Traffic Data and Associated Services along the I-95 Corridor

Volume I - Technical

RFP 82085N

Prepared for:

UNIVERSITY OF MARYLAND 18 56

I-95 CORRIDOR COALITION

INRIX

Inrix, Inc.
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June 22, 2007

Bruce D. Brewer
University of Maryland
Department of Procurement & Supply
2113-R Chesapeake Building
College Park, Maryland 20742-3111

Re: Request for Proposal for Traffic Data and Associated Services along the I-95 Corridor (RFP No. 82085N)

Dear Mr. Brewer:

As co-Founder, President and Chief Executive Officer of INRIX, I am extremely pleased to submit our response to your request for proposals to provide traffic data and associated services for the I-95 Corridor Coalition.

After careful consideration of the University's and the Coalition's needs, objectives, and challenges, associated with the implementation and operation of a regional traffic monitoring system, INRIX has assembled an approach to completely meet your near-term needs while providing a uniquely capable and flexible platform for the expansion and evolution contemplated and required by the Coalition over what could be a 10-year contract lifespan. Further, we have assembled a talented and experienced consulting services team – led by industry leader PBS&J – to provide the Coalition and its member agencies with capabilities, resources and options to take full advantage of the unprecedented data made available by our proposal.

Our proposal is rooted in several key themes:

- √ **Full limited access highway coverage from project inception**. We will meet all mandatory requirements for the baseline system within the published project budget from the very beginning of operations – 6 months from notice to proceed – including covering all freeways specified. We currently provide real-time data to dozens of customers for over 75% of the identified freeway mileage (including over 80% in the core states).
- √ **Our architecture is designed for enhancement and expansion**. The INRIX Smart Dust Network and INRIX Traffic Fusion Engine provide a unique platform for scaleable and cost-effective improvement and expansion to achieve many of the highly desired and desired elements in the RFP, specifically including growing coverage into state highways and arterials and to other regions of the Coalition. In addition to expanding our access to traditional road sensor data, we continue to add dozens of new commercial vehicle data suppliers to the Smart Dust Network, featuring accurate, real-time information from taxis, service delivery vans, airport shuttle services, long haul trucks, and other vehicles. Over the past year alone, we have more than tripled the overall number of data points entering the INRIX Traffic Fusion Engine from probe vehicles each day, with additional growth already in the pipeline.

- √ **Risk management is inherent with INRIX**. Our business model is predicated upon the reliable supply of the most cost-effective quality data possible. We are neither overly dependent on a single source data supplier nor rely upon unproven technology to deliver our services. Further, our proposal is not contingent upon the implementation of risky or costly approaches that have yet to be proven to work on a scale anywhere close to the size of the baseline system identified by the Coalition.
- √ **Demonstrated experience delivering real-time data on a national scale**. We deliver data today in our production environment on a national scale to dozens of customers under operational service level agreements. We have the infrastructure in place and demonstrate this on a daily basis.
- √ **Liberal data usage terms**. We understand and accept the data ownership and data licensing provisions of the RFP without exception. In fact, we are willing to discuss liberalizing the usage conditions further as we believe strongly that our clients should have the ability to utilize our data to the maximum extent possible (in most cases this will not impair our ability to conduct business with other clients).

I want to reiterate our excitement at the prospect of working for the Coalition and its member agencies on this signature project. We applaud the Coalition for having the vision to create such a bold and important program and strongly believe the timing is perfect for such a strategic initiative. The Coalition has clearly stated its objective is an operational system, not a pilot or test deployment. As the operator of the nation's largest real-time traffic data service, we agree with the Coalition and have proven that operational services on this scale are both possible and affordable. Our data can immediately support your efforts with the ISN, ICAT and the Corridors of the Future initiatives, and like the Coalition, we look forward to illustrating the value of the availability of quality data across a large region.

Through this proposal, we will show how we are uniquely suited to support you in this endeavor, with our ability to offer complete, high quality data in the near-term as well as a platform for improvement, expansion and growth, all in a risk-managed and cost-effective business model. As requested, all prices and offerings in this proposal are valid for 120 days from the date of June 22, 2007, and this is the only proposal being submitted by or including INRIX.

Rick Schuman, our Vice President, Public Sector, is our primary point of contact for the project. Rick has lived up and down the entire I-95 corridor for nearly 25 years and has ample knowledge of the region, the Coalition and its members and in many ways has prepared his entire life to lead this project. Rick can be reached at 407-298-4346 or rick@inrix.com. Rick, myself and the entire INRIX team look forward to working with the Coalition on this project; we know that the Coalition views this as a signature project and to be very clear, so will we.

Sincerely,

Inrix, Inc.

Bryan Mistele

President & CEO

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Executive Summary

INRIX is extremely excited at the prospect of supporting the University of Maryland, the I-95 Corridor Coalition and its member agencies in the implementation, operations and expansion of a real-time regional traffic monitoring service. As this summary will explain in brief, INRIX and its partners can meet the ambitious mandatory requirements of the RFP in the near-term while also offering unmatched flexibility and capabilities to fully exploit the traffic data provided and to intelligently and cost-effectively expand coverage as clearly desired:

Our Team

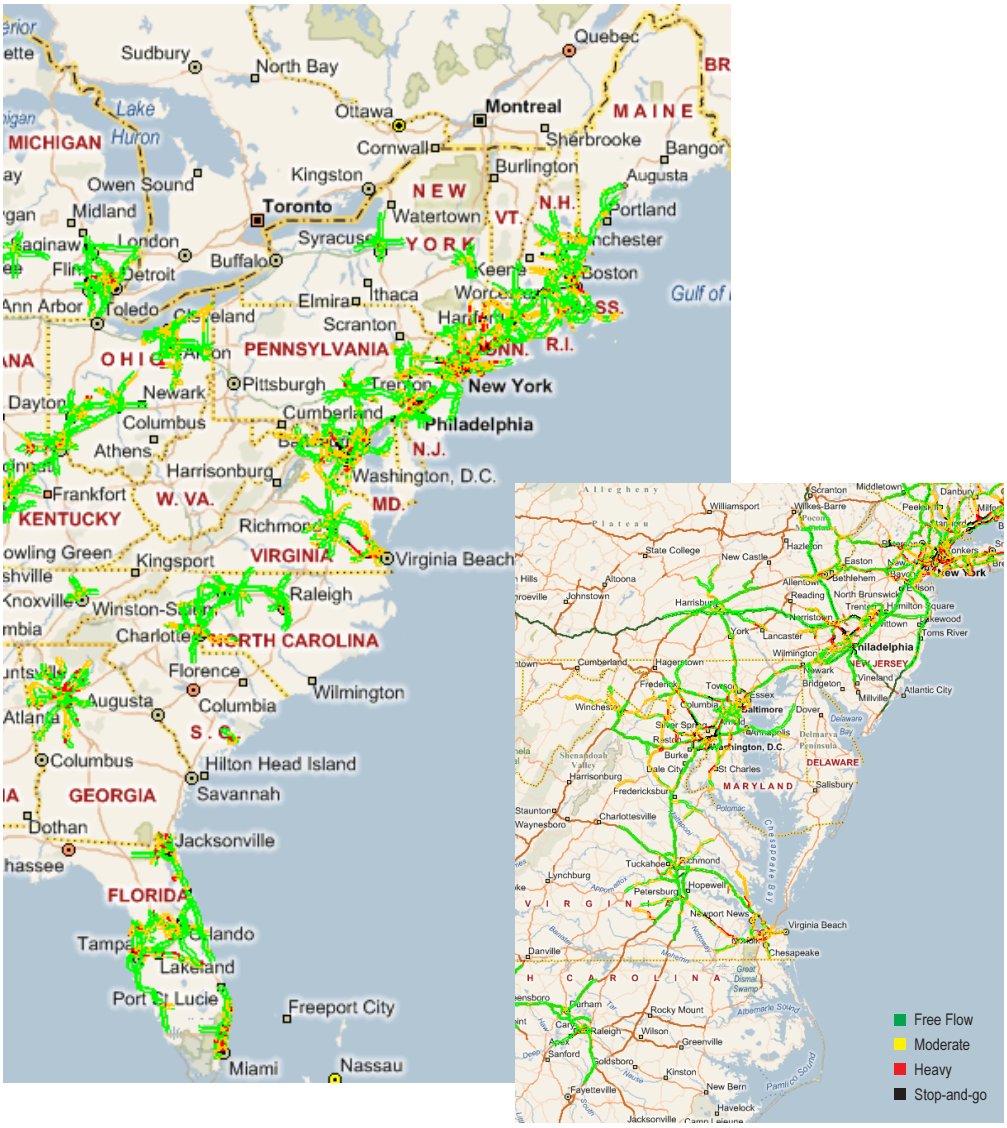
- √ Data Services
  - — Prime Contractor: INRIX
  - — Enhancement Options: SpeedInfo, DTS, TruePosition
- √ Consulting Services
  - — Lead Consultant: PBS&J
  - — Team Members: EnterInfo (Maryland MBE), Open Roads Consulting, Berkeley Transportation Systems (BTS), University of Washington's Transportation Research Center, Tele Atlas

Our Offering

- √ INRIX's basic architecture and current/planned source data can cover all freeway baseline mileage in accordance with the requirements within 6 months of contract initiation. We currently provide real-time average speeds for 75% of the baseline system's freeway mileage and over 80% of the core system's freeway mileage (see map on page 1-2).
- √ INRIX accepts the data ownership and data licensing provisions of the RFP without exception. Further, we are willing to discuss liberalizing the usage conditions further as we believe strongly that our clients should have the ability to utilize our data to the maximum extent possible.
- √ To expedite the availability of quality data on arterials and alternate routes, INRIX would like to establish an arterial/alternate route applied

Key Points of INRIX Proposal

- ♦ Best real-time data available approach; not married to a specific source data technology
- ♦ Largest probe vehicle network in the U.S.; data growing at 8-10% per month
- ♦ Architecture that blends all available source data to created fused data in real-time
- ♦ Infrastructure already in place to support project across full baseline system
- ♦ Innovative and scalable options for enhancing source data, now and in the future
- ♦ Consulting team experience matches Coalition's needs
- ♦ INRIX is entirely focused on traffic data and very committed to making this project a success



research and testing initiative as part of this project with the Coalition and will make our data available at no cost for up to 1000 miles of arterial coverage for the three-year base operating period as our contribution to the initiative.

√ INRIX will deliver, for each road segment (defined using industry standard TMC location codes), current speed, travel time, average speed, and the 85th percentile reference speed, updated at least every 5 minutes with latency on average of 4.5 minutes.

√ INRIX is including three innovative *optional* offerings to enhance source data via task orders. Note that each would be structured to input additional data into the INRIX Traffic Fusion Engine and INRIX, recognizing the value these enhanced data options could bring to the project, will not mark-up costs of these options:

— SpeedInfo self-contained radar sensors, turn-keyed and paid for through a reasonable monthly per sensor service fee;

- DTS and its unique experience developed with VDOT – to convert traditional traffic count stations to also support real-time reporting needs – making available its services at the same price and terms as the current VDOT contract to all agencies wishing to convert any number of count stations to dual use capability; and
- TruePosition is prepared to conduct a small, cost-effective trial in Wilmington, DE to leverage E-911 development equipment, already in place in a commercial wireless network, to provide additional source data.

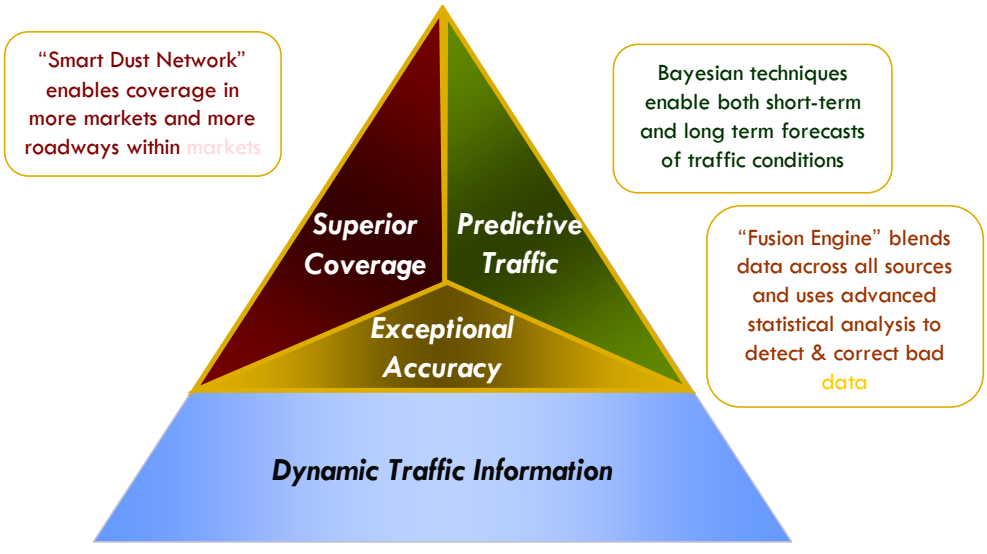
√ Fully capable consulting team with strong Maryland MBE to assist in deriving full utility from available data

√ After initial deployment is complete, INRIX will conduct a public RFI process in conjunction with the Coalition to seek proposals for additional methods of cost-effective source data generation.

Our Approach

INRIX is the exclusive beneficiary of years of research and millions of dollars of development by Microsoft Research into the statistical inference of traffic patterns, predictive analysis and mobile-based visualizations of real time systems. INRIX has built upon Microsoft's patented, proprietary technologies to enable the delivery of next generation traffic information services.

INRIX differentiates itself in the Traffic Data space along three main points. The INRIX "Smart Dust Network" enables us to provide the broadest traffic **coverage** possible. Our painstaking attention to detail that drives the INRIX "Traffic Fusion Engine" enables us to provide the **highest accuracy** and best quality traffic data available. We continually **innovate** in the traffic area,



Traffic Incidents, Real-time & Predictive Flow, Comparative Speeds, Time Estimation, Congestion, Key Route Traffic, Historical & Reference Average Speeds, Dynamic Fuel Prices

leveraging our latest patented analytical techniques possible to provide dynamic traffic predictions of future conditions (while predictions are not a part of the requirements for this project, the techniques developed for creating predictions also helps the Fusion Engine's ability to process, filter and interpret source data in real-time).

The INRIX "Smart Dust Network" is the first nationwide traffic solution to go beyond the limitations of road sensors and provide accurate real-time and predictive traffic speed information for major freeways and highways in every major metropolitan area in the U.S. INRIX acquires real-time and historical sensor data from hundreds of public and private sources including anonymous, real-time GPS probe data from more than 650,000 commercial fleet, delivery and taxi vehicles; toll tag data; and occupancy and speed measurements from several Department of Transportation sensor networks (including several Coalition agencies). Additionally, the INRIX Smart Dust Network aggregates real-time incidents and hundreds of market-specific criteria that affect traffic – such as construction and road closures, sporting and entertainment events, school schedules and weather forecasts.

"We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten."

– Bill Gates

The INRIX Traffic Fusion engine is the realization of INRIX's unique ability to combine traffic flow and incident information from multiple data sources. The Fusion Engine exploits the techniques of Collaborative Filtering – the automatic validation of data from disparate sources that are in statistical agreement. The INRIX Traffic Fusion Engine utilizes sophisticated Bayesian modeling and proprietary error detection and correction to process the real-time, historical and predictive information aggregated by the INRIX Smart Dust Network. INRIX Traffic Solutions are then distributed to customers via XML services and applications.

Our Philosophy

At INRIX, we consider ourselves first and foremost a traffic content fusion company. We are committed to providing our business and commercial customers – our focus is not to serve the general public directly – with the best information possible. We know this means that we must continue to innovate regarding source data. We have no allegiance to any specific source data approach, just that they work, are cost-effective and do not create excessive risk for our clients or INRIX.

We understand that neither we nor the Coalition can stand still over the next 3-10 years. We expect change and anticipate evolution in our data suppliers, our platform, and our consulting team. To illustrate our ability to adapt, next month we will be releasing our eighth major upgrade to our Traffic Fusion Engine in roughly two years. While we are convinced we have put together the most compelling team and approach possible looking forward, we are fully prepared to evolve as the Coalition's needs do.

Also, we understand that success isn't about the data, but about the uses and applications of the data. INRIX, and PBS&J, are committed to assisting the

Coalition and its member agencies – as we do with our other clients – in developing compelling uses for the data we provide.

As requested, all prices and offerings in this proposal are valid for 120 days from the date of June 22, 2007. This is the only proposal being submitted by or including INRIX.

We are fully aware that this project is a keystone project for the Coalition. It would clearly be a keystone project for INRIX as well, and you will have the full resources of a focused, dedicated company (and team) ensuring the project is a success.

References

INRIX has over 30 end user clients who provide services to consumers and business customers. INRIX traffic data, similar to what is desired by the Coalition, is being utilized in some of the nation's leading in-vehicle navigation systems, portable navigation devices, mobile phone based navigation services and internet portals. The following references highlight some of the diverse customer base we presently service with real-time data analogous to what is being sought by the RFP, both in terms of content and demonstrating the scale of operational infrastructure required to deliver the services.

Clear Channel's Total Traffic Network

In November 2005, INRIX announced an agreement with Clear Channel's Total Traffic Network, a division of Clear Channel Radio providing INRIX's traffic flow information to its customer base, including broadcasters and real-time traffic navigation systems. Clear Channel Radio is the first broadcaster to launch a ground-breaking programming and technology service delivering real-time traffic data directly to vehicles, using its own network of reporters, traffic cameras, helicopters and airplanes – Total Traffic Network. Clear Channel's Total Traffic Network now serves more than 125 metropolitan markets in three countries, including the United States, Mexico and New Zealand. Total Traffic Network delivers real-time traffic data via in-car or portable navigation systems, broadcast media, wireless and Internet-based services. For more information, see www.realtimetraffic.net. The growing list of customers currently using Total Traffic Network's real-time reports include BMW NA, MINI USA, Garmin International, Nextel, Verizon Wireless, Kenwood Electronics, Tom Tom Navigator, Navigon, Delphi, Microsoft, GPS, MSN Autos, MapPoint, Cingular, ATX, AAA, Rand McNally, Weatherbug, Siemens VDO, Mio Technology, and Cobra Electronics.

Company	*Clear Channel Radio, Total Traffic Network*
Primary Contact	*Len Konecny, Vice President, Business Development*
Telephone Number	*(404) 870-5084*
Email Address	*lenkonecny@clearchannel.com*

Tele Atlas

In April of 2006, INRIX announced an agreement with Tele Atlas to take over the traffic operations of the Tele Atlas Traffic product line. With Tele Atlas Traffic originally being a competitive business to INRIX, this announcement was a significant testament to the rapid evolution and quality of INRIX traffic and services. Through the merging of operations, INRIX inherited approximately 12 customers including TomTom, Cingular, Microsoft, VDOT (511) and NCDOT (511). In addition to the merging of operations, Tele Atlas is productizing traffic solutions and has the rights to resell INRIX Traffic to

their worldwide map customer base. As the 2nd largest digital map provider in the world, Tele Atlas maps are omnipresent, and are embedded within most of the leading providers of map based services including large internet portals (Google, Yahoo etc), Portable Navigation Companies (TomTom, Dash etc), and Automotive (BMW, GM, DaimlerChrysler etc). Traded on the Frankfurt Stock Exchange among others, Tele Atlas has more than $300M in annual sales.

Company	*Tele Atlas*
Primary Contact	*Hardie Morgan, Chief Financial Officer*
Telephone Number	*(281) 300-5146*
Email Address	*hardie.morgan@teleatlas.com*

TeleNav

In January 2007, Telenav announced a relationship with INRIX to provide "Telenav Traffic" featuring traffic enabled-routing with their market leading navigation application for mobile handsets. Telenav is the first company to provide GPS navigation service with traffic rerouting on consumer mobile phones and is the leading navigation application provider to Sprint/Nextel. Currently, their traffic-enabled application is available on 4 Blackberry handsets including the Pearl, 3 Motorola phones including both the RAZR and SLVR, 4 Sanyo phones, 2 Samsung phones, and 1 LG phone. Since January, Telenav has trademarked one click rerouting and their application even updates estimated time of arrival based on the traffic provided by INRIX. Founded in 1999, Telenav has gone through hyper growth and the current subscriber base is estimated at over 1 million subscribers. In addition to Sprint, Telenav's platinum customer list includes AT&T (Cingular), Alltel, Boost, Rogers Wireless, and Qwest.

Company	*TeleNav Inc.*
Primary Contact	*Sal Dhanani, Co-Founder and Director of Marketing*
Telephone Number	*(206) 686-9393*
Email Address	*salman@telenav.com*

Wisconsin DOT

In January 2007, Wisconsin DOT executed an agreement with Short Elliot Hendrickson, with INRIX as the leading subcontractor, to provide real-time traffic flow conditions along the two major corridors between Milwaukee and Green Bay (US 41 and I-43) spanning nearly 250 centerline miles. The project, with requirements similar to the Coalition's RFP, is INRIX's first inter-city corridor coverage in a non-metropolitan area as well as our first specifically to support a public agency, and is proceeding as scheduled with real-time data now available for acceptance testing by Wisconsin DOT. Several elements of

this project are similar to how our data would be accessed and utilized by the Coalition, including the use of TMC location codes to define and reference road segments, partner portal access, and the need for operations center integration. Further our experience in developing project documentation to aid a state DOT in accessing and integrating our data as well as creating and executing a system acceptance test will benefit both INRIX and the Coalition and expedite project implementation.

Agency	*Wisconsin DOT*
Primary Contact	*Dean Beekman, Freeway Operations Engineer*
Telephone Number	*(414) 227-4154*
Email Address	*dean.beekman@dot.state.wi.us*

Consulting Services References

The RFP specifically requests references for data service provision. If the Coalition desires references for our consulting services team led by PBS&J, we will be happy to provide them.

Technical Proposal

This section provides an overview of the team INRIX has assembled to serve the University and Coalition, the approach being proposed, how both the team and the approach address the Coalition's requirements, and how risk is sufficiently understood and managed.

This section is divided into four subsections:

- √ INRIX Team Overview
- √ Real-Time Traffic Data Approach and Requirements Satisfaction
- √ Consulting Services Approach and Requirements Satisfaction
- √ Risk Analysis

INRIX Team Overview

INRIX will serve as the Prime Contractor and provide traffic data for the project. INRIX (www.inrix.com) is the leading provider of accurate real-time, historical and predictive traffic information nationwide, providing partners and customers with the highest quality data and broadest coverage available for traveler information and operations applications. INRIX Traffic Services leverage sophisticated statistical analysis techniques, originally developed by Microsoft Research, to aggregate and enhance traffic-related information from hundreds of public and private sources, going well beyond the limitations of static road sensor networks, historical-based models and cellular data aggregators, to offer customers the most sophisticated understanding of the unique system-wide traffic patterns. INRIX, based in the Seattle area, was founded in July, 2004 and is a venture funded Delaware Corporation.

INRIX will be joined at the outset of the project by three firms offering enhanced source data options for the Coalition and its member agencies:

- **SpeedInfo** provides the most cost efficient and highly accurate sensor solution for measuring traffic flow in the country. The company's technology combines its wireless network design expertise with solar-powered Doppler radar. The autonomous speed sensors are attached to existing infrastructure such as light or sign poles, and real-time traffic flow data is then sent via the AT&T® Wireless network. SpeedInfo (www.speedinfo.com) creates, enhances, and then distributes the data providing an accurate-to-the-minute review of traffic congestion with a focus on flow rather than just incident detection. With nearly a thousand sensors installed and operational – including over one hundred in Coalition states – SpeedInfo sensors are currently in use improving information for traffic engineering, relieving traffic congestion and empowering drivers with real-time information in many

of America's largest metropolitan areas. Headquartered in San Jose, California, SpeedInfo is a venture funded small business enterprise. *This proposal makes available – as an option – SpeedInfo's sensor as a turnkey solution for a low per monthly fee per sensor, enabling the deployment of sensors in quantities and locations deemed desirable by the Coalition and/or its member agencies to expand source data in specific locations.*

- **Digital Traffic Systems, Inc. (DTS)** is an infrastructure services company that focuses on the specialized installation of sensor and display technologies to provide timely information for use in transportation, safety, security, enforcement and public applications. Formed in 1999 to provide traffic data solutions for the transportation industry, DTS (www.dtsits.com) has evolved into a comprehensive infrastructure services company with a full range of sensor and integrated technology solutions. DTS is currently responsible for the service, installation, maintenance and repair of more than 400 statewide traffic monitoring sites under contract to Virginia DOT (with nearly 100 sites having been upgraded by DTS to support real-time data transmission as well) and the installation, maintenance and repair of more than 350 statewide traffic telemetry systems under contract to Florida DOT. Headquartered in Albuquerque, New Mexico, DTS maintains operations in New Mexico, Virginia and Florida. Plans are in place for the company's selective expansion throughout the nation. *This proposal makes available DTS's expertise in converting or creating traffic count stations that can also generate real-time source data to be used in the project. DTS is offering the exact pay item prices, terms and conditions that currently govern its statewide traffic data services contract with VDOT to the Coalition and its member agencies, allowing – at Coalition/agency option – agencies the potential of establishing or converting sites to dual traffic counting and real-time usage.*

- **TruePosition** is the largest company solely dedicated to location-based technologies and services in the world. With more than 15 years of experience and unrivaled technical expertise, TruePosition works with operators on a global basis and provides technology and applications to over 270 million end-user devices. TruePosition has designed and installed, on a nationwide basis, wireless location systems (WLS) for AT&T and T-Mobile to meet the FCC's E911 mandate. These two WLSs possess the potential to provide much more location capacity than that required for E911. Thus, this excess capacity in over 75,00 base stations could be utilized to provide real-time traffic monitoring of large geographic areas to augment, and greatly enhance, current traffic monitoring equipment. TruePosition, headquartered in Pennsylvania, is a subsidiary of Liberty Media Corporation, whose businesses include some of the world's most recognized brands, including Discovery Channel, Animal Planet, DIRECTV, QVC, Starz, and IAC/InterActive Corp. *This proposal contains an option to conduct, in the pre-operational*

stage of the project, a small scale test in the Wilmington, Delaware area to assess the potential – technically and from a business perspective – to utilize infrastructure already existing nationwide within major wireless networks to increase source data in a cost-effective manner. While many wireless network approaches are being marketed, working with TruePosition gives INRIX and the Coalition a unique opportunity to leverage an existing infrastructure first via a low-cost trial.

PBS&J will serve as the lead consultant on the project. PBS&J (www.pbsj.com) is an employee-owned firm that provides infrastructure planning, engineering, environmental, construction management, architecture, and program management services to public and private clients, and is a national leader in travel information and data collection services and software program management. The firm is ranked by Engineering News-Record as 25th among the nation's top consulting firms. PBS&J has almost 3,900 employees located in more than 75 offices throughout the U.S., roughly half of which reside in the Coalition states. INRIX will turn over day-to-day management of the consulting services project elements to PBS&J.

INRIX and PBS&J have assembled a first rate team that collectively gives the Coalition and its member agencies several new experienced and capable options when considering a new task.

- **Open Roads Consulting (ORC)** is an innovative technology company specializing in software development and system integration solutions for the intelligent transportation systems and physical security communities. ORC (www.openroadsconsulting) develops Advanced Traffic Management System (ATMS) software for traffic 24x7 traffic management centers, data archive management systems and performs regional and statewide integration. ORC thrives on challenges, which is why it pioneered the ability for Virginia DOT to receive and ingest Virginia State Police computer aided dispatch data allowing it to be filtered and then distributed through the statewide 511 system, VDOT TOCs, local 911 centers and more. ORC, a woman-owned business enterprise (WBE) based in Chesapeake Virginia, is well versed in using all applicable industry and ITS Standards, including national ITS Architecture standards, such as IEEE 1512, TMDD and NTCIP, or cross-industry standards like CAP and EXDL, or Internet standards like FTP, AJAX and SOAP. *Open Roads Consulting offers the Coalition a variety of potential solutions through its extensive experience with alternative data feeds and communications formats, along with the expertise to fully integrate new data into existing ATMS software and ATIS systems. They also add to the considerable depth across the team in data archiving and decision support tools.*

- **EnterInfo** is a leading consulting and software development firm, and a MDOT registered Maryland-based minority business enterprise (MBE). EnterInfo (www.enterinfo.com) specializes in Internet-based

GIS implementations, website design, GUI development, GIS-T applications, database design and support, and systems integration and testing. As an innovator in its field, EnterInfo has a history of developing unique tools and solutions for public agencies to better serve the public. These key unique solutions include the USDOT Best Transportation Website (CHART), the award winning Maryland SHA Highway Management Information System, the first real-time web-based snowplow tracking system accessible by the public and the first statewide real-time crime reporting system (Delaware). *EnterInfo provides a wide-range of GIS, software development and system integration expertise and will provide ATMS and ATIS systems integration support, develop publicly accessible websites, and develop decision support tools for Coalition member agencies.*

Berkeley Transportation Systems

- **Berkeley Transportation Systems** is a national leader in performance monitoring for transportation agencies and the developer of PeMS (Performance Measurement System), which is used extensively by Caltrans to archive, analyze and monitor their traffic flow data and sensor performance. By applying a business intelligence approach, BTS (www.bt-systems.com) helps public agencies save time and money by leveraging existing ITS investments and automating transportation system monitoring, allowing agencies to make better and faster decisions about resource allocation and operational approaches. *BTS has extensive experience in wide-area data collection, archiving, reporting, and performance measures along with developing decision support tools that could be used by the Coalition member agencies to fully utilize the traffic flow data provided under this contract.*

Tele Atlas

- **Tele Atlas** delivers the digital maps and dynamic content that power some of the world's most essential navigation and location-based services. Founded in 1984, the company provides maps covering 64 countries around the world and uses a sophisticated network of professional drivers, mobile mapping vans and more than 50,000 data resources to deliver highly accurate and up-to-date digital maps. Tele Atlas (www.teleatlas.com) has approximately 2,400 full-time staff and contract cartographers in offices across Europe, the U.S., Canada and Asia. Tele Atlas data helps 41 of the 50 states manage their critical infrastructure services, and the vast majority of public safety agencies using commercial data rely on Tele Atlas. *Tele Atlas staff provide half the support to the North American Location Code Alliance the implements TMC codes for North America, and it is this staff expertise that will be available to the Coalition to assist with road segmentation issues.*

TRAC

- **Washington State Transportation Research Center – TRAC** is a joint endeavor between the Washington State Department of Transportation (WSDOT) and the state's two largest research universities, the University of Washington (UW) and Washington State University (WSU). The results of TRAC's research and applied science efforts and

collaborations are innovative solutions to pressing problems in transportation system design, construction, operations, and maintenance. In particular, TRAC – UW (http://depts.washington.edu/trac/), under the direction of Mark Hallenbeck, is known as a national leader in traffic congestion monitoring, travel time research, performance measures, and decision support tools. *Mr. Hallenbeck and his staff will lend their considerable expertise as an advisor to the Coalition on matters of data collection, its use, how it meets with FHWA and AASHTO recommended approaches and guidelines, as well as practical experience on the quality and value of various traffic data types in certain settings (i.e., arterial vs. freeway).*

INRIX Project Staff

Rick Schuman, Vice President: Lead project manager for this project, Rick lives in the Orlando, Florida area, has spent nearly 25 years living along all parts of the I-95 corridor, and in previous positions, consulted for several Coalition members in the areas of data collection and traveler information. Rick is responsible for public sector business development and sales at INRIX. Prior to joining INRIX, Rick was a Vice President at PBS&J, where he led the creation of the nation's first consulting practice focused specifically on travel information, real-time transportation data collection and analysis.

Since this is a signature project, Rick will be supported by additional key INRIX executives and staff including these individuals:

- **Craig Chapman, Chief Technology Officer:** The co-founder of INRIX, Craig is an accomplished development engineer and architect with 30 years experience developing advanced software systems and managing teams of software and hardware engineers. Prior to INRIX, Craig was an executive at Microsoft serving as the Development Manager for the Automotive Business Unit.
- **Alex Meyer, Vice President of Operations:** Alex is responsible for all production operations, customer and partner support, and internal IT at INRIX. Alex has over 19 years experience establishing and managing technology and customer support organizations. Previously, Alex was a VP at AT&T Wireless where he managed all aspects of numerous functions encompassing acquisition integration, retail sales and supply chain systems, fraud and revenue assurance systems, and network usage delivery systems.
- **Kush Parikh, Vice President of Business Development:** Kush is responsible for business development and strategic partnerships at INRIX, including managing the source data portfolio. Kush has over 10 years of experience in the high tech sector, specifically in sales, product marketing, and business management in emerging markets. Kush most recently managed the Mobile TV Business Unit at Texas Instruments.

- **Oliver Downs, Principal Scientist:** Oliver brings ten years of experience in advanced Bayesian predictive modeling, machine learning algorithm design and is a pioneer in the field of quantum-inspired optimization algorithms. A graduate of Princeton University, and the University of Cambridge, UK, Oliver specializes in applying abstract analytical ideas from mathematical, physical and statistical science to problems in the real world. Prior to INRIX, Oliver consulted for various customers, including Microsoft Research, MSN, Barnes & Noble, and the Seattle Times.

Consulting Services Project Staff

Our consulting resources are primarily based in the Coalition states and have strong familiarity with the region, the Coalition and its member agencies.

Todd Kell, the team's consulting project manager, resides in Richmond, previously worked for Virginia DOT and served on and consulted for the Traveler Information Program Track of the Coalition. Importantly, Rick and Todd have worked closely together for several years and the Coalition can expect a well functioning team.

More information regarding the consulting services team is provided in the *Consulting Services Approach and Requirements Satisfaction* subsection later in this section.

Real-Time Traffic Data Approach and Requirements Satisfaction

This subsection presents our point-by-point response to the specific RFP requirements contained in the Real-Time Traffic Data Requirements table, as well as supplemental and background information on the INRIX Platform and detailed information germane to specific item numbers in the data requirements table.

