft, forgery, falsification or destruction of records or receiving stolen property;

(2) Been convicted of any criminal violation of a state or federal antitrust statute;

(3) Been convicted under the provisions of Title 18 of the United States Code for violation of the Racketeer Influenced and Corrupt Organization Act, 18 U.S.C. §1961 et seq., or the Mail Fraud Act, 18 U.S.C. §1341 et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

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(4) Been convicted of a violation of the State Minority Business Enterprise Law, §14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland;

(5) Been convicted of a violation of §11-205.1 of the State Finance and Procurement Article of the Annotated Code of Maryland;

(6) Been convicted of conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any law or statute described in subsections (1)—(5) above;

(7) Been found civilly liable under a state or federal antitrust statute for acts or omissions in connection with the submission of bids or proposals for a public or private contract;

(8) Been found in a final adjudicated decision to have violated the Commercial Nondiscrimination Policy under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland with regard to a public or private contract; or

(9) Admitted in writing or under oath, during the course of an official investigation or other proceedings, acts or omissions that would constitute grounds for conviction or liability under any law or statute described in §§B and C and subsections D(1)—(8) above, except as follows (indicate reasons why the affirmations cannot be given, and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of the person(s) involved and their current positions and responsibilities with the business, and the status of any debarment):

E. AFFIRMATION REGARDING DEBARMENT

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities, including obtaining or performing contracts with public bodies, has ever been suspended or debarred (including being issued a limited denial of participation) by any public entity, except as follows (list each debarment or suspension providing the dates of the suspension or debarment, the name of the public entity and the status of the proceedings, the name(s) of the person(s) involved and their current positions and responsibilities with the business, the grounds of the debarment or suspension, and the details of each person's involvement in any activity that formed the grounds of the debarment or suspension).

F. AFFIRMATION REGARDING DEBARMENT OF RELATED ENTITIES

I FURTHER AFFIRM THAT:

(1) The business was not established and it does not operate in a manner designed to evade the application of or defeat the purpose of debarment pursuant to Sections 16-101, et seq., of the State Finance and Procurement Article of the Annotated Code of Maryland; and

(2) The business is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business, except as follows (you must indicate the reasons why the affirmations cannot be given without qualification):

G. SUB-CONTRACT AFFIRMATION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, has knowingly entered into a contract with a public body under which a person debarred or suspended under Title 16 of the State Finance and Procurement Article of the Annotated Code of Maryland will provide, directly or indirectly, supplies, services, architectural services, construction related services, leases of real property, or construction.

H. AFFIRMATION REGARDING COLLUSION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business has:

(1) Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;

(2) In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the bidder or offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

I. CERTIFICATION OF TAX PAYMENT

I FURTHER AFFIRM THAT:

Except as validly contested, the business has paid, or has arranged for payment of, all taxes due the State of Maryland and has filed all required returns and reports with the Comptroller of the Treasury, the State

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Department of Assessments and Taxation, and the Department of Labor, Licensing, and Regulation, as applicable, and will have paid all withholding taxes due the State of Maryland prior to final settlement.

J. CONTINGENT FEES

I FURTHER AFFIRM THAT:

The business has not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency working for the business, to solicit or secure the Contract, and that the business has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency, any fee or any other consideration contingent on the making of the Contract.

K. ACKNOWLEDGEMENT

I ACKNOWLEDGE THAT this Affidavit is to be furnished to the Procurement Officer and may be distributed to units of: (1) the State of Maryland; (2) counties or other subdivisions of the State of Maryland; (3) other states; and (4) the federal government. I further acknowledge that this Affidavit is subject to applicable laws of the United States and the State of Maryland, both criminal and civil, and that nothing in this Affidavit or any contract resulting from the submission of this bid or proposal shall be construed to supersede, amend, modify or waive, on behalf of the State of Maryland, or any unit of the State of Maryland having jurisdiction, the exercise of any statutory right or remedy conferred by the Constitution and the laws of Maryland with respect to any misrepresentation made or any violation of the obligations, terms and covenants undertaken by the above business with respect to (1) this Affidavit, (2) the contract, and (3) other Affidavits comprising part of the contract.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

Date: _____

By: _____ (print name of Authorized Representative and Affiant)

_____ (signature of Authorized Representative and Affiant)

CONTRACT AFFIDAVIT

A. AUTHORITY

I HEREBY AFFIRM THAT:

I, _____ (print name), possess the legal authority to make this Affidavit.

B. CERTIFICATION OF REGISTRATION OR QUALIFICATION WITH THE STATE DEPARTMENT OF ASSESSMENTS AND TAXATION

I FURTHER AFFIRM THAT:

The business named above is a (check applicable box):

Note: For the purposes of this Certification, Domestic means incorporated or with a strong legal presence within the State of Maryland, Foreign means incorporated outside of or without a strong legal presence in Maryland

- (1) Corporation — domestic or foreign;
- (2) Limited Liability Company — domestic or foreign;
- (3) Partnership — domestic or foreign;
- (4) Statutory Trust — domestic or foreign;
- (5) Sole Proprietorship.

and is registered or qualified as required under Maryland Law. I further affirm that the above business is in good standing both in Maryland and (IF APPLICABLE) in the jurisdiction where it is presently organized, and has filed all of its annual reports, together with filing fees, with the Maryland State Department of Assessments and Taxation. The name and address of its resident agent (IF APPLICABLE) filed with the State Department of Assessments and Taxation is:

Name and Department ID Number: _____ Address: _____

and that if it does business under a trade name, it has filed a certificate with the State Department of Assessments and Taxation that correctly identifies that true name and address of the principal or owner as:

Name and Department ID Number: _____
Address: _____.

Pursuant to §7-201 et seq. of the Corporation and Associations Article of the Annotated Code of Maryland, corporations not incorporated in the State of Maryland shall be registered with the State Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201 before doing any interstate or foreign business in this State. ***NOTE: "Foreign" contractors are required to register with the Maryland Department of Assessments & Taxation at the time of proposal submission. The forms for registration are available from the website <http://www.dat.state.md.us/sdatweb/sdatforms.html> For further help call (410) 767-1340 or email: charterhelp@dat.state.md.us.***

C. FINANCIAL DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, the provisions of State Finance and Procurement Article, §13-221, Annotated Code of Maryland, which require that every business that enters into contracts, leases, or other agreements with the State of Maryland or its agencies during a calendar year under which the business is to receive in the aggregate \$100,000 or more shall, within 30 days of the time when the aggregate value of the contracts, leases, or other agreements reaches \$100,000, file with the Secretary of State of Maryland certain specified information to include disclosure of beneficial ownership of the business.

NOTE: The financial disclosure form is available under on the following web site:

<http://www.sos.state.md.us/PublicDisclosure.aspx>. For further information, go to www.sos.state.md.us

D. POLITICAL CONTRIBUTION DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, Election Law Article, §§14-101 — 14-108, Annotated Code of Maryland, which requires that every person that enters into contracts, leases, or other agreements with the State of Maryland, including its agencies or a political subdivision of the State, during a calendar year in which the person receives in the aggregate \$100,000 or more shall file with the State Board of Elections a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election.

NOTE: The political contribution disclosure form is available at

http://www.elections.state.md.us/campaign_finance/disclosure_of_contributions.html. Frequently asked questions and answers are available from this website.

E. DRUG AND ALCOHOL FREE WORKPLACE

(Applicable to all contracts unless the contract is for a law enforcement agency and the agency head or the agency head's designee has determined that application of COMAR 21.11.08 and this certification would be inappropriate in connection with the law enforcement agency's undercover operations.)

I CERTIFY THAT:

(1) Terms defined in COMAR 21.11.08 shall have the same meanings when used in this certification.

(2) By submission of its bid or offer, the business, if other than an individual, certifies and agrees that, with respect to its employees to be employed under a contract resulting from this solicitation, the business shall:

(a) Maintain a workplace free of drug and alcohol abuse during the term of the contract;

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(b) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of drugs, and the abuse of drugs or alcohol is prohibited in the business' workplace and specifying the actions that will be taken against employees for violation of these prohibitions;

(c) Prohibit its employees from working under the influence of drugs or alcohol;

(d) Not hire or assign to work on the contract anyone who the business knows, or in the exercise of due diligence should know, currently abuses drugs or alcohol and is not actively engaged in a bona fide drug or alcohol abuse assistance or rehabilitation program;

(e) Promptly inform the appropriate law enforcement agency of every drug-related crime that occurs in its workplace if the business has observed the violation or otherwise has reliable information that a violation has occurred;

(f) Establish drug and alcohol abuse awareness programs to inform its employees about:

- (i) The dangers of drug and alcohol abuse in the workplace;
- (ii) The business's policy of maintaining a drug and alcohol free workplace;
- (iii) Any available drug and alcohol counseling, rehabilitation, and employee assistance programs; and
- (iv) The penalties that may be imposed upon employees who abuse drugs and alcohol in the workplace;

(g) Provide all employees engaged in the performance of the contract with a copy of the statement required by §E(2)(b), above;

(h) Notify its employees in the statement required by §E(2)(b), above, that as a condition of continued employment on the contract, the employee shall:

- (i) Abide by the terms of the statement; and
- (ii) Notify the employer of any criminal drug or alcohol abuse conviction for an offense occurring in the workplace not later than 5 days after a conviction;

(i) Notify the procurement officer within 10 days after receiving notice under §E(2)(h)(ii), above, or otherwise receiving actual notice of a conviction;

(j) Within 30 days after receiving notice under §E(2)(h)(ii), above, or otherwise receiving actual notice of a conviction, impose either of the following sanctions or remedial measures on any employee who is convicted of a drug or alcohol abuse offense occurring in the workplace:

- (i) Take appropriate personnel action against an employee, up to and including termination; or
- (ii) Require an employee to satisfactorily participate in a bona fide drug or alcohol abuse assistance or rehabilitation program; and

(k) Make a good faith effort to maintain a drug and alcohol free workplace through implementation of §E(2)(a)—(j), above.

(3) If the business is an individual, the individual shall certify and agree as set forth in §E(4), below, that the individual shall not engage in the unlawful manufacture, distribution, dispensing, possession, or use of drugs or the abuse of drugs or alcohol in the performance of the contract.