To fully understand this response, in addition to the definitions contained in section 1.5 of the RFP, the following definitions are needed:

Source Data: Raw information such as probe vehicle data records or sensor data that is provided to INRIX as part of the INRIX Smart Dust Network.

INRIX Smart Dust Network: The collection of source data INRIX utilizes for processing via the Traffic Fusion Engine.

INRIX Traffic Fusion Engine: The platform utilizing sophisticated Bayesian modeling and proprietary error detection and correction to process the real-time, historical and predictive information aggregated by the INRIX Smart Dust Network.

Highlights and themes of the INRIX response include:

- √ This proposal meets or exceeds the mandatory requirements in the RFP.
- √ INRIX's current/planned source data and fusion engine can cover all freeway baseline mileage in accordance with the requirements within 6 months of contract initiation. We currently provide real-time average speeds for 75% of the baseline system's freeway mileage and over 80% of the core system's freeway mileage as shown in the table below.

State	Current Inrix Coverage (Miles)	Required Coverage (Miles)	% Currently Covered
Core System	***1244***	***1531***	***81.3%***
New Jersey	460	473	97.3%
Pennsylvania	153	156	98.1%
Delaware	46	46	100.0%
Maryland (DC)	314	314	100.0%
Virginia	252	295	85.4%
North Carolina	19	247	7.7%
Baseline, not Core	***1931***	***2654***	***72.8%***
Maine	126	357	35.3%
New Hampshire	102	102	100.0%
Massachusetts	366	366	100.0%
Rhode Island	74	74	100.0%
Connecticut	401	416	96.4%
New York	264	264	100.0%
South Carolina	0	220	0.0%
Georgia	0	127	0.0%
Florida	598	728	82.1%
Total	***3175***	***4185***	***75.9%***

Note: Inrix coverage estimated based on maps, may not be precise; Required coverage reflects information included in RFP maps.

- √ INRIX will provide current speed, travel time, average speed, and the 85th percentile reference speed for each road segment (defined using industry standard TMC location codes) updated at least every 5 minutes with latency on average of 4.5 minutes.
- √ This proposal offers multiple, exclusive, approaches as options to allow Coalition member agencies to increase their ability to generate sensor data to increase source data available for use.
- √ To expedite quality data on arterials and alternate routes, we would like to establish an arterial/alternate route applied research and testing initiative as part of this project with the Coalition, and will make our data available at no cost for up to 1000 miles of arterial coverage for the three-year base operating period as our contribution to the initiative.
- √ INRIX accepts the data ownership and data licensing provisions of the RFP without exception and is willing to discuss liberalizing the usage conditions further as we believe strongly that our clients should have the ability to utilize our data to the maximum extent possible.

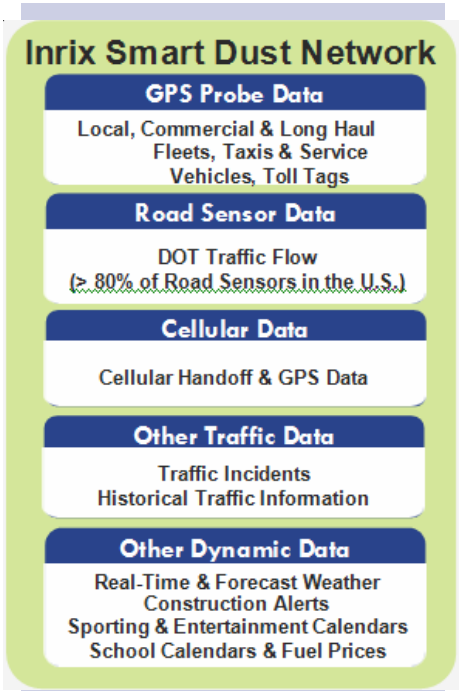
√ After initial deployment is complete, INRIX will conduct a public RFI process in conjunction with the Coalition to seek proposals for additional methods of cost-effective source data generation.

The INRIX Platform Overview

To understand how INRIX is positioned to deliver this project as envisioned by the Coalition, some background on the INRIX technology platform is useful prior to examining the Real-Time Traffic Data Requirements Table. There are three key elements to INRIX Real-Time data delivery:

INRIX Smart Dust Network

The INRIX Smart Dust Network is the first nationwide traffic solution to go beyond the limitations of road sensors and provide accurate real-time and predictive traffic speed information for major freeways, highways, arterials and side streets in every major metropolitan area in the U.S.



The INRIX Smart Dust Network represents a traffic technology breakthrough that dramatically improves the accuracy, quality and coverage of traffic information. INRIX acquires real-time and historical sensor data from hundreds of public and private sources including anonymous, real-time GPS probe data from more than 650,000 commercial fleet, delivery and taxi vehicles; toll tag data; and occupancy and speed measurements from Department of Transportation sensor networks. Additionally, the INRIX Smart Dust Network aggregates real-time incidents and hundreds of market-specific criteria that affect traffic – such as construction and road closures, sporting and entertainment events, school schedules and weather forecasts.

While some traffic solutions only offer highway-level coverage and are dependent upon extremely expensive and often unreliable road sensor networks for information, the INRIX Smart Dust Network provides high-quality real-time and predictive traffic

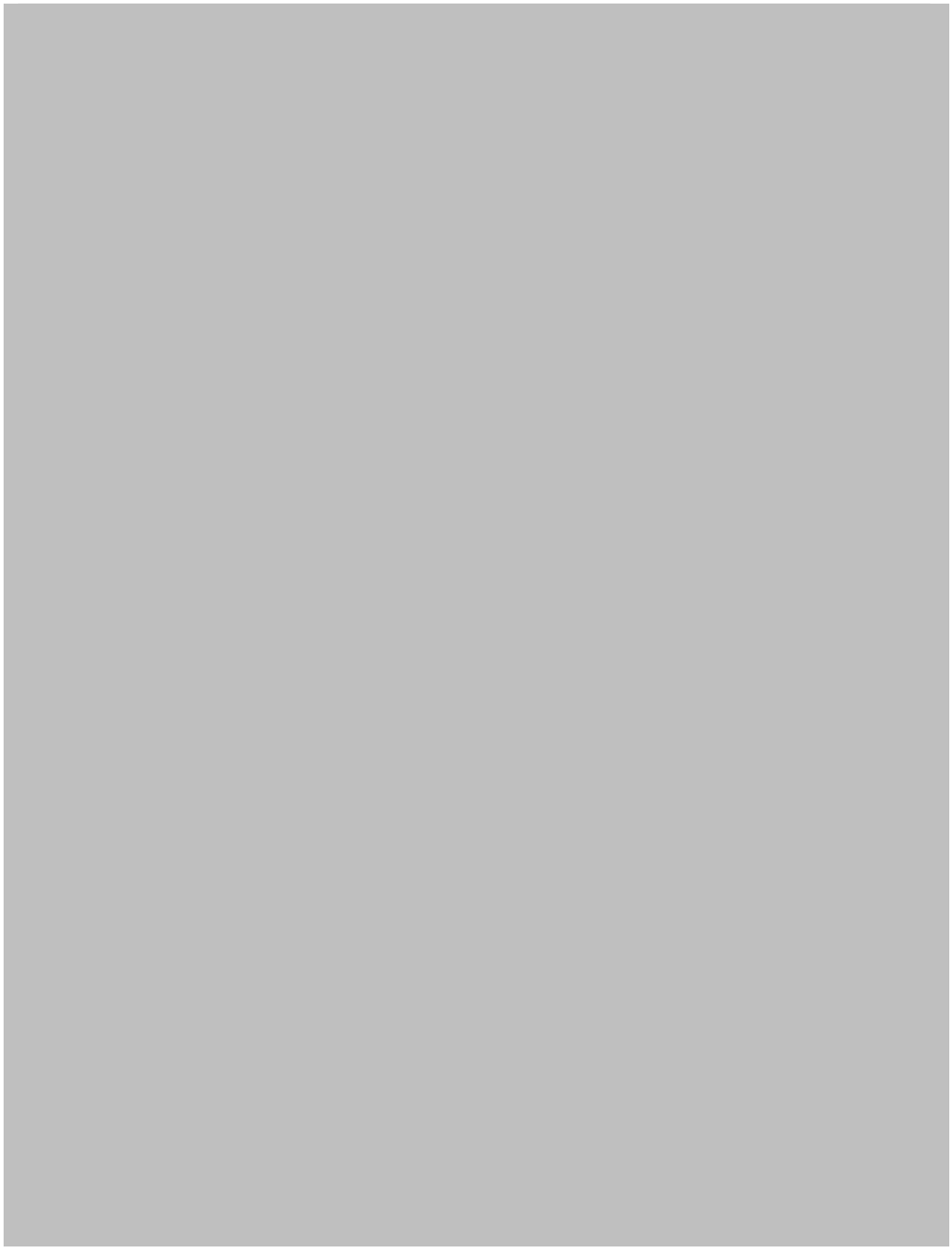
INRIX sources data from public and private physical sensor networks in 20 markets across the US, resulting in a total of 15,000 sensors providing real-time data on average every 5 minutes, and in some cases every 30 seconds.

The physical sensor data is combined with data from INRIX's network of more than 650,000 GPS-enabled probe vehicles, comprising a targeted portfolio of local service fleets,

information in cities and states where accurate traffic data was not previously available such as Miami, Las Vegas, New York, Tampa, San Antonio and Providence. Extensive recent ground-truth testing of the INRIX Smart Dust Network proved an 8–15% accuracy advantage over traditional embedded road sensors.

The INRIX Smart Dust Network comprises a multitude of distinct dynamic data sources, which INRIX is uniquely able to combine using its Traffic Fusion Engine, producing the most accurate real-time and predictive traffic data available.

INRIX Traffic Fusion Engine



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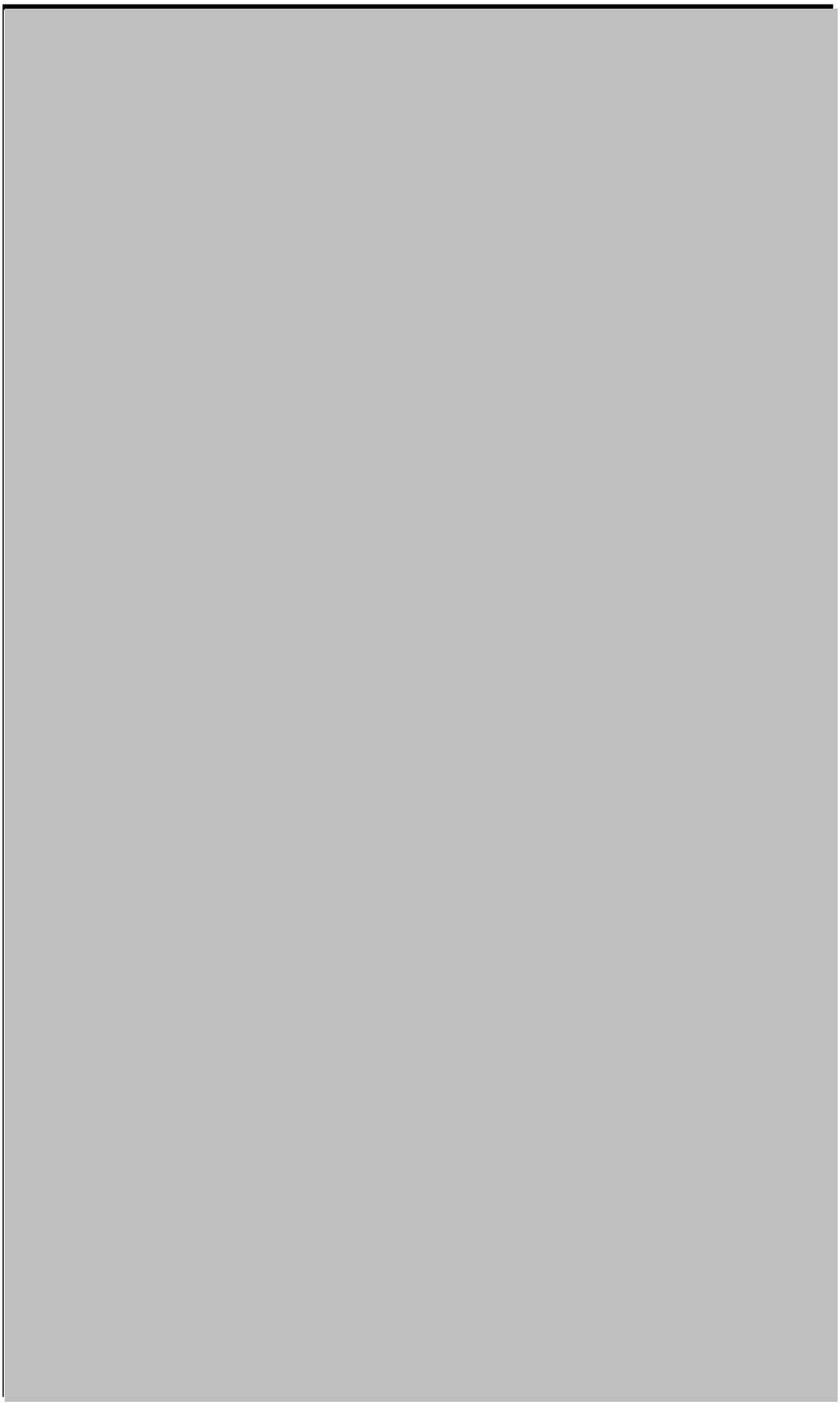

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INRIX Partner Portal

INRIX provides access to real-time data generated by the INRIX Traffic Fusion Engine to customers through the INRIX Partner Portal (partner.inrix.com). Access is controlled by username and password, with access rights defined by customer contract. The Portal also includes a document center containing information necessary to interpret the data feeds available through the Partner Portal.

Real-Time Traffic Data Requirements Table

The table on the following pages contains the traffic data requirements and INRIX's response to the requirements following the instructions set forth in the RFP. Where appropriate and necessary, additional supporting information is provided after the table, with references in the table indicating the location of the information.

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Real-Time Traffic Data Requirements

Item	Description	Priority	Response Code	Respondent Comments
REAL-TIME TRAFFIC DATA REQUIREMENTS				
Data Elements				
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 integer)	M/E	E	Will provide mean travel time, speed, average travel time for given hour and day of the week, and [redacted] reference speed for each reporting segment; allowing for "fall back" data in periods of low flow and comparative calculations to be computed by Coalition/member agency applications.
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.	M/E	F	Using XML schema, absence of real-time speed, travel time for a reporting segment will indicate low flow or unavailable data; overall market files will be time stamped to enable interfaced systems to determine when systemic file availability issues have arisen.
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.	D/E	F	INRIX currently does not include quality indicator as part of the data feed, but would include this at the request of the coalition. We could easily create a z-score for the specified confidence interval as part of the XML schema.
4	Other traffic data valuable for roadway operations. This may include but is not limited to such metrics as volume, occupancy, event data, and incident data.	D/E	P	Several additional flow related, incident and event related files are available for possible inclusion into the data service as described in the narrative.
Data Quality				
5	**Average Absolute Speed Error** The absolute speed error is defined as 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. Given that monitored links will be of different lengths, quality requirements based on speed rather than travel time will normalize the effect of varying link lengths. Speed data shall have a maximum average absolute error of 10 MPH in each of the following speed ranges: 0-30 MPH, 30-45 MPH, 45-60 MPH and > 60 MPH. <u>Calculation Method</u> Let: A_{ij} = Speed data for link *i* at time *j* from the data service. B_{ij} = Corresponding speed from the validation data Average absolute error = mean(abs($A_{ij} - B_{ij}$)). Speed range is dependent on the validation data (B_{ij}). Example: A source of validation data exists for various routes and for various times interval within the I-95 corridor. Speed data from the validation data source will be grouped according to the speed ranges given above. All validation speed data points within the 0-30 MPH range will be compared with the respective speed data reported by the data service and a single average absolute error will be calculated for the 0-30 MPH speed range. Similarly, for each of the remaining speed ranges, a single average absolute error metric will be calculated based on the difference between the validation data in that range and the corresponding speed from the data service.	M/E	F	INRIX has conducted dozens of its own ground truth drive tests utilizing root mean squared error as the primary metric to determine if a tested market (and specific road) is ready for operational release. Our techniques and tools allow us to stratify by time of day and road segment; at present we have not stratified our tests by speed ranges, though that is easily achievable. Our results by and large have met this level of accuracy requirement and we only expect our results to improve between now and mid 2008 with growth in source data quantity and continued improvements in our fusion engine. INRIX offers to process the ground truth drive test data using its established analysis tools to assist in testing if desired by the Coalition.
6	**Speed Error Bias** Error bias is defined as the average speed error (not the absolute value) in each speed range. Speed data 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. <u>Calculation Method</u> Let: A_{ij} = Speed data for link *i* at time *j* from the data service. B_{ij} = Corresponding speed from the validation data Average error = mean($A_{ij} - B_{ij}$) Speed range is dependent on the value B_{ij}. The calculation is similar to that of Average Absolute Speed Error, but without the absolute value operator.	M/E	F	INRIX does not currently calculate error bias; this is primarily because in our data analysis of root mean square error, we have not seen a noticeable bias of results toward over or under-reporting of speed; we fully expect to meet the requirement as defined in the RFP.
7	Accuracy requirements will be in effect for vehicle flows exceeding 500 VPH.	M/C	Concur	INRIX understands that it will be evaluated only in conditions when more than 500 vehicles per hour are traveling in a given direction at a location.
Temporal Reporting				
8	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	F	INRIX currently provides real-time data to customers 24x7.
9	Maximum data latency shall be less than or equal to eight (8) minutes.	M/E	F	[redacted] total current average data latency = 4.5 minutes.
10	Maximum data latency shall be less than or equal to five (5) minutes.	HD/E	P	[redacted]

Real-Time Traffic Data Requirements (2)

Item	Description	Priority	Response Code	Respondent Comments
	Spatial Reporting			
11	Maps depicting the roadways within the corridor for which realtime traffic data are included in Section J. Offerors should use these maps as a basis for developing technical proposals. These maps represent a consensus vision of the network of roadways that define the corridor. Actual implementation will be done on a task order by task order basis in consultation with the respective road authorities. During implementation the selection of routes may differ from those depicted in the maps. Vendors should use roadway network depicted in the maps, referred to as the baseline system, as the basis of their technical proposals. Using the maps as a guide indicate the following: · Variations or limitations between the proposed coverage and that identified on the coverage maps. · Any regions on the baseline system for which real-time traffic data cannot be provided. Price proposals will be based on a subset of routes in the baseline system bounded by the geographic extents of North Carolina, Virginia, Maryland, Delaware, Pennsylvania, and New Jersey. This subset of routes, referred to as the **core system**, is the anticipated location for the initial three year project. For the core system provide the following: · Start-up costs, and subscription fees for three years of service. [NOTE : The baseline system and core system are provided to assist in the development and evaluation of proposals. Actual roadways and system extents will be specified in task orders. As part of the price proposal, vendors must provide a cost model to be used as contract prices in developing task orders to acquire traffic data.]	M/E	E	INRIX is capable of providing data per the requirements defined in this table for all freeways defined in the baseline service. INRIX currently provides real-time speed data for over 80% of the 1500+ miles identified as core system freeways and over 75% of the 4000+ miles of the baseline system freeways (see map x-x). The balance of the freeway system defined in an initial task order would be completely covered when the initial operational period begins (it is likely that these roadways will be covered by INRIX by mid-2008 regardless of this procurement). Further, INRIX provides real-time data for over 10,000 centerline miles of roadway in the Corridor Coalition states (see map x-x); any/all of these facilities are available to the Coalition for inclusion in their coverage as desired.
	Route types for which traffic data is to be provided include:			
12	I-95	M/C	F	Can fully cover - cover 1100+ miles currently.
13	Other limited-access, multi-lane facilities such as other interstate highways, freeways, beltways, and by-passes	M/C	F	Can fully cover - currently cover roughly 2,000 of the 2,200 miles of the baseline systems non I-95 freeways.
14	Arterials and state highways	HD	P	Can provide best data available for core system arterials (or equivalent size coverage) for free for the first three years - do not expect probe data of any kind to immediately meet data quality requirements herein. See text on page 3-x for further explanation.
15	Ramps and interchange turning movements	D/E	P	North American Location Code Alliance expanding TMC location codes to freeway to freeway ramps in 2008-9; will enable analysis, then coverage would be possible where sufficient data exists.
16	HOV and other lane specific modes	D/E	P	The INRIX architecture accommodates the provision of HOV/special lane information provision. Unclear when and where sufficient data density will be available to support. Inrix will examine once the initial coverage is up and running.
	Link Definitions:			
17	Segmentation of the road network is the responsibility of the vendor and shall be performed in cooperation with the University. Link definition should be 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 intersections. The following chart indicates the anticipated segment lengths for various road classifications. Link length guidelines URBAN RURAL FREEWAYS 1-3 miles 3-10 miles ARTERIALS 0.5-3 miles 2-5 miles	I/C	F	INRIX utilizes TMC location codes developed and maintained by the North America Location Code Alliance; these codes identify interchanges and the segments between them for freeways and major intersections and the segments between them for arterials. All freeways in the baseline system are or will be covered by end of 2007; analysis is ongoing of identified arterials, coverage will be added as soon as possible if arterials selected by the Coalition for coverage do not yet have TMC codes. INRIX will provide translation tables to the Coalition to allow for integration of data into systems not using Tele Atlas or Navteq maps (which have built in support for the TMC code tables). See page 3-x for more detailed background information.
18	Ramps and interchange turning movements (if provided) will be reported as separate links.	D/C	P	The INRIX architecture accommodates the provision of ramp level information. TMC codes available for grade separated lanes now; other HOV/special use lanes will be coded in 2008. See #15.
19	HOV and other lane specific modes (if provided) will be reported as separate links.	D/C	P	TMC location codes currently support grade separated HOV/managed lanes. The North America Location Code Alliance plans to establish coverage for non-grade separated HOV/managed lanes by mid 2008. Segment lengths will be similar to parallel general purpose lane segments.
20	Link definitions shall, at a minimum, contain beginning and ending latitude, longitude, heading, common name or route number, and a unique identifier. Use applicable TMDD standards or comparable open and published data standards.	M/E	E	TMC location tables contain all information listed, as well as cross street(s), city, county, state and other informational elements.

Real-Time Traffic Data Requirements (3)

Item	Description	Priority	Response Code	Respondent Comments
Availability and Reliability				
21	Reliability: 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. 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. Traffic data shall be provided for at least 95% of all links at all required time reporting intervals (see Temporal Reporting requirements).	M/E	F	A qualitative review suggests to us that for the baseline system for which we currently provide real-time coverage, during non-overnight hours, we have valid traffic data estimates at or near the 95% level as specified. Currently, data is often imputed for periods of low flow to enable applications using INRIX data to compute travel times (for the Coalition, this will be addressed by inclusion of an average and reference speed directly into the feed). Although in most cases, we do not have access to volume information and we cannot be certain, we assume the periods in which we created imputed values would nearly always fall into "periods of low flow" as defined by this RFP and not included in the 95% requirement. With INRIX data points increasing 8-10% each, we only expect our ability to meet this requirement to improve.
22	Availability: Data subscription services shall maintain at least 99% 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	E	INRIX's overall operational availability systemwide (all files, all customers) through the first five months of 2007 was 99.90%, including scheduled maintenance.
Data Formatting, Packaging and Access				
23	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	F	INRIX serves its customers through its Partner Portal precisely how this requirement is written, via passwords and access control.
24	Data shall be updated whenever the mean speed changes by 3 MPH or greater, the travel time changes by 5% or greater, or the status flag changes OR a full data set shall be supplied at least once every five (5) minutes. In either case the latency requirements of the data prevail (Items 9 & 10 under temporal reporting).	M/E	F/E	Current approach updates files available through our partner portal every 5 minutes; likely to evolve in the next 6-9 months to a web service model where the update rate for files can change to suit user needs; underlying data calculated every minute is the lowest update rate possible.
25	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	F	INRIX utilizes simple XML file structures to provide data based on a published interface and a documented open schema. See page 3-x for more details.
26	Hardware, software and network capacity shall be sufficient to initially support up to 40 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	F	INRIX has a First Class network infrastructure with hosting provided by a Tier 1 data provider. Our platforms have been built to scale quickly to meet rising capacity and bandwidth needs, and can support multiple thousands of data subscriptions and can scale to 100's of thousands if required.
27	Offerors shall provide an archiving service for all data provided to the Coalition.	M/E	F	INRIX currently archives all raw input data along with months of processed output traffic data. The infrastructure is set up to scale and will support as much archival data as the Coalition will require.
Website for Monitoring Traffic Data				
28	Offerors shall provide a web-based tool to view real-time traffic data by the Coalition and its members (not the general public). The monitoring service is for use only by the Coalition. The web site will be password protected.	M/E	E	Have two internally utilized options, one of which will serve as the basis for the web site, to be selected in consultation with the Coalition as to its preference. See page 3-x for details. Web site will the ability to view all roads in the areas in which INRIX is providing data to the Coalition, even if the Coalition is not paying for the data feed for those roads.
29	The website shall have the capacity to initially support up to 200 concurrent users with the ability to scale to 1000 concurrent users as needed.	M/C	F	INRIX has a First Class network infrastructure with hosting provided by a Tier 1 data provider. Our capacity and bandwidth can support multiple thousands of data subscriptions and can scale to 100's of thousands if required.
30	Data from the real-time traffic service can be viewed in real-time via the website.	M/C	F/E	Currently, INRIX has a partner portal through which all feeds are accessible and a real-time client that ingests that feed to show traffic conditions in 94 markets across the United States. This Client also can view additional data such as incidents, and in major metropolitan markets predictions, key routes and historical conditions (15 minute intervals) for an average of two weeks.
31	Archived traffic data can be accessed via the website.	M/C	F	In addition to the web client described in #30, INRIX will make a web based query tool available to the Coalition to facilitate the access to large amounts of data in a user-friendly manner.
32	Routes and data can be selected and viewed in an electronic map-based interface.	D/E	F	INRIX current web client enables specific subsegments of coverage to be viewed either by market or key route. This could easily be scaled to display whatever the Coalition's requirements are.

Real-Time Traffic Data Requirements Table — Supporting Information

Item 1: Mean Travel Time and Speed

INRIX has evolved and continues to evolve the data it provides to its customers. Over the next several months, INRIX plans to implement a "flexible feeds" approach to serving up our data to customers, in addition to our standard XML data feed approach. The Coalition will benefit from this platform enhancement as it will easily enable us to provide speed, travel time, average speed (based on the current hour and day of the week), and an overall 85th percentile speed based upon our terabytes of historical source data. This approach enables the Coalition to benefit from both our real-time services and the vast historical archive we have created. Below is an example of our current XML file for average speeds (note that color is provided to paint maps for customers who don't wish to do their own calculations).

Item 4: Other Traffic Data

INRIX supplies several different types of feeds, including incidents, key routes and predictions. The figure associated with the INRIX Partner Portal description earlier in this section shows the types of "flow" data files we presently provide. The figure on the next page illustrates the types of incident data we make available (note that we provide these by time zones, so presently the entire I-95 corridor is contained in the "eastern" file). The table following it shows the status of the various types of current feeds we provide by metropolitan market.

Further, if the Coalition or a member agency taps DTS to assist in creating dual use traffic count stations, the raw data would likely include typical sensor data beyond speeds (volume, occupancy, etc.) and could be made available directly to the relevant agency along with providing additional source data for INRIX.

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Inrix Product Discovery
Select a region to view incident data:
Traffic Flow Data
Regional Incident Data
Fuel Prices
PARTNER PORTAL SUPPORT
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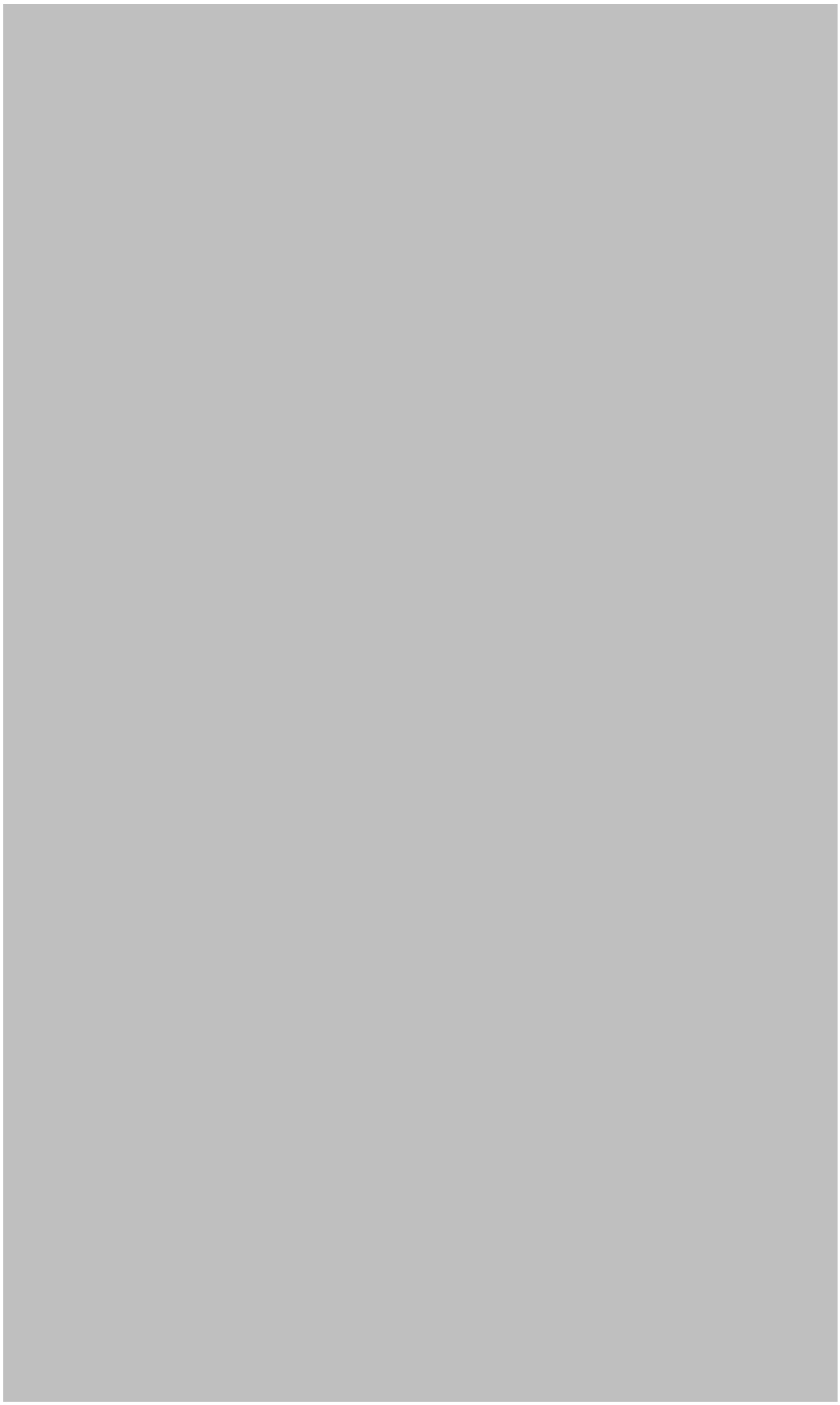
Item 5: Data Quality



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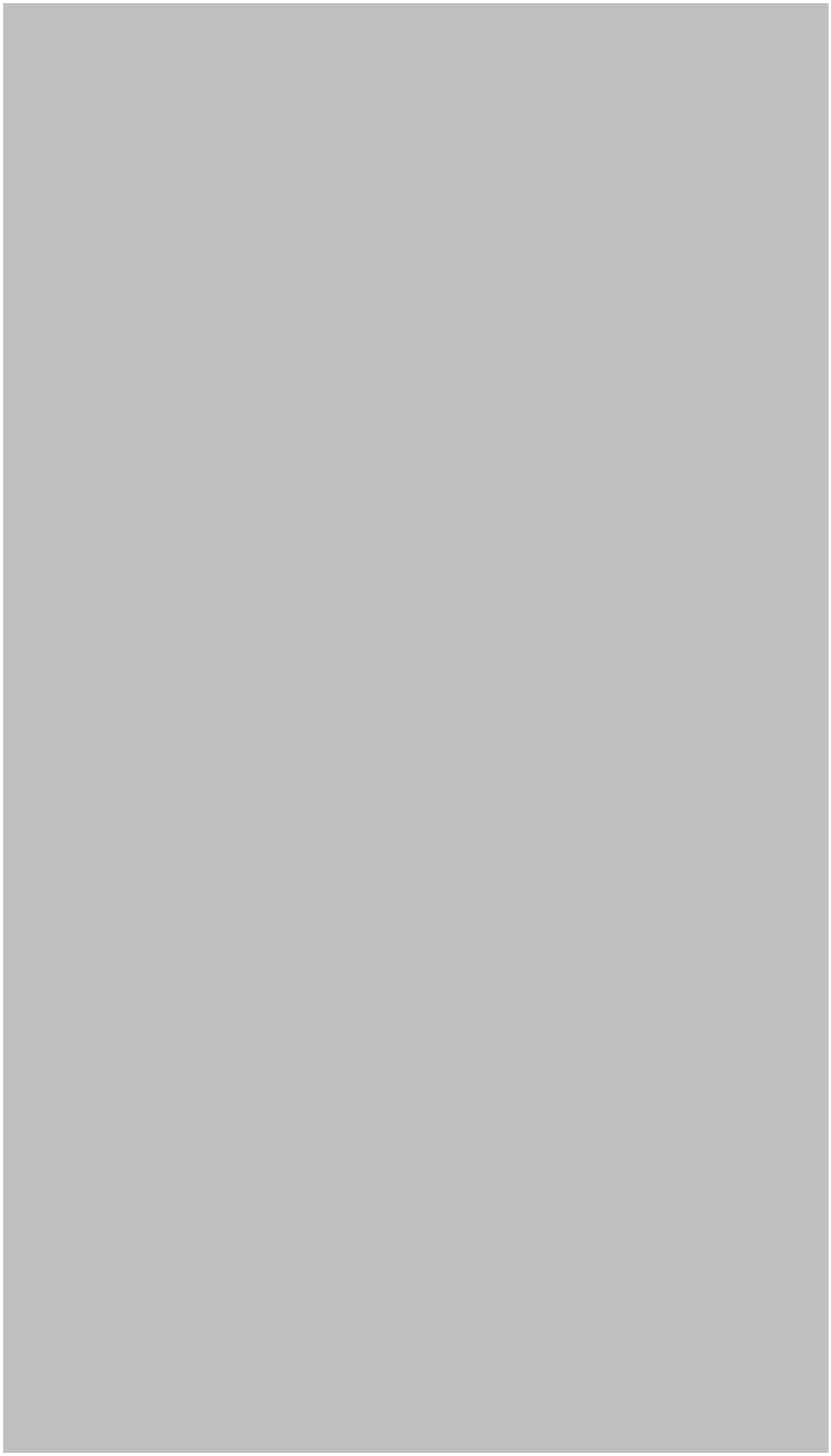

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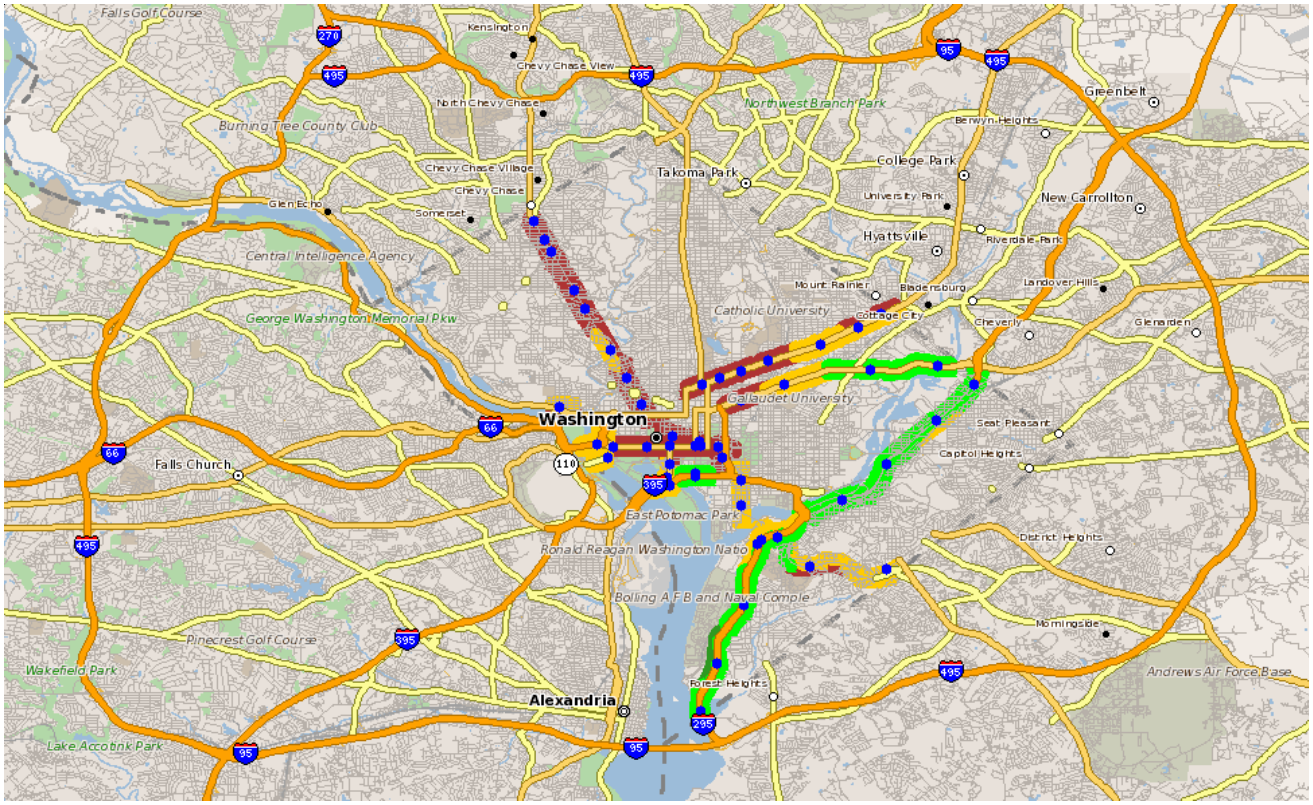
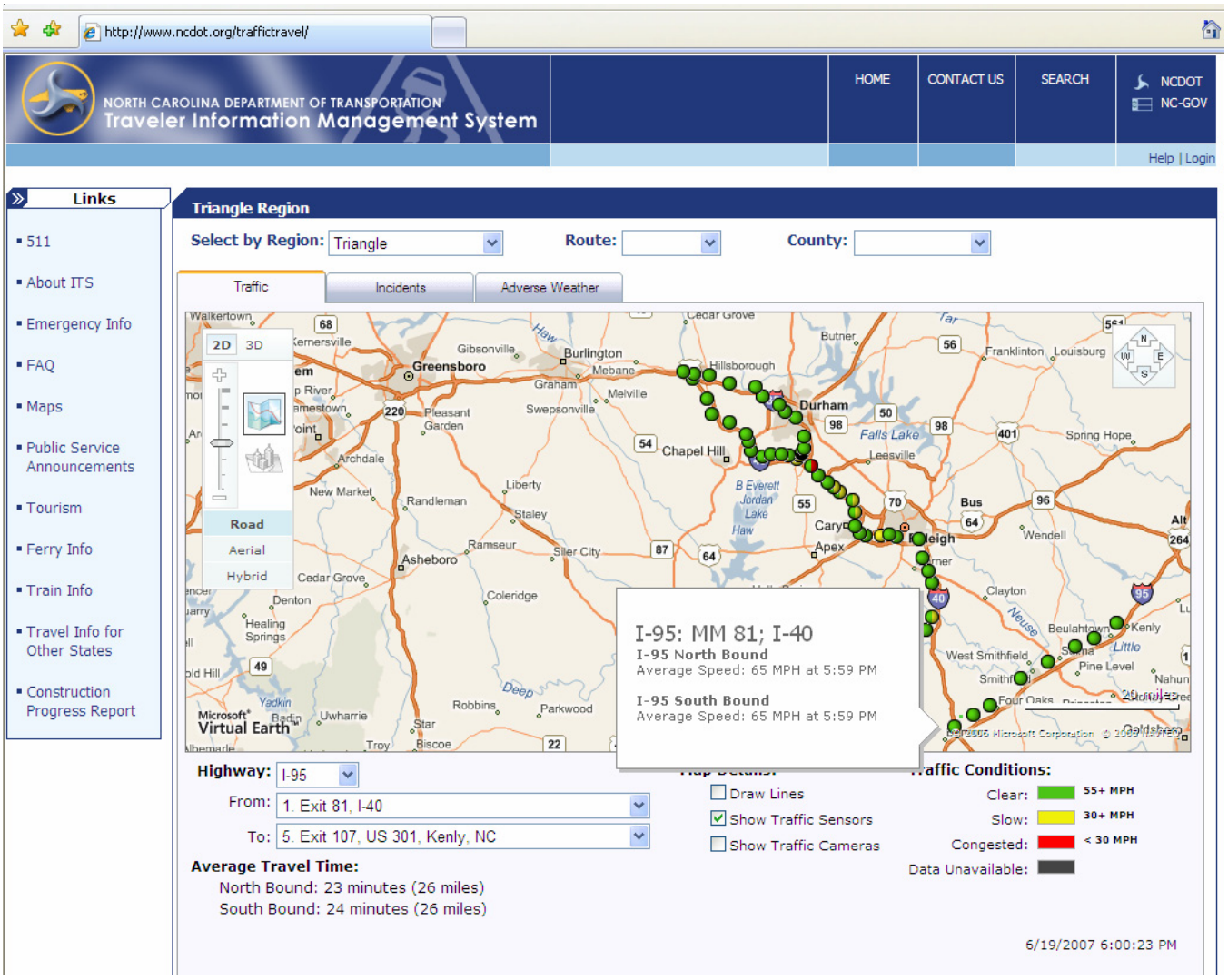
Enhanced Source Data Options

This proposal includes three innovative optional offerings to enhance source data via task orders. Two of these options provide cost-effective methods of expanding sensor based data collection along roads as desired. The third option offers a new innovative twist on the examination of cellular network data as source data. Each option is offered to the Coalition exclusively through the INRIX proposal and no mark-ups to the costs provided have been nor will be added by INRIX.

- **SpeedInfo**'s DVSS-100 Doppler Vehicle Speed Sensor is a fully self contained, roadside mounted, vehicle speed measurement sensor. This non-intrusive, high performance speed sensor shatters existing sensor performance and cost points. In addition to low unit cost, the sensor is extremely robust and will perform maintenance free for years. The sensor is battery powered, solar charged, and mounts quickly on existing poles or overpasses. The DVSS-100 uses a 24.125 GHz Doppler microwave transceiver that is coupled to a Digital Signal Processor, to measure and calculate vehicle speed. The DVSS-100 is capable of determining average or composite vehicle speed for a multiple lane freeway or highway. Speed information is backhauled to SpeedInfo's data server over a GSM cellular data link.

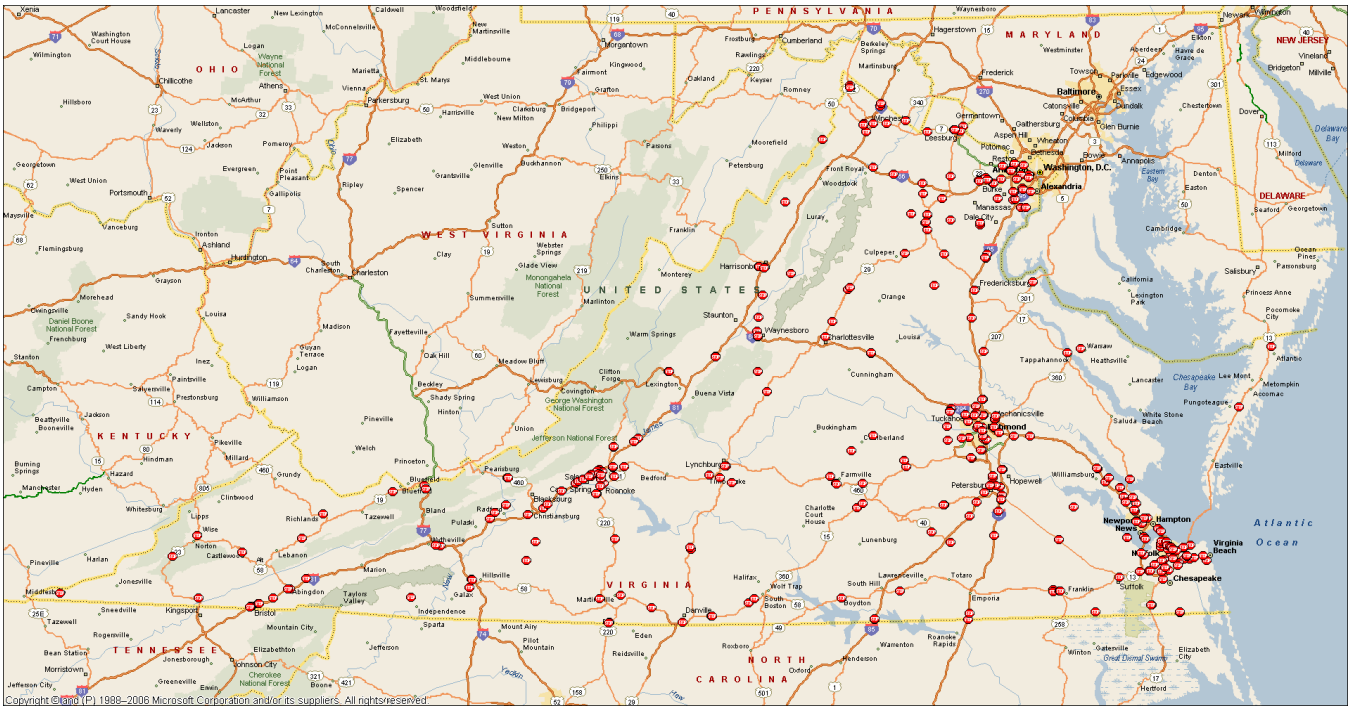
  Over 500 sensors are deployed and operational across the United States, and the number is growing rapidly. Over 100 of these sensors are deployed and providing data to I-95 Corridor member agencies DCDOT and NCDOT (see maps below).





Through this proposal, INRIX is making SpeedInfo's data service exclusively available to the Coalition and its member agencies as an option under a monthly service fee per sensor under terms defined in Volume II of this proposal. This approach is structured such that any member agency during the life of the contract could choose to add any number of sensors to place at locations on existing poles of its choosing. SpeedInfo will install the sensors, typically within four months of notice to proceed, and operate and maintain the sensors for the period specified in the task order. The data will be provided to INRIX as source data and could also be provided directly to the funding agency via SpeedInfo's XML client. INRIX has already established an interface to ingest the data from SpeedInfo's XML server for any amount of sensors ultimately deployed.

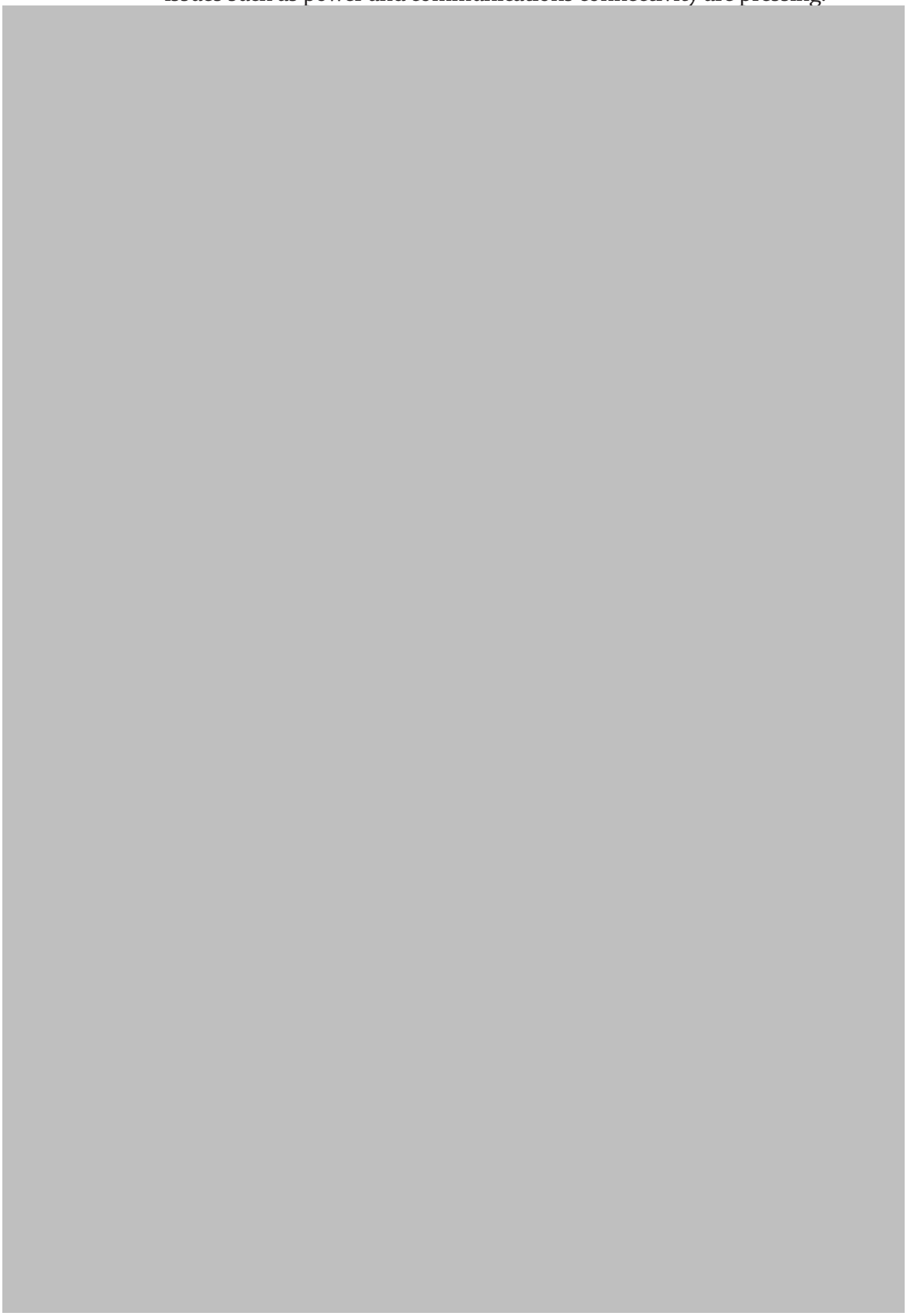
- **Digital Traffic Systems (DTS)** currently operates and maintains VDOT's and maintains FDOT's traffic count stations under long-term contracts. Further DTS has led the implementation in roughly 100 of VDOTs 400 count stations of dual use equipment (see map for count stations), allowing for the stations to continue to provide traffic count data but also to serve as real-time sensors for traffic operations functions. Through this proposal, INRIX is offering to all member agencies the ability to tap the resources of DTS for the same terms under which DTS is contracted by VDOT at present. This would allow any agency at their option to evolve any number of their traffic count stations – or even create stations from scratch – that can provide source data to INRIX and data directly to the agency.



This approach also leverages the significant investment in contracting that VDOT and DTS have expended to create a standard price this and makes available the leading resource as far as overall knowledge of traffic count station programs corridor wide to aid any agency considering moving in this direction. In fact, several scenarios based on DTS's knowledge, experience and pricing have been scoped and included in the financial proposal to illustrate the kinds of tasking agencies with various types of equipment may pursue.

Further, DTS has also demonstrated its ability to improve the quality of the provided data. Since DTS first began its contract for VDOT, data quality has improved from only 75% of sites yielding acceptable data to more than 95% of the sites generating acceptable data. Thus access to DTS could prove a win-win for both the operations and planning sections of an agency. With each member agency of the Coalition having dozens, if not hundreds of similar count stations in operation, this

option opens up yet another avenue to obtain more source data to increase the overall quality of data provided, particular in inter-urban areas where issues such as power and communications connectivity are pressing.



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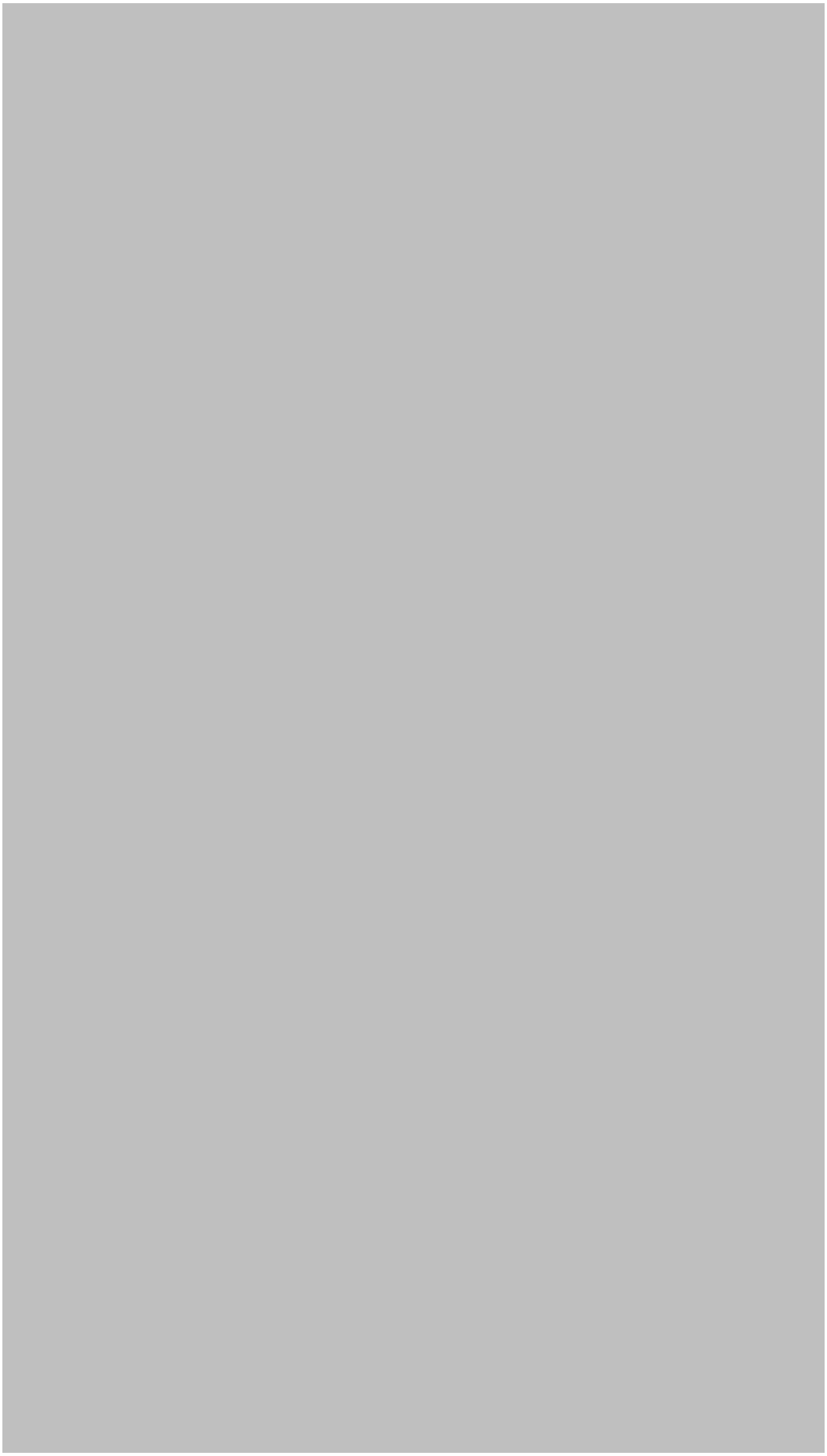

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RFI(s) for New Data Sources

Like the Coalition, INRIX has an interest in continuing to expand and improve our source data. Upon completion of the initial operational capability in mid 2008, INRIX will initiate a public RFI process to broadly seek proposals for additional methods of source data generation. INRIX will work closely with the Coalition in this process to determine what, if any, sources merit further consideration and the appropriate approach to assess then ultimately incorporate data (e.g., INRIX invests, Coalition invests, combination, etc.). If successful, this process would be repeated going forward.

Item 11 — Roadway Coverage

A strength of INRIX's approach is that it is highly scaleable both in terms of data and coverage. Our approach to data allows us to gain access to data essentially across the U.S. when a source data contract is completed. Our platform is based upon commercial maps and designed for scalability so that we can easily expand the amount of roads we snap source data to while not impacting the operational performance of the service.

It is this combination of factors that has allowed us to cover 75% of the entire baseline freeway system as of today and allows us to propose covering any or all of those roads in the initial development of the service. The fold-out map on the next page illustrates in greater detail INRIX's current real time speed coverage.

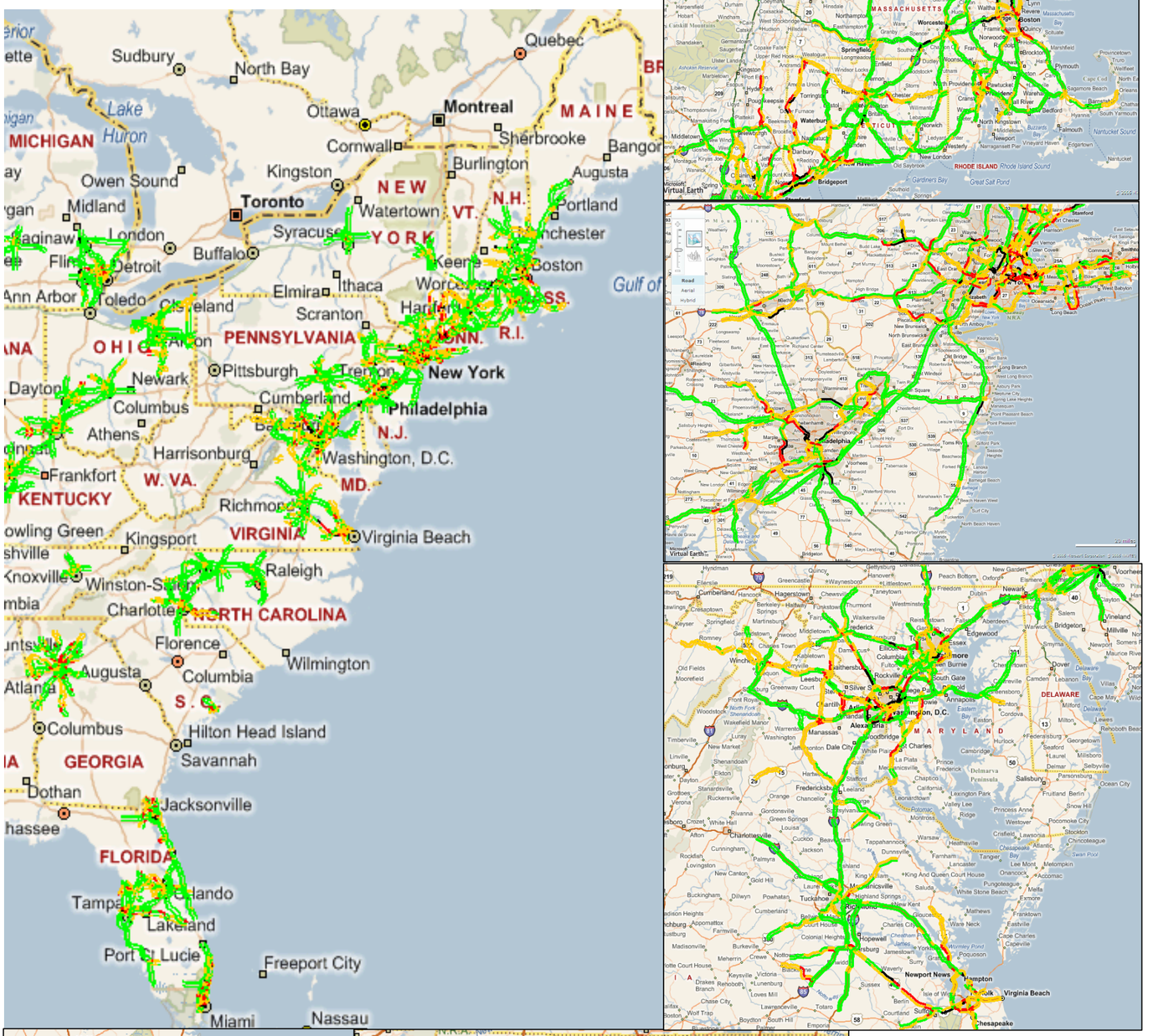
INRIX and Tele Atlas (a member of the North America Location Code Alliance) have performed an extensive review of the maps provided with the RFP both in terms of coverage and location code availability. For the core system, all identified freeways and arterials were researched. For the baseline system, the identified freeways were researched. Note that the distances might not match precisely between these spreadsheets (Core System Coverage Analysis on page 3-27 and Baseline System Coverage Analysis on page 3-28) and the mileage summaries on the maps.

Item 14 — Arterials and State Highways

INRIX has had perhaps the most experience with attempting to provide quality data, from probe-based sources, for arterials of any traffic data provider. Our current conclusion is that only in cases where substantial traffic flow and low signal density exists can reasonably reliable data be provided. Further, as explained in more detail in the risk analysis, INRIX does not believe that any single technology approach – including probe vehicle data – can yield reliable arterial data at the same quality levels as on freeways, certainly not in an operational environment across the corridor in early in the project. Since the RFP does not distinguish requirements based on arterial vs. freeway (rather based on flow rates), our proposal does not commit to meeting the defined quality levels for arterials coverage.

However, INRIX is as interested as the Coalition – as are most of our current customers – in calculating and delivering high quality data for arterials. Thus, we have proposed an approach to both help advance the start-of-the-art regarding arterial and alternate route data provision as well as give the Coalition

INRIX's Current
Real Time Speed Coverage



Core System Coverage Analysis

State	Road	From	To	Mileage by Type (Est.) I-95	Beltways	Parallel Freeways	Parallel Arterials	Intersecting Freeways	Intersecting Arterials	Inrix Coverage Status	TMC Code Status	Notes
New Jersey	I-95/New Jersey Turnpike	MP 0 - DE state line	MP 116	121						✓	✓	
	I-95/NJ Turnpike (Western Spur)	I-95/NJTP Eastern Spur	I-95/NJTP Eastern Spur	11						✓	✓	
	I-95 (Mercer County)	MP 0 - PA State Line	I-295	9						✓	✓	
	I-287/Route 440	NY State Line	NY State Line		65	7				✓	✓	
	Route 444/GS Parkway	I-95/NJTP	NY State Line			46				✓	✓	
	Route 9W/Palisades Pkwy	I-95	NY State Line			11				✓	✓	
	I-295	DE State line	I-95 (Mercer County)			68				✓	✓	
	I-80	MM 38	I-95					30		✓	✓	
	I-280	I-80	I-95/NJTP					18		✓	✓	
	I-78	MM 26	NY State Line					40		✓	✓	
	I-278	US 1	NY State Line					2		✓	✓	
	I-195	I-295	MM 11					11		✓	✓	
	I-276 (NJTP Extension)	PA State Line	NJTP					7		✓	✓	
	Route 90	PA State Line	Route 73					3		○	✓	
	Route 42 (N-S Freeway)	PA State Line	Atlantic City Expwy					10		✓	✓	
	US 322	PA State Line	Route 555					22		⊙	✓	Not limited access entire route (cover PA line to I-195 - approx 4 mi)
	US 1	PA State Line	I-287				33			○	✓	
	Route 73	Route 90	Route 544						11	○	✓	
	New Jersey Totals			141	65	132	33	143	11			Inrix Coverage = 460 freeway miles out of 481
Pennsylvania	I-95	DE State line	NJ State Line	51						✓	✓	
	I-476	I-95	I-276			21				✓	✓	
	PA Turnpike/I-76/I-276	Route 100/Pottstown Pike	NJ State Line					47		✓	✓	
	I-76 (Schuylkill Expwy)	PA TPKE/I-276	NJ State Line					25		✓	✓	
	I-676 (Vine Street Expwy)	I-76	NJ State Line					7		✓	✓	
	US 322 (West of I-95)	US 1	I-95					7		○	✓	Most of facility not limited access
	US 322 (East of I-95)	I-95	NJ State Line					2		✓	✓	
	US 1	US 202	NJ State Line				50			⊙	✓	Cover NJ line to Route 63 - approx 15 miles; not all limited access
	US 202	DE State line	I-76				26			⊙	✓	Most of road is limited access (cover from 202byp to I-76; ~ 19 mi)
	Route 100 (Pottstown Pike)	US 202	PA TPKE/I-76				7			○	✓	South of Route 30 mostly limited access
	Route 63	US 1	I-95						3	✓	✓	Fully limited access
	Route 30 (Exton Bypass)	Route 100/Pottstown Pike	US 202						2	✓	✓	Fully limited access
	Pennsylvania Totals			51	0	21	83	88	5			Inrix Coverage = 153 freeway miles out of 160
Delaware	I-95	MD State Line	PA State Line	23						✓	✓	
	I-495	I-95/I-295	I-95			11				✓	✓	
	I-295	I-95	NJ State Line			6				✓	✓	
	Route 1	US 13	I-95					5		✓	✓	
	US 13/US40	MD State Line	11th St, Wilmington				18			○	✓	
	US 301/Route 896	Bethel Church Road	Route 273 (Newark)						10	○	✓	
	Delaware Totals			23	0	17	18	5	10			Inrix Coverage = 45 freeway miles out of 45
Maryland/ District of Columbia	I-95	VA State line	DE State Line	109						✓	✓	
	I-695	Full	Full		52					✓	✓	
	I-495	VA State line	I-95		16					✓	✓	
	I-895	Full	Full			15				✓	✓	
	Route 295/I-295	I-95	I-95			39				✓	✓	
	I-70	US 29	I-695					5		✓	✓	
	I-195	Full	Full					5		✓	✓	
	Route 100	US 29	MD 10					18		✓	✓	
	I-97	MD Bus 3	I-695					5		✓	✓	
	Route 32	Burns Crossing Rd	MD 108					19		✓	✓	
	Route 50	DC State Line	MD 197					12		✓	✓	
	US 40	I-695	DE State Line				45			○	✓	
	US 1	I-495	I-695				21			○	✓	
	US 29	DC Line	I-70				25			⊙	✓	Cover from I-70 to MD 32 (9 miles)
	US 279	US 40	DE State Line						5	○	✓	
	Route 22	MD 156	Aberdeen Proving Ground						8	○	✓	
	Route 24	Trimble Rd, Edgewood	MD 22						7	○	✓	
	Route 150	Presidents St, Baltimore	Middle River						12	○	✓	
	Route 175	US 29	US 1						5	○	✓	
	Route 198	MD 650	Route 32						14	○	✓	
	Route 214	I-295	MD 193						9	○	✓	
	Route 4	I-295	Ritchie Marlboro Rd						12	○	✓	
	Maryland/DC Totals			109	68	54	91	64	72			Inrix Coverage = 295 freeway miles out of 295
Virginia	I-95	NC State Line	MD State Line	172						⊙	✓	Cover all but MM 0 to MM 17
	I-495	I-95	MD State Line		14					✓	✓	
	I-295	I-95	I-64		53					⊙	✓	Real-time coverage gap to be filled in late 2007
	I-395	I-95	DC Line					10		✓	✓	
	I-64	MM 173	MM 205					32		✓	✓	
	I-895	Full	Full					8		○	✓	
	US 1	I-95 (MM 81)	DC Line				95			○	✓	
	US 301	NC State Line	I-95 (MM 45)				45			○	⊙	
	Route 234	VA 640	US 1						7	○	○	
	US 17	VA 616; US 1	I-95: Bus US 17						10	✓	✓	Two sections; NW and SE of F'burg
	Bus US 17	VA 3	US 17						5	○	○	
	Route 3	Gordon Rd	Forest Lane Rd						9	○	✓	
	Route 207	US 1	Penola Rd						5	○	○	
	Route 30	US 1	US 301						6	○	✓	
	Route 54	US 1	US 301						6	○	✓	
	Route 10	Route 106	Route 150						24	○	○	
	US 360	VA 150	Pole Green Rd						19	⊙	✓	
	Route 144	I-95	I-295						5	○	○	
	US 58	TBD	Airport						10	○	✓	Need TMC expansion east of I-95
	Virginia Totals			172	67	0	140	50	106			Inrix Coverage = 252 freeway miles out of 289
North Carolina	I-95	SC State Line	VA State Line	187						⊙	✓	Cover MM 65 to MM 81
	US 64	Route 1003	Bus/Alt US 64					11		○	✓	
	US 264	Route 581	Route 111/222					24		○	✓	
	I-40	Route 242 (MM 325)	Route 96 (MM 334)					9		⊙	✓	Cover MM 325 to MM 328
	I-295	US 401	I-95					7		○	⊙	Full TMC coverage Fall 2007
	Route 87	South of I-95	Bus 401					9		○	✓	
	US 301	SC State Line	VA State Line				187			○	⊙	Part of it is I-95 (Between MM 10 and MM 22)
	Route 48	Route 903	US 301						10	○	○	
	Route 46	Route 48	US 301						6	○	✓	
	US 158	Route 48	US 301						5	○	✓	
	Route 903	Route 48	US 301						10	○	○	
	Route 481	Route 4	US 301						9	○	○	
	Route 33	Route 4	US 301						5	○	○	
	Route 4	I-95 (@ MM 145)	US 301						4	○	○	
	Route 48	US 301	Route 4 (@ MM 145)						7	○	○	
	US 70	Bus US 70	Alt US 70						10	○	✓	
	Bus US 70 (or Bypass?)	US 70	US 70						10	○	✓	
	US 421	US 301	I-95						1	○	✓	
	Route 24	Fort Bragg	I-95						10	○	✓	
	Route 59	I-95	US 401						8	○	✓	
	Route 20	I-95	US 301						1	○	○	
	Route 130	US 301	I-95						1	○	○	
	North Carolina Totals			187	0	0	187	60	97			Inrix Coverage = 19 freeway miles out of 247