(4) I acknowledge and agree that:

(a) The award of the contract is conditional upon compliance with COMAR 21.11.08 and this certification;

(b) The violation of the provisions of COMAR 21.11.08 or this certification shall be cause to suspend payments under, or terminate the contract for default under COMAR 21.07.01.11 or 21.07.03.15, as applicable; and

(c) The violation of the provisions of COMAR 21.11.08 or this certification in connection with the contract may, in the exercise of the discretion of the Board of Public Works, result in suspension and debarment of the business under COMAR 21.08.03.

F. CERTAIN AFFIRMATIONS VALID

I FURTHER AFFIRM THAT:

To the best of my knowledge, information, and belief, each of the affirmations, certifications, or acknowledgements contained in that certain Bid/Proposal Affidavit dated _____, 20____, and executed by me for the purpose of obtaining the contract to which this Exhibit is attached remains true and correct in all respects as if made as of the date of this Contract Affidavit and as if fully set forth herein.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

Date: _____

By: _____ (printed name of Authorized Representative and Affiant)

_____ (signature of Authorized Representative and Affiant)

CONFLICT OF INTEREST INFORMATION

A. Each solicitation that will result in the selection of a Contractor who will assist a unit in the formation, evaluation, selection, award, or execution of a State contract shall provide notice of the requirement of this regulation.

B. "Conflict of interest" means that, because of other activities or relationships with other persons, a person is unable or potentially unable to render impartial assistance or advice to the State, or the person's objectivity in performing the contract work is or might be otherwise impaired, or a person has an unfair competitive advantage.

C. "Person" has the meaning stated in COMAR 21.01.02.01B (64) and includes a bidder, offeror, Contractor, consultant or subcontractor or subconsultant at any tier, and also includes an employee or agent of any of them if the employee or agent has or will have the authority to control or supervise all or a portion of the work for which a bid or offer is made.

D. If the Procurement Officer makes a determination prior to award that facts or circumstances exist giving rise or which could in the future give rise to a conflict in interest, the procurement officer may reject a bid or offer under COMAR 21.06.02.03B.

E. After award the State may terminate the contract, in whole or in part, if it deems such termination necessary to avoid an actual or potential conflict of interest. If the Contractor knew or reasonably could have been expected to know of an actual or potential conflict of interest prior to or after award and did not disclose it or misrepresented relevant information to the Procurement Officer, the State may terminate the contract for default, institute proceedings to debar the Contractor from further State contracts, or pursue such other remedies as may be permitted by law or the contract.

F. A conflict of interest may be waived if the Procurement Officer, with approval of the agency head or designee, determines that waiver is in the best interest of the State. The determination shall state the reasons for the waiver and any controls that avoid, mitigate, or neutralize the conflict of interest.

G. Each bidder or offeror responding to a solicitation that will result in the selection of a Contractor who will assist a unit in the formation, evaluation, selection, award, or execution of another State contract shall provide the affidavit and disclosures set forth in Subsection H of this regulation to the Procurement Officer with the bid or offer and such other times as may be required by the Procurement Officer.

H. The affidavits and disclosures required by Subsection G of this regulation shall be in substantially the same form as follows:

CONFLICT OF INTEREST AFFIDAVIT AND DISCLOSURE

A. "Conflict of interest" means that because of other activities or relationships with other persons, a person is unable or potentially unable to render impartial assistance or advice to the State, or the person's objectivity in performing the contract work is or might be otherwise impaired, or a person has an unfair competitive advantage.

B. "Person" has the meaning stated in COMAR 21.01.02.01B(64) and includes a bidder, offeror, Contractor, consultant, or subcontractor or subconsultant at any tier, and also includes an employee or agent of any of them if the employee or agent has or will have the authority to control or supervise all or a portion of the work for which a bid or offer is made.

C. The bidder or offeror warrants that, except as disclosed in D below, there are no relevant facts or circumstances now giving rise or which could, in the future, give rise to a conflict of interest.

D. The following facts or circumstances give rise or could in the future give rise to a conflict of interest (explains in detail--attach sheets if necessary):

E. The bidder or offeror agrees that if an actual or potential conflict of interest arises after the date of this affidavit, the bidder or offeror will immediately make a full disclosure in writing to the Procurement Officer of all relevant facts and circumstances. This disclosure shall include a description of actions which the bidder or offeror has taken and proposes to take to avoid, mitigate, or neutralize the actual or potential conflict of interest. If the contract has been awarded and performance of the contract has begun, the Contractor shall continue performance until notified by the Procurement Officer of any contrary action to be taken.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

Date: _____ **By:** _____
(Signature of Authorized Representative and Affiant)

Printed Name: _____

Title: _____

Federal Employer Identification Number (FEIN): _____

**PRINCIPLES OF SOCIAL RESPONSIBILITY
and
SOCIAL RESPONSIBILITY AFFIDAVIT INFORMATION**

I. Principles of Social Responsibility

A. As provided for in Section VIII. C. of the University System of Maryland Procurement Policies and Procedures, the University is required to make purchases from and award contracts to “responsible” contractors. The Procurement Officer may use certain factors, including but not limited to a satisfactory record of integrity and business ethics to determine if a bidder or offeror is responsible. The University has determined that a bidder or offeror’s record of integrity and business ethics includes a demonstrated commitment to providing goods and services in an ethical, and socially and environmentally responsible manner by compliance with all applicable:

- (1) Federal and state labor relations and employment laws;
- (2) Federal and state non-discrimination in employment laws;
- (3) State of Maryland Commercial Nondiscrimination laws;
- (4) State of Maryland, Minority Business Enterprise (“MBE”) laws; and,
- (5) Federal and state health, safety and environmental laws.

The above laws are referred to as “Social Responsibility Laws.” The bidder or offeror’s compliance with the above laws is referred to as “Social Responsibility.”

B. Each bidder or offeror shall complete a Social Responsibility Affidavit, in the form that follows, as part of a bid or proposal submitted to the Procurement Officer in response to any solicitation to furnish goods or services of any kind including, but not limited to architectural or engineering services; construction; construction related services; maintenance; consulting; information technology (hardware, software and services); equipment or other commodities.

C. The Procurement Officer shall consider information provided in the Social Responsibility Affidavit to determine if a bidder or offeror is responsible. A determination that a bidder or offeror is not responsible may be considered as the basis for eliminating that bidder or offeror from further consideration for a contract award.

D. After award, the University may terminate a contract for default if the bidder or offeror did not disclose the requested information; misrepresented relevant information to the Procurement Officer; or was subject to a final judgment of non-compliance with applicable Social Responsibility Laws post-award. In such cases, the University may also institute proceedings to debar the vendor from further State contracts, or pursue such other remedies as may be permitted by law or the contract.

SOCIAL RESPONSIBILITY AFFIDAVIT AND DISCLOSURE

A. The bidder or offeror agrees that if it is the subject of a final, non-appealable judgment with respect to compliance with applicable Social Responsibility Laws after the date of this affidavit, the bidder or offeror will immediately make a full disclosure in writing to the Procurement Officer of all relevant facts and circumstances. This disclosure shall include a description of actions which the bidder or offeror has taken or proposes to take to correct the violation. If the contract has been awarded and performance has begun, the vendor shall continue performance until notified by the Procurement Officer of any contrary action to be taken.

B. CERTIFICATION OF COMPLIANCE WITH SOCIAL RESPONSIBILITY LAWS

I HEREBY AFFIRM THAT:

(1) There has been no final, non-appealable judgment made during the last five years against the bidder or offeror for noncompliance with federal or state labor relations and other employment laws or regulations, including but not limited to the National Labor Relations Act, as amended; the Davis-Bacon Act, as amended; the Fair Labor Standards Act, as amended; the Maryland Living Wage law, State Finance and Procurement Article, §18-101 et seq., Annotated Code of Maryland; the Maryland Prevailing Wage law, State Finance and Procurement Article, §17-201 et seq., Annotated Code of Maryland; federal and state child labor laws; federal minimum wage laws and; the Family Medical Leave Act, except as follows (explain below or add additional sheets):

(2) There has been no final, non-appealable judgment made during the last five years against the bidder or offeror for violation of federal or state non-discrimination in employment laws or regulations, including but not limited to laws prohibiting discrimination on the basis of race, color, religion, ancestry or national origin, sex, age, marital status, sexual orientation, or disability unrelated in nature and except so as to reasonably preclude the performance of the employment, except as follows (explain below or add additional sheets):

(3) There has been no final, non-appealable judgment made during the last five years against the bidder or offeror for violation of the State of Maryland Commercial Non-Discrimination Policy, State Finance and Procurement Article, §19-101 et seq., Annotated Code of Maryland, except as follows (explain below or add additional sheets):

University of Maryland RFP No. 83794N To Provide Real-Time Traffic Data and Associated Products to I-95 Coalition Organizations and Affiliates

(4) There have been no instances during the last five years of failure by the bidder or offeror to meet mutually agreed upon goals for minority business participation (MBE) on projects performed for the University or any other State of Maryland agency, or any other sanctions for MBE program non-compliance; or any final, non-appealable judgment of noncompliance with the State of Maryland Minority Business Participation law, State Finance and Procurement Article, § 14-308 et seq., Annotated Code of Maryland, except as follows (explain below or add additional sheets):

(5) There has been no final, non-appealable judgment made during the last five years against the bidder or offeror for violation of federal or state health, safety or environmental laws or regulations , including but not limited to the U.S. Occupational Safety and Health Act standards; Maryland Occupational Health and Safety laws, State Labor and Employment Article, § 5-101 et seq., Annotated Code of Maryland, or the Federal Noise Control Act of 1972, except as follows (explain below or add additional sheets):

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

Date: _____ By: _____
(Authorized Representative and Affiant)

CERTIFICATION REGARDING INVESTMENT ACTIVITIES IN IRAN

Ref: Maryland Board of Public Works Advisory Number 2013-1

1. The undersigned of _____ (Contractor) certifies that, in accordance with State Finance & Procurement Article, §17-705:

(i) it is not identified on the list (see NOTE below) created by the Board of Public Works as a person engaging in investment activities in Iran as described in §17-702 of State Finance & Procurement Article; and

(ii) it is not engaging in investment activities in Iran as described in State Finance & Procurement Article, §17-702.