Note: Mileage numbers may not match exactly the maps provided - best efforts we used to create this table, but the maps were occasionally ambiguous

✓ = Complete Inrix real-time coverage; complete TMC code coverage
⊙ = Partial Inrix real-time coverage; Partial TMC code coverage
○ = No Inrix real-time coverage; No TMC code coverage

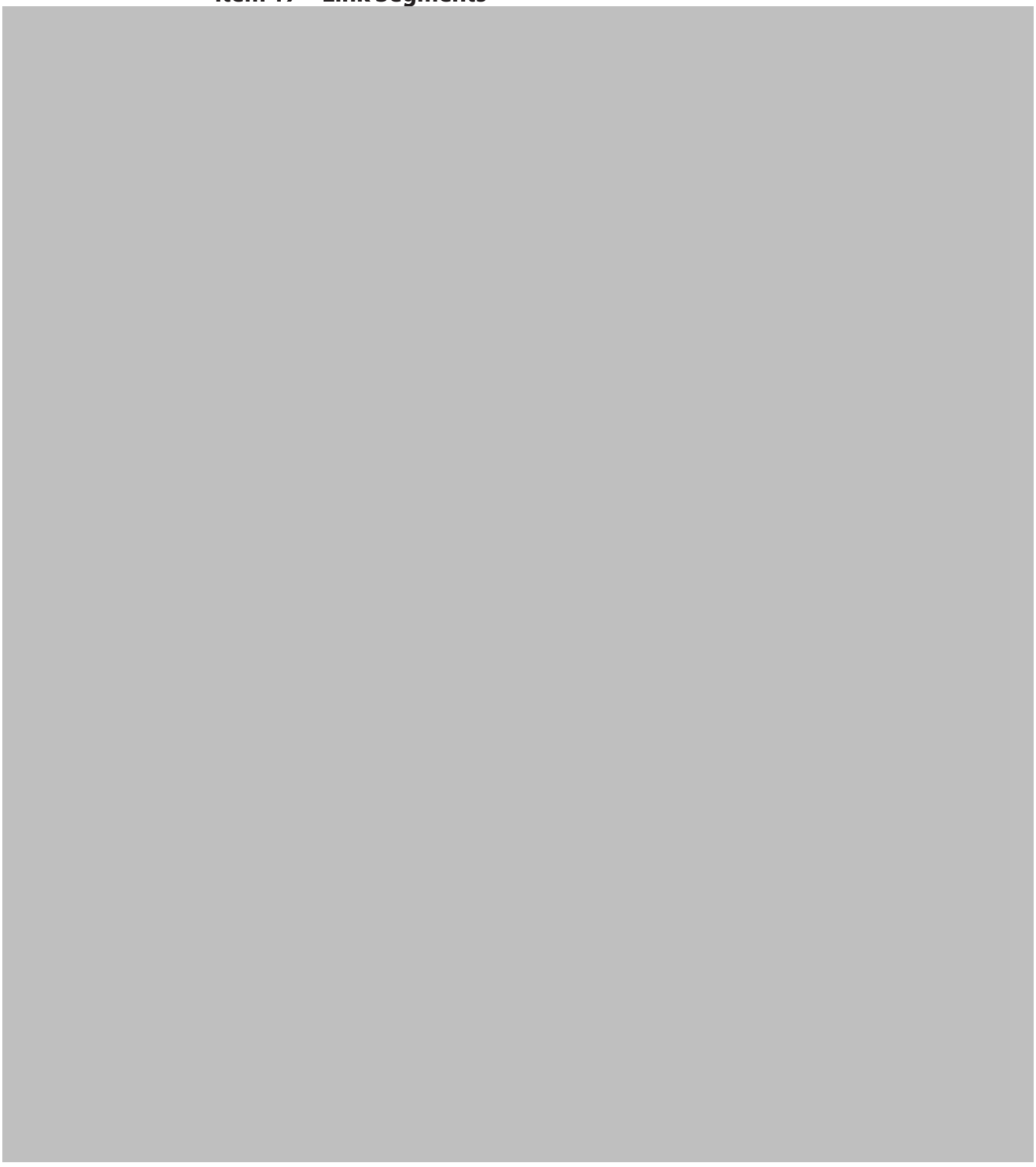
Baseline System Coverage Analysis

State	Road	Mileage by Type (Est.)				Inrix Coverage Status	TMC Coverage Status	Notes
		I-95	Beltways	Parallel Freeways	Intersecting Freeways			
Maine	I-95	303				⊙	✓	Cover MM 0 to MM 90 approx (and Falmouth spur - 5M) - 95 total
	I-295			52		⊙	✓	Cover MM 0 to MM 31
	I-195				2	○	✓	
	Maine Totals	303	0	52	2			Inrix Coverage = 126 freeway miles out of 357
New Hampshire	I-95	16				✓	✓	
	I-93			22		✓	✓	
	Route 101			33		✓	✓	
	Route 3			20		✓	✓	
	I-293				11	✓	✓	
	New Hampshire Totals	16	0	75	11			Inrix Coverage = 102 freeway miles out of 102
Massachusetts	I-95	88				✓	✓	
	I-495		88			✓	✓	
	Route 3			20		✓	✓	
	I-290			19		✓	✓	
	I-190			19		✓	✓	
	I-395			12		✓	✓	
	I-90			59		✓	✓	
	I-84			8		✓	✓	
	I-93				46	✓	✓	
	I-295		4			✓	✓	
	Route 213				3	✓	✓	
	Massachusetts Totals	88	92	137	49			Inrix Coverage = 366 freeway miles out of 366
Rhode Island	I-95	44				✓	✓	
	I-295		23			✓	✓	
	Route 10			5		✓	✓	
	Route 37				2	✓	✓	
	Rhode Island Totals	44	23	5	2			Inrix Coverage = 74 freeway miles out of 74
Connecticut	I-95	111				✓	✓	
	I-395			55		✓	✓	
	I-84			98		✓	✓	
	I-91			38		✓	✓	
	Route 9				12	✓	✓	
	Route 15			83		⊙	✓	All but 15 miles (arterial cross section south of Hartford) covered
	I-691				9	✓	✓	
	US 72				8	✓	✓	
	Route 6				5	✓	✓	
	Connecticut Totals	111	0	274	34			Inrix Coverage = 401 freeway miles out of 416
New York	I-95	24				✓	✓	
	I-84			35		✓	✓	
	I-87			68		✓	✓	
	I-287			11		✓	✓	
	Garden State Pkwy			2		✓	✓	
	Palisades Pkwy			8		✓	✓	
	I-684			28		✓	✓	
	Hutchison Pkwy			19		✓	✓	
	I-295			9		✓	✓	
	I-678			14		✓	✓	
	I-278			34		✓	✓	
	I-495			11		✓	✓	
	Belt Pkwy			16		✓	✓	
	New York Totals	24	0	255	0			Inrix Coverage = 264 freeway miles out of 264
South Carolina	I-95	198				○	✓	
	I-20				8	○	✓	
	I-26				14	○	✓	
	South Carolina Totals	198	0	0	22			Inrix Coverage = 0 freeway miles out of 220
Georgia	I-95	112				○	✓	
	I-16				15	○	✓	
	Georgia Totals	112	0	0	15			Inrix Coverage = 0 freeway miles out of 127
Florida	I-95	383				⊙	✓	Cover all but MM 88 to MM 160
	I-10					✓	✓	
	I-295		35			✓	✓	
	Route 9A		25			✓	✓	
	Route 10				8	○	✓	
	Route 202				12	○	✓	
	Route 528				15	✓	✓	
	FL Turnpike			109		⊙	✓	All but MM 116 to MM 152
	Sawgrass (869)			23		✓	✓	
	I-75				22	✓	✓	
	I-595				13	✓	✓	
	HEFT (821)			48		✓	✓	
	Palmetto (826)			24		✓	✓	
	Dolphin (836)				16	✓	✓	
	FL 924				8	✓	✓	
	FL 874			6		✓	✓	
	I-195				3	○	✓	
	Florida Totals	383	60	210	97			Inrix Coverage = 598 freeway miles out of 728

✓ = Complete Inrix real-time coverage; complete TMC code coverage
⊙ = Partial Inrix real-time coverage; Partial TMC code coverage
○ = No Inrix real-time coverage; No TMC code coverage

and INRIX the opportunity to build from today towards the desired future. As such, we propose to work with the Coalition to establish an arterial/alternate route applied research and testing initiative as part of this project with the Coalition. To show our commitment to this initiative, we will make data available in our feed, in the format described in item 1, on the arterials defined in the core system (or some equivalent system up to 1000 miles in coverage) for the three-year base operating period as our contribution to the initiative.

Item 17 – Link Segments



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Item 20 – Link Segment Definition

[redacted]

Item 22 – Availability

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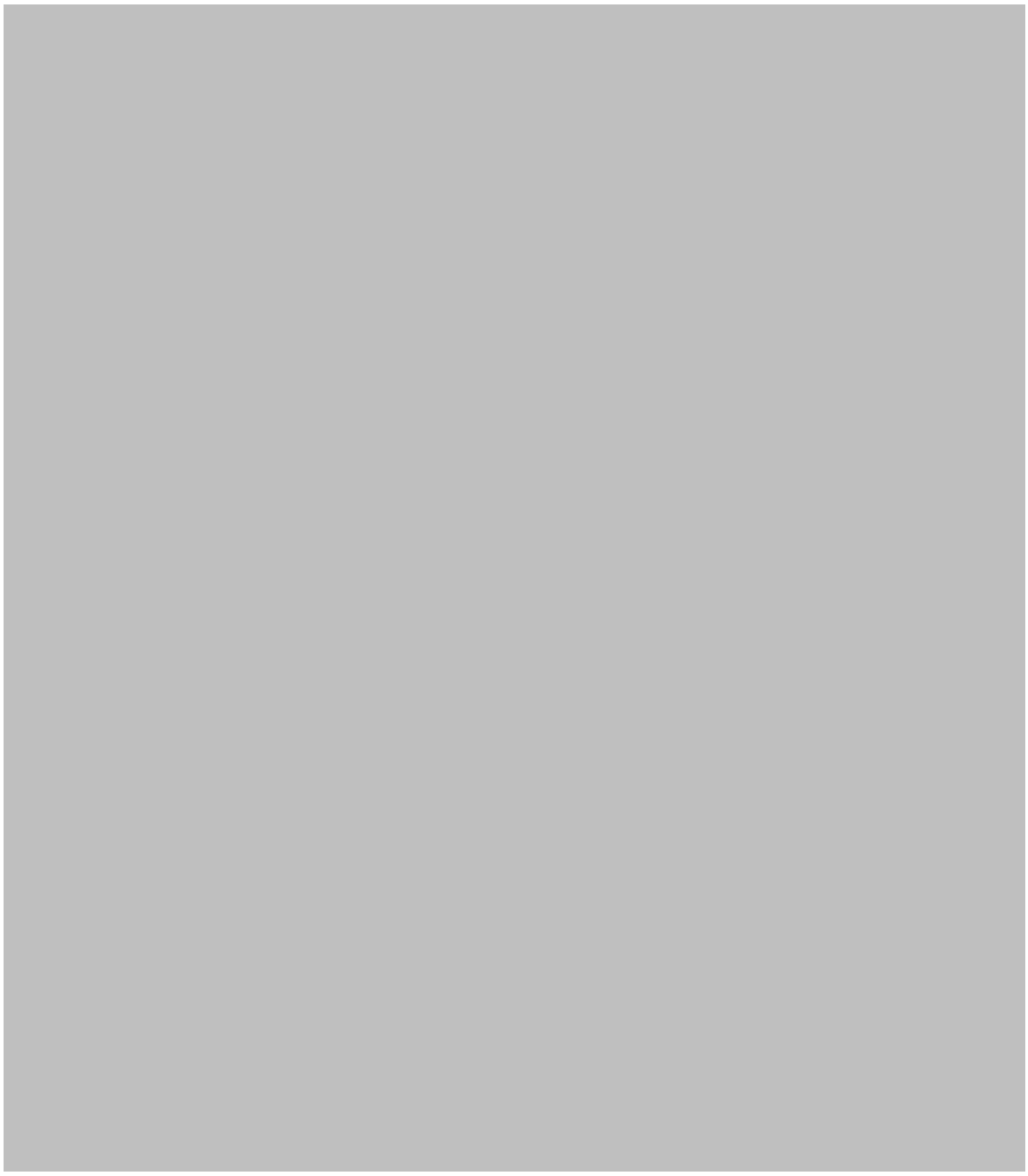

Item 28 – Website

INRIX will utilize one or both of two options as the basis for meeting the web site requirements of the RFP. One approach is based upon an expansion of the site that has been used to illustrate our flow data coverage throughout the proposal. The other option is a web client we currently utilize internally to QC data, to demonstrate our data and possible applications and the Clear Channel's Total Traffic Network's field offices utilize to compare flow data and incident reports.

The following screen captures illustrate some of the features of the current web client.

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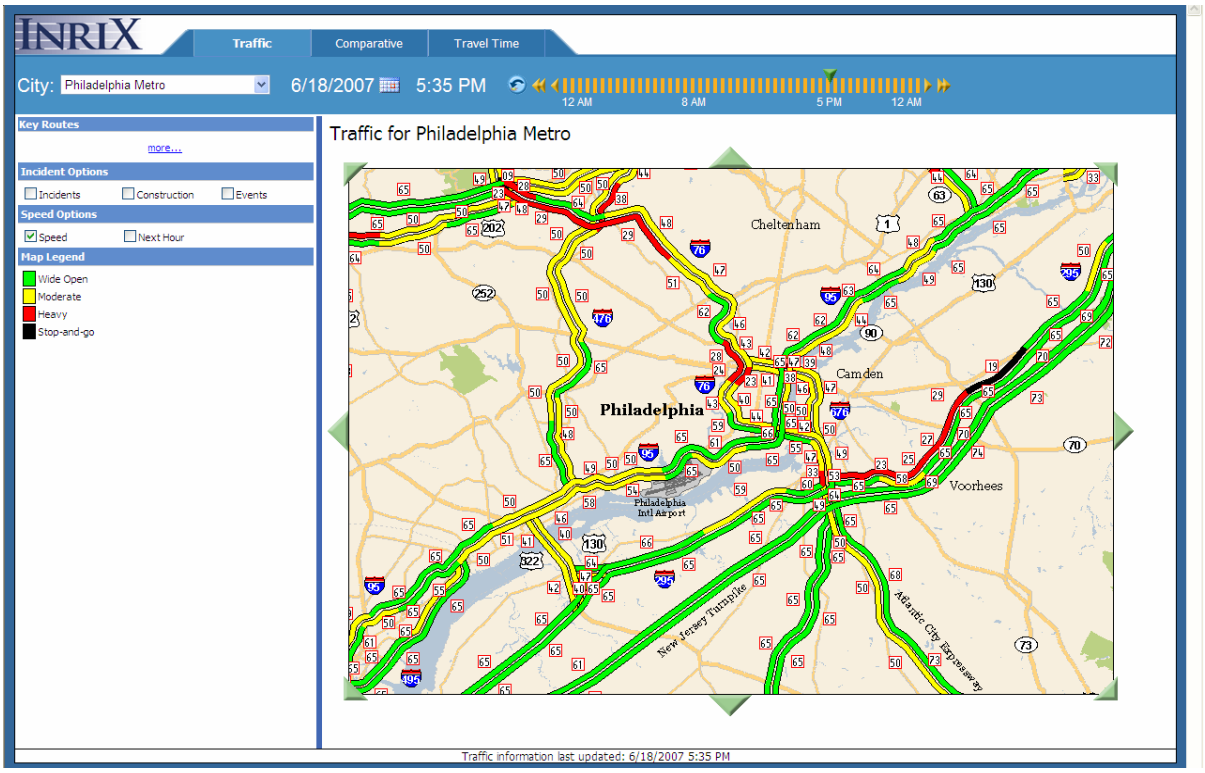
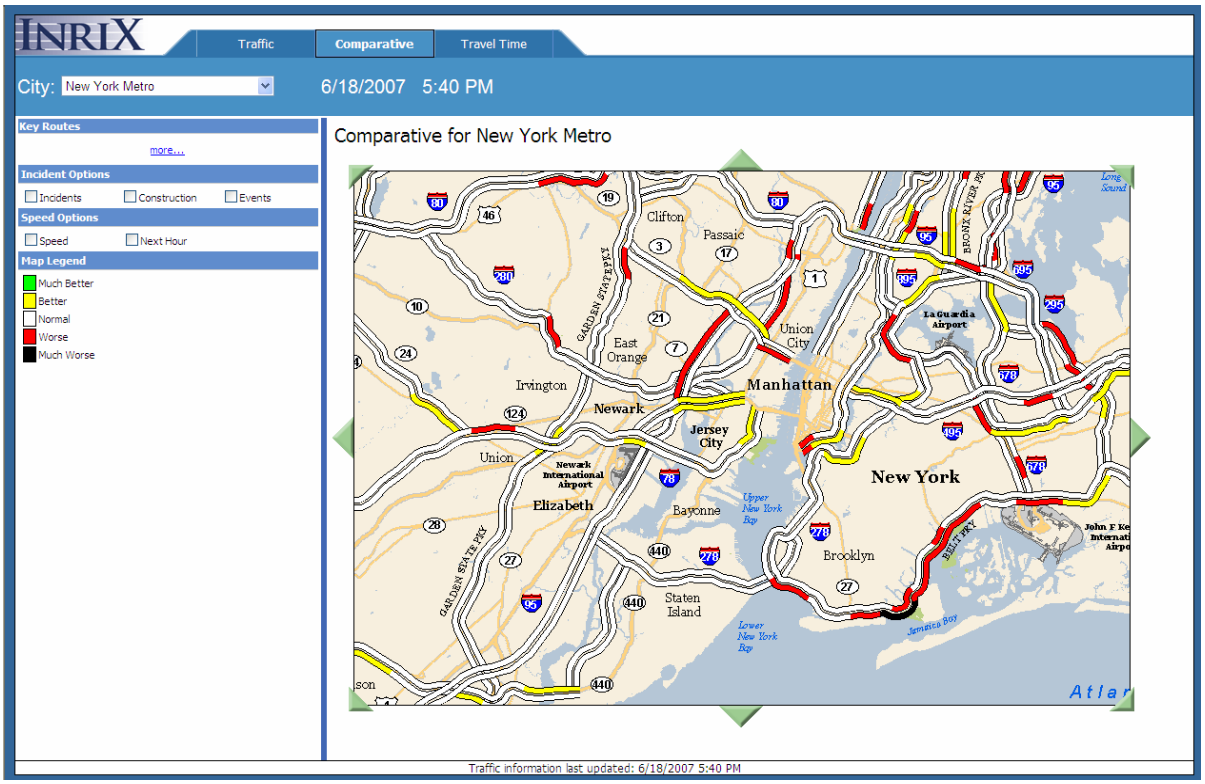


Image 1 – Current flow data. Notice the reported speed can toggle on or off.

Image 2 – Comparative with expected conditions. Speed toggle shows +/- speed change versus expected conditions.



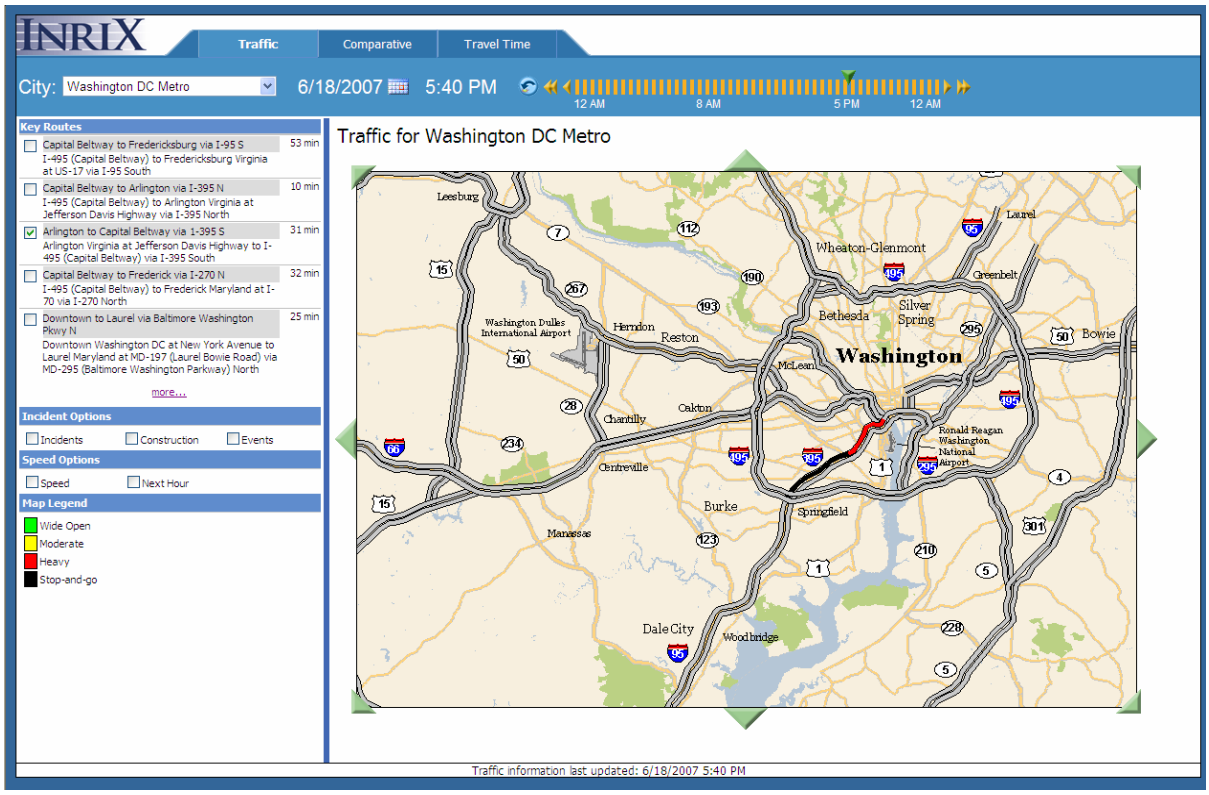


Image 3 – Key Route travel times. Note the route selected to the left.

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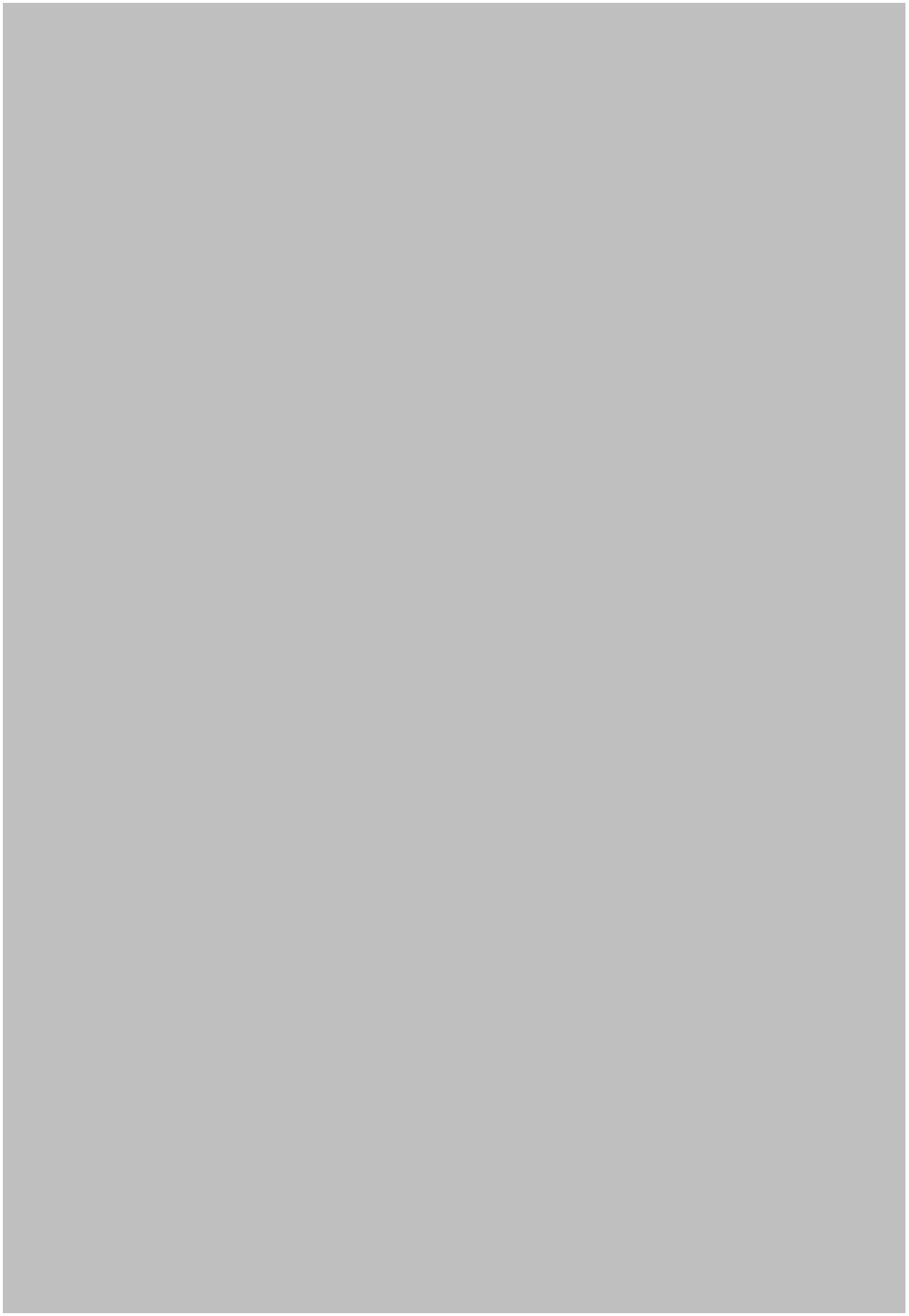

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Consulting Services Approach and Requirements Satisfaction

As mentioned previously in this document, PBS&J will serve as the lead consultant on the project and will manage the day-to-day tasks that may develop over the life of the contract. The PBS&J-led team of consultants was assembled to provide fresh resources, new ideas and capabilities to the Coalition, while also bringing a deep knowledge of, and experience with, some of the Coalition's member agencies.

PBS&J has a long history in managing task order-driven IDIQ and on-call contracts with numerous state and federal clients. While each project of this type is unique, they all have commonalities that allow PBS&J's experience, management and administrative approach to work well together.

A diversity of firms, talents and resources are what the Coalition will gain with the group assembled by INRIX. The consulting team's general roles and duties are expected to be, but not limited to, the following:

PBS&J –

- √ Consultant services management
- √ 511 and ATIS integration experience (PBS&J developed and operates the 511 systems in North Carolina and Virginia)
- √ Experience in almost every stated requirement

Open Roads Consulting –

- √ Integration of feeds
- √ ATMS and ATIS experience

EnterInfo –

- √ System integration and testing
- √ GIS
- √ Website development

Berkeley Transportation Systems –

- √ Decision support systems
- √ Traffic forecasting

Tele Atlas –

- √ Highway link network/ international expert
- √ GIS

TRAC –

- √ Overall traffic data and travel time advisor/ national expert
- √ Decision support
- √ Performance measures

The table on the following page contains the Consulting Services Requirements and the INRIX team's ability to meet the requirements.

A more detailed list of key staff and their expertise as it pertains to the stated consulting services requirements can be found in the *Consulting Services – Key Staff Areas of Expertise* table on a following page. As that table shows, every requirement is covered by this small representative group of key staff, while the depth and experience of each firm is available to the Coalition and the member agencies. Resumes of the key staff are also included at the end of this section of the document.

The *Consulting Services – Key Staff Areas of Expertise* table also clearly shows the areas of technical overlap that the team has. It is important to understand that the overlap is intentional for two reasons:

- √ None of the consulting services team members have been guaranteed any specific type of work or specific percentage by INRIX or PBS&J (aside from meeting and exceeding the MBE/ DBE goal of 25%), and
- √ Overlap in expertise allows PBS&J to work with the Coalition and its members to find the best fit (staff, experience, location, familiarity, etc) for the task at hand, versus assigning the only team member with relevant experience.

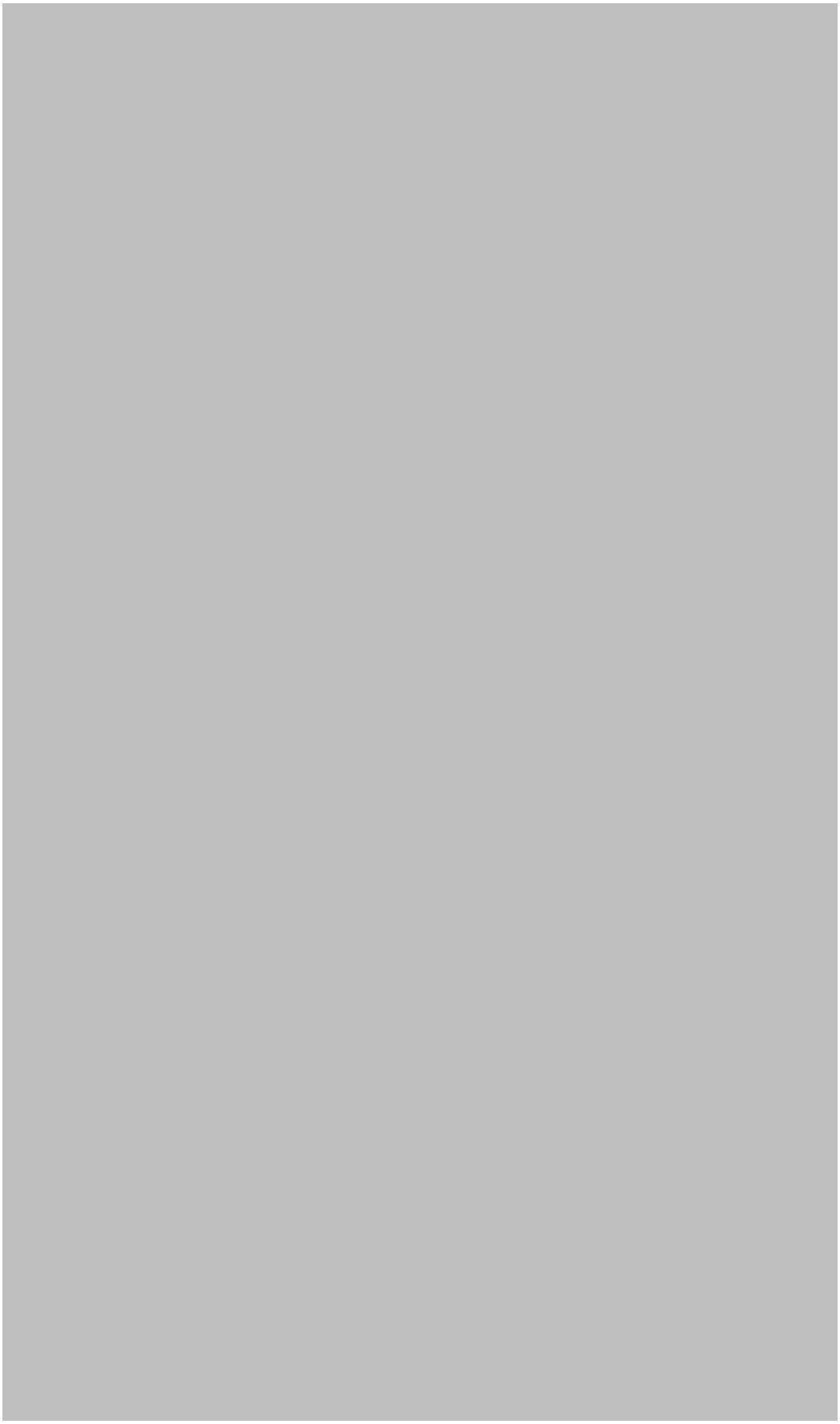
In addition, the INRIX-led team is willing to add subcontractors over the life of the project to meet specific needs (technology, institutional, etc.) not initially considered by the Coalition or the University of Maryland when developing the request for proposal.