Or;

2. The undersigned is unable make the above certification regarding its investment activities in Iran due to the following activities:

Signature:

Date Signed:

Name of Authorized Representative:

Title:

NOTE: Information and List is available at:

www.bpw.state.md.us

Click On "Advisories"

Scroll Down to "2013-1"

Click On "IAI LIST"

Section L - Evaluation Factors for Award

A. EVALUATION COMMITTEES

The Procurement Officer shall establish separate technical and financial evaluation committees to review and rate the proposals. The financial evaluation committee may be composed of the Procurement Officer and any other individuals appointed by the Procurement Officer. The technical evaluation committee shall be composed of other individuals appointed by the Procurement Officer.

B. ACCEPTABILITY OF PROPOSALS:

The Procurement Officer shall determine which contractors have met the basic requirements of the RFP. Failure to comply with any mandatory requirement will normally disqualify a contractor's proposal. The Procurement Officer shall have the sole authority to determine whether any deviation from the requirements of this RFP is substantial in nature. The Procurement Officer may waive or permit to be cured minor irregularities or minor informalities in proposals that are immaterial or inconsequential in nature, whenever it is determined to be in the University's best interest. In addition, the Procurement Officer may reject in whole or in part any and all proposals if such is in the University's interest, and may reject proposals that are outside the competitive range financially, without performing a technical evaluation. The University may accept other than the lowest priced offer. The Procurement Officer may conduct discussions with contractors in any manner deemed necessary to best serve the interests of the University. The Procurement Officer may limit the competitive range to firms highly rated technically by the University for purposes of efficiency. The University reserves the right to make an award to more than one contractor or to split an award among contractors.

C. TECHNICAL EVALUATION:

The technical evaluation committee shall conduct its evaluation of the technical merit of the proposals in accordance with the requirements and specifications of the solicitation. The Contractor must satisfy and explicitly respond to ALL the requirements and specifications, including a detailed explanation of how each item listed in the requirements and specifications is to be met. The last phase of this technical evaluation will be the ranking by the Committee of each qualified proposal on technical merit.

The criteria noted below will be used by the committee for the technical evaluation of proposals for this procurement. Criteria are listed in descending order of importance. "Demonstration of ability" encompasses information provided in the proposals as well as record of past performance. Past performance will be determined by references including but not limited to: the quality of product delivered, ability to meet the specifications as defined, Proposer's record for on-time delivery, technical quality, cost control, demonstrated corrective actions, etc. as required under Section A-2 "Instructions, Conditions and Notices to Contractors", Section M-1B "References".

1. Demonstration of a full understanding of the RFP, and the demonstration of ability to meet all mandatory requirements for the provision of Traffic Data for the various roadway types. This includes technical requirements in Section C, subsection 3.1,

categories 1 through 11 designated as mandatory (M) and all other non-technical requirements including support of the Data Ownership and Data Licensing provisions (section C, subsection 6).

2. Demonstration of ability to meet the highly desirable (HD) technical requirements as specified in Section C, subsection 3.1, categories 1, 5, 6, 7, 8, and 9.
3. Demonstration of ability to meet the highly desirable (HD) technical requirements as specified in Section C, subsection 3.1, categories 2, 3, 10, and 11.
4. Demonstration of the extent to which project risk can be minimized and/or mitigated. (Section C, Subsection 3.3)
5. Demonstration of ability to meet desirable technical requirements (D) as specified in Section C, subsection 3.1, categories 1, 5, 6, 7, 8, and 9.
6. Demonstration of ability to meet desirable (D) technical requirements as specified in Section C, subsection 3.1, categories 2, 3, 10, and 11.
7. Economic benefits to Maryland, category 12.

The technical evaluation for volume and/or OD, Section C, Subsection 3.1, category 4, will be performed in parallel. Proposals will be ranked based on the extent to which the use case scenarios for real-time volume and/or OD data may be satisfied and the evidence which supports the Proposer's ability to provide proposed real-time volume and/or OD data. Proposals for real-time volume and/or OD may be considered for separate award.

The terms "must" or "shall" are used throughout this document to indicate mandatory requirements. The terms "Mandatory," "Highly-Desirable" and "Desirable" (abbreviated as M, HD, and D, respectively) are used to describe technical specifications in Section C. The Contractor's proposal is to clearly state that it meets all mandatory requirements and specifications; that is, that the Contractor is fully capable of delivering the items and providing the services as specified in this RFP. The Contractor's proposal is to state clearly the degree to which it can meet any highly desirable and desirable technical requirements. Each Contractor must provide a written detailed response to each requirement and specification.

Misinterpretation of requirements and specifications by the Contractor shall not relieve the Contractor of responsibility to accurately address the requirements of the RFP or to perform the contract, if awarded.

The Committee may request additional technical assistance from any source. Industry standard references may be used during the evaluation process.

D. FINANCIAL EVALUATION:

The separate financial volume will be distributed to the financial evaluation committee. This information will then be used to establish a financial ranking.

Evaluation of pricing proposals will be performed based on pricing estimates delivered for the Sample Data Regions. The pricing model provided by the vendor will be analyzed with respect to the Sample Data Regions for accuracy and consistency.

E. BASIS OF AWARD:

Financial rankings of proposals will be combined with the corresponding technical rankings to determine a final ranking for each proposal. **Technical merit will have greater weight than price.** Price proposals will increase in importance for proposals of equal or near equal technical rank. The Procurement Officer will recommend contract award to the responsible contractor or contractors whose proposal is (are) determined to provide overall best value to the University, considering the evaluation factors in this RFP, and price.

F. NEGOTIATION:

The University has the right to accept the best proposal as submitted, without discussion or negotiation. Contractors should therefore not rely on having a chance to discuss, negotiate and adjust their proposals.

Contractors who submit proposals initially judged by the Procurement Officer to be reasonably susceptible of being selected for award may be asked to discuss their proposals with the University to facilitate arrival at a contract most advantageous to the University. If the Procurement Officer determines that discussion is in the best interest of the University, the Procurement Officer will advise contractors in the competitive range to submit a best and final offer for consideration after discussions are held.

However, discussions may not be conducted if the Procurement Officer determines either that discussions are not in the best interests of the University or that discussions need not be conducted: (a) with respect to prices that are fixed by law or regulation, although consideration shall be given to competitive terms and conditions; (b) because the time of delivery or performance does not permit discussions; or (c) because it can be demonstrated clearly from the existence of adequate competition or accurate prior price experience with the particular item that acceptance of an initial offer without negotiation would result in a fair and reasonable price.

ATTACHMENT 1

Request for Proposals 83789N Real time Traffic Data Pricing Sheet

ATTACHMENT 2

I-95 Vehicle Probe Project Data Validation Program

I-95 Vehicle Probe Project Data Validation Program Version 2.4

November 7, 2013

An essential aspect of the I-95 Corridor Coalition's (the Coalition) traffic monitoring system that spans much of the east coast is the validation program to insure its quality and accuracy. The traffic monitoring system, called the Vehicle Probe Project (VPP), is procured from private industry (the Vendor) based on contract specifications. The data validation program is designed to ensure data quality and is comprised of data collection, processing, calculation of quality metrics, and contract conformance. This document provides an overview of the principles and process, which have been executed in over 40 discrete test reports since 2008.

DATA COLLECTION

Portable Bluetooth sensors, developed in the Center for Advanced Transportation Technology at the University of Maryland are used for ground truth data collection, as demonstrated in Figure 1. The portable units run on rechargeable batteries and are deployed on freeways in proximity to the roadway at the base of a sign post or guard rail post. Units are deployed and collect data for 10 to 14 days. Sensors store the MAC ID of the detected Bluetooth devices along with their detection time in a removable memory card. Data are recorded and download for processing to a database server at the end of each deployment. Matching MAC addresses between two consecutive sensors generates travel time samples which form the basis of comparison to VPP data.

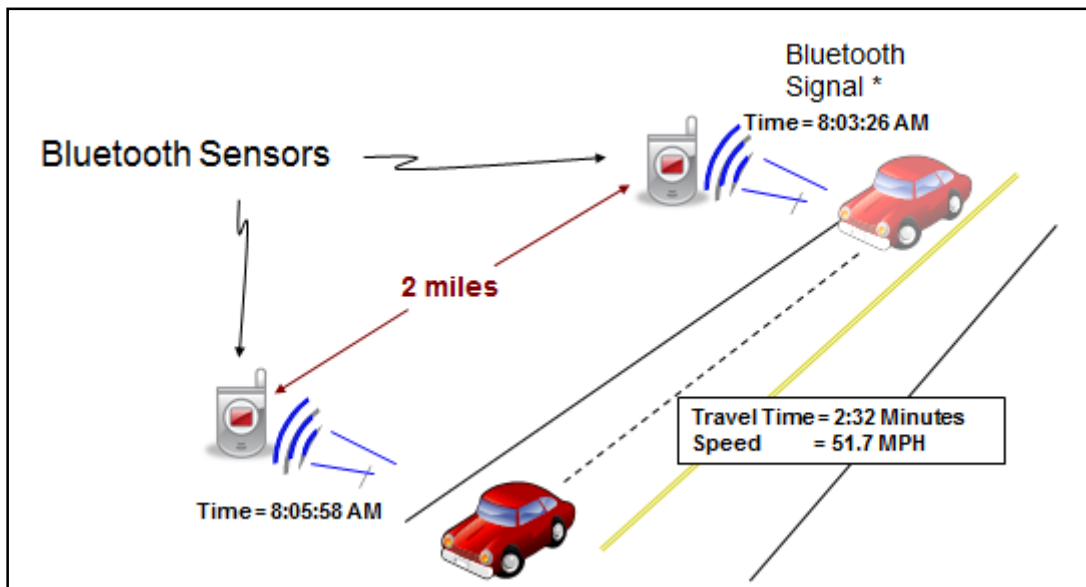


Figure 1. Bluetooth MAC ID Data Collection

Data collection is performed approximately monthly. The Coalition coordinates with state personnel to plan and collect data. Segments are chosen to maximize the probability of observing slowdowns and congestion. Generally, for freeway validation, segments are chosen between 1 and 3 miles in length that correspond to the boundaries of Traffic Message Channel Codes (TMCs). To date, only freeway segments have been subject to contract quality specifications, although various arterial data has been collected and process consistent with the described methodology.

Sensors are deployed as close as possible to the endpoints of TMC segments based on the geodetic coordinates provided in the TMC location database. In the deployment process, every

effort is made to minimize the distance between sensor deployment location and the target TMC point. Actual sensor locations, and distance along the roadway between sensors are recorded.

DATA PROCESSING

Data collected from Bluetooth sensors are used to estimate ground truth travel time for comparison with VPP data. Prior to comparison, Bluetooth matched pair data, conveniently referred to as traversals or observations, go through a processing of filtering and aggregation. Various filters are applied to identify and discard outliers. After data is filtered, data is assembled into five minute time intervals. For each five minute time interval the number of traversals must exceed a pre-defined minimum, and the variance of the points must not exceed a pre-defined maximum to be used in the validation process. See Figure 2 for an overview of the process.

Bluetooth data filtering and aggregation

Individual observations in each five minute time interval must be aggregated to produce the space mean speed corresponding to that time interval. This aggregate speed estimate is the basis of comparison with the corresponding vehicle probe data feed and therefore plays a crucial role in determining the results of the validation. Space mean speed in a five minute interval is obtained as the ratio of the segment length to the average observed travel times in that time interval as defined in Eq. 1.

$$S_{BT} = \frac{L_r}{\frac{\sum_{i=1}^n T_i}{n}} \times 3600 \quad (1)$$

where, S_{BT} is the space mean speed in miles per hour, L_r is the real distance between the pair of sensors in miles, T_i is the travel time of the i th observation in seconds, and n is the number of observations in the five minute time interval in question. All data, including the raw Bluetooth detections, traversals, outlier filtering, and final aggregate speed calculations are provided for each validation exercise for review by the Coalition and Vendor¹. Any data collection or processing anomalies or inconsistencies are reviewed, and, upon consensus of both the Coalition and Vendor, are either included or excluded from the validation.

¹ INRIX Inc. has been the Vendor from 2008 to present.

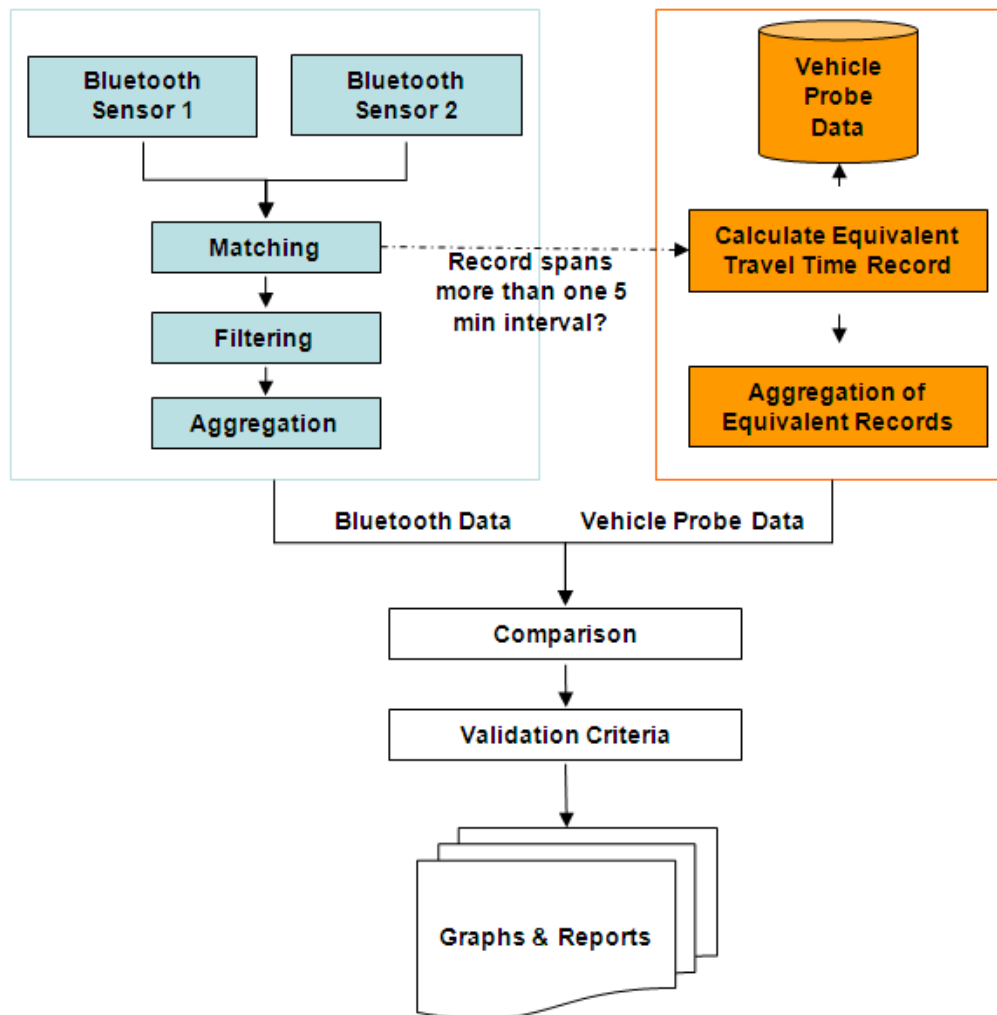


Figure 2. Validation Framework

Equivalent Vehicle Probe speed estimation

VPP travel time data is aggregated across TMC segments and for each five-minute time interval for comparison. The aggregation of VPP data is based on travel time and takes into account situations in which the Bluetooth travel time spans the five-minute evaluation intervals. For example, if the travel time indicated by Bluetooth spans the five minute analysis boundary, then an equivalent VPP travel time (and corresponding speed) is calculated based on the VPP speeds reported for the successive time intervals that span the trip length. Note that Bluetooth data are assigned to five-minute analysis intervals based on the time of trip completion.

Comparison and Quality Measures

In order to account for the uncertainty (or error) in the estimate of the mean, the standard deviation of the Bluetooth travel speed observations in each five minute time interval are used to establish confidence bounds. The standard error is estimated as given in Eq. 2

$$S.E._{BT} = \frac{S.D._{BT}}{\sqrt{n}} \quad (2)$$

where, $S.E._{BT}$ is the standard error of the Bluetooth speed mean estimate on a specific segment of the roadway in any given five minute interval. The 95th confidence band is established as

±1.96 times the standard error. The contract specifications for the average absolute speed error (AASE) and speed error bias (SEB) are assessed against this interval boundary.

CALCULATION OF QUALITY METRICS

The VPP quality metrics are based on the average absolute speed error (AASE) and speed error bias (SEB). Each are applied separately in four distinct speed bands for freeways. Aggregated Bluetooth and VPP speed data in five minute intervals are separated into speed bins based on the observed mean Bluetooth speed for each five-minute interval. The four speed bin boundaries are:

0-30 MPH, 30-45 MPH, 45-60 MPH and > 60 MPH.

AASE is calculated for each bin as follows:

Let: A_{ij} = Speed data for link i and 5-minute time interval j from the aggregated VPP.

B_{ij} = Speed data for link i and 5-minute time interval j from aggregated Bluetooth data

C_{ij} = Confidence band for link i and time interval j of aggregated Bluetooth data

T = Total number of 5-minute time intervals ($\sum_{ij}(1)$)

Average absolute speed error = $\sum_{ij}(\text{maximum}(0, \text{abs}(A_{ij} - B_{ij}) - C_{ij})) / T$

Note that the minimum absolute speed error for any five minute interval is 0. This occurs if the VPP speed data point falls within the confidence bounds of the Bluetooth data.

SEB is calculated for each bin as follows:

Speed error bias = $\sum_{ij} (\text{if } A_{ij} > (B_{ij} + C_{ij}), A_{ij} - (B_{ij} + C_{ij})$
 $\text{elseif } A_{ij} < (B_{ij} - C_{ij}), A_{ij} - (B_{ij} - C_{ij})$
 $\text{else } 0) / T$

Summary results for each validation exercise are reported in table format. A sample is shown in Table 1. For each speed range the AASE and SEB are provided as calculated against the 95th confidence interval as well as against the mean. The number of five-minute intervals and corresponding hours of data collection are also provided.

Table 1. Typical reporting of contract quality metrics.

SPEED BIN	Data Quality Measures for				No. of 5 Minute Samples	Hours of Data Collection
	1.96 SEM Band		Mean			
	SEB 5 mph (contract specifications)	AASE 10 mph	SEB	AASE		
0-30	1.4	1.9	1.9	3.1	1671	139
30-45	3.5	4.4	4.9	6.5	1483	124
45-60	1.7	2.0	3.4	4.2	12490	1041
60+	-0.4	0.9	-1.1	3.0	16672	1389

CONTRACT CONFORMANCE AND IMPACT TO PAYMENT

In order to determine conformance to contract specifications, and apply payment adjustments based on conformance, the following methodology is in effect.

The impact to payment of subscription rates is based on the four speed categories previously defined. The payment formula is divided into four equal portions, each corresponding to one of the four speed categories. If quality specs are fully met in each of the four speed categories, the Contractor will receive the full invoiced amount. If the quality of the data falls short in a specific speed category, the corresponding payment for that respective speed category will be reduced. Any payment reduction will be affected based on a linear combination of two factors, Q₁ and Q₂,

corresponding to AASE and SEB as described below. An illustration of the scheme is shown for a hypothetical invoice for March 2009 in Table 2.

Table 2. Hypothetical Invoice and payment calculation.