Consulting Services Requirements

Item	Description	Priority	Response Code	Respondent Comments
	CONSULTING SERVICES			
1	Providing data feeds in other formats such as streaming XML, FTP, SFTP, CORBA, SOAP and JMS as needed to support ATMS, ATIS and other ITS applications within the Coalition.	M/E	E	The Consulting Services team has a experience working with all of the stated data feed formats and applying solutions to support ATMS, ATIS and other ITS applications. Experience in this area includes the NCDOT 511 system, ATMS software development and integration for VDOT. See the Consulting Services - Key Staff Areas of Expertise table on the following page for experience by key staff person.
2	Provide other formats, such as various implementations of TMDD standards, Alert-C, ISO and SAE standards as needed to support ATMS and ATIS (and other ITS applications) within the Coalition.	M/E	E	The Team has a experience working with all of the stated standards and formats as many of these are used in both the public sector as well as the mapping, auto and navigation industries, which the team has extensive experience working with. See the Consulting Services - Key Staff Areas of Expertise table on the following page for experience by key staff person.
3	Develop alternate link data formats in order to integrate data into existing ITS applications	M/E	E	The development of these alternate formats can be spread across firms, but would most likely be led by Open Roads Consulting
4	Extend capability of web-based monitoring system	M/C	E	Extending this capability is something that BTS performs on a daily basis and would likely be supported by ORC or EnterInfo as all have good experience in this area.
5	Re-segment portions of the highway link network to adapt to physical changes and institutional needs	M/C	E	Highway link re-segmenting is something that Tele Atlas and Open Roads Consulting handle on a daily basis on both international and regionial levels. As a leader in the electronic mapping industry, and a participant in the North America Location Code Alliance, this is the primary reason Tele Atlas is on the team.
6	Provide a publicly accessible web site for viewing traffic data	D/E	E	The Inrix Team is very skilled in developing publicly accessible websites for viewing traffic and tavel data, which includes the CHART website developed for MSHA by EnterInfo.
7	Assist the Coalition and its members with integrating traffic data into ATMS and ATIS systems	M/C	E	The Inrix Team concurs with this requriement and believes that integrating data into existing critical software at DOTs is a key component of the services offered. Both ORC and EnterInfo have extensive expereince as ATMS software developers and system integrators, plus PBS&J has expereince integrating speed and travel time information existing 511 sytstems in the Corridor
8	Develop traffic forecasting capability	D/E	E	This capability exisits within the team and would be led by BTS based on their experience along the I-5 corridor.
9	Develop decision support tools	D/E	E	Decision support tools is something amost every team member has developed for previous clients and properly setting them up along with relevant performance measures is the key to a useful tool.

Consulting Services – Key Staff Areas of Expertise

Staff	Project role	Company	General support				Providing data feeds in other formats to support ATMS, ATIS and other ITS applications						Provide other formats to support ATMS, ATIS and other ITS applications				Link data formats	Web-based monitoring	Highway link network	Web site	Data integration	System and support development	
			511 and ATIS development	ATMS development	GIS	Performance measures	Streaming XML	FTP	SFTP	CORBA	SOAP	JMS	TMDD standards	Alert-C	ISO	SAE standards	Develop alternate link data formats in order to integrate data into existing ITS applications	Extend capability of Web-based monitoring system	Re-segment portions of the highway link network to adapt to physical changes and instiutional needs	Provide publicly accessible Web site for viewing traffic data	Assist with integrating traffic data into ATMS and ATIS systems	Develop traffic forecasting capability	Develop decision support tools
Bhandari, Mamta	Sr. Engineer/Analyst	PBS&J	●			●										●		●					
Bonds, John	Systems Engineer	PBS&J	●	●		●	●	●			●		●	●	●	●	●	●			●	●	●
Kell, W. Todd	Project Manager	PBS&J	●		●																		
Morgan, Benjamin	Database Specialist	PBS&J	●	●		●	●	●			●	●	●				●	●		●	●		●
Gaarder, Erik	Sr. Engineer/Analyst	PBS&J	●			●									●								●
Press, Bill	Sr. Engineer/Analyst	PBS&J			●																		
Robison, David	Sr. Programmer	ORCI	●	●	●	●	●	●	●	●	●		●				●	●	●	●	●		●
Clark, Jonathan	Programmer	ORCI		●			●	●	●	●											●		
Horner, John	Sr. Engineer/Analyst	ORCI		●			●	●	●	●	●							●		●	●		●
Skiffington, Daniel	Jr. Programmer	ORCI		●	●	●		●	●	●	●						●		●		●		
Dong, Jason	Sr. Engineer/ Analyst	EnterInfo	●	●	●												●	●		●	●		●
Leung, Roger	Sr. Engineer/ Analyst	EnterInfo		●	●															●	●		●
Choi, Willie	Programmer	EnterInfo			●															●	●		●
Zhong, Lei	Sr. Programmer	EnterInfo			●															●	●		●
Sung,Weilin	Programmer	EnterInfo			●															●	●		●
Yang, Bo	Database Specialist	EnterInfo			●															●	●		●
Hranac, Rob	Systems Engineer	BTS			●	●												●				●	●
Kwon, Jaimyoung	Sr. Engineer/ Analyst	BTS				●												●		●		●	●
Morris, Bill	D'base Specialist	BTS				●											●	●		●		●	●
Petty, Karl	Systems Engineer	BTS				●												●		●		●	●
Shieh, Eric	Programmer	BTS			●	●												●		●			
Lipkin, Paul	Sr. Engineer/ Analyst	Tele Atlas			●									●					●				
Hallenbeck, Mark	Sr. Engineer/ Analyst	TRAC-UW				●															●		●



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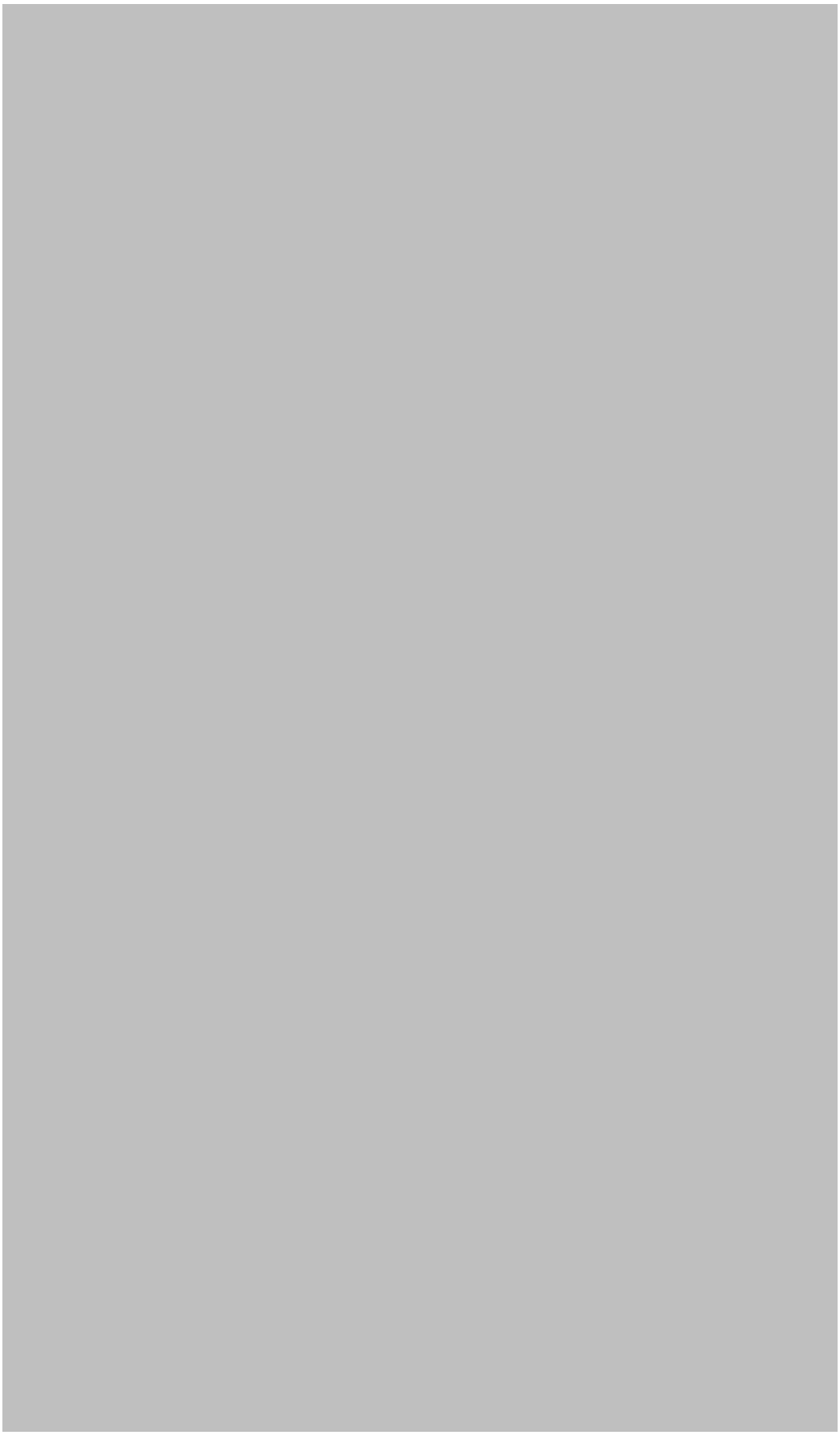

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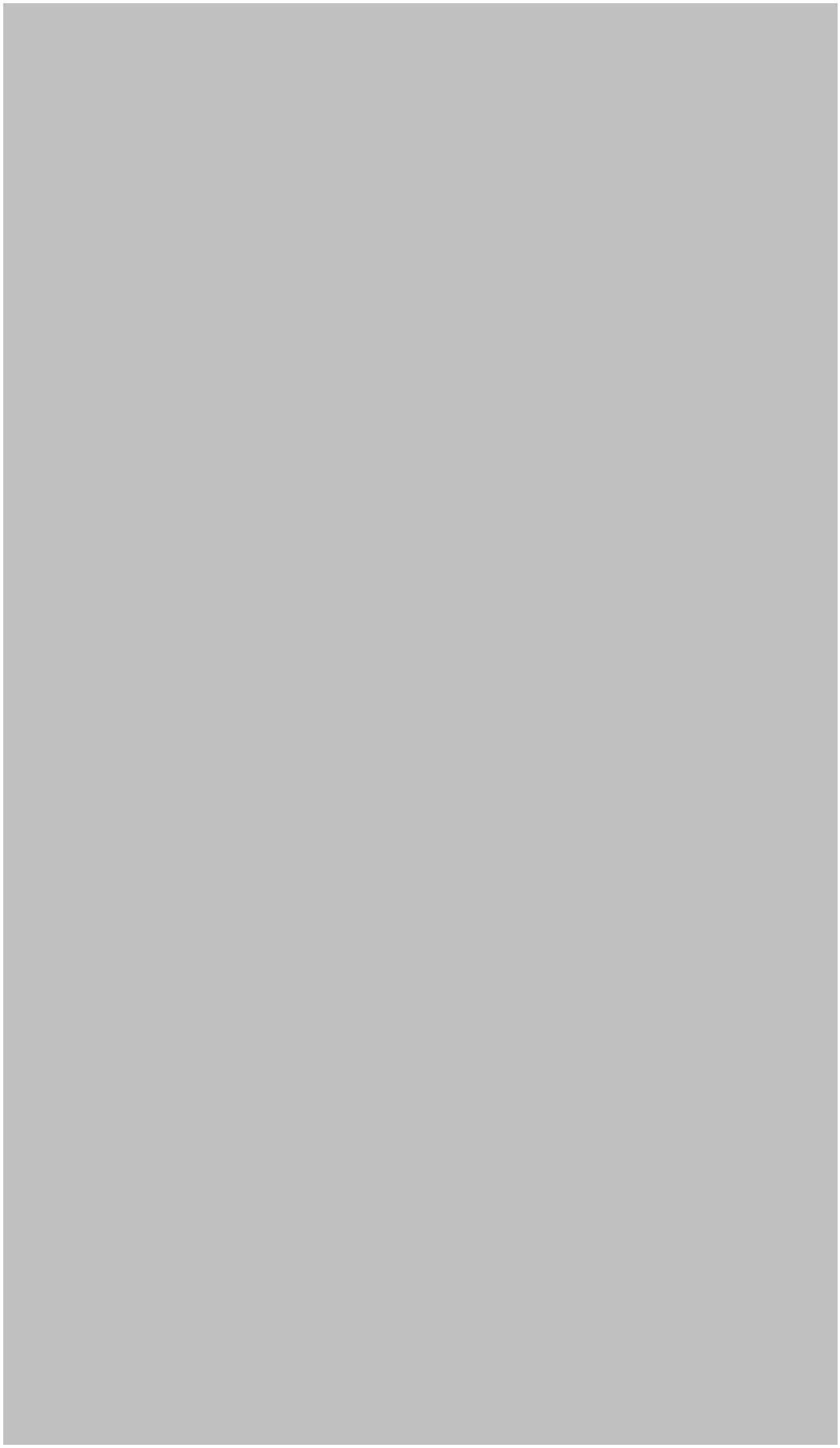

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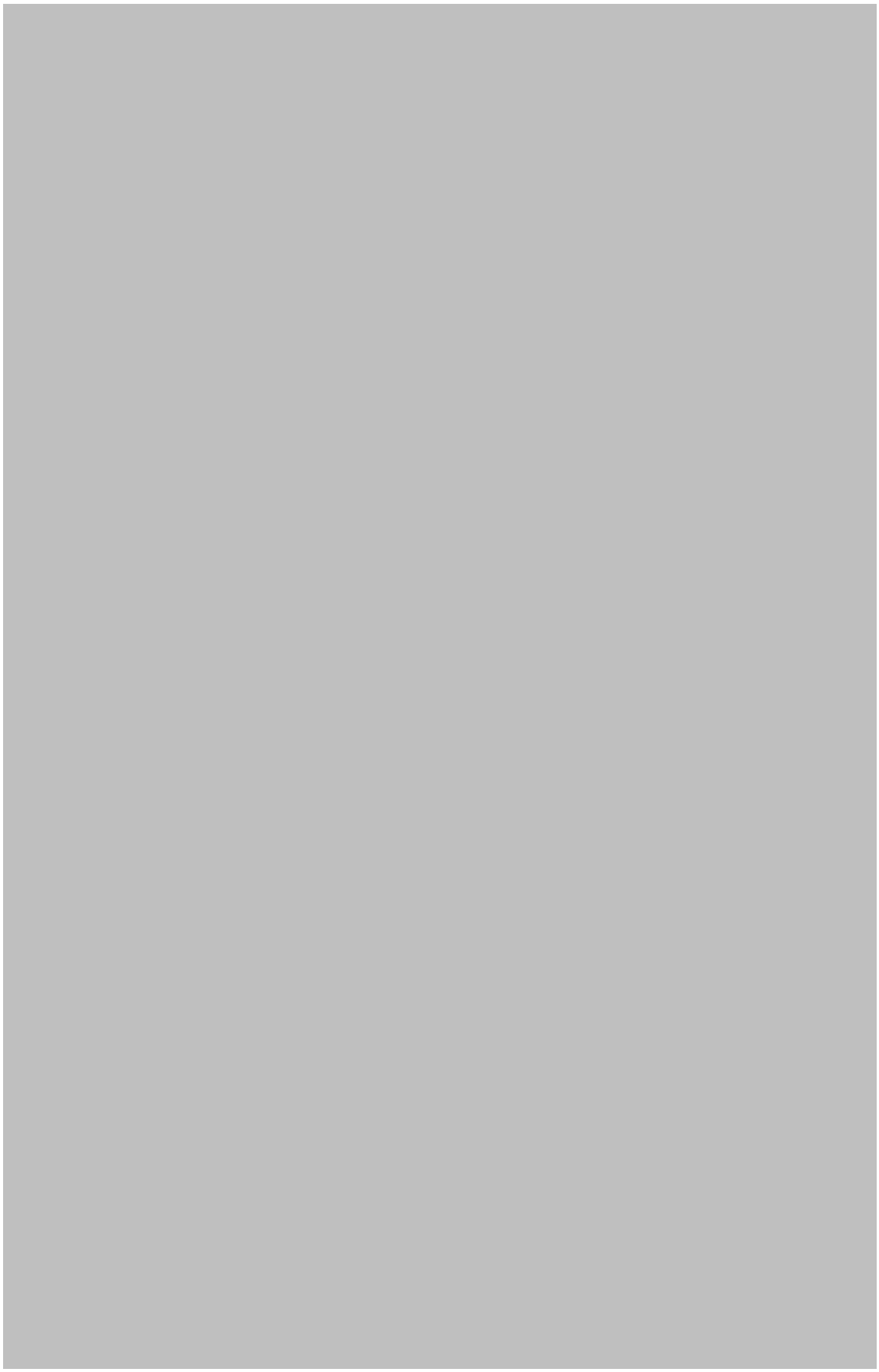

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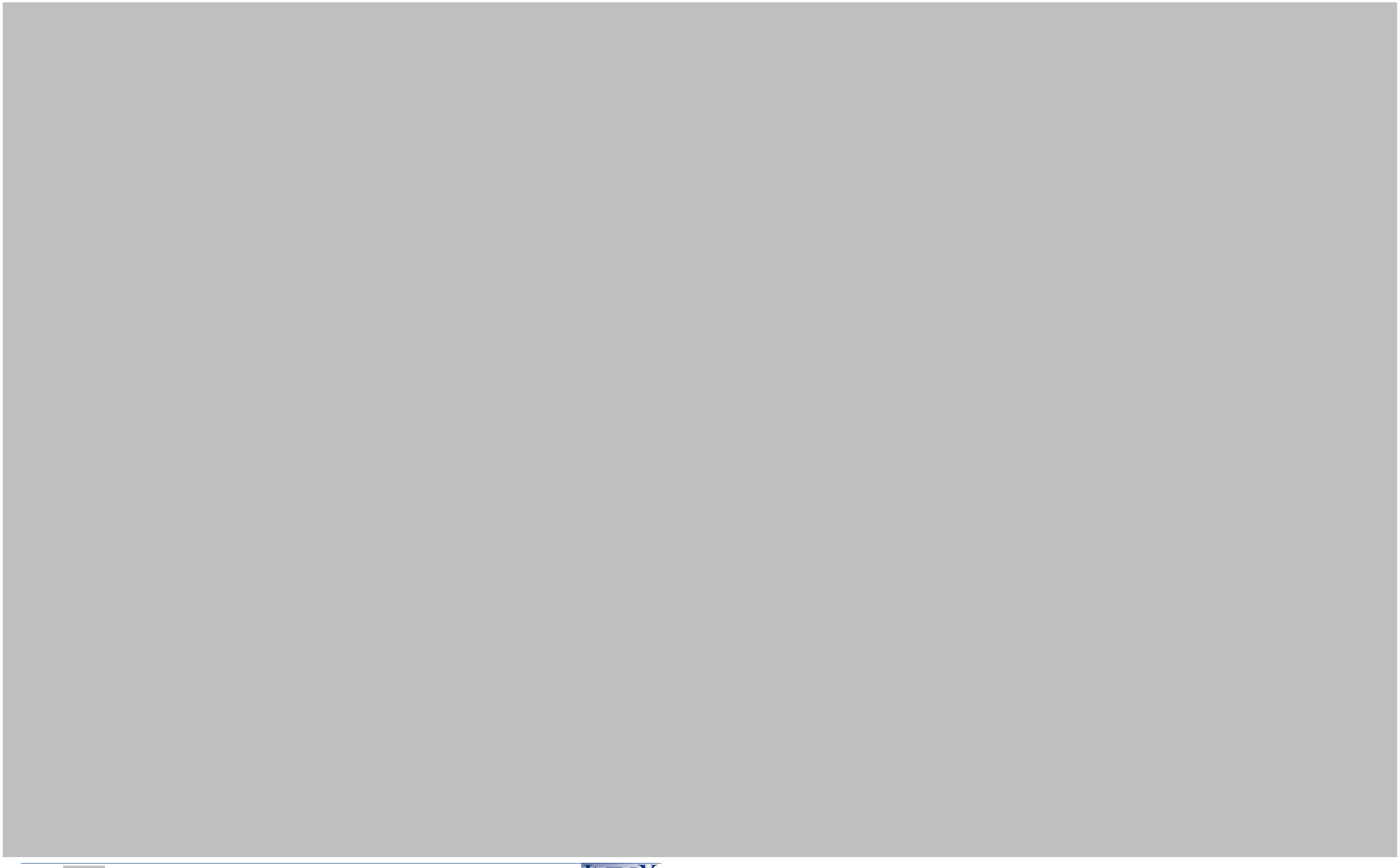

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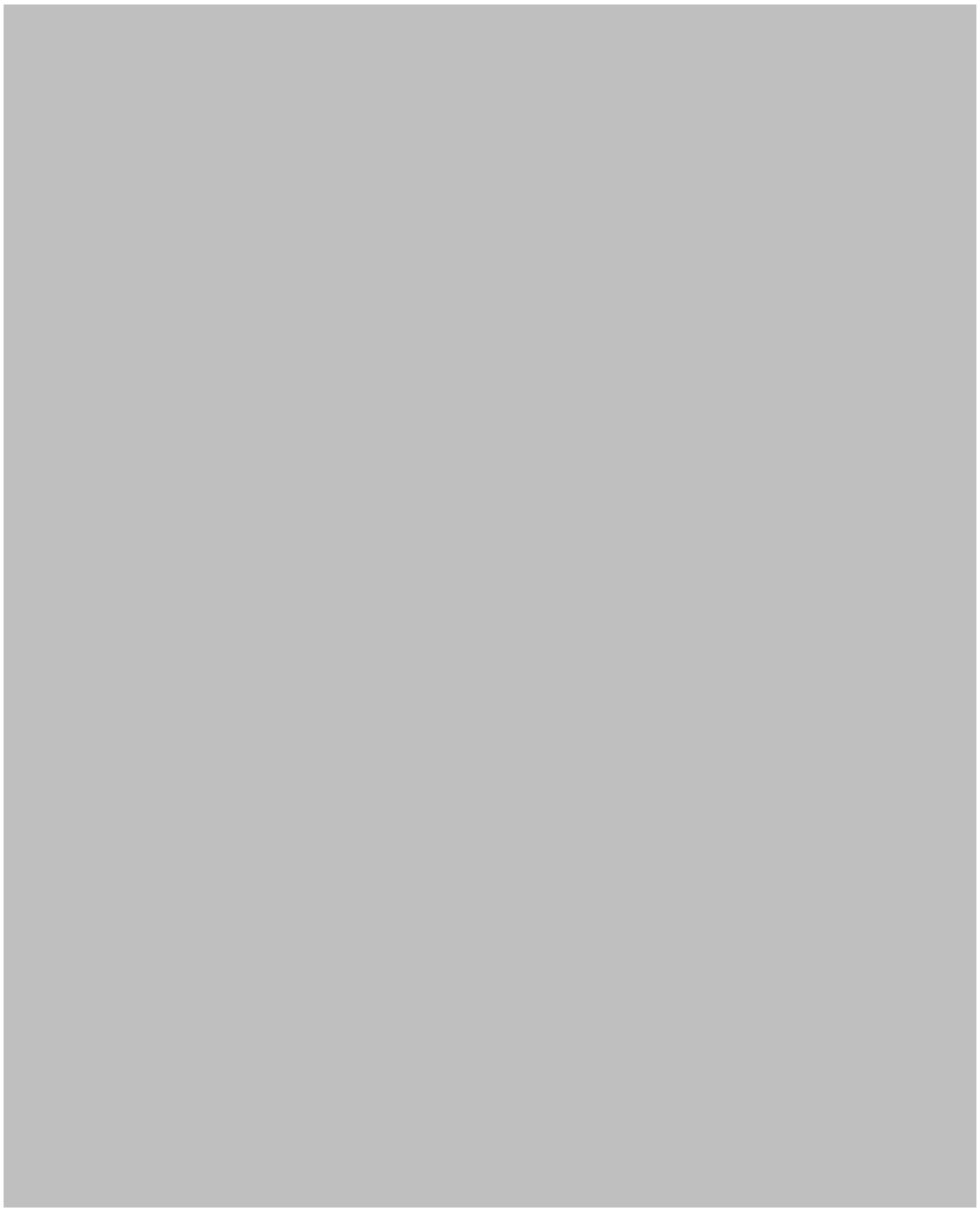

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Mamta Bhandari

Senior Project Manager Analyst

PBS&J

Education

B.S., Finance, Bombay University, India, 1995

M.B.A., Finance, Bombay University, India, 1997

Certifications

Project Management Professional (PMP)

Ms. Bhandari has 9 years of overall experience with over 6 years as a project manager, concurrently managing multi-functional global teams on several complex projects. Her focus during the last 5 years has been delivering speech recognition/IVR systems for several statewide departments of transportation and other travel industry clients. She has been involved in managing client relations, developing detailed project and resource plans, tracking and communicating progress, and anticipating and resolving project issues throughout the project life cycle. She also has experience in creating service delivery organizations - building high-performing delivery teams and business processes from the ground up. She has earned a project management professional (PMP) certification from the Project Management Institute (PMI).

North Carolina 511 Travel Information Telephony System, Raleigh, North Carolina (North Carolina Department of Transportation (NCDOT)). ITS Specialist. This project for the NCDOT involves the operation of the statewide 511 phone service for North Carolina from 2004-2008. The system was previously developed and implemented by PBS&J. Responsibilities include the phone system, marketing efforts, focus groups and user surveys, integration of public and private sector data, system documentation and testing, and performance monitoring. Ms. Bhandari assists in the day-to day client management and maintenance and operational aspects for the NCDOT 511 system. Last year she was involved with the overall redesign, including front end and back end aspects of the NCDOT 511 system, to meet client needs and industry best practices. She also worked on developing a detailed test strategy, including a test plan, test scripts, and issue reporting documents for testing the redesigned application.

Virginia 511 Implementation and Operations, Richmond, Virginia (Virginia Department of Transportation (VDOT)). ITS Specialist. This project for VDOT involves the design and operation of Virginia's statewide 511 phone service and web site through August 2007. Responsibilities include all carrier coordination, marketing, the phone system, Web site, public- and private sector data integration, establishing a creative business approach to delivering travel services, system documentation and testing, and performance monitoring. Ms. Bhandari assists in the day-to-day client management and maintenance and operational aspects for the VA 511 system.

Virginia 511 Implementation and Operations, Richmond, Virginia (Virginia Department of Transportation (VDOT)). Project Manager and ITS Specialist. This project for VDOT involves the redesign of the VADOT 511 system and the operation of the phone service and Web site through August 2009. The redesign is being undertaken to improve the front end, back end and coverage aspects of the system. PBS&J previously developed and managed the implementation of this system, which was launched in 2004. Responsibilities include public- and private sector data integration, voice user interface redesign, enhancing roadway

coverage, system documentation and testing, performance monitoring, all carrier coordination, and marketing. Ms. Bhandari assists in the day-to-day client and team management for redesigning and operating the VA 511 system.

Districtwide Traffic Operations (2004-2009), Districtwide, Florida (Florida Department of Transportation (FDOT), District Five). ITS Specialist. This $3 million, 5-year contract with FDOT District Five, involved continuing traffic operations services for projects on the 2,100 miles of state highway in the nine central Florida counties. Services were provided on a task-order basis, often in response to citizen complaints and requests from local government agencies, include signal warrant studies, intersection analysis, corridor studies, traffic signal design, intelligent transportation systems (ITS) planning and design, traffic signal inspection, traffic data collection, and arterial traffic signal retiming. Ms. Bhandari is responsible for reviewing and testing additional functionality added to the FDOT 511 system for providing personalized traveler information to callers. She assists with ongoing system changes to improve overall system usability.

Statewide Intelligent Transportation System General Consultant Services (2006-2009), Statewide, Florida (Florida Department of Transportation (FDOT), ITS Office). ITS Specialist. This multiyear, intelligent transportation systems (ITS) general consultant services contract with the Florida Department of Transportation Central District, involves providing technical, management, and administrative tasks related to the planning, architecture and standards development, integration, operations, maintenance, telecommunications, and mainstreaming of ITS throughout Florida. This contract also consists of the preparation of design criteria packages for ITS implementation, deployment, and integration of more than 2,200 miles of ITS on the limited-access corridors in Florida. The major initiatives along these corridors include providing coordinated operations for all modes; active facilities management involving freeway-management systems, incident management, evacuation coordination, smart work zones, commercial vehicle-information systems, and commercial vehicle information systems and networks (CVISN)-related projects; and information sharing in the form of central data warehousing and advanced traveler information systems (ATIS). Ms. Bhandari worked with seven district FDOT teams and the central office to help define detailed functional requirements for a Statewide 511 ATIS system. She lead the effort of gathering and standardizing information on roadway and segment coverage offered by the six existing 511 systems in the state of Florida. She also worked with the FDOT district teams to understand and document lessons learned from planning, developing, testing, tuning and deploying present and past 511 systems.

Professional Development
Project Management, Business Management, Financial Planning, Client Management, System/Application Development, Quality Assurance

John M. Bonds

Senior ITS Specialist
PBS&J

Education

M.S., Aeronautical Engineering, USN Post Graduate School, 1970
B.S., Aerospace Engineering, University of Michigan, 1968

As a senior intelligent transportation systems (ITS) specialist in the ITS division, Mr. Bonds combines his broad management and engineering experience in high-technology systems with recent applications experience in advanced public transportation systems (APTS), advanced traveler information systems (ATIS), advanced transportation management systems (ATMS) and electronic payment systems (EPS). Mr. Bonds is a system engineer with more than 34 years of experience in all aspects of system development from concept to site acceptance testing. He specializes in systems architecture definition and system design and specification, with a focus on requirements allocation and traceability to the National ITS Architecture.

Prior to joining PBS&J, Mr. Bonds worked in the defense industry to design and specify high-technology electronic systems, from radar warning receivers for combat jets to highly classified signals intelligence collection systems for the U.S. government.

In addition to his recent ITS experience, Mr. Bonds is experienced in designing, specifying, integrating, and testing high-technology systems ranging from automated flight planning systems to highly classified signal intercept and analysis systems.

Mr. Bonds' representative experience includes the following:

Intelligent Transportation Systems

Smartlink, ATMS/ATIS , North Carolina Department of Transportation (NCDOT). Mr. Bonds is creating the functional architecture and writing the specifications for a statewide advanced traffic management system that integrates with an advanced traveler information system. The functional specification will be combined with a scope of services document to create a procurement package for NCDOT.

Statewide Transportation Management Center Software Library System (SunGuide), Florida Department of Transportation (FDOT). Mr. Bonds led the development of a statewide software system used to command and control regional transportation management centers. He wrote system specifications, scope of services documents, and assisted in the competitive procurement of the system. He wrote the test plans and procedures for the independent verification and validation (IV&V). He continues to support the project by providing system engineering services for system upgrades and enhancements.

Southwest Florida 511 System, FDOT. Mr. Bonds designed the functional and physical architecture for the interim ATIS for three counties in Florida. He wrote the interface specification between the data fusion system and the interactive

voice response (IVR) system. He went on to manage the integration and testing of the system and conducted final acceptance testing for FDOT.

511 System, NCDOT. Mr. Bonds provides support for system operations by capturing and analyzing data feeds when there are problems and by documenting the system architecture and interfaces.

511 System, VDOT. Mr. Bonds conducted a formal acceptance test of the system. He wrote the test plan and test procedures, led the team that performed the test, and submitted a formal test report. He continues to support operations when there are problems and suggests ways to make the system more reliable.

"Plan One" Toll System Development, FDOT, Florida's Turnpike Enterprise (FTE). Mr. Bonds managed the system engineering process used to develop system requirements for the toll replacement project.

Orlando Regional Alliance for Next Generation Electronic Payment Systems(EPS) (ORANGES), Central Florida Regional Transportation Authority (LYNX), Orlando, Florida. Mr. Bonds served as systems engineer and chief test engineer for this project, and managed the federal field operational test (FOT) of a multi-issuer, multi-application smart card. He was responsible for documenting the system interfaces and integrating and testing the system prior to field deployment. Mr. Bonds also wrote the interface control document (ICD), test plan, test procedures, various user guides, and supervised the factory and field testing of the system.

Statewide ITS Engineering Management Plan, FDOT. Mr. Bonds served as project manager and chief engineer for the development of a standard system engineering process for the State of Florida.

AZTech II Model Deployment Initiative (MDI), Maricopa County Department of Transportation (MCDOT), Arizona. Mr. Bonds was responsible for the interface documentation and specification of the add-on traveler information capability for wireless application protocol (WAP)-enabled telephones.