Hypothetical Invoice for March 2009					
Total Amount Invoiced:					\$ 100,000.00
Application of Quality Metrics					
Category	Payment Portion P_x	Quality Factors		Overall Q Factor	Payment ($P_x * Q * Invoice$)
		AASE Q_1	SEB Q_2	$\frac{2}{3} * Q_1 + \frac{1}{3} * Q_2$ Q	
0-30 MPH	25%	0.80	1.00	0.87	\$ 21,666.67
30-45 MPH	25%	1.00	0.93	0.98	\$ 24,416.67
45-60 MPH	25%	1.00	1.00	1.00	\$ 25,000.00
> 60 MPH	25%	1.00	1.00	1.00	\$ 25,000.00
Total Payment					\$ 96,083.33

Each speed category is assigned an equal initial weight of 25% of the overall invoice payment. This approach is used in order to balance the quantity of traffic in each category against value of the information represented by each speed bin. Traffic flowing at nominal speeds of 60+ mph (particularly daytime non-rush hour periods and overnight hour periods) has historically accounted for approximately 72% of all freeway validation data, while minor congestion of 45-60 mph accounts for roughly 22%, moderate congestion of 30-45 mph accounts for 3%, and severe congestion (0-30MPH) accounts for the remaining 4%.

The value of the traffic information is greatest for congested conditions (0-30 mph and 30-45 mph). Likewise, accuracy of traffic data is most critical during congested time periods. By placing equal weights on each speed bin, the importance of information during moderate to severe congestion is balanced with the preponderance of data delivered during free-flow conditions.

Utilizing this model, a quarter of each payment is dependent on the quality of traffic data in each of the four speed bins as shown in Table 2. The quality factors, Q_1 and Q_2 , are based on the validation results from the AASE and SEB. The 2008 VPP contractual limit on AASE is 10 MPH. If the calculated AASE is 10 MPH or less, there is no penalty and Q_1 factor is equal 1.0. If the measured AASE falls between 10 MPH and 15 MPH, the Q_1 factor is decreased proportionally from 1.0 to 0 as illustrated in the top graph of Figure 3. If the AASE is 15 or greater, the quality factor, Q_1 , is zero.

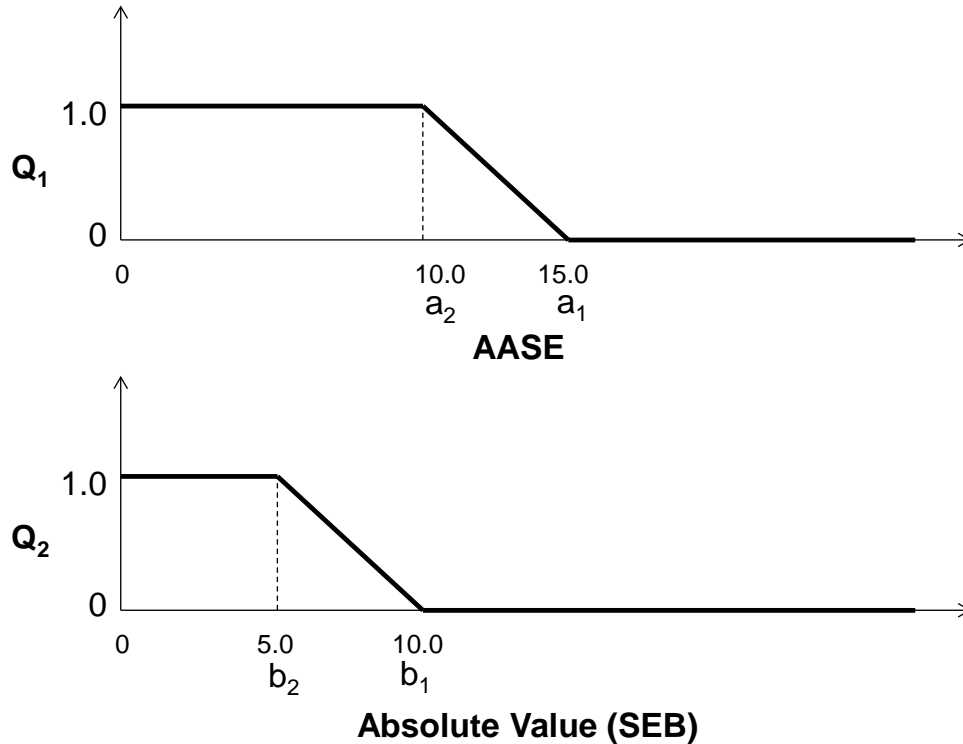


Figure 3. Illustration of the calculation of the AASE and SEB quality factors (Q_1 and Q_2) A similar scheme is applied to the SEB to produce the Q_2 quality factor as illustrated in the bottom graph of Figure 3. The Q_2 is equal to 1.0 for an SEB less than five (5) mph (note the absolute value is applied to SEB). The Q_2 is proportionally decreased to zero as the SEB reaches 10 mph.

The overall quality factor (Q) for the specified speed category is the linear combination of $2/3 * Q_1 + 1/3 * Q_2$.

The data used in the calculation of the payment factors (namely the AASE and SEB) will be a representative sample of the vehicle probe project. Limits in terms of minimum amount of data, geographical extents, and time period of sampling are provided below. Data from multiple validation exercises are combined to create an ‘Assessment Data Set’.

Guidelines for creation of the Assessment Data Set for the calculation of Quality Factors:

- At a minimum, the data from the most recent three complete validation exercises predating the invoice will be included in the Assessment Data Set. Additional data will be included (chronologically in time), if needed, to meet additional criteria.
- A minimum of three states will be represented in the Assessment Data Set.
- A minimum of 1500 hours in aggregate across all speed bins, and a minimum of 25, 50, 300, and 1000 hours respectively in each of the speed bins (0-30, 30-45, 45-60, > 60) will be included in the Assessment Data Set.
- Data will be included sequentially by date proceeding backward from the date of the invoice until all of the above requirements are met.

Both the Coalition and the Vendor has opportunity review the validation results prior to publication. Upon mutual agreement of both the Coalition and Vendor, data, methods, and

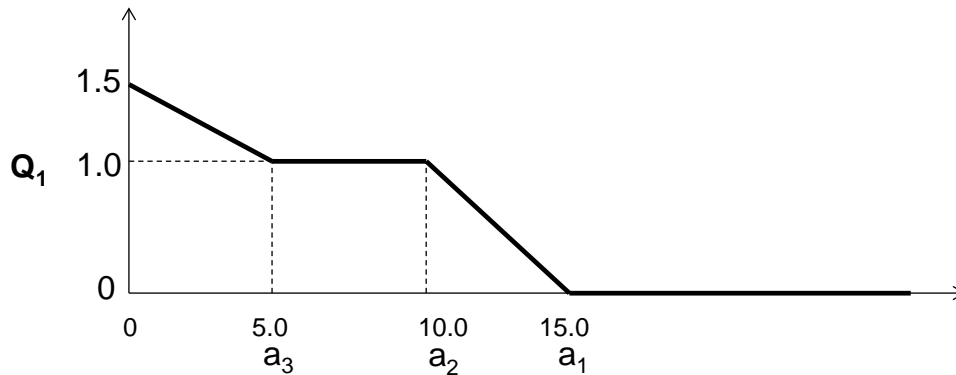
processes may be amended. Accuracy metrics for the calculation of quality factors will be applied against the 95th confidence band.

Offset Credit

In order to encourage improvements in data quality, The Coalition implemented an Offset Credit program. Offset Credit is calculated based on the results of the 0-30 MPH and 30-45 MPH speed bins, which have proven the most difficult to consistently meet contract specifications. The quality of data in these lower speed bins best reflects the ability of the data feed to accurately capture congestion. If the data feed incorrectly reports a significant congestion event, the AASE in these lower speed bins are significantly impacted.

For the lower two speed bins, Q_1 is calculated as illustrated in Figure 2. If the AASE falls below 5 MPH, a Q_1 value greater than 1.0 is possible. As the AASE decreases from 5.0 to 0, the Q_1 proportionally increases from 1.0 to 1.5. These Q_1 values are used in the calculation of the payment for the lower speed bins. If the resulting payment is greater than the invoice, the overage (in terms of percentage of payment) may only be applied to future invoice payments in the event that quality falls below minimum standards subject to the following:

- Payment for any invoice can never exceed the amount of the invoice.
- Any offset credit is applied to future invoices in the event data quality dictates a reduction in payment.
- Earned Offset Credits shall remain active for a period not-to-exceed period eighteen (18) months.



AASE Q_1 Calculation for 0-30 and 30-45 Speed Bins

Figure 4. Illustration of the Q_1 factor for Offset Credit

A sample of a payment calculation from the VPP is shown Table 3.

Table 3. Sample Payment Calculation from 2011

(a) Individual validation results comprising the Assessment Data Set

University of Maryland RFP No. 83794N To Provide Real-Time Traffic Data and Associated Products to I-95 Coalition Organizations and Affiliates

State	Absolute Speed Error (<10mph)		Speed Error Bias (<5mph)		Hours of Data Collection	# Data Points	
	Comparison w ith SEM Band	Comparison w ith Mean	Comparison w ith SEM Band	Comparison w ith Mean			
MD - Oct 2011							
	0-30 MPH	2.40	3.60	1.40	1.80	72.3	868
	30-45 MPH	4.30	6.50	3.20	4.60	30.9	371
	45-60 MPH	1.70	4.10	1.40	3.20	252.2	3026
	> 60 MPH	0.90	3.00	-0.40	-1.00	429.0	5148
	All Speeds	1.43	3.55	0.49	0.83	784.4	9413.0
PA - Sep 2011							
	0-30 MPH	3.50	5.20	2.90	3.80	42.8	514
	30-45 MPH	5.20	8.10	3.60	5.20	43.4	521
	45-60 MPH	1.30	3.40	0.80	2.20	700.8	8410
	> 60 MPH	0.90	2.80	-0.60	-1.90	971.6	11659
	All Speeds	1.23	3.23	0.15	0.05	1758.7	21104.0
VA - Jul 2011							
	0-30 MPH	7.70	8.70	6.30	6.70	68.2	818
	30-45 MPH	6.00	7.30	3.90	4.60	111.0	1332
	45-60 MPH	2.20	4.00	0.30	1.00	309.5	3714
	> 60 MPH	1.80	3.80	-1.70	-3.40	243.0	2916
	All Speeds	3.16	4.87	0.74	0.62	731.7	8780.0

(b) Aggregate Assessment Data Set

State	Absolute Speed Error		Speed Error Bias		Hours of Data Collection	# Data Points	
	Comparison w ith SEM Band	Comparison w ith Mean	Comparison w ith SEM Band	Comparison w ith Mean			
AGGREGATE QUALITY CALCULATION							
	0-30 MPH	4.63	5.87	3.57	4.09	183.3	2200.0
	30-45 MPH	5.53	7.35	3.71	4.74	185.3	2224.0
	45-60 MPH	1.60	3.69	0.80	2.11	1262.5	15150.0
	> 60 MPH	1.03	3.00	-0.71	-1.89	1643.6	19723.0
	All Speeds	1.71	3.67	0.36	0.36	3274.8	39297.0

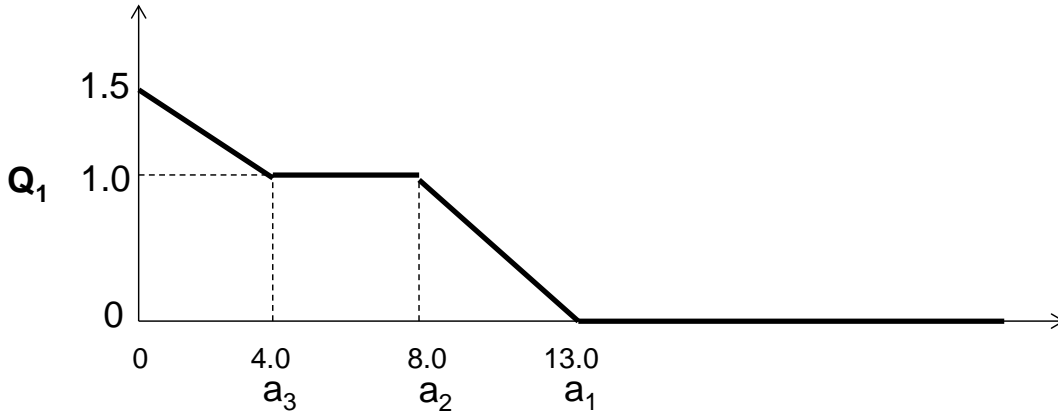
(c) Application of payment formula resulting in Offset Credit of 0.62%

	Absolute Speed Error		Speed Error Bias		Hours of Data Collection	Payment Factor 2/3*Q1 + 1/3*Q2	Proportion	Total Payment	
	Comparison w ith SEM Band	Q1 Factor	Comparison w ith SEM Band	Q2 Factor					
PAYMENT CALCULATION									
	0-30 MPH	4.63	1.04	3.57	1.00	28.7	1.02	25%	0.256
	30-45 MPH	5.53	1.00	3.71	1.00	53.0	1.00	25%	0.250
	45-60 MPH	1.60	1.00	0.80	1.00	325.3	1.00	25%	0.25
	> 60 MPH	1.03	1.00	-0.71	1.00	1176.5	1.00	25%	0.25
									100.62%

EXTENSIONS OF METHODOLOGY 2013

Varying AASE and SEB Accuracy Specifications

The basic methodology for impact to payment can be adapted to other AASE and SEB accuracy specifications by changing the critical points on the Q₁ and Q₂ curves as designated by [a₁, a₂, a₃] and [b₁, b₂] respectively. For example, an AASE accuracy specification of 8 mph may be implement in the Q₁ curve by a₁ = 4, a₂ = 8, and a₃ = 13, as illustrate in Figure 5.



AASE Q1 Calculation for 0-30 and 30-45 Speed Bins

Figure 5. Illustration of the Q1 factor for max AASE of 8 mph

Measuring Latency

Latency within the Vehicle Probe Project is defined as the difference between the time the traffic flow is perturbed as a result on an incident and the time that the change in speed is reported in the traffic data. Conceptually, latency is measured by observing the time difference between the onset of a slowdown as reported by Bluetooth traffic monitoring, and that reported by the VPP. A graphical representation is shown in Figure 6.

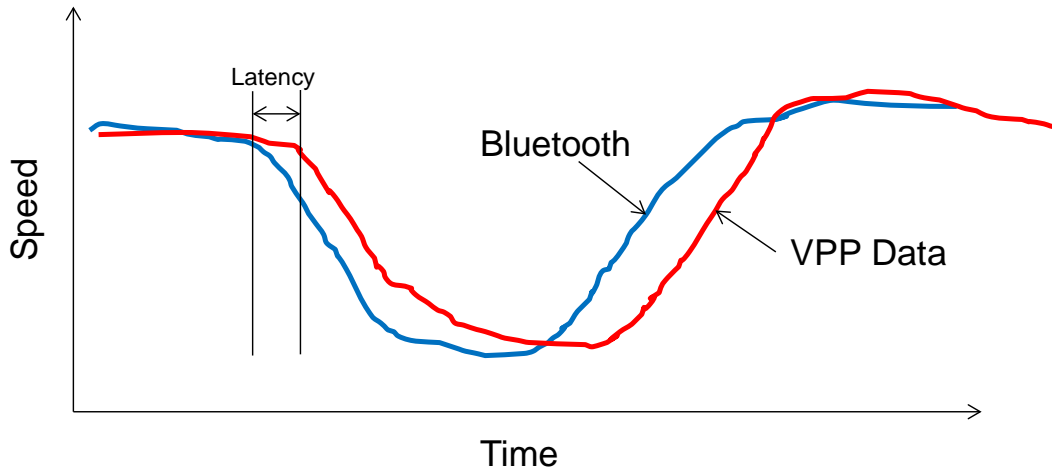


Figure 6. Measurement of Latency

Measurement of latency is on an event by event basis, where an event represents a major slowdown. The proposed basis for measuring latency within the VPP is as follows:

- Bluetooth data is summarized to a one-minute basis.
- Slowdown events are identified within the Bluetooth data from which to measure latency. Candidate criteria for slowdowns is a decrease in traffic speed of 20 mph within a 10 minute period, and speed remains below the 20 mph for at least 15 minutes as illustrated in Figure 7.

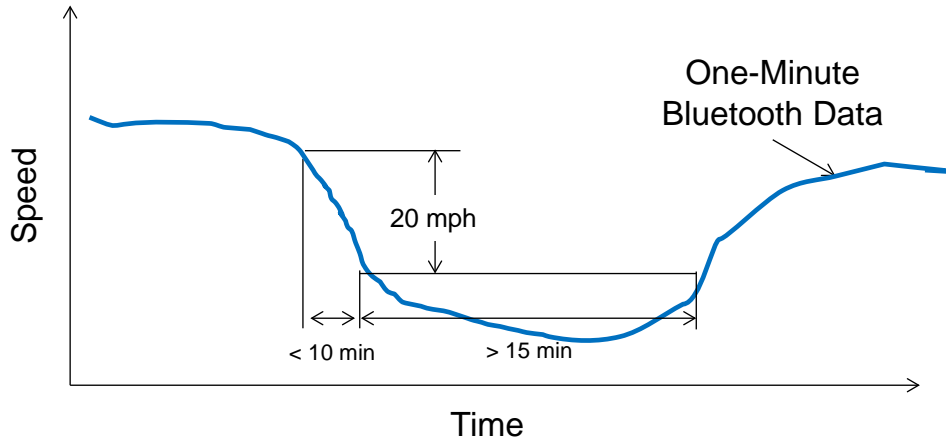


Figure 7. Determination of a Slowdown Event

- VPP data is downloaded from the Regional Integrated Transportation Information System (RITIS) at the highest resolution and correlated to the Bluetooth data with a variable time offset. The time offset that maximizes the correlation during the slowdown between the Bluetooth and VPP data determines the latency for the slowdown event.
- The average latency is determined by the average of individual latency calculations across the entire validation data set.

CONTRACT CONFORMANCE AND IMPACT TO PAYMENT FOR LATENCY

The impact to payment of subscription rates for latency is implemented with a third factor, Q_3 , based on the average calculated latency. Q_3 is calculated similar to Q_1 and Q_2 as shown in Figure 8. Full credit is received for average latency less than or equal to maximum specified latency specified (c_2), eight minutes as illustrated in Figure 8. Q_3 is linearly reduced from 1.0 to 0 for average latencies greater than the specification (c_2) up to a maximum defined by c_1 , eight to fifteen minutes in Figure 8. Q_3 is 0 for average latencies greater than c_1 . Offset credit can also be incorporated for average latencies less than a specified threshold, similar to implementation of offset credit for Q_1 .

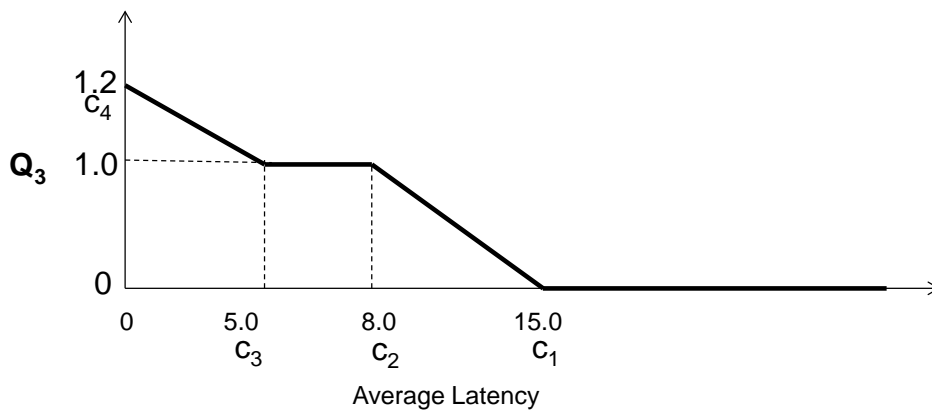


Figure 8. Calculation of Q_3 Factor for Latency

The critical points, c_1 , c_2 , c_3 , and c_4 may be modified for different levels of latency specifications.

The overall quality factor (Q) for each specified speed category is then modified by the inclusion of Q_3 , such that the overall quality factor (Q) becomes a function of Q_1 , Q_2 and Q_3 . The exact form of the function has not been implemented, but will be based on Coalition research, relative importance of latency with other specifications, and in collaboration with the vendor.

Latency will introduce additional guidelines for creation of the Assessment Data Set for the calculation of Quality Factors. In addition to the guidelines for Q_1 and Q_2

- A minimum of thirty slowdowns will be represented in the Assessment Data Set.