Smart Fleet System Concept of Operations (CONOPS), LYNX, Florida. Mr. Bonds developed the CONOPS document detailing an integrated voice and data communications network, sharing automated vehicle location (AVL) data with fixed route transit and para-transit services. Smart bus capabilities included smart card; schedule adherence monitoring in real time, both on-board the bus and at a central dispatch site; emergency communications back-up; automatic passenger counting and real time overload reporting; engine performance monitoring in real time; next bus announcements at bus stops; and traveler information. CONOPS led to a system specification, test plan, implementation plan, and a request for proposal (RFP).

City of Corpus Christi Integrated Communications Network (COAST), Texas.
Using shared fiber-optic cables, the Texas Department of Transportation (TxDOT) and the City of Corpus Christi will share camera surveillance video, dynamic message signs, and traffic and weather incident data among COAST partners. Mr. Bonds developed the concept of operations for this network.

Professional Affiliations
California Alliance for Advanced Transportation Systems (CAATS)
Intelligent Transportation Society of America (ITSA)

W. Todd Kell, AICP

Associate Vice President, Program Manager
PBS&J

Education

M.S., City Planning, Georgia Institute of Technology, 1994
B.S., Political Science, James Madison University, 1990
Career Discovery Program, Harvard University Graduate School of Design, Urban Planning and Design, 1989

Certifications

American Institute of Certified Planners (AICP), #013661

Professional Affiliations

American Planning Association (APA)
Intelligent Transportation Society of America (ITSA)
ITS Virginia Board of Directors (2001–2006)
ITS Virginia Executive Board (2006 – present)
Virginia Planning Association

Mr. Kell is the east region program manager for PBS&J's intelligent transportation systems (ITS) division, and is based out of the Richmond, Virginia, office. He has 13 years of experience in ITS technologies, transportation planning, transit operations analysis and planning, and multimodal cost analysis. His current focus is on the planning, development, and deployment of advanced traveler information systems (ATIS) and 511 systems, and innovative business models.

Prior to joining PBS&J, Mr. Kell was the travel information program manager at the Virginia Department of Transportation (VDOT). Prior to this position, he was a senior transportation planner with TransCore/SAIC for 6 years.

Mr. Kell's project experience includes:

Northern Region Operations Variable Message Sign Travel Time Preliminary Investigation, VDOT, Virginia. Mr. Kell is serving as the project manager for the investigation and feasibility of using existing and acquired data to disseminate travel time information via variable message signs in northern Virginia. This effort also involves the development of a grant application to the Federal Highway Administration (FHWA) for implementation funding.

Re-design of the NC 511 Travel Information Telephony System, North Carolina DOT (NCDOT), Raleigh, North Carolina. Mr. Kell served as the project manager for the design, development and deployment of the re-designed statewide 511 system for NCDOT. The system was launched in January 2007 on time and under budget.

VA 511 Statewide Travel Information System, VDOT, Richmond, Virginia. Mr. Kell is the project manager for the development, deployment, operation, maintenance and marketing of a statewide 511 telephone and Web service for VDOT. His duties include overseeing the development of multiple data source interfaces, data integration, telephony coordination, Web site development, telecommunications carrier coordination, performance monitoring, all project documentation, and general program management. The statewide system was publicly launched in February 2005 and PBS&J is under contract to operate it through July 2009.

NC 511 Travel Information Telephony System, NCDOT, Raleigh, North Carolina. Mr. Kell served as the project manager for the development, deployment, operation, and maintenance of a statewide 511 system for NCDOT. His duties included overseeing the development of multiple data source interfaces, data integration, telephony coordination, all project documentation, and general program management. The system was publicly launched in August 2004 and continues operation today.

PBS&J

511 Traveler Information Services, 511 Deployment Coalition, Washington, D.C. Mr. Kell assists PBS&J's program management support to the 511 Deployment Coalition, a partnership of the American Association of State Highway and Transportation Officials (AASHTO), ITS America, the American Public Transportation Association (APTA), and USDOT, which was established in 2000 to coordinate the deployment of 511 telephone-based traveler information services. Mr. Kell was the primary author of the *511 Implementation and Operational Guidelines,* Version 2.0.

511 Virginia Decision Support Assistance, VDOT, Richmond, Virginia. Mr. Kell served as an on-call resource providing support for operating and short-term planning efforts related to the 511 Virginia system along the I-81 corridor.

Baton Rouge 511 Design and Implementation Plan, Louisiana DOTD (LADOTD), Baton Rouge, Louisiana. Mr. Kell served as project engineer for the development of a 511 implementation plan for the Baton Rouge area. The project was conducted in three phases: (1) stakeholder engagement and project research, (2) vision development, and (3) conceptual system design.

Mississippi Statewide 511 Implementation Plan, Mississippi DOT (MDOT), Jackson, Mississippi. Mr. Kell served as project engineer for the development of a 511 implementation plan for the state of Mississippi. The project was conducted in three phases: (1) stakeholder engagement and project research, (2) vision development, and (3) conceptual system design. MDOT is using this plan to secure funding from the Mississippi Transportation Commission.

While at VDOT, Mr. Kell led the Department's efforts in advanced traveler information systems, including "511 Virginia" and "Partners In Motion." He also focused on the development of statewide policies, such as VDOT's *Guidelines on Access to Smart Traffic Center Data and Video Imagery,* and has years of experience cultivating public-private partnerships across the state. Mr. Kell was an active participant in the National 511 Deployment Coalition Working Group, where he headed the committee that developed and delivered the *Deployment Assistance Report #1: Business Models* and Costs released in 2002.

Prior to his duties at VDOT, Mr. Kell was a senior transportation planner at TransCore/SAIC, where he served as the firm's deputy project manager on the Washington, D.C. area ATIS project, "Partners In Motion." He also played integral roles in other projects of regional significance including the multimodal analysis of the I-270 corridor in Maryland; alternatives analysis of the unused freight railroad right-of-way between Bethesda and Silver Spring, Maryland, for the Georgetown Branch Transitway/Trail MIS/DEIS; and the present and future transit needs analysis of a 20+ mile segment of U.S. 1 in Fairfax and Prince William counties, Virginia.

Mr. Kell also served as support staff on the ATIS program track for the I-95 Corridor Coalition where he helped foster interstate communication and knowledge of traveler information systems from Virginia to Maine.

Presentations
511 National Conference, Instructor, "101 Training Session" – 2006, 2003
ITS Tri-Chapter Meeting and Exposition – 2005
ITS America Annual Meeting and Exposition – 2005, 2004, 2003
ITS Virginia Annual Conference and Exhibit – 2007, 2004, 2003, 2002, 2001
ITS Wisconsin Annual Meeting – 2004
ITS Maryland Annual Conference – 2003, 2002
Virginia Sheriff's Association Conference – 2006
National Rest Area Conference – 2002
Virginia Assoc. of Planning District Commissions Summer Conference – 2002
Annual Community Transportation Association of America Conference – 1999

Courses/Seminars
National Highway Institute – Overview of Systems Engineering (6/02)
National Transit Institute – Major Investment Study Training Course (4/98)

Honors and Awards
VDOT Commissioner's Award for Excellence recipient, 2002
Governor's Award nominee, 2002
Traveler Information Systems Scan Tour of Europe (Team Member) – Fall 2001

Benjamin R. Morgan

ITS Specialist
PBS&J

Education
B.S., Electrical Engineering,
University of Virginia, 2003

Professional Affiliations
Intelligent Transportation Society
of Virginia (ITSVA)

Mr. Morgan is a senior analyst with the travel network information division and is based out of PBS&J's Richmond, Virginia, office. His current focus is on the planning, development, and deployment of advanced traveler information systems (ATIS) and 511 systems. He is currently working with the North Carolina 511 rebuild team and supporting the Virginia 511 system.

Mr. Morgan's project experience includes:

VA 511 Statewide Travel Information System, Virginia Department of Transportation (VDOT), Richmond, Virginia. Mr. Morgan is the lead system designer and developer for the next generation 511 Virginia system. Duties on this project have included the development of critical design documents, software development in a wide variety of languages and protocols (XML, ASP.NET, XHTML, VB.NET, C#, SOAP, VXML, JavaScript, Java, SQLServer) and working with IVR developers to achieve project goals. The system is scheduled to launch in July 2007.

NC Smartlink Upgrade Project Manager Services, Raleigh, North Carolina. Mr. Morgan is supporting the project team tasked with managing NCDOT's effort to integrate the State's ATIS resources into a single ATMS. Responsibilities include requirements development and management, system test planning and technical evaluation of various project aspects.

NC 511 Statewide Travel Information System Year 4 Rebuild, North Carolina Department of Transportation (NCDOT), Raleigh, North Carolina. Mr. Morgan filled a leading roll in all phases of developing the North Carolina 511 Travel Information System. The rebuilt system launched in January 2007.

Mr. Morgan has conducted extensive ATIS technology research in support of several projects, including:

- 511 Coalition Nationwide Effective Practices Report.
- Florida Statewide Advanced Travel Information Services Integration.
- VoIP Emerging Technology Report for 511 Coalition.
- Orlando-Orange County Expressway Authority (OOCEA) Data Server Project Personalized Travel Alert Research.

Mr. Morgan previously worked for the State Corporation Commission of Virginia as a utility engineer. In this role Mr. Morgan was responsible for insuring Virginia's utility operators designed, maintained and operated jurisdictional utility systems in accordance with the Code of Federal Regulations. Mr. Morgan was also his division's lead for adoption of new technology in support of daily processes and enhanced performance.

Mr. Morgan also has worked in the University of Virginia's Human Motion Analysis and Biomechanics Laboratory, working in the area of dynamic system response.

Mr. Morgan held the position of technical specialist with the Center for Law and Military Operations at the Judge Advocate General's school in Charlottesville, Virginia. Mr. Morgan was responsible for the maintenance, design and improvement of multiple databases for deployed Judge Advocates worldwide, as well as consulting on the Center's positions and strategies with regard to emerging technologies.

Mr. Morgan is a former member of the United States Marine Corps with an honorable discharge.

Erik H. Gaarder

Project Manager
PBS&J

Education

B.S., Mechanical Engineering, Worcester Polytechnic Institute, 1990
M.S., Mechanical Engineering, University of Illinois, 1993
MBA, Business Administration (Marketing and Corporate Strategy), University of Michigan, 2004

Certifications

PMP (Project Management Professional), April 10, 2006
PMP# 32578

Mr. Gaarder serves as a project manager in PBS&J's intelligent transportation systems division. He has 14 years of experience in project management, new product and business development, process improvement, and operations. He is a creative problem solver with excellent communication, project management, team building, and leadership skills. Mr. Gaarder's current general responsibilities at PBS&J include monitoring/managing project production for compliance with schedule, budget, and quality objectives. He also guides, reviews, supervises, and/or coordinates the work of multidisciplinary project teams.

Mr. Gaarder's PBS&J experience includes:

Statewide Advanced Traveler Information System, Florida (Statewide). This project is for the Florida Department of Transportation (FDOT) Central Office Intelligent Transportation System (ITS) Section and involves the development of Florida's Statewide Traveler Information System to be implemented in calendar year 2008, which will upgrade and integrate the existing regional traveler information services implemented by the FDOT districts. Mr. Gaarder serves as project manager and has led a 40+ project team of consultants and clients through the first stage delivery of Florida's next generation advanced traveler information system (ATIS).

- Conducted nationwide market and technology study to identify best practices, evolving technology trends, and environmental factors.
- Researched end-user needs and preferences, ran an online survey, and interviewed key stakeholders to define customer proposition.
- Led workshops and facilitated meetings with the eight Florida transportation districts to achieve consensus and finalize concept design.
- Led translation of concept design into business and technical requirements and developed request for quote/invitation to negotiate.

Before joining PBS&J, Mr. Gaarder's experience included:

Visteon Corporation, Senior Systems Engineer, Michigan.

- Led product and requirements definition in pursuit and delivery of telematics and multimedia business (revenues exceeding $100 million/year).
- Pursued new business opportunities in 42-volt/14-volt automotive systems. Conducted market assessments, competitive analyses, and led trade studies to rationalize design alternatives, concluding in viable current business.
- Led international team in the development of new product development processes for the software and systems engineering community (> 500 engineers). Achieved CMMI (Capability Maturity Model Integrated) Level 2 and on track for Level 3.

Ford Motor Company, Production/Maintenance Supervisor, Michigan

- Supervised team of 40 production employees for automotive parts assembly plant and oversaw production of more than $50 million/year.
- Supervised 30 skilled trades (electricians, plumbers, millwrights, mechanics, etc.) and coordinated the maintenance of equipment worth more than $80 million.
- Responsible for safety, quality, delivery, cost, and morale.
- Negotiated and resolved concerns with union leaders.
- Implemented visual factory and self-directed work teams to achieve flawless production launch of a new ignition coil; received corporate quality award.

Quality Manager (International Assignment), Sao Paulo, Brazil

- Launched 110,000-square-foot manufacturing facility in Brazil. Recruited, trained, and supervised team that created and implemented the plant quality system.
- Achieved ISO 9000 and Ford Q1 quality certification in 15 months (nine months ahead of schedule).
- Oversaw installation and approval of $10 million worth of equipment.
- Led customer support during validation of four new products (fuel pump, starter motor, throttle body, and air fuel charging assembly). Received Corporate Customer Driven Quality Award for resolving Taubate Engine Plant testing issue.
- Collaborated with marketing to perform competitor analysis of automotive components.

Professional Affiliations

Intelligent Transportation Society of America (ITS America)
INCOSE (International Council on Systems Engineering)
American Society of Mechanical Engineers (ASME)
PMI (Project Management Institute)

William J. Press, GISP

Program Manager
PBS&J

Education

M.S., Geography, University of Massachusetts, 1991
B.S., Geography, University of Maryland, 1986

Certifications

Certified Geographic Information System Professional (GISP), 00023454, 04/25/06

Software

GIS, CADD, Access, Visio

Mr. Press oversees geographic information systems (GIS) operations for PBS&J's mid-Atlantic region and is responsible for project deliveries, quality assurance, and professional development for a staff of 20 GIS analysts and developers. He has over 20 years experience in all phases of the GIS project life cycle, including database design, data conversion, quality assurance/quality control, needs analysis, application development, map production, project management, and technical presentations. His GIS project implementations have included environmental resource inventories, NPDES inspection, asset management, water/wastewater distribution networks, property analysis, facilities planning, emergency preparedness, environmental impact modeling, and mobile GIS applications.

Little Patuxent Water Filtration Plant, Howard County, Maryland. Project manager overseeing development of an ESRI ArcIMS application linking aerial imagery and structure layers with as-built and archival drawings of plant buildings and infrastructure. Responsibilities included requirements documentation, QC of as-built drawing database entries, testing of security protocols, and demonstration of application capabilities to internal and external clients.

Air Force Materiel Command (AFMC) – MicroPAVER Interface, U.S. Air Force, Dayton, Ohio. Project manager overseeing development of an ESRI ArcGIS Server application linking aerial imagery and pavement layers (runways, taxiways, parking) with AFMC's MicroPAVER database. MicroPAVER incorporates over 50 attributes that track pavement condition, aircraft type, and frequency of use to assign a priority index ranking for each Air Force base. Responsibilities include requirements documentation, preparation of geodatabase layers and raster catalogs, evaluation of mapping and reporting tools, and demonstration of application capabilities to internal and external clients.

Intercounty Connector (ICC) Environmental Impact Analysis, Maryland State Highway Administration (SHA). GIS task manager, 2003 - 2006. Integrated and standardized preliminary engineering drawings (MicroStation) and environmental resource inventory datasets (GIS) to calculate potential impacts from all proposed alternatives and options. Compiled GIS polygons representing limits of disturbance (LOD) from source DGN polylines. Prepared geoprocessing analysis routines with ESRI's ModelBuilder to overlay LODs with parks, historic sites, wetlands, streams, and other resource layers. Exported impact tables into Access databases to streamline integration with reports, presentation maps, and document figures. Prepared suitability tables and maps highlighting potential parkland replacement sites and identifying environmental stewardship opportunities.

ICC Project File Management System (PFS), SHA. Project Manager, 2003 - 2006. Developed a Microsoft Access database to index all correspondence, agency memoranda, and technical documents associated with current ICC study. Implemented tracking tools for the ongoing compilation of Administrative Record documents that SHA's attorneys will use for any lawsuits brought against the ICC. Enhanced PFS database design to store over 3,000 comments received during the DEIS public hearing review period. Developed tracking tools and user interface screens to assign technical responses to all public hearing comments. Designed input forms, table links, and modules to enable multi-user edits and updates. Provided database administration, technical support, and training to project team staff on-site at SHA and at remote offices. Exported data tables for migration of Access database to online, multi-user interface. Designed SQL queries and customized report layouts to streamline production of FEIS public comment reports.

NPDES Stormwater Outfall Inspection, SHA. GIS task manager, 2004 - 2006. Developed a customized ArcPad GIS application to streamline field-based inspections of SHA-owned outfalls with entry of NPDES asset management database records. Designed an ESRI geodatabase to integrate inspection data, produce status maps, and generate summary reports.

Total Maximum Daily Load (TMDL) Analysis and Mapping, Statewide, SHA. Created GIS models linking EPA's stream impairment databases with hydrographic features from USGS's National Hydrography Dataset (NHD). Integrated NHD geodatabases to prepare detailed maps of TMDL levels associated with impaired basins. Designed ESRI geodatabase to guide long-term data development and monitoring efforts and to ensure compatibility with future Oracle databases.

GIS Assessor Tools, Washington D.C. Real Property Tax Administration. Project manager, 2001 - 2002. Coordinated the development of GIS applications and datasets to integrate triennial assessment processes with automated land records databases. Created new geodatabase design of assessment tables and relationships using Visio 2000 UML CASE Tools. Produced GIS applications requirements document to guide development of customized ArcView applications linking the District's GIS geodatabase with the Assessor's Computer Assisted Mass Appraisal (CAMA) database. The resulting applications allowed the Assessor's Office to meet deadlines for creating annual assessments and for beginning the phase-out of the triennial schedule.

District-wide GIS Data Collection, Washington, DC Office of the Chief Technology Officer (OTCO). Coordinated the collection of emergency management data from source agencies into the district's central GIS database. Facilitated monthly, inter-departmental emergency data collection task force meetings.

GIS Data Migration and Application Development, Washington, DC Office of Planning (DCOP). Onsite GIS project manager responsible for managing departmentwide GIS implementation, including deployment of mapping and data loading utilities, migration of older datasets to geodatabase format, and development of new applications and datasets to support DCOP initiatives. Served as liaison between DCOP and OCTO GIS.

US 301 Corridor Study, Charles and Prince George's Counties, Maryland. GIS technical lead for a corridor study that examined proposed alignment alternatives and improvements to US 301 in Charles and Prince George's Counties. Integrated GIS tax maps and databases to identify potentially impacted properties for each roadway alternative. Generated owner notification letters for impacted properties and prepared public presentation maps highlighting roadway alternatives and impacts.

US 13/113 Corridor Transportation Study, Delaware, DelDOT. GIS technical lead for a corridor transportation study that examined proposed bypass alternatives and access improvements to US 13 and US 113 in Kent and Sussex Counties. Responsibilities included integration of GIS, CADD and aerial imagery datasets to calculate potential environmental and socio-economic impacts and to prepare public meeting presentation graphics.

Montgomery County Department of Transportation Planning, GIS-T Study. Project manager, 2000 - 2001. Provided full range of client consulting services including GIS needs assessment, strategic plan, database design, data migration plan, application design, and training documentation. Developed project schedule and managed budget and staffing resources.

GIS System Design and Implementation, Town of Greenwich, Connecticut. On-site GIS coordinator responsible for database design, software installation, and quality control application development. Chaired monthly GIS coordination meetings with town stakeholders and data conversion contractors. The database design was for all planimetric and cadastral databases in advance of a $1 million data conversion effort. To protect the town's data conversion investment, a series of custom ArcInfo and ArcView QC applications were developed to validate digital data deliveries against the accepted database designs. Prepared QC summary reports to document data acceptance or rejection.

GIS Data Management Prototype, Sultanate of Oman. Onsite systems analyst responsible for development of a GIS prototype for basemap and land records maintenance within the National Ministry of Housing. Compiled a seamless digital basemap from four disparate sources including AutoCAD drawings, ArcInfo coverages, non-georeferenced scanned maps, and COGO property boundary files. Developed Arc Macro Language (AML) Code to automate data transformation and projection routines. Developed a land records database by entering parcel attributes from hard copy forms into Excel spreadsheets, saving

data to ASCII format, and importing info INFO tables. Wrote new AML code for a customized graphical user interface (GUI) demonstrating ArcInfo functionality of basemap and land records maintenance. The GUI included applications to perform data entry, data transformation, data conversion, QA/QC, and mapping.

Database Design and Quality Control Implementation, City of Charleston, South Carolina. Project manager responsible for the logical and physical design of planimetric and cadastral databases. The database designs were used to guide the development of new cadastral and planimetric GIS layers including roads, buildings, tidal wetlands, non-tidal wetlands, waterways and property boundaries. Developed customized ArcInfo and ArcView quality control applications to validate digital data deliveries against the accepted database designs. Prepared customized Arc Marco Language (AML) routines to automate development of ArcInfo Librarian data storage layers.

Photogrammetric QC and Training, Water Authority, El Paso, Texas. Developed QA/QC procedures and applications to assist water utility with review and acceptance of raster and planimetric datasets. Provided assistance and training to data vendor (Surdex Corporation) on implementing standardized routines for translating AutoCAD files into ESRI shapefile formats.

Forest Inventory and Data Conversion, US Forest Service. Developed customized ArcInfo data entry menus and routines to digitize and link tree stand polygons with valid data attributes as specified in tabular tree stands datasets. Following data validation and QC, integrated tree stands layers with the Forest Service's Oracle database. Prepared summary reports based on analysis of tree stands database.

NPDES Stormwater Inventory, Montgomery County, Maryland. Prepared digital network of stormwater infrastructure as part of county's NPDES mapping efforts. Linked tabular files to produce summary reports of pipe and structure characteristics.

NPDES Stormwater Mapping, Prince George's County, Maryland. Managed the preparation and conversion of hard copy map sheets into a seamless ArcInfo coverage of stormwater network. Database design and development of RDBMS files relating NPDES attributes to linear and point features.

Presentations
ESRI User Conference - 2005, 2000, 1997
Towson GIS Conference – 2007, 2003, 2001, 1997
ESRI Mid-Atlantic User Group (MUG) Conference - 1996
ESRI Southeast Regional User Group (SERUG) Conference - 1999

Professional Development
ArcHydro Geodatabase Design, ESRI, 2005
Visual Basic for Applications (VBA), ESRI, 2005
Bentley GeoGraphics, Bentley Corp., 2005
Geodatabase Design, ESRI, 2002
Project Management Training (PMI), Penn State University, 2000 - 2001
GeoMedia Professional, Intergraph Corp., 2000
Programming with Avenue, ESRI, 1999
Programming with AML, ESRI, 1994

DAVID R. ROBISON

Education
B.S. in Computer Science, Rensselaer Polytechnic Institute (RPI), 1985

Areas of Expertise
Software Engineering
System Integration
Standards (ITS, Emergency and Industry)
Traffic Management
Traveler Information
National/Regional ITS Architecture

ITS and Emergency Response Standards
NTCIP
IEEE 1512
TMDD
Emergency Data Exchange Language (EDXL)
Common Alert Protocol (CAP)
OGC WMS/WFS
Others

Languages
C, C++, JAVA, SOAP, XML, JavaScript, SQL, Oracle, PostgreSQL, Waba, Open Source Tools

Operating Systems
Windows NT/2000/XP/Server 2003, Windows CE (embedded systems), and Linux.

Software Development Tools
Borland, JBuilder, MS Visual C++, MS FrontPage, MS Visual Developer, Eclipse

Mr. Robison has 20 years of experience in software engineering and over the last eight years has proactively pursued new technologies to advance Intelligent Transportation Systems (ITS). He has extensive expertise in Advanced Transportation Management Systems (ATMS), Archive Data Management Systems, Traveler Information, Strategic Highway Data Analysis, Regional and Statewide Integration, and ITS Standards. He has expertise and experience in open architecture integration efforts including: TMC-to-TMC, TMC-to-device, TMS-to-511, TMC-to-CAD, TMC-to-arterial, and TMC-to-archive systems. He has experience in ITS and industry standards and integrating new and legacy ITS field devices. Mr. Robison is results-orientated, innovative, and has an outstanding capability in applying technology to provide real world solutions.

Professional Experience

- Senior Software Engineer in the reuse of the VDOT Statewide Data Gateway for incident information collection, dissemination and management in the Hampton Roads, VA area. This system, the Regional Traffic Incident Management Information System, RTIMIS, integrates the VDOT transportation management system, state and local police 911 systems, and local government transportation systems.
- Senior Software Engineer for the VDOT I-81 Systems Integration contract where he was a key team member in the enhancement and deployment of the ATMSs within the I-81 Corridor. Mr. Robison was instrumental in the design and development of rule-based scenario responses, integration of legacy field devices, IP-based video control and monitoring software, and digital video switcher solutions that replace the need for expensive analog switchers.
- Senior Software Engineer responsible for the design and development of a web-based video distribution system currently used by VDOT and their PPTA partner to share video over the Internet for stakeholders and the traveling public across multiple states.
- Senior Software Engineer supporting the VDOT Strategic Highway Data Analysis project where Mr. Robison prepared the database and hundreds of reports used for assessing trends and causal factors including: 1) Bike crash reports for Districts, Jurisdictions, and Statewide, 2) Intersection crash reports for Districts, Jurisdictions, and Statewide, 3) Pedestrian crash reports for Districts, Jurisdictions, and Statewide, and 4) Run-off-the-road crash reports for Districts, Jurisdictions, and Statewide. These reports were used by analysts to generate the Strategic Highway Safety Plan.
- Senior Software Engineer for the VDOT Richmond/Tri-cities System Manager Contract. Mr. Robison was responsible for the open architecture design and deployment of the ATMS. Innovative components include a real-time GIS based graphical user interface, and Java based client interface. Mr. Robison provided the software for communications to/from multiple roadway devices (with varying

Publications / Presentations

"Improving Incident Management using GIS and Real-time Information", ESRI-MUG 2006 Annual Conference

"Interagency Data Sharing: Institutional, Operational, and Technical Issues", 2006 VA GIS Conference

"Embracing Change in Real World ITS Deployments – Minimizing Fragile Systems, Maximizing Your Investment", 2002 ITS America Conference

protocols) to include Dynamic Message Signs, CCTV, Highway Advisory Radio, and Traffic Sensor Stations.

- As part of the VDOT Richmond/Tri-cities System Manager Contract, Mr. Robison was responsible for the design and development of the integration of state police Computer Aided Dispatch data with the VDOT ATMS. This integration platform evolved to the VDOT Statewide Data Gateway, which is used to share real-time information between all the VDOT transportation management centers, 1st responders, the VDOT 511 traveler information system, the Transportation Emergency Operations Center, and other stakeholders. This platform provides a highly scalable system that supports all the ITS standards including IEEE 1512, TMDD, Common Alert Protocol, and others.
- Senior Software Engineer responsible for the design and development of an ATMS Interactive Training System used for hands-on operator training. This system provides the means for operators to exercise all the ATMS system functionality without disrupting on-going operations. Additionally, it allows the playback of past incidents for customized training, whether in a rural or urban environment.
- Senior Software Engineer for the VDOT Archive Data Management System (ADMS) Virginia project. Mr. Robison supported the design and development of the web-based application for searching and processing gigabytes of archived traffic sensor and incident data collected on a statewide basis.
- Senior Software Engineer supporting the VDOT Hampton Roads Phase 3 project. Mr. Robison was responsible for the requirements analysis and design of the communications node processor and associated test computer used to test communications to/from the roadway devices.
- Lead Software Architect, Anaheim Decision Support System, Anaheim CA – Responsible for the design and development of the center-to-center interties between the City of Anaheim TMC and Caltrans District 12 TMC. Developed middleware solution to abstract a legacy system that provided a means for standardized information exchange between the two centers.
- Software Engineer, Las Vegas NV - Designed and developed hardware and software solutions to integrate remote radar systems into the range information network. Projects included the transmission of data over voice-grade telephone lines and live video over standard T1 telephone lines.

JONATHAN CLARK

Education
University of North Carolina, Chapel Hill, NC, BS in Mathematical Sciences with Computer Science emphasis, 1987, Magna Cum Laude

Areas of Expertise
Software Engineering
System Integration
Testing
Configuration Management
Traffic Management
Emergency Management
Incident Management
Data Sharing
ISO 9001

Languages
C++, JAVA and JavaScript, ColdFusion,

Operating Systems
RSX-11 (DEC systems), RMX-86/88 (embedded systems), Windows NT/2000/XP/Server 2003, Windows CE (embedded systems), and Linux.

Software Development Tools
JBuilder, Microsoft Visual C++, Microsoft Visual Developer, Eclipse, JIRA, Confluence, AcuRev

Mr. Clark is an experienced senior software engineer with 17 years of professional experience. He has in-depth expertise and experience in the full software lifecycle process, best practices, and has successfully managed the development of numerous software and database systems.

Professional Experience

- Sr. Software Engineer for the VDOT I-81 Systems Integration contract where he was the Task Manager for the Traffic Signal Integration Task. This task included requirements definition, and design of the integration of the existing traffic signal system with the Advanced Transportation System (ATMS), OpenTMS Enterprise.

  Mr. Clark was a key team member for the development of the next generation OpenTMS Enterprise System for the I-81 corridor supporting the addition of a module that monitors all activities conducted by the system and alerts the operator, if needed. He supported the replacement of the Afton Mountain Fog System, which required integration with an undocumented, unsupported legacy Variable Message Sign. This system also implemented a rule-based algorithm to activate fog responses, e.g., post messages and turn on fog lights, automatically.

- Technical Manager for the Hampton Roads, VA Metropolitan Planning Organization (MPO) Regional Requirements Analysis where he has conducted interviews with 17 local city traffic departments, 17 local emergency response agencies, state police, state department of transportation, and other significant regional traffic stakeholders to ascertain and document requirements, a top level architecture, and a concept of operations for a system to fuse emergency dispatch and transportation data in to a real time map-based common regional view of the transportation in Hampton Roads, available to all stakeholders and potentially the general public.

- Technical Manager for the Hampton Roads, VA MPO Regional Incident Sharing System Prototype: Create a working prototype, including city traffic, state DOT, state police, and city emergency response participants, of a system to fuse emergency dispatch and transportation data in to a real time map-based common regional view of the transportation in Hampton Roads, available to all stakeholders and potentially the general public.

- Prior to joining Open Roads, Mr. Clark was a Development Systems Manager with both development and technical management responsibilities. He developed applications using database (SQL), Cold Fusion, XML, Soap, Python, Perl, and Visual Basic and .NET. He effectively managed a team of web developers to implement an Internet system supporting 85 sales offices. He coordinated with management to prioritize projects and define project requirements.

- Senior Software Developer and Technical Manager who developed software

applications using Visual C++ and Windows CE environment. Mr. Clark developed and managed ISO 9001 procedures. He coordinated with engineering staff (electronics, mechanical, etc.) to prioritize projects and allocate software resources.

- Senior Software Engineer where he was the Technical Leader of a team of engineers that implemented both PC based and embedded Point of Sale (POS) system. He was also the Technical leader of a team of engineers that implemented embedded gasoline dispenser and control systems. He developed a software and hardware architecture for new products in conjunction with third party vendors and other engineering disciplines. He coordinated the successful launch of new products with project management, sales, and service organizations. Mr. Clark acquired comprehensive experience in C++, HTML, JavaScript, Linux, Visual C++ and Windows CE and software engineering best practices.

JOHN HORNER

Education
Master of Civil Engineering, North Carolina State University, 2006; M.S. Computer Science, North Carolina State University, 1992; B.A. English Literature, University of North Carolina, 1983

Areas of Expertise
Software Engineering
System Integration
Transportation Engineering
System Integration
Testing
Statistical/Data Analysis
Traveler Information
Expert Systems

Languages
Java, C, XML, SGML, SQL, J2EE, JDBC; working knowledge of C++, Lisp, Prolog, PERL

Operating Systems
Windows NT/2000/XP/Server 2003, UNIX

Software Development Tools
Eclipse, CVS, Ant, Weblogic, AcuRev

Publications / Presentations
"The Impact on Travel Behavior of Proximity to Major Urban Centers" (2006, TRB Compendium of Papers)
"Data Reuse Methods for Transportation Planning in Small and Medium Sized Towns" (Submitted)

Mr. Horner has 16 years of experience in software engineering including all phases of the development process from requirements analysis to architectural design, coding, verification and packaging. Mr. Horner offers a unique combination of civil engineering with a focus on Transportation/ITS and his 16 years of experience as a software developer.

Professional Experience

- Senior Software Engineer who is responsible for all aspects of software development, testing and deployment. Mr. Horner is instrumental in working with clients to understand end user requirements and translating them to technical solutions. He has worked with numerous stakeholders in the Hampton Roads, VA area including VDOT, state and local emergency responders, and local government agencies to develop a concept of operations and gather functional requirements for an incident management application.
- Senior Software Engineer who developed a database agnostic architecture for an Advanced Transportation Management System. This architecture allows the integration with any SQL-compliant database. Mr. Horner implemented automated testing scripts for system testing.
- Transportation Engineer under a Southeastern Transportation Center Research Fellowship who performed statistical analyses on survey data to identify different classes of travel behavior in small towns. Mr. Horner developed new quantitative classification scheme to guide planners in making choices on transferring survey data and trip generation rates from town to town.
- Senior Systems Developer for SAS Institute supporting Financial Applications Development. Mr. Horner redesigned a calculation engine for an existing commercial product achieving a one hundred fold performance increase. He developed server side technology for a global enterprise financial application grossing millions annually. He conceived and implemented a framework for authoring and executing automated test scripts for the product.
- Applications Developer for SAS Institute Publications Technology Development. Mr. Horner designed and implemented the company's first online publication ordering system. He designed and implemented a tool integrating SAS software with SGML publishing software. This was presented at a national user's conference demonstrating software engineering best practices.
- Teaching Associate at the North Carolina State University (NCSU) Computer Science Department. Mr. Horner was fully responsible for all aspects of undergraduate data structures class where he determined curriculum, lectured and evaluated students.
- Research Assistant at the NCSU where he designed an Internet website employing artificial intelligence. He also designed and implemented a database and applications for the placement office.

DANIEL J. SKIFFINGTON

Education:
B.S. Computer Science, Virginia Polytechnic Institute and State University, 2002

Certifications
Security Access Control
Security Intrusion Detection

Areas of Expertise
Software Engineering
System Integration
System Usability
System Testing
Configuration Management
Database Management
Geographical Information Systems
Traffic Management
Data Archival
Physical Security Systems

Languages
C, C++, Java, JavaScript, HTML, SQL, XML, BASIC

Operating Systems
Windows NT/2000/XP/2003 and Linux

Software Development Tools
Eclipse, JBuilder, CBuilder, MS Visual C++, MS Visual Developer, ESRI ArcIMS, ESRI ArcGIS Engine/Server, AccuRev, JIRA, Confluence, Open Source Tools

Training
Crystal Reports
Configuration Management

Publications / Presentations
"A GIS Solution to Traffic Management", ESRI-MUG 2006 Annual Conference

Mr. Skiffington is a software engineer who supports all aspects of the software lifecycle process to include: requirements analysis, system design, coding, testing, deployment, maintenance, configuration management, and documentation for both web-based and client/server applications. He has been instrumental in the development and maintenance of Advanced Transportation Management Systems, Data Archival Management Systems, and Geographical Information Systems. Mr. Skiffington is a self-starter, conceptual and logical thinker who has contributed both as a developer and technical lead.

Professional Experience

- Software Engineer for the VDOT I-81 Corridor System Integration Contract who was responsible for component enhancements for the Advanced Transportation Management System. He has been a key team member contributing in the following areas:
  - Upgraded the Variable Message Sign module functionality and has supported the integration of numerous types of mobile and fixed signs. He has worked side-by-side with sign vendor staff to troubleshoot integration and communications hand-shaking.
  - Supported the development of the travel time module that interfaces with the field device server to update data, report and display the travel time in tabular, map and graphical (time history) format.
  - Responsible for many of the iterative system releases and associated acceptance testing and training.
  - Key team member in the upgrade from ESRI MapObjects to ESRI ArcGIS Engine. Mr. Skiffington conceptualized and developed a significantly improved system architecture that improved the overall performance. This effort was successfully conducted over a compressed timeframe.
  - Developed an excellent and professionally packaged set of reports including graphics showing operational and system performance measures. This report is fully automated and can be executed over varying durations.
  - Provides on-going technical support for system maintenance, releases, documentation, and configuration management.
- Software Engineer for the VDOT Archive Data Management System (ADMS) Virginia sponsored by FHWA. His responsibilities included supporting the development of the web portal used by transportation and emergency planners. Mr. Skiffington was the key resource in developing the real-time update for the web-based Geographical Information System map using ESRI ArcIMS. This module provided incident and flow/speed updates on the map display. He gained experience with open source programming tools in conjunction with Tomcat web server on this project.

- Software Engineer for the VDOT Richmond System Manager Contract who was responsible for maintenance and enhancements to the Advanced Transportation Management System. Specifically, Mr. Skiffington was a key team member in the upgrade of the commercial-off-the-shelf (COTS) tools used within the system.
- Software Engineer who conducted acceptance testing on various ITS products. Mr. Skiffington verified the accuracy of acceptance test procedures against software requirements and the system functionality. He provided independent testing on a commercial video distribution system product and updated corresponding user and system administrator manuals.

Jason Dong, Sr. Analyst (EnterInfo)

Education

M.S., Information Technology, Virginia Polytechnic Institute and State University, 2003
M.S., Urban Planning and GIS, Virginia Polytechnic Institute and State University, 1996
B.S., Architecture, Tsinghua University, 1993

General Experience Summary

Mr. Dong has over ten years of extensive GIS and Internet mapping application programming experience. He is a Microsoft Certified Solutions Developer with extensive GIS and Internet mapping application programming experience in Visual Basic, Active Server Pages, Visual InterDev, HTML, Java, JavaScript, Map Objects, Internet Map Server, ArcIMS, GeoMedia Objects, and GeoMedia Web Map. Mr. Dong is especially experienced in database design and implementation using SQL Server, Oracle and Oracle Spatial Cartridge, with primary focus in the design and implementation of large-scale multi-tier client-server and WEB-based application with the latest IT and mapping technologies.

Specific Experience Summary

Mr. Dong is one of the most experienced developers specializing in integrated WEB-based GIS solutions. A lead developer of several successful enterprise-wide GIS systems, he has successfully integrated GIS with GPS, electronic sensors, weather sensors, wireless communication devices, voice recognition engines, and image capturing systems.

Work Experience

Enterprise Information Solutions, Inc., Vice President of Software Development, 11/2001 – Present.

Overall responsibilities as the software architect to guide system design and software engineering process for multiple projects. Primary duties include designing and leading the implementation of critical system components.

Step9 Software Inc. Senior Developer, 4/2001 – 11/2001

Designed and led the implementation of iCustomer portal application for a telecommunications customer relationship and order management system. This project utilized development skills in object-oriented design using UML and Visio, database design with Visio, SQL Server 2000 and Visual Basic 6.

Enterprise Information Solutions, Inc., Director of Internet Technology, 1997 – 2001

Managed several information system and application development projects for various customers, several samples of which are cited below. Responsible for managing the software development staff consisting of system analysts and programmers. Hands-on system design and programming practices include the coding of critical elements of various projects. Established the software engineering procedures and coding standards for the company.

- ***CHART EORS Internet/Intranet Web Mapping for the Maryland State Highway Administration***

  Led the implementation of a state-of-the-art traffic monitoring WEB site for the Maryland State Highway Administration to display road speed sensor, road condition status, real-time video and snapshot camera information through an integrated mapping interface. Designed and developed the WEB mapping site using ASP, IIS4.0, Visual Basic, COM, HTML and JavaScript, MapObjects Internet Map Server and SQL Server 7.0 as the backend database.

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- ***Signing and Lighting Project Management System for Maryland State Highway Administration's Office of Traffic and Safety***

  Led the implementation of an Intranet WEB site using ArcIMS, ASP, IIS, Oracle 8i spatial cartridge and ArcSDE to manage, display and report map and project information through an easy to use WEB interface.

- ***Real Time Crime Reporting for the State of Delaware's Dept. of Public Safety***

  Designed and led the implementation of an enterprise-wide intranet application to provide all Delaware law enforcement personnel with real-time access to crime data reported from police cars through wireless CDPD communication. Installed and configured Oracle 8.0.5 database and FailSafe clustering. Designed and set up the database table structure, views and triggers. Developed object-oriented design using UML and Visual Modeler. Performed performance tuning for Oracle and Spatial Cartridge. Developed WEB site using ASP/JavaScript and GeoMedia Web Enterprise. Implemented Microsoft Cluster Server to provide 24-7 availability for the IIS/ASP application and Oracle 8.0.5 server to support thousands of client users on the Delaware State Police's intranet.

- ***Client/Server Vehicle Tracking System for the Delaware State Police***

  Developed the system consists of server software, administration tools, and client application which allow real time wireless communication of vehicle GPS information to central server, allowing multiple monitoring stations to perform vehicle location query and map display.

- ***Palm Field Data Collection Application***

  Developed Oracle 8i/Lite application with Satellite Forms on Palm OS to collect field data and synchronize with central database server. Developed Palm Query Application to query and update data from wireless PalmVII PDAs.

- ***Live Map for Enterprise Information Solutions, Inc.***

  WEB based GIS solution that offers an organization the ability to distribute their data warehouse to field workers, allowing edits, updates, and inserts, seamlessly through lightweight software components.

- ***DocView for Montgomery County, Maryland***

  Automated road survey application that field crews used to distinguish different roadway conditions throughout the entire county.

Enterprise Information Solutions, Inc., GIS Application Engineer, 1995 – 1997

Was responsible for the full life cycle software project implementation including designing, planning, coding and testing of software products utilizing Visual Basic and various GIS software packages. Designed, developed and maintained Internet mapping and database intensive and websites. Administered a large-scale MS SQLServer database.

Palm Beach County, Florida, Planning Department, Database Administrator, 1995

Established a county-wide parcel-based land use database using MS FoxPro. Developed FoxPro program for data updates and browsing. Analyzed potential sites for hurricane shelter suitability based on land use and zoning data.

Roger Leung, Senior Developer (EnterInfo)

Education

Ph.D., Chemical Engineering, University of Florida, 1986
M.S, Chemical Engineering, University of Florida, 1981

General Experience Summary

A MicroSoft certified professional with extensive experience in developing GIS applications using MicroSoft and ESRI development tools, Dr. Leung's wide experience in application development, website development, Internet programming include MS Windows 95/98/NT/2000 applications, MS Visual Basic and MS Visual InterDev, XML, JavaScript, IIS applications, Active Server Pages (ASP), HTML, COM, DCOM, and ActiveX programming. He also has relational database design and development experience in Oracle 8 (SQL*Plus 8, Developer/2000 R2.1, Designer/2000 R2.1 & LifeCycle), MS SQL Server 7.0, MS Access, DAO/ADO/RDO/SQL, and data warehousing and analysis. He has used SAS for statistical design experiments and data analysis and graphing. Additional software experience includes Crystal Reports and Microsoft OLAP (SQL Server 7). Dr. Leung is experienced in many environments, including IBM mainframe (VMS, COBOL, JCL), Wang VS minicomputer, and IBM PC (Professional Basic/DOS).

Specific Experience Summary

Dr. Leung has extensive experience in integrating GIS solutions with WEB technologies. Specific GIS programming and software experience include ESRI ArcIMS, ArcSDE, ArcInfo 8, ArcObjects, MapObjects, MapObjects LT, MapObjects Internet Map Server (MoIMS), ArcView Avenue, ArcView, ArcInfo, and IDRISI.

Work Experience

Enterprise Information Solutions, Inc., Sr. Computer Software Analyst, 2000 – Present

Solectron Global Services, Systems Analyst, 1999 - 2000

W.L. Gore & Associates, Information Systems Manager, 1996 - 1999

RELEVANT PROJECTS

Highway Management Information System for Maryland State Highway Administration

Dr. Leung was the Key Developer for the redesign and implementation of this vital database. The HMIS is currently being migrated from Informix to Oracle and redesigned to comply with new FHA modified data requirements for the Highway Performance Monitoring System.

Traffic Monitoring System Support and Development for the Maryland State Highway Administration

EnterInfo maintains, supports, configures and develops the Traffic Monitoring System (TMS) database for the Maryland State Highway Administrator (SHA). The TMS database is ORACLE-based and stores over 300GB of the traffic data generated by a variety of the electronic devices such as monitoring sensors, cameras, signals, and hardwired panels. Dr. Leung is a key team member responsible for the support of the Oracle database and map publishing. This project requires data migration from Informix to ORACLE. Dr. Leung completed many WEB programming tasks using various development tools including VB, ORACLE Designer, Java script and ASP.

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Delaware Environmental Information System for the Delaware Department of Natural Resources and Environmental Control

Developed a WEB-based GIS application using ArcIMS-based MapView. Retrieved data from multiple databases and merged into an enterprise-wide SQL Server. Developed geocoding utilities using Visual Basic and ESRI MapObjects. Customized GIS components using JavaScript and XML. The technologies used in this system include MS Windows 2000 Advanced Server, ESRI ArcIMS 3.0, ESRI ArcSDE 8.0, ESRI ArcObjects, MS SQL Server 7.0, IIS applications, MS Active Server Pages (ASP), Java Script, XML, and MS Visual Basic 6.0.

Willie Choi, Systems Analyst (EnterInfo)

Education

B.S. Computer Science, University of Maryland at College Park, 2002
B.A., Economics, University of Maryland at College Park, 2002

General Experience Summary

Mr. Choi has 3 years and 7 months of experience in systems analysis, application programming, database support, and software testing. Graduated from one of the top computer science programs in the nation, Mr. Choi has demonstrated strong technical capabilities, intuitive solution development, and the ability to complete complicated task for large-scale mission critical systems. Mr. Choi is proficient with various WEB development tools and Oracle/SQLServer database. As a young developer, he has always become the key developer providing effective solutions for the development team.

Specific Experience Summary

C#.NET, VB.NET, ASP.NET, Java, SQL, PL/SQL, C, C++, Pascal, HTML, Perl, VBScript, Visual Basic, JavaScript, PHP, ColdFusion, ASP, XML, J2ME, MS Visual Studio.NET, InstallShield, MS SQL Server, MS Visual Basic, ColdFusion MX, Dreamweaver, SQL PLUS, TOAD, Dr. Java, JBuilder, ORACLE, SourceSafe.

Work Experience

POSITION: Enterprise Information Solutions, Application Developer, (January 2007 – Present)

Duties/Responsibilities: Mr. Choi is responsible to perform WEB, client/server, and desktop programming tasks using various development tools. He is also responsible for performing technical support tasks for Oracle and SQLServer database systems.

POSITION: Trawick & Associates, Bethesda, MD Programmer Analyst (January 2004 – January 2007)

Duties/Responsibilities: Mr. Choi was responsible for the system development life cycle (design, implementation, testing, and packaging) and post development maintenance of the OREIS project using VB, C# .NET, TCP/IP, Advanced Encryption Standard (AES), and MSSQL. He developed OREIS online for the Regional Information Sharing System's (RISS) Anti-Terrorism Information Exchange (ATIX) using ColdFusion and JavaScript. He developed the OREIS WEB Service module for The National Law Enforcement Telecommunications System (NLETS) using C# .NET and Global Justice XML Data Model (GJXDM) and the OREIS mobile environment module using J2ME, ASP.NET and web service. Mr. Choi also developed a WEB based Graphic Information System (GIS) interface using ASP.NET, MSSQL, and Google Map's API. In addition to the software programming, Mr. Choi also has provide technical support and performed helpdesk duties for users.

POSITION: Invertix, Annandale, VA Software Developer (July 2003 – January 2004)

Duties/Responsibilities: Mr. Choi participated in the maintenance and development of the mNet project for the Federal Bureau of Investigation's (FBI) Law Enforcement Online (LEO). He modified existent and implement new functionalities to the system using ColdFusion, JavaScript, Smart Pass, and ORACLE. Mr. Choi also performed Oracle database support tasks. He created PL/SQL procedures to automate the data loading, integrity verification, and tables joining work. He also developed various scripts to stress testing the reliability of different projects.

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Lei Zhong, Developer (EnterInfo)

Education

M.S. Urban Planning, Virginia Polytechnic Institute and State University, Blacksburg, VA
M.S. (candidate), Computer Science, Johns Hopkins University, Laurel, MD., 2001 – ongoing
B.A., Architecture, Tsinghua University, Beijing, China, 1993
Certified as Master of Urban and Regional Planning GIS, December 2000
Sun Certified Java Programmer, May 2001

General Experience Summary

A Java certified developer with extensive experience in developing WEB-based GIS applications using MicroSoft, Java, and ESRI development tools, Mr. Zhong has wide knowledge of GIS theory and strong skills in GIS packages. He has over three years programming experience in GIS application development using Visual Basic, Visual InterDEV, ESRI's MapOjects, ArcIMS, and ArcSDE. He is skilled in C++ programming and object-oriented design. His experience in application development, website development, and Internet programming include MS Windows 95/98/NT/2000 applications, MS Visual Basic and MS Visual InterDev, XML, JavaScript, IIS applications, Active Server Pages (ASP), HTML, COM, DCOM, and ActiveX programming. His knowledge of relational database design and development include Oracle 8 (SQL*Plus 8, Developer/2000 R2.1, Designer/2000 R2.1 & LifeCycle), MS SQL Server 7.0, MS Access, and DAO/ADO/RDO/SQL.

Specific Experience Summary

Mr. Zhong has extensive experience in integrating GIS solutions with WEB technologies. GIS programming and software experience include ESRI ArcIMS, ArcSDE, ArcInfo 8, ArcObjects, MapObjects, MapObjects LT, MapObjects Internet Map Server (MoIMS), ArcView Avenue, ArcView, ArcInfo, and IDRISI.

Work Experience

Enterprise Information Solutions, Inc., Applications Developer, 2001 – present

CHART – Emergency Operations Center for the Maryland State Highway Administration

As Applications Developer, Mr. Zhong provided GIS applications development services for the internal Intranet and the public WEB site of the State's traffic monitoring and emergency operations center. These development efforts include working with the following:

- Device Editor Tool - MapObjects Client/Server Application. This system allows users to add/edit the spatial locations and attributes for devices. It works on shapefiles as well as SQL Server database. Updates are made to the live data.
- CHARTWeb Internet Site - Public MO IMS Site. This works with SQL Server data and shapefiles. Responsibilities included installing and deploying MO IMS, establishing several MO IMS services, performing system testing and enhancing performance through load balancing efforts.
- EORS Intranet Site - MO IMS Site. This works with SQL Server data and shapefiles.

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Environmental Systems & Tech. Inc., Programmer, 1999-2000

Developed Internet-based applications for environmental database management with VB and MapObjects.

VA Polytechnic Institute and State University, Computer Lab Administrator, 1998-2000

- Co-administered the Urban Planning Department computer lab
- Redesigned and maintained WEB site for the Association of Chinese Students and Scholars at VA Tech

Nanshan Institute of Architectural Design, China

As CADD Coordinator, founded and developed the computer lab for the Institute serving over 40 users

Weilin Sung, Application Programmer (EnterInfo)

Education and Certification

M.S., Computer Science, George Washington University, Washington, DC, 05/2000.
B.S., Engineering and Aeronautical Engineering, Tamkang University, Taiwan, 05/1995.
Sun Certified Web Component Developer (SCWCD, Exam 310-080), Alexandria, VA, 10/2003
Sun Certified Programmer for the Java 2 Platform (SCJP, Exam 310-025), Arlington, VA, 04/2002

General Experience Summary

Mr. Sung is a Web Developer with over seven years experience. He has broad development experience using both Microsoft technologies such as Visual Studio.Net, ASP.Net, Visual Basic and Java technologies using JSP and Java Servlet. He has over 6 years of experience with web application development using all these tools and Java Script, XML, XSLT and XML DOM. He is a Sun Certified Programmer/Web Developer with two Java Certificates (SCJP and SCWCD) from Sun Microsystems. He has seven years of experience developing systems using popular relational databases including Oracle9i, SQL Server and Access.

Specific Experience Summary

Mr. Sung has over five years of experience implementing GIS on Intranet and Internet environments using ESRI's ArcSDE, ArcIMS system. Mr. Sung is also very proficient in the suite of ESRI products such as ArcGIS and ArcObjects. He is has over four years of experience working with ESRI's ArcSDE product managing GeoDatabases using Microsoft SQL Server and Oracle 9i. Mr. Sung has developed many IT and GIS applications for the Maryland State Highway Administration. He understands MDOT operation requirements and is familiar with MDOT's IT, GIS, and quality assurance requirements. Mr. Sung has is proficient with linear referencing, dynamic segmentation, and most popular transportation network models. Mr. Sung is familiar with the LDAP and Single Sign On technologies. All the development tasks that he has performed require the use of SourceSafe or ClearCase configuration management software. Mr. Sung has a strong working knowledge of requirement management and automated testing software.

Work Experience

PRESENT POSITION: Enterprise Information Solutions, Inc., Applications Developer, (May 2000 – Present)
Mr. Sung has successfully developed many desktop, client/server, and WEB applications for government clients. Some project examples include:

Developed a web-based, map-enabled traffic information application for Maryland State Highway Administration (CHART). This application provides real-time traffic information for the general public over the world-wide-web and is programmed using ASP.Net, ArcIMS4, ArcSDE, XML, XSLT, and SQL Server 7.

Developed the WEB based Memorandum of Action search application for Maryland State Highway Administration. This WEB application is developed using ASP, Java Script and HTML. The application allows the users to search SHA's memorandums scanned in PDF format based on the attributes stored in the backend Oracle database.

Programmed a Traffic Control Device (TCD) web system for Maryland State Highway Administration using ESRI ArcIMS 3.1, SDE, ASP, JavaScript, XML, and Oracle8i. The enterprise web system provided many functions to manipulate maps, such as zoom in, zoom out, zoom to, pan, identify, and spatial query. The application also allowed the users to add or modify the spatial information in Oracle8i through web interface in real-time by using SDE.

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Designed and programmed a 3-tier web system for Maryland State Highway Administration. The online traffic information retrieval system included a file indexing system implemented using HTML, JavaScript, and ASP, a PDF file system, and a back-end database system using Oracle8i. The enterprise web solution provided the employees of Maryland State Highway Administration an efficient and convenient way to retrieve desired electronic documents from their archives.

Built a web based GIS application for the World Bank. The application provides online search for World Bank projects and displays different coloring schemes for the World Bank's key development indicators on the map using ASP.Net, ArcIMS4, ArcSDE, XML, XSLT, Oracle9i, and SQL Server 2000. Developed a VB 6.0 application for Verizon. The application provided Verizon field workers a visual and instinctive data entry/modify system instead of the traditional form filling system. The user-friendly system helped Verizon workers to set up their cable installation and maintenance database, which was built upon Access 2000, by instinct and minimized typing. After every workday, these individual systems will be synchronized with center database and data will be uploaded for central processing.

As a Computer Technician with the **Metropolitan Washington Airport Authority, (May 1999-May 2000),** Mr. Sung designed a MS Access database and developed SQL statements to manage the facilities of the airport. Mr. Sung also designed and programmed a Personal Information Manager system for the department using Sybase, JavaScript and HTML and tested the application on the web using PowerDynamo 3.0.

Bo Yang, QA/QC Specialist (EnterInfo)

Education

M.S. Computer Science, Towson University, Maryland, 2003
B.S., Biochemistry, Zhongshan University, P.R.China, 1999
Oracle Certified OCA, 2004

General Experience Summary

Ms. Yang is an Oracle certified DBA with extensive experience in geo-spatial database processing. She has successfully complete WEB development projects, Data mining and database application design, and image asset solution projects. Ms. Yang is proficient with ESRI GIS applications including ArcGIS, ArcView, ArcSDE, ArcIMS, shapefiles, and geodatabase. She has completed programming tasks using Java, JSP, JavaScript, HTML, XML, ColdFusion, C++, OpenGL, and VB Studio.

Specific Experience Summary

Ms. Yang is proficient with most major GIS applications, client/server development tools, RDBMS, WEB programming and document management solutions. She has hands-on experience processing data for GIS related IT projects. Her software applications experience include: ESRI ArcIMS, ArcGIS, ArcView, LaserScan Lamps2, Oracle, SQL Server, and Access.

Work Experience

Enterprise Information Solutions, Inc., GIS Data Specialist, 2003 – Present
Towson University, Network Assistant, 2001-2003

RELEVANT PROJECTS

Ms. Yang performed production and QA/QC duties for several image asset inventory projects. The projects involve the reviewing and editing of data records in Oracle, MicroSoft Access, and ESRI ArcGIS and geodatabase. Ms Yang used image based asset application to create asset inventories and validate database records using the photo images captured along the roads. Ms. Bo reviewed and approved the images captured by the field crew and asset records collected using the images.

- Ms. Yang used LaserScan and ArcGIS mapping application to apply updates to the NOAA electronic nautical charts (ENC). The work requires through understanding of the various nautical related sources produced by cost guard, corps of engineers, utility companies, and private sources. Ms. Yang demonstrated high productivity and quality work superior among the co-workers.
- Ms. Yang completed network support and WEB programming tasks using HTML and JavaScript. She completed an on-line book selling system using JSP and Java Servlet to handle the parsing and communication between the server and the browser front-end.

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Rob Hranac
Vice President

Expertise

Rob Hranac's experience revolves around the connection between transportation systems and information technology. He has a decade of practical experience working with public sector agencies deploying technology to monitor, model, and optimize a broad array of transportation systems. He has specific expertise in geographic information systems, travel demand models, and traffic microsimulation models.

Education

M.S., Transportation Engineering, University of California at Berkeley, 2001
M.C.P, City Planning, University of California at Berkeley, 2001
B.S., Systems Engineering, Boston University, 1997
B.A., Economics, Boston University, 1997

Experience

Federal Highway Administration, Next Generation Simulation (NGSIM) Project. During his time at Cambridge Systematics, Mr. Hranac was the project manager of the Next Generation Simulation program for the Federal Highway Administration (FHWA), a multi-million dollar, multi-year program to improve traffic microsimulation models. For the FHWA, Mr. Hranac helped manage the provision of new and improved analysis tools for transportation operations and associated research. In this capacity, he oversaw a complex consortium of four major research universities and a dozen sub-contractors as they researched next generation traffic microsimulation algorithms. Mr. Hranac also led the first major successful vehicle trajectory data collection effort in two decades. As side products of these efforts, Mr. Hranac successfully lobbied the Massachusetts Institute of Technology to release their traffic simulator (MITSIM) under an open source license. He also led the development of a practical open source tool that translate video images into detailed sub-second locations and dimensions of vehicles.

Orange County Transportation Authority, State Rourte 91 Dynamic Pricing. For the Orange County Transportation Authority (OCTA), Mr. Hranac developed a dynamic pricing algorithm for State Route 91 (SR91). SR 91 currently operates using variable pricing, which changes hourly on a fixed tolling schedule, based on historical demand on the corridor, rather than current traffic conditions. As a first step in making the transition to dynamic pricing, OCTA installed a travel time monitoring system and creating a dynamic pricing algorithm. The dynamic pricing algorithm developed by Mr. Hranac for OCTA is more complex than traditional HOT lane dynamic pricing algorithms, because the goals of the agency are more complex than simply filling excess capacity on an existing HOV lane. Rather, they include interactions between corridor efficiency, guaranteed reliability, and bond obligations. As such, the OCTA dynamic pricing model takes a novel pricing approach to harmonize these conflicting goals.

Jaimyoung Kwon, Ph.D.
Associate

Expertise

Dr. Jaimyoung Kwon is an expert in the statistical analysis of freeway and arterial systems. His academic research and practical experience has focused on the development of modeling techniques that align performance monitoring inputs with pragmatic outputs for traffic engineers. Dr. Kwon is a professor of statistics at California State University and works part time for Berkeley Transportation Systems.

Education

Ph.D., Statistics, University of California at Berkeley, 2000
M.S., Statistics, Seoul National University, 1996
B.A., Computer Science and Statistics, Seoul National University, 1994

Experience

PeMS 7.0 Development. For Caltrans, Dr. Kwon was the principal statistician of the Freeway Performance Measurement System (PeMS), version 7.0. Dr. Kwon solved some of the most complex issues surrounding statewide performance measures in California, including: the prediction of travel time; data quality monitoring; and estimation of truck traffic volume. In this role, Dr. Kwon developed various statistical methodologies for freeway PeMS project, including: (1) visualization of extremely large datasets, (2) probabilistic detection of loop malfunctions in real time and analysis of general data quality issues, (3) imputation of missing/bad loop data, (4) analysis of freeway incident data and study of the relationship between incidents and traffic conditions, (5) study of high-occupancy vehicle (HOV) lane utilization, (6) estimation of truck traffic volume from loop data, and (4) travel time prediction

PeMS 6.0 Development. For Caltrans, Dr. Kwon was the principal statistician of the Freeway Performance Measurement System (PeMS), version 6.0. In this role, Dr. Kwon worked broadly on the application of statistics to transportation science, analyzing large spatio-temporal data from freeway loop detectors. In support of this earlier version of PeMS, Dr. Kwon developed various background statistical methodologies for the freeway project, including the basics of detector diagnostics and large scale imputation.

Bill Morris
Data Warehouse Architect
14 Years of Experience

Expertise

Bill Morris is an expert in the development of the internal processing engine of large-scale data warehousing and analysis systems. He has been working for nearly fifteen years as a professional data analyst and engineer. His expertise includes data warehousing, network programming and systems integration.

Education

M.A., Linguistics, University of Wisconsin at Madison, 1994
B.S., Computer Science, University of Wisconsin at Madison, 1992

Experience

PeMS 7.0 Development. For Caltrans, Mr. Morris was a principal architect of the Freeway Performance Measurement System (PeMS). In particular, his duties included the development of a data processing engine for: aggregation; diagnostics; and performance measure computation. He has developed routines within PeMS for Caltrans that support equipment configuration management, as well as real-time logic and monitoring of the freeway system itself.

PeMS Spokane Deployment. For the Spokane Regional Transportation Council, Mr. Morris led the deployment of a performance monitoring system to be shared between the state transportation district and regional metropolitan planning organization. Mr. Morris managed all aspects of the deployment, including system integration with detectors, user interface customization, and user training.

Karl Petty, Ph.D.
President

Expertise

Dr. Karl Petty is the President of Berkeley Transportation Systems, Inc. He holds a Ph.D. in Electrical Engineering from UC Berkeley and has been a Director of Engineering managing software development teams in multiple Silicon Valley firms. Dr. Petty oversaw the development of PeMS for Caltrans and has since fostered its expansion into an internationally leading transportation business intelligences software platform. Dr. Petty sits on the Transportation Research Board's Freeway Operations Committee and – as such – is an expert on the application of freeway performance monitoring regimes to transportation performance measurement programs.

Education

Ph.D., Computer Science, University of California at Berkeley, 1997
B.S., Electrical Engineering, Michigan State University, 1991

Experience

PeMS 7.0 Development. For Caltrans, Dr. Petty developed and oversaw the expansion of the Freeway Performance Measurement System (PeMS) to encompass all real-time freeway data within the state of California, as well as several other deployments in other states and internationally.

Inktomi. For Inktomi, Dr. Petty served as director of engineering for media. In this role, he was initially in charge of the MediaBridge Core Networking Team. His responsibilities expanded to include management of three additional software development teams: the Content Distribution System (a product to synchronize distribution of content to web pages), Media Publisher (a product that allows users to setup, maintain and run streaming video presentations), and the Traffic Director (a redirection product). Dr. Petty was also responsible for management and professional development of development managers and engineers, interfacing with QA managers, working directly with product management on direction, and assisting product marketing with messaging.

Eric Shieh
Associate
12 Years Experience

Expertise

Eric Shieh is an expert in the end-to-end development and delivery of complex data systems in the fields of enterprise transportation business intelligence software. His areas of focus lie in the architecting of frameworks that provide stable and scaleable foundations for performing complex, data-intensive analysis on transportation systems.

Education

B.S., Computer Science, University of California at Berkeley, 1996

Experience

PeMS 7.0 Development. For Caltrans, Mr. Shieh has served as user interface lead on the PeMS 7.0 development and deployment. In this capacity, he has developed the fundamental set of reporting templates used statewide by Caltrans engineers to manage the performance of the state freeway network. This included the development of two and three dimensional plots for freeway and bottleneck analysis used in the I-880 corridor analysis effort, as well as the fundamental maps and interfaces used by engineers statewide.

Arterial/Freeway Travel Time Comparison. For the San Diego Association of Governments (SANDAG), Eric has worked to develop a system of route-based comparisons. This system measures travel times on freeways and parallel arterials and provides freeway managers with the tradeoff between network points in real time.

Open Harbor Software. During his time at Open Harbor, Mr. Shieh managed the development and deployment of their trade management platform by coordinating the product management, development, quality assurance, and operations teams to ensure delivery of features within schedule and without disruption. During his tenure as Software Delivery Manager, he emphasized testing methodology, reined in scope creep, and promoted communications between divisions resulting in the first major deployment without the need for downtime or rollbacks. He also developed the user interface architecture for DHL's Trade Automation Services (TAS) website which has provided international shipping services to its customers for over three years.

Paul Lipkin
115 Manor Dr • Piedmont, CA 94611 • Phone (510) 282-3126
paul@lipkin.us

SUMMARY OF QUALIFICATIONS

Technical executive recognized for leadership in solving significant technical and business problems. Proven success in assessing situations and rapidly developing appropriate solutions. Developed products as the founder of a software startup, migrated existing products to new platforms and turned around floundering engineering organizations.

Instrumental in the rapid growth of TFS, co-Founded iKnowMed, responsible for operations as COO at Kivera and currently delivering dynamic content products for Tele Atlas. Utilize a hands-on, collaborative approach to insure that delivered products meet customer needs.

EDUCATION

- B.A. Computer Science - University of California, Berkeley

EXPERIENCE

Tele Atlas **2003 - present**

Director, Dynamic Content, Product Development & Engineering

Responsible for the Dynamic Travel Content (DTC) group for Tele Atlas, North America which delivers dynamic content such as traffic incidents, real-time speed data, historical speed and weather information to both the private sector and to state governments.

- Responsible for: source acquisition, customer relationships, data center operations and engineering of new products and delivery platforms
- Development of the dynamic content strategy for Tele Atlas and supports business development activities. Maintain relationships with all of the current and emerging dynamic content suppliers.
- Developed an industry consortium for location referencing with closest competitor and have presented papers on the topic at US and European industry conferences.

Kivera **2001 - 2002**

Chief Operating Officer/Acting VP Engineering

Responsible for engineering, QA, product management, finance, HR, consulting, IT, customer support and Facilities. Kivera is a leading Location Based Services (LBS) engine provider to the wireless, auto navigations and web market.

- Led the engineering team to dramatically improve the quality and performance of Location Based Services (LBS) engine that included an indexed database of every street and address range in North America and Europe.
- Reorganized and restructured chaotic management and engineering situation and implemented basic processes needed in this growing organization. Orchestrated significant organizational changes without major disruptions or morale issues.

iKnowMed **1995 - 2000**

Co-Founder, Vice President Engineering

1 of 3 founders of iKnowMed. Key member of senior management team which took company from 3 to 100 employees and through 3 rounds of financing.