ATTACHMENT 3

Real-Time Volume and Origin- Destination Data for Operations: Concepts, Definitions and Use Case Scenarios

Attachment 3

Real-Time Volume and Origin-Destination Data for Operations Concepts, Definitions and Use Case Scenarios

Version 3.4

October 07, 2013

In 2012, the I-95 Corridor Coalition approved funding for a research initiative proposed by the University of Maryland (UMD) Center for Advanced Transportation Technology (CATT) to investigate the feasibility of integrating real-time volume and origin-destination (O-D) data into the Vehicle Probe Project (VPP). In July of 2013, UMD CATT issued a Request for Information (RFI) to industry to gather information on the state of the practice in relation to this concept. One of the main findings of the RFI was the uncertainty in the definition of real-time volume and O-D, and confusion on how such data could be used for operations and traveler information purposes.

In order to resolve the uncertainty and confusion, the UMD CATT began discussions with vendors, industry, and state Departments of Transportation (DOTs) to better define the concept. As a by-product of this discussion, UMD began to collect and organize a set of use case-scenarios that amplify the use of vehicle flow data (encompassing volume and O-D) for operations and traveler information. The use-case scenarios provide a top-level view of how applications can be enhanced or enabled if such data were available. Within these scenarios the concepts of volume data and O-D are at times distinct, and at other times combined.

Although the use-case scenarios do not dictate the format for the data, a frequently raised question was what format such data would take within the context of the VPP. To facilitate discussion, a sample realization of how real-time volume and O-D data may be provided within the context of the existing VPP, utilizing Traffic Message Channel (TMC), for corridor and regions. . However, this is only a sample realization, and does not restrict how vendors may eventually be able to provide such data. Unlike travel time and speed which is reported up to once per minute, it is anticipated that volume and O-D will much less dynamic, requiring less frequent updates, perhaps 5 to 15 minute reporting for volume, and 15 minute to one hour for O-D. .

In the sections that follow, the real-time volume and O-D concepts are defined, with sample data formats, and use-case scenarios described. UMD CATT invites vendors, consultants, and agencies to comment and contribute to the discussion.

Defining the Concepts

Currently the VPP provides an estimate of speed and travel time for each highway segment, updated as frequently as once per minute using standardized TMC road segments. Similarly, volume and O-D real-time data feeds would provide a continuous source of data, encoded in a similar format, and updated periodically – though possibly not as frequently as travel time and speed data.

Volume Data

Real-time volume data is envisioned as the hourly directional flow rate out of a TMC segment reported on a periodic basis, perhaps as an additional field in the current speed and travel time data feed on a per minute basis, or perhaps as an independent data feed that updates once every five minutes or more. The volume data would be an estimate of the hourly vehicle flow rate across all lanes of traffic (not per lane volume). Although the format of the data may be a literal volume estimate in terms of vehicles per hour, it is anticipated that the granularity of broad-based volume information based on probe data would be fundamentally limited. Flow regimes, such as 0 (estimate of no traffic), 1-250, 250-500, 500-750, etc., may be better suited than actual flow measurements, acknowledging that the sampling nature of existing technology will fundamentally limit the accuracy of volume estimate based on the statistical limits of sampling theory. Even with known accuracy limits, broad based volume information on a per segment basis would enable and assist with several operations applications.

[In the above discussion, volume is defined as the number of vehicles exiting a segment on an hourly basis. Other metrics such as number of vehicles on the segment, entering vehicle flow, density of vehicles, etc. may also be reported.]

The accuracy of volume estimates based on sampling data is explored in the following four charts. As the sampling rates increases, the percentage error decreased. The percentage error is defined here as the ratio of the binomial standard deviation (based on flow rate, reporting interval and sampling percentage) to the flow rate itself. Results are shown for sampling rations of 5, 10, 25 and 50 percent.

	Time Aggregation (minutes)	Volume (vehicles/hour)									
		50	100	200	500	750	1000	1500	2000	3000	5000
5% Sampling	5	214%	151%	107%	68%	55%	48%	39%	34%	28%	21%
	10	151%	107%	75%	48%	39%	34%	28%	24%	19%	15%
	15	123%	87%	62%	39%	32%	28%	23%	19%	16%	12%
	30	87%	62%	44%	28%	23%	19%	16%	14%	11%	9%
	60	62%	44%	31%	19%	16%	14%	11%	10%	8%	6%
10% Sampling	5	147%	104%	73%	46%	38%	33%	27%	23%	19%	15%
	10	104%	73%	52%	33%	27%	23%	19%	16%	13%	10%
	15	85%	60%	42%	27%	22%	19%	15%	13%	11%	8%
	30	60%	42%	30%	19%	15%	13%	11%	9%	8%	6%
	60	42%	30%	21%	13%	11%	9%	8%	7%	5%	4%
25% Sampling	5	85%	60%	42%	27%	22%	19%	15%	13%	11%	8%
	10	60%	42%	30%	19%	15%	13%	11%	9%	8%	6%
	15	49%	35%	24%	15%	13%	11%	9%	8%	6%	5%
	30	35%	24%	17%	11%	9%	8%	6%	5%	4%	3%
	60	24%	17%	12%	8%	6%	5%	4%	4%	3%	2%
50% Sampling	5	49%	35%	24%	15%	13%	11%	9%	8%	6%	5%
	10	35%	24%	17%	11%	9%	8%	6%	5%	4%	3%
	15	28%	20%	14%	9%	7%	6%	5%	4%	4%	3%
	30	20%	14%	10%	6%	5%	4%	4%	3%	3%	2%
	60	14%	10%	7%	4%	4%	3%	3%	2%	2%	1%

Table 1 Estimated volume error as a function of sampling percentage, time aggregation, and volume

Origin – Destination Data

Origin-destination data, or simply O-D data, has different realizations depending on the network context. It may be as expansive as Travel Analysis Zones (TAZ) used frequently in long term planning operations, or as limited as turning movement proportions within an intersection or interchange. For real-time operations, O-D is envisioned as a data feed separate from that speed or travel time reflecting actual trip making patterns between a subset of nodes within the network. Using the TMC context, the data feed would report at an appropriate time interval (perhaps 15 minutes) the TMC to TMC trip making patterns on a specified geographic scale. At the smallest scale, it could track turning movement counts. At larger specified scales, it may track corridor distribution of traffic. At the largest scale it would reflect region to region trip demand. The smaller scales could be facilitated with direct TMC to TMC trip matrixes, whereas the larger scale could be facilitated by first grouping TMC to large nodes. For example, at larger scales, the TMCs could be grouped such as:

- i. TMC set 1 -> TMC set 2: 25 percent
- ii. TMC set 1 -> TMC set 3: 60 percent

- iii. TMC set 1—> TMC set 4: 15 percent
- iv. Etc.

TMC sets would reflect manageable zones indicative of regional trip making patterns. Samples of O-D by scale are provided in Figure 1. Figure 1a represents a small scale O-D reflecting turning movements at an interchange. The set of TMC segments A through H provide node representations for the entry/exit links on the on the interchange. Figure 1b represents a corridor O-D using similar logic, except each arrow represents a pairing of TMCs to capture flow both inbound and outbound on the corridor. Figure 1c depicts larger groupings of TMCs to reflect regional flow patterns.

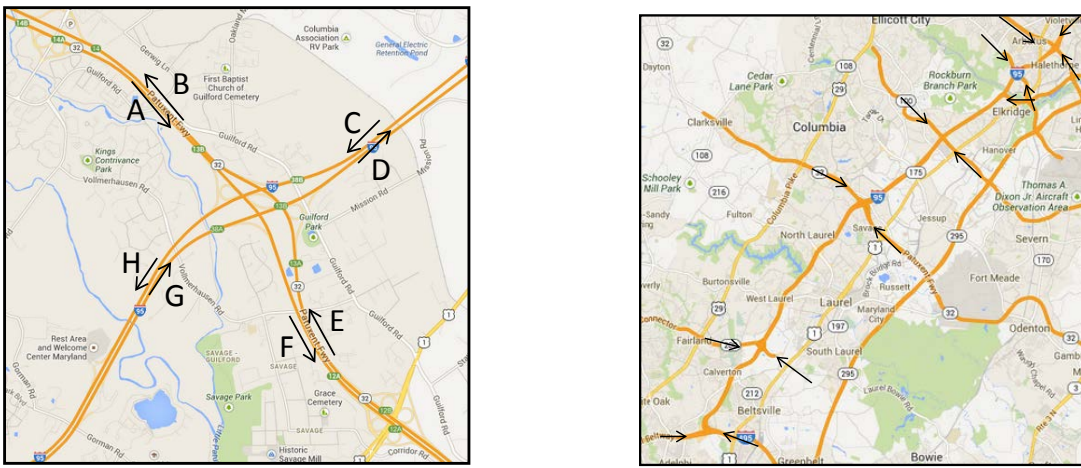


Figure 1a Interchange turning movement O-D Figure 1b Corridor scale O-D

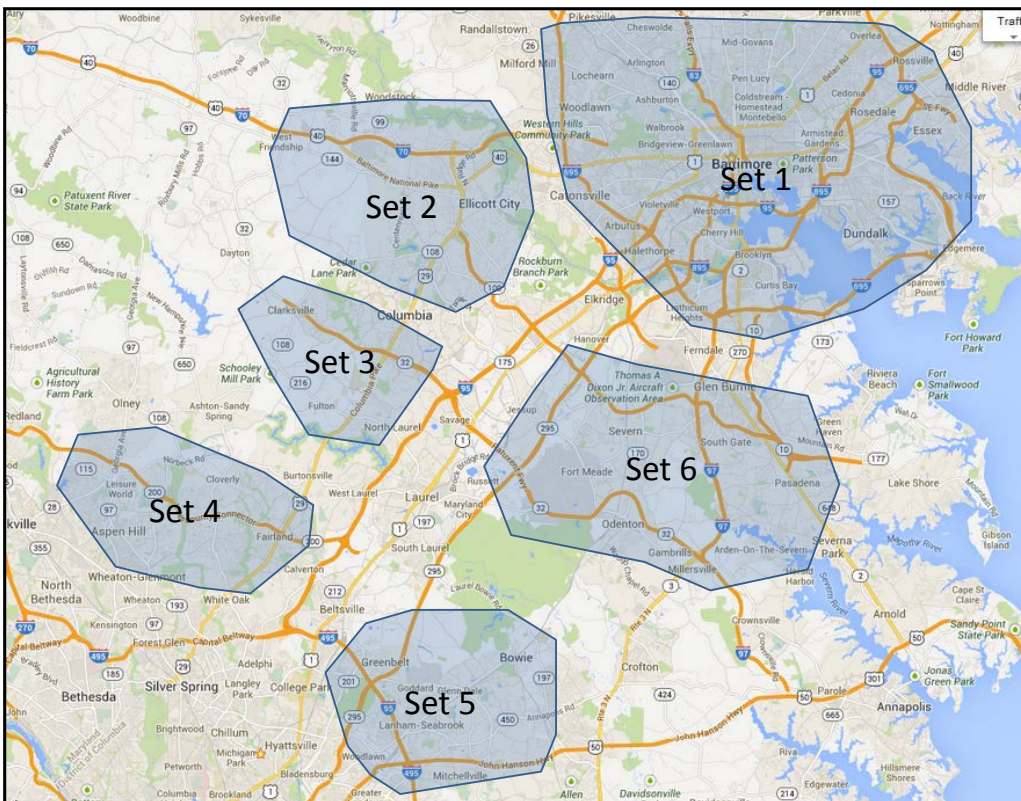


Figure 1c Regional O-D using TMC sets

Although volume and O-D measures are distinct, they are often complimentary within the context of highway management operations.

Real-Time Volume and Origin-Destination Data Use Case Scenarios

The following are a collection of scenarios in which the availability of volume data and/or O-D may enable or enhance highway management operations. Some examples may be purely volume (and are annotated with a 'V' only), some may be only 'O-D' (annotated accordingly), and some may be both ('V and O-D').

(1) Real-time volume flow during major events and incidents – [V]

Current volume information is available primarily in two forms. Volume sensors (in the forms of loops or radar) provide vehicle counts and occupancy at select locations, but are typically limited due to high cost of installation and maintenance. Highway performance monitoring system (HPMS) data provides sample counts to estimate hourly weekday and weekend volumes under normal demand. Major events can dramatically alter usage patterns. Hurricanes, major snow storms, political events such as the inauguration, and major incidents are all examples of possible scenarios on the eastern portion of the United States that have occurred, and can occur in which anticipated volumes greater differ from actual roadway volume/demand. During such events, anticipated volumes from HPMS have little value, and the density of most real-time traffic counters is too sparse to provide a comprehensive view of traffic flow. Whereas the existing VPP can provide speeds and travel times, the demand characteristics on the network are absent.

Real-time flow information in terms of volume on a per TMC basis would greatly benefit situational awareness. For example, during major snow events in the Washington, D.C. metropolitan area the Federal Government has the latitude to dismiss government workers earlier, and has done so on occasion. On such occasions the prevailing evening rush hour patterns are completely disrupted, typically moving rush hour earlier in the day. Broad-based flow data on various facilities during such situations would provide more objective understanding of the impact during such events. Also, volumes could also be combined with incident information to better determine roadway incident rates to help identify high-incident segments/corridors. Ideally, as greater understanding is gained of these unusual off-peak traffic patterns, this data might also be used to support the Government's decisions regarding such early releases.

(2) Monitoring road closure and clearance of major events – [V]

Probe-based traffic monitoring has succeeded in recent years to provide comprehensive speed and travel time situational awareness for urban networks, as well as rural highways. Low-flow conditions remain problematic. During events or weather that diminish the volume, it remains problematic to determine from probed based data if the roadway is closed, extremely slow, or simply absent of demand (volume of vehicles). Augmenting real-time speed and travel time with flow (volume or demand) estimates would provide the additional dimension to better resolve such situations.

One such example is determining clearance of rural incidents. Often the onset of an

incident is reported to traffic management centers via normal emergency reporting. However, the clearance of incidents in rural portions of the network remains problematic. The corresponding 511 systems may inadvertently leave incorrect incident data long after the incident has been cleared. Flow information may provide sufficient information to resolve closure of rural incidents.

Applications are not limited to rural areas, but could also apply to urban areas or any time when volume data is helpful to identify when traffic has returned to “normal” (historically normal) conditions. Time to ‘return to normal’ conditions is an incident management performance measure that has been discussed, but never put into practice because due to the difficulty of determining normal flow based solely on speed or travel time data. Recent attempts to use speed/travel time only data to determine winter weather road clearance times suffer from similar issues. Speed alone is often insufficient to conclusively determine return to ‘normal conditions’ without accompanying volume data.

(3a) Accurate Operations Performance Measures – [V]

Current user costs for congestion are calculated based on HPMS anticipated volumes, factored for time of day, seasonal, and day of week. Actual volumes would provide more accurate measures of congestion impact. Also, identifying events in which volumes are drastically different from nominal weekday traffic would also prevent statistical outliers (such as major snow storms) that impact both travel time and volumes from incorrectly biasing performance measures.

Moreover, real-time volumes, together with speeds can be used to calculate real-time user delay costs which can be important to convey performance to management and elected officials.

(3b) Operations Performance Measures assessed by Trip – [O-D]

Current performance measure concepts assign performance to the network on a segment by segment basis, which does not always reflect the experience of the users who make known trips from suburbs to city for work, or suburbs to the beach for weekend. O-D information would allow a trip-making approach to highway performance measures that may more accurately reflect the experience of the user.

(4) Diversion Routes During Incidents [V & O-D]

Traffic response to reported incidents, 511 or travel time information is difficult to monitor. Travel time and speed, though useful for traveler information, provides little data to understand driver reaction. Most information on diversion is ad-hoc, subjective views, as sensors are rarely positioned to provide objective information in changes of flow patterns. Volume flows and O-D in the form of diversion paths from nominal would aid in understanding traffic diversion during incidents, predicting flows on adjoining roads, and possibly provide better traveler information on which alternate routes to use.

An example in the Maryland region is impact of congestion on I-270, a radial interstate feeder to the Northwest of the DC metropolitan area, to traffic on Rockville Pike, a parallel arterial roadway. Another example is the balance of flow between I-95, Route 29, Route 1, the Baltimore-Washington Parkway, and to a lesser extent I-97, all over

which provide parallel paths between the DC and Baltimore metropolitan regions. Do major incidents on I-95 impact expected volumes – and associated diversion paths to other parallel facilities? Volume data alone may be able to resolve some of the diversion patterns. Volume and O-D combined assists in the more complex networks, as well as to better understand the limits of diversion in some instances.

(5) Impact of Traveler Information on Diversion Routes [V and O-D]

Most states have invested substantially in changeable message signs (CMS) to alert drivers of expected delay and for emergency situations. However, measuring the impact of information provided to the public (either due to posted travel times or in the event of emergencies that require evacuation) is problematic. Flow data provides a means of direct feedback on the effectiveness of use of CMS. As with diversion due to incidents, volume data alone can assist with simple scenarios, where as volume combined with O-D would provide sufficient data across a larger impacted network, as well as understand the complexity of the trip making. As a corollary, volume and O-D data will also improve understanding of the relationship between message content and diversions.

(6) Volume Heat Maps, Understanding Utilization of Existing Capacity – [V]

Network monitoring consists primarily of speed and travel time at present. Although the theoretical relationship with volume is well understood, and many traffic management centers and transportation experts have an understanding of volume flow (tidal, peak, etc.) from experience, the knowledge of volume flow is less objectively monitored. Diversion of traffic from one facility that is experiencing an incident to another facility may simply overwhelm capacity, causing extreme slowdowns if traffic is diverted. Understanding capacity, and under-utilized capacity is essential for further operations effectiveness.

(7) Real-time O-D flows and Diversion Impacts [V and O-D]

Although O-D is frequently considered only in planning aspects, understanding expected turning and diversion patterns (in addition to volume and speed) remains only theoretical. In addition to monitoring and predicting speeds and volume fluctuations as a result of major perturbations to the network, predicting changes in demand (of where people need to go and where they are coming from) in response to major events (hurricanes and snow storms) may prove critical to management and preparation. Unlike volumes and travel times, understanding of normal weekday O-D is lacking beyond simple tidal flow impacts. A better model of major regions and feeders and their destinations will better inform operations personnel of incident impacts, and optimal response. Knowledge of the O-D demand combined with prevailing volume on roadways information provide the basis to optimally direct traffic to maximize the utility of available capacity.

(8) Use of Travel Demand for Calculation of Signal Timing [V and O-D]

Traditionally, signal timing is calculated based on traffic volumes measured using either machine counts or manual counts taken over a relatively short period of from 15 minutes to a single day. As a result, short term variations in demand occurring when the counts are taken will bias the results. Longer term measurements of traffic volumes would improve the quality of off-line signal timing. Similarly, signal timing patterns implemented for non-recurring congestion (incidents and special events) is typically developed using “seat-of-the-pants” estimates due to the difficulty of collecting demand data during these unpredictable conditions. The availability of reliable volume data

during non-recurring conditions would be a valuable resource for calculation of signal timing to be used during non-recurrent congestion.

(9) Traveler Information for Work Zone Applications [O-D]

Appropriate traveler information for work zones is dependent on the type of traveler, their typical trip pattern, and percent local versus regional versus through travelers. Having this type of information would assist in developing an appropriate traveler information strategy, possibly even the help decide on the appropriate communication medium based on demographics. Here is an example: consider a large work zone on the Raleigh, North Carolina beltline. Are the majority of the people traversing the work zone at 10am ...

- Soccer moms from within the county
- Business men associated with the Research Triangle Park
- Construction workers related to the activity

Each group infers a different type of communication content and strategy. In reality, the disposition of the travelers will be a mix among various groups, with differing origin/destination patterns. However, knowledge of that disposition would assist to better focus, prioritize the travel information program. Furthermore, if real-time feedback is available (meaning that updated O-D data is transmitted on a day by day, or hour by hour basis) perhaps both the impact of the work zone AND the traveler information program may be assessed.