- Developed prototype to secure funding and built engineering team of 40 developers.
- Architected object-oriented 3-tier system used to replace paper charts in physician offices.
- Implemented iKnowChart and deployed it in less than 1 year. iKnowChart has a patented user interface, sophisticated rules engine and a coded, hierarchical vocabulary of over 100,000 clinical terms.

iKnowMed

Vice President Implementation & Client Services

- Developed a team of 20 implementation consultants to implement iKnowChart nationally to 100 physicians in 6 months.
- Led team that developed interfaces between iKnowChart and hospital, local lab, local practice management, scheduling and billing systems.
- Led iKnowMed's Entrepreneur's Foundation team that included continued participation by more than ½ the company in community events.

Medicus Systems **1995**

Senior Project Manager

- Responsible for delivery of Resource Case Management product and was a senior member of technical product migration team
- Implemented prototype and design for EMPI component. (Enterprise-wide Master Person Index)
- Member of the architecture team to develop hospital-based outcomes information system

TRW Financial Systems **1982 - 1994**

Director of Industry Systems

Rose up through the ranks from system developer, application developer to project manager to Manager of Project managers.

- Developed real-time image systems for large financial institutions including: Citibank, Pacific Bell, Continental Bank, Bank of America and American Express. Systems included multiple UNIX servers, custom high-bandwidth network protocol, specialized hardware for high speed image capture and sub-second image display.
- Technical member of the sales team that was responsible for large system sales to financial institutions.
- Director, Quality Management, responsible for process improvement initiatives.

Résumé

MARK E. HALLENBECK

Washington State Transportation Center
1107 NE 45th Street, Suite 535
University of Washington, MS-354802
Seattle, Washington 98105
(206) 543-6261

EDUCATION

1980 MS, Civil Engineering, University of Washington
1979 BS, Civil Engineering, University of Washington

PROFESSIONAL ASSOCIATIONS

Transportation Research Board , Committees AFD30, ABJ20,
Conference Chair NATMEC 2004

PROFESSIONAL EXPERIENCE

Director, Washington State Transportation Center (TRAC), University of Washington, Seattle, Washington, July 1, 1993 to present

Affiliate Faculty, Departments of Civil and Environmental Engineering and Urban Design and Planning, University of Washington, Seattle, Washington, September 1989 - present, teaching Intelligent Transportation Systems, Urban Transportation Planning, and Traffic Engineering

Senior Research Engineer - Associate Director, Washington State Transportation Center (TRAC), University of Washington, Seattle, Washington, September 1984 to June 1993

Senior Consultant, Peat, Marwick, Mitchell & Co., Management Systems Department, Washington, D.C., July 1980 to August 1984

Selected Project Experience at TRAC

Current responsibilities include managing and conducting research projects in all aspects of transportation engineering with specific emphasis on traffic data collection, and Intelligent Transportation System implementation as well as directing TRAC's client relations, administrative and office functions. Specific projects include:

- NCHRP 20-58(3). Detailed Planning for Research on Providing a Highway System with Reliable Travel Times, Technical Consultant. Providing input to this key NCHRP project based on the findings from four years of analysis of data archives from the Puget Sound freeway management system.

- Traffic Congestion Monitoring - Urban, Principal Investigator, for WSDOT. In this project, was responsible for developing alternative plans and strategies for measuring urban traffic congestion in Washington state. Plans include the collection of travel time data using AVI tags on cars, HOVs, and buses, in conjunction with the AVI based transit signal priority system being installed in the Puget Sound area.

Selected Project Experience at TRAC (Continued)

- NCHRP 7-16 – Recommended Revisions to the AASHTO Guidelines for Traffic Data Programs, Technical Consultant to Cambridge Systematics, Inc. for this revision to these national guidelines

- Statewide Archive, Principal Investigator, for WSDOT. The development of a GIS based, web accessible system for providing access to traffic data collected by a wide variety of ITS devices being installed by WSDOT. The intent is to provide universal, easy access to data generated with ITS equipment.

- Smart Highways Network Manager Working Paper. Principal Investigator, for Florida Turnpike Enterprise, as sub to PBS&J. This project described what data handling resources were needed by the highway agency of the future as that agency strives to take advantage of the data generated by the VII and IVI programs.

- Update of the Federal Highway Administration's Traffic Monitoring Guide. Principal Investigator for this project to revise and refine the traffic data collection guidance provided by FHWA to the states.

- Framework For Developing Incident Management Systems. Project Manager, for FHWA and WSDOT. Developed a document that describes the steps necessary for developing a formal, efficient incident response program. Products from this project include a report discussing the needs, issues and potential designs of incident response systems, a step-by-step framework for developing such a system, and a case study of how such a system was developed and evolved over time.

- NW Region FLOW Evaluation. Principal Investigator, for WSDOT of four consecutive two years projects, that have resulted in the development and active use of a data archive and analysis process used to monitor the frequency, geographic extent, and duration of congestion on the Puget Sound freeway system.

- FHWA Incident Management Workshop. Principal Investigator, for FHWA for this project that refined and presents the FHWA workshop on incident management (Demo 86).

- Western States Transparent Borders Project, Principal Investigator for this project that is determined the institutional and regulatory barriers to implementing IVHS CVO technologies that should improve the efficiency of interstate truck freight movements.

Confidentiality Claims

In accordance with Section A-2, Part M of the RFP, this section identifies the specific portions of the proposal that are deemed by INRIX to contain confidential, proprietary information or trade secrets. The following table identifies all parts of the proposal, both in Volume I and Volume II, that are to be protected and not disclosed under the Access to Public Records Act, State Government Article, Title 10, Subtitle 6, Annotated Code of Maryland.

Section	Page(s)	Content to be Protected	Rationale
Volume I, Tab 3, Technical Proposal	3-9 through 3-10	INRIX Traffic Fusion Engine section	Confidential details on INRIX competitive business advantage and technical know how
Volume I, Tab 3, Technical Proposal	3-11	INRIX Partner Portal section	Confidential technical details of INRIX solutions
Volume I, Tab 3, Technical Proposal	3-12, 3-15 through 3-19, 3-23, 3-24, 3-29 through 3-31, 3-33, 3-34	Real-Time Traffic Data Requirements Table and supporting information (specific pages in section)	Confidential details of INRIX solutions, architecture, market coverage and partner relationships
Volume I, Tab 4, Risk Analysis	3-44 through 3-48	Risk Analysis section	Confidential details on INRIX competitive business advantage including IP and Source Data aggregation and analysis methods
Volume II, Tab 2, Pricing	29 and 30 of section	Pricing, Specific proposed option	Confidential details on innovative option pricing

Traffic Data and Associated Services along the I-95 Corridor

Volume II - Financial

RFP 82085N

Prepared for:

UNIVERSITY OF MARYLAND 18 56

I-95 CORRIDOR COALITION

INRIX

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Traffic Data and Associated Services
along the I-95 Corridor

Volume II - Financial

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

1. CONTRACT NUMBER	2. SOLICITATION NUMBER	3. TYPE OF SOLICITATION	4. DATE ISSUED	5. REQUISITION NUMBER
	82085N	NEGOTIATED (RFP)	04/27/07	R07615

6. ISSUED BY	7. ADDRESS PROPOSAL TO
UNIVERSITY OF MARYLAND DEPARTMENT OF PROCUREMENT AND SUPPLY 2113-R CHESAPEAKE BUILDING COLLEGE PARK, MARYLAND 20742	University of Maryland Department of Procurement & Supply Attn.: RFP Number82085N 2113-R Chesapeake Building College Park, Maryland 20742-3111

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	B. TELEPHONE (NO COLLECT CALLS)		C. E-MAIL ADDRESS	D. FAX NUMBER
		AREA CODE	NUMBER		
	Bruce D. Brewer	301	405-5829	bbrewer@umd.edu	301-314-9565

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.
YES – X Amendments have been received

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:

a) This Contract, including the Solicitation/Request for Proposal and amendments and modifications made thereto
b) 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 AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Print or Type)
Inrix, Inc. 4055 Lake Washington Blvd NE, Suite 200 Kirkland, WA 98033 FEI#: 201296081	Inrix, Inc. 4055 Lake Washington Blvd NE, Suite 200 Kirkland, WA 98033	Bryan Mistele, President and CEO

15. TELEPHONE NUMBER			16. SIGNATURE	17. OFFER DATE
AREA CODE	NUMBER	EXT.		
425	284-3801	NA		June 22, 2007

AWARD (To be completed by University)

18. ACCEPTED AS TO ITEMS LABELED	19. AMOUNT	20. FRS ACCOUNT NUMBER

21. ADMINISTERED BY (If other than Item 6)

22. NAME OF PROCUREMENT OFFICER	23. UNIVERSITY OF MARYLAND	24. AWARD DATE
(Type or Print)	(Signature of Procurement Officer)	

IMPORTANT – Award will be made on this Form or by other authorized official written notice.

AMENDMENT OF SOLICITATION

1. AMENDMENT NUMBER	2. DATE ISSUED	3. NUMBER OF PAGES
A001	**06/08/07**	**13**

4. ISSUED BY	5. ADMINISTERED BY (If other than Item 4)
UNIVERSITY OF MARYLAND DEPARTMENT OF PROCUREMENT AND SUPPLY 2113-R CHESAPEAKE BUILDING COLLEGE PARK, MARYLAND 20742 POINT OF CONTACT: **Bruce D. Brewer** TELEPHONE NUMBER: 301-405-5829 FACSIMILE NUMBER: 301-314-9565 ELECTRONIC MAIL ADDRESS: bbrewer@umd.edu	

6. NAME, ADDRESS AND FEI NUMBER OF CONTRACTOR	7A. AMENDMENT OF SOLICITATION NUMBER
Inrix, Inc.,4055 Lake Washington Blvd NE, Suite 200 Kirkland, WA 98033 FEI#: 201296081	**82085N**
	7B. DATED **04/27/07**

8. AMENDMENT OF SOLICITATION

The solicitation identified in 7A above is amended as set forth in Item 9.
The due date and time specified for receipt of offers/bids **X is not extended.**
Contractor must acknowledge receipt of this amendment prior to the due date and time specified in the solicitation or as amended, by completing Items 6 and 10 and returning **1** copy(ies) of the amendment to the Issuing Office identified in Item 4.
FAILURE OF CONTRACTOR'S ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR RECEIPT OF OFFERS/BIDS PRIOR TO THE DUE DATE AND TIME SPECIFIED MAY RENDER CONTRACTOR'S OFFER UNACCEPTABLE/NON-RESPONSIVE AND SUBJECT TO REJECTION.

9. DESCRIPTION OF AMENDMENT

9.1 This Amendment Serves To:

9.1.1 Provide an updated Excel price-proposal spreadsheet.

9.12 This Amendment serves to convey the Questions received from vendors, and Answers.

9.13 This Amendment Serves to convey a PDF file of Attendees at the Pre Proposal Conference.

9.14 This Amendment Serves to convey a PDF file of the report "Cellular Probe Data Evaluation Case Study: The Baltimore Multimodal Traveler Information System (MMTIS).

9.15 This Amendment Serves to convey a MS Word listing of all vendors receiving the RFP.

9.16 This Amendment Serves to Modify reporting requirements as defined in the Minority Business Enterprise (MBE) Participation, Page 69, "Contract Administration Requirements" as follows:
On a Monthly Basis, the Contractor is required to provide the Procurement Officer as defined in Section G/Contract Administration Data, Paragraph 5 "Notices", an MBE Subcontractor Activity report defining: (1) The dollar expenditure of all Service Task Orders for the reporting month, (2) the MBE subcontract dollar expenditure for the reporting month, (3) a total contract aggregate dollar expenditure of all Service Task Orders, and (4) a total contract dollar amount of all MBE subcontract funding under the contract.

9.2 The Due Date for Proposals of Friday, 22 June 2007, 4:00 P.M. ET as defined in Section A-2/Instructions, Conditions, and notices to Contractors, Paragraph E/Closing Date is not extended.

9.3 By Signing this Amendment, the contractor accepts the incorporation of these revisions.

Except as provided herein, all terms and conditions of the document referenced in Item 7A, including previous amendments, if any, shall remain in full force and effect.

10A. NAME AND TITLE OF SIGNER (Type or Print)	11A. NAME OF PROCUREMENT OFFICER (Type or Print)
Rick Schuman, Vice President, Public Sector	Bruce D. Brewer
10B. CONTRACTOR SIGNATURE (Signature of Person Authorized to Sign)	10C. DATE SIGNED 6/8/07

AMENDMENT OF SOLICITATION

1. AMENDMENT NUMBER	2. DATE ISSUED	3. NUMBER OF PAGES
A002	**06/13/07**	**12**

4. ISSUED BY	5. ADMINISTERED BY (If other than Item 4)
UNIVERSITY OF MARYLAND DEPARTMENT OF PROCUREMENT AND SUPPLY 2113-R CHESAPEAKE BUILDING COLLEGE PARK, MARYLAND 20742 POINT OF CONTACT: **Bruce D. Brewer** TELEPHONE NUMBER: 301-405-5829 FACSIMILE NUMBER: 301-314-9565 ELECTRONIC MAIL ADDRESS: bbrewer@umd.edu	

6. NAME, ADDRESS AND FEI NUMBER OF CONTRACTOR	7A. AMENDMENT OF SOLICITATION NUMBER
Inrix, Inc. 4055 Lake Washington Blvd NE, Suite 200 Kirkland, WA 98033 FEI#: 201296081	**82085N**
	7B. DATED **04/27/07**

8. AMENDMENT OF SOLICITATION

The solicitation identified in 7A above is amended as set forth in Item 9.
The due date and time specified for receipt of offers/bids **X is not extended.**
Contractor must acknowledge receipt of this amendment prior to the due date and time specified in the solicitation or as amended, by completing Items 6 and 10 and returning **1** copy(ies) of the amendment to the Issuing Office identified in Item 4.
FAILURE OF CONTRACTOR'S ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR RECEIPT OF OFFERS/BIDS PRIOR TO THE DUE DATE AND TIME SPECIFIED MAY RENDER CONTRACTOR'S OFFER UNACCEPTABLE/NON-RESPONSIVE AND SUBJECT TO REJECTION.

9. DESCRIPTION OF AMENDMENT

9.1 This Amendment Serves To Convey additional Questions/Answers submitted by the required date on the RFP, but inadvertently excluded in the A001 Response. The Additional Questions/Responses concern numbers 40 – 43. Responses under Questions 1 – 39 are repeated unaltered.

9.2 Contractor's MBE Attachment B provided with their proposal shall denote the Subcontractors the Contractor intends to utilize in attaining the overall goal of 25%. Amendment A002 (1) deletes the requirement to assign an independent goal to each subcontractor proposed, and (2) provides revised MBE Attachment B forms.

9.2 The Due Date for Proposals of Friday, 22 June 2007, 4:00 P.M. ET as defined in Section A-2/Instructions, Conditions, and notices to Contractors, Paragraph E/Closing Date is not extended.

9.3 By Signing this Amendment, the contractor accepts the incorporation of these revisions.

Except as provided herein, all terms and conditions of the document referenced in Item 7A, including previous amendments, if any, shall remain in full force and effect.

10A. NAME AND TITLE OF SIGNER (Type or Print)	11A. NAME OF PROCUREMENT OFFICER (Type or Print)
Rick Schuman, VP, Public Sector	Bruce D. Brewer
10B. CONTRACTOR SIGNATURE (Signature of Person Authorized to Sign)	10C. DATE SIGNED 6/15/07

AMENDMENT OF SOLICITATION

1. AMENDMENT NUMBER	2. DATE ISSUED	3. NUMBER OF PAGES
A003	**06/15/07**	**1**

4. ISSUED BY	5. ADMINISTERED BY (If other than Item 4)
UNIVERSITY OF MARYLAND DEPARTMENT OF PROCUREMENT AND SUPPLY 2113-R CHESAPEAKE BUILDING COLLEGE PARK, MARYLAND 20742 POINT OF CONTACT: **Bruce D. Brewer** TELEPHONE NUMBER: 301-405-5829 FACSIMILE NUMBER: 301-314-9565 ELECTRONIC MAIL ADDRESS: bbrewer@umd.edu	
6. NAME, ADDRESS AND FEI NUMBER OF CONTRACTOR Inrix, Inc. 4055 Lake Washington Blvd NE, Suite 200 Kirkland, WA 98033 FEI#: 201296081	7A. AMENDMENT OF SOLICITATION NUMBER **82085N** 7B. DATED **04/27/07**

8. AMENDMENT OF SOLICITATION

The solicitation identified in 7A above is amended as set forth in Item 9.
The due date and time specified for receipt of offers/bids **X is not extended.**
Contractor must acknowledge receipt of this amendment prior to the due date and time specified in the solicitation or as amended, by completing Items 6 and 10 and returning **1** copy(ies) of the amendment to the Issuing Office identified in Item 4.
FAILURE OF CONTRACTOR'S ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR RECEIPT OF OFFERS/BIDS PRIOR TO THE DUE DATE AND TIME SPECIFIED MAY RENDER CONTRACTOR'S OFFER UNACCEPTABLE/NON-RESPONSIVE AND SUBJECT TO REJECTION.

9. DESCRIPTION OF AMENDMENT

9.1 This Amendment Serves To Convey one additional Questions/Answer deemed by the Committee to be of significant value to warrant distribution.

9.2 Please Clarify the following:

9.1.1 Question: That on Page 36, Section G, Subsection 3/Schedule of Payments, Note 2 under Paragraph 2.5, "Mobility" should be "Mobilization", and clarify it to mean that there is a cap on the total mobilization costs equal to 20% of the annual fee,

9.1.2 *Response: The word "Mobility" as referenced in 9.1.1 is revised to read "mobilization". And, the, 20% cap remains unchanged.*

9.3 The Due Date for Proposals of Friday, 22 June 2007, 4:00 P.M. ET as defined in Section A-2/Instructions, Conditions, and notices to Contractors, Paragraph E/Closing Date is not extended.

9.4 By Signing this Amendment, the contractor accepts the incorporation of these revisions.

Except as provided herein, all terms and conditions of the document referenced in Item 7A, including previous amendments, if any, shall remain in full force and effect.

10A. NAME AND TITLE OF SIGNER (Type or Print)		11A. NAME OF PROCUREMENT OFFICER (Type or Print)
Rick Schuman, VP, Public Sector		Bruce D. Brewer
10B. CONTRACTOR SIGNATURE (Signature of Person Authorized to Sign)	10C. DATE SIGNED 6/18/07	

Pricing

This section contains the pricing information as requested by the RFP, in three parts:

- √ Real-Time Traffic Data Services for the Core System
- √ Cost Model for Traffic Data Services to be used as Contract Pricing
- √ Consulting Services

Pricing for the Core System

As shown on the following page, we have offered a compelling price for the complete Core System as described in the RFP. Our core system pricing is based upon the following:

- √ Covers INRIX's core service, utilizing source data INRIX utilizes to serve all of our customers. Enhanced source data options will require supplemental funding as described in this proposal;
- √ Per centerline mile, 24x7 coverage;
- √ Pricing provided is for the mandatory coverage in the core system, 1531 centerline miles of freeways;
- √ Start-up/Mobilization pricing is based upon the rate schedule below; and
- √ Arterial/alternate route coverage will be provided at no cost initially in the core system (or a resulting system of analogous size of roughly 900 centerline miles) for the base period. If arterial/alternate route coverage is included in years 4-10, a rational per mile price will be established based upon negotiation with the Coalition, although it will not exceed the freeway mileage per year price (the rationale for this is that INRIX and the Coalition are not currently in a position to value the quality of arterial data provided, and the relative importance of source data – if any – to be provided by the Coalition's member agencies to create the service such as signal system data, etc.).

INRIX Service Rate Schedule

Contract Year	1	2	3	4	5	6	7	8	9	10
Mobilization $/mile*	150	150	150	160	165	170	175	180	185	190
Annual Cost $/mile	750	750	750	800	825	850	875	900	925	950

** = For coverage added that year*

SECTION B, PART 2.0 PRICE PROPOSAL FORM - RFP 82085N Amendment A001

R007 05/21/07

ITEM	DESCRIPTION	QTY	PRICE
1	Startup-Mobilization Fees (if applicable)	1	$ 229,650.00

			Base Contract Period			Optional Seven (7) Year Renewal Periods							
Item	DESCRIPTION	QTY	Year 1/ Base Year 1	Year 2/ Base Year 2	Year 3/ Base Year 3	Year 4/ Option Year 1	Year 5/ Option Year 2	Year 6/ Option Year 3	Year 7/ Option Year 4	Year 8/ Option Year 5	Year 9/ Option Year 6	Year 10/ Option Year 7	TOTAL
2	Data Subscription fee Base 3 year period	1	$ 1,148,250.00	$ 1,148,250.00	$ 1,148,250.00								$ 3,444,750.00

			Base Contract Period			Optional Seven (7) Year Renewal Periods							
ITEM	DESCRIPTION	QTY	Year 1/ Base Year 1	Year 2/ Base Year 2	Year 3/ Base Year 3	Year 4/ Option Year 1	Year 5/ Option Year 2	Year 6/ Option Year 3	Year 7/ Option Year 4	Year 8/ Option Year 5	Year 9/ Option Year 6	Year 10/ Option Year 7	TOTAL
3	Data Subscription fee, Option Years 4 - 10	1				$ 1,224,800.00	$ 1,263,075.00	$ 1,301,350.00	$ 1,339,625.00	$ 1,377,900.00	$ 1,416,175.00	$ 1,454,450.00	$ 9,377,375.00
												TOTAL	$ 13,051,775.00

			Base Year 1		Base Year 2		Base Year 3		Option Year 1		Option Year 2	
Item	Labor Categories	Est. Hours	Hourly Rate	Extension	Hourly Rate	Extension	Hourly Rate	Extension	Hourly Rate	Extension	Hourly Rate	Extension
1	Project Manager	75	$ 168.00	$ 12,600.00	$ 173.04	$ 12,978.00	$ 178.23	$ 13,367.34	$ 183.58	$ 13,768.36	$ 189.09	$ 14,181.41
2	Senior Engineer/Analyst	100	$ 149.05	$ 14,905.35	$ 153.74	$ 15,374.38	$ 158.59	$ 15,858.50	$ 163.58	$ 16,358.23	$ 168.74	$ 16,874.07
4	Engineer/Analyst	140	$ 125.98	$ 17,636.50	$ 130.64	$ 18,289.46	$ 135.49	$ 18,968.06	$ 140.52	$ 19,673.35	$ 145.76	$ 20,406.46
5	Junior Engineer/Analyst	230	$ 95.64	$ 21,996.98	$ 99.05	$ 22,781.36	$ 102.59	$ 23,595.33	$ 106.26	$ 24,440.11	$ 110.07	$ 25,316.90
6	Senior Programmer	100	$ 143.30	$ 14,330.00	$ 120.74	$ 12,073.80	$ 125.03	$ 12,503.21	$ 129.49	$ 12,948.87	$ 134.11	$ 13,411.42
7	Programmer	125	$ 117.10	$ 14,637.63	$ 98.08	$ 12,260.09	$ 101.55	$ 12,694.13	$ 105.16	$ 13,144.50	$ 108.89	$ 13,611.87
8	Junior Programmer	200	$ 96.20	$ 19,240.00	$ 99.89	$ 19,977.20	$ 103.72	$ 20,744.52	$ 107.72	$ 21,543.25	$ 111.87	$ 22,374.77
9	Systems Engineer	100	$ 157.66	$ 15,765.87	$ 162.88	$ 16,287.76	$ 168.28	$ 16,827.76	$ 173.87	$ 17,386.52	$ 179.65	$ 17,964.74
10	Database Management Specialist	125	$ 107.79	$ 13,474.13	$ 111.83	$ 13,979.08	$ 116.03	$ 14,504.22	$ 120.40	$ 15,050.41	$ 124.95	$ 15,618.53
11	Clerical/Administrative Support	350	$ 63.70	$ 22,295.00	$ 65.69	$ 22,990.10	$ 67.74	$ 23,707.37	$ 69.85	$ 24,447.53	$ 72.03	$ 25,211.34
	Subtotal Labor:			$ 166,881.45		$ 166,991.22		$ 172,770.44		$ 178,761.13		$ 184,971.53

			Option Year 3		Option Year 4		Option Year 5		Option Year 6		Option Year 7	
Item	Labor Categories	Est. Hours	Hourly Rate	Extension	Hourly Rate	Extension	Hourly Rate	Extension	Hourly Rate	Extension	Hourly Rate	Extension
1	Project Manager	75	$ 194.76	$ 14,606.85	$ 200.60	$ 15,045.06	$ 206.62	$ 15,496.41	$ 212.82	$ 15,961.30	$ 219.20	$ 16,440.14
2	Senior Engineer/Analyst	100	$ 174.07	$ 17,406.58	$ 179.56	$ 17,956.29	$ 185.24	$ 18,523.79	$ 191.10	$ 19,109.67	$ 197.15	$ 19,714.55
4	Engineer/Analyst	140	$ 151.20	$ 21,168.54	$ 156.86	$ 21,960.81	$ 162.75	$ 22,784.53	$ 168.86	$ 23,641.02	$ 175.23	$ 24,531.66
5	Junior Engineer/Analyst	230	$ 114.03	$ 26,227.02	$ 118.14	$ 27,171.79	$ 122.40	$ 28,152.62	$ 126.83	$ 29,170.97	$ 131.43	$ 30,228.36
6	Senior Programmer	100	$ 138.92	$ 13,891.56	$ 143.90	$ 14,389.99	$ 149.07	$ 14,907.45	$ 154.45	$ 15,444.73	$ 200.03	$ 20,003.29
7	Programmer	125	$ 112.78	$ 14,096.90	$ 116.80	$ 14,600.33	$ 120.98	$ 15,122.88	$ 125.32	$ 15,665.33	$ 162.28	$ 20,285.62
8	Junior Programmer	200	$ 116.20	$ 23,240.49	$ 120.71	$ 24,141.91	$ 125.40	$ 25,080.59	$ 130.29	$ 26,058.14	$ 135.38	$ 27,076.28
9	Systems Engineer	100	$ 185.63	$ 18,563.14	$ 191.82	$ 19,182.47	$ 198.23	$ 19,823.50	$ 204.87	$ 20,487.04	$ 211.74	$ 21,173.92
10	Database Management Specialist	125	$ 129.68	$ 16,209.53	$ 134.60	$ 16,824.38	$ 139.71	$ 17,464.10	$ 145.04	$ 18,129.76	$ 150.58	$ 18,822.48
11	Clerical/Administrative Support	350	$ 74.28	$ 25,999.59	$ 76.61	$ 26,813.08	$ 79.01	$ 27,652.65	$ 81.48	$ 28,519.16	$ 84.04	$ 29,413.52
	Subtotal Services:			$ 191,410.21		$ 198,086.10		$ 205,008.51		$ 212,187.13		$ 227,689.83

TOTAL ESTIMATED SERVICES:	$ 1,904,757.53
TOTAL DATA	$ 13,051,775.00
TOTAL CONTRACT	$ 14,956,532.53

INRIX Traffic Data Services Cost Model

The INRIX team and approach is offering a simple, cost-effective, aggressive and realistic pricing model to the Coalition as it seeks value for its investments. INRIX offers a simplified "per mile" pricing for its standard data services, along with straightforward enhancement options to further improve available data or to trial innovative approaches to data enhancement that will improve freeway data quality and/or improve or enable limited access/alternate route data delivery. While it may be tempting to offer complex formulas, soft matches, the appearance of cost-sharing, etc., we believe our approach provides the clearest method of pricing transparency as well as a model that could thrive – both for the Coalition and for INRIX – for up to the full 10 year term of the potential contract.

For coverage increases associated with follow-on task orders, the table titled *INRIX Service Rate Schedule* provides the costing based upon the year the contract year the task order is executed. The annual per mile fee will be prorated to cover only the months operational in the initial contract year ($1/12^{th}$ of the annual fee due for each operational month). The start-up fee will be based upon the year a task is authorized to add coverage.

Further, INRIX recognizes that over the potential 10-year lifespan of the contract, it is a near certainty that source data not used or contemplated at present will be available to INRIX and the Coalition for possible inclusion to improve data quality in covered areas. For this project, INRIX will adopt a simple philosophy: if the inclusion of source data is something that occurs nationally, and/or has a clear cost/benefit to our clients other than the Coalition, this data will be incorporated into our services at no additional charge to the project. If new source data provides a quality lift (improved data on existing coverage or enabling new coverage) sought by the Coalition but is not nationally deployable, not a benefit to our other customers or cost prohibitive, then additional funding will be sought from the Coalition to include the source. We understand cases in which Coalition investment is appropriate; it may not be 100% of the cost. We commit to work with the Coalition to establish the appropriate percentage of funding for specific project enhancements.

As part of this proposal, INRIX offers three unique options to enhance coverage in certain regions of the Coalition as desired by member agencies, in addition to the INRIX core service fees (in the unexpected event that a member agency seeks to deploy a data enhancement option along roadways not already covered by INRIX) per mile INRIX "standard data service" fees in the table titled *INRIX Service Rate Schedule* would be required to allow us to ingest, process and provide the data for these new roads.

- √ ***SpeedInfo***, self contained radar sensors to enhance or extend coverage when/where desired by Coalition member agencies;
- √ ***DTS***, and its potential to migrate traditional traffic count stations in Virginia, possibly Florida, and even other Coalition states to also act as real-time sensor stations; and,

- √ A trial by ***TruePosition*** (an E-911 equipment provider) to assess an innovative approach to use existing equipment to improve data services, particularly along arterials/alternate routes. Note this trial will be conducted utilizing TruePosition test equipment located in the Wilmington, DE, area and will serve as both a technology and business model laboratory for the Coalition and INRIX.

The following pages describe the pricing models for each of these three options.

Additional Data Feeds

As described in more detail in the Technical Volume, INRIX currently has several additional data feeds available that could fulfill Item #4 of the Real Time Traffic Data Requirements table in the RFP. These include:

- √ Predictive flow data – forward-looking speed information along a specific section of roadway, at 15 minute increments with up to a one year time horizon.
- √ Key route drive times – inferred drive times for certain pre-selected routes, based on current traffic speeds.
- √ Key route drive time, predictive – inferred drive times for pre-selected routes, based on predictive data
- √ Incidents (events, construction, accidents, etc) – traffic incidents reported by data providers
- √ Incidents (flow data) – reports of traffic congestion for specific sections of roads, in most cases based on INRIX flow data, and in some cases augmented with data from other providers, such as Clear Channel's Total Traffic Network.
- √ Events – traffic-impacting events in major urban markets up to one year in advance that have in excess of 10,000 people attending.

It is not possible to provide specific cost estimates at present for each feed, given the IDIQ nature of the contract. INRIX welcomes the chance to describe these feeds in more detail, understand the Coalition's interest and subsequently develop appropriate scope and price proposals for tasking.

SpeedInfo

INRIX is offering the Coalition – as an option – the ability to add SpeedInfo doppler radar sensors as source data for the project. As with other elements of the INRIX proposal, the pricing model is quite simple: $200/sensor/month, with member agencies determining where and when they would like sensors deployed. Any request can be completed within 4 months of task order execution. The following describes the pricing, terms and conditions.

FastRoute Traffic Speed Data Service

The Traffic Speed Data Service is a turn-key data service program. SpeedInfo will deploy and operate the sensor network for a minimum term of three (3) years. The data service program includes the following:

- √ Sensor, solar panel, mounting hardware, installation*
- √ Operation expense (i.e. communications and maintenance)
- √ Traffic data and server license
- √ Cost of installation
- √ Repair / replace sensors if they fail during the maintenance period

Under this program, SpeedInfo owns the sensor and the data it generates.

The customer licenses the data from SpeedInfo and has has unlimited rights to distribute the data to anyone they wish. INRIX will include the sensor data as source data into the INRIX Fusion Engine. SpeedInfo may also distribute the data to 3rd parties.

Terms and Conditions

- √ Minimum quantity: 10 sensors (per task)
- √ All invoices are 2% 15, net 30days. FOB Destination.
- √ All prices are subject to change without notice.
- √ No early termination on service contracts.

* installation assumes customer authorized to provide right-of-way or access to infrastructure and does not include costs for permits or local fees, if any.

Warranty

Fastroute™ Data Service Warranty is one year from date of shipment. During warranty period, SpeedInfo will repair or replace, at its option, and pay for ground shipping and normal re-installation costs.

Limited Warranty – DVSS-100 Sensor

Subject to the Limitations, Exclusions and Disclaimers hereof, SpeedInfo Corporation ("SpeedInfo") warrants that the DVSS-100 Doppler Vehicle Sensor and FastRoute™ traffic data service (hereinafter collectively or individually referred to as "Product" as appropriate) purchased from SpeedInfo, a SpeedInfo distributor, or a SpeedInfo reseller will conform to SpeedInfo's specifications and be free from defects in material or workmanship for the respective Limited

Warranty period. SpeedInfo does not warrant that the Product will meet the specific requirements of the end-user customer.

If the Product, while subject to this Limited Warranty, is defective in material or workmanship during the warranty period, then SpeedInfo, at its option, will REPAIR or REPLACE the Product.

All exchanged parts and Products replaced under this Limited Warranty will become property of SpeedInfo. SpeedInfo' sole obligation is to supply (or pay for) all labor necessary to repair the Product found to be defective within the Limited Warranty period and to repair or replace defective parts with new parts or, at the option of SpeedInfo, serviceable used parts that are equivalent or superior to new parts performance.

WARRANTY LIMITATION AND EXCLUSION

THIS WARRANTY SETS FORTH SPEEDINFO'S MAXIMUM LIABILITY FOR ITS PRODUCT. THIS WARRANTY EXTENDS ONLY TO PRODUCTS PURCHASED FROM SPEEDINFO OR AN SPEEDINFO AUTHORIZED RESELLER. SpeedInfo shall have no further obligation under the foregoing Limited Warranty if the Product has been damaged due to abuse, misuse, neglect, accident, unusual physical or electrical stress, unauthorized modifications (including use of an unauthorized mount), tampering, alterations, or service other than by SpeedInfo or its authorized agents, causes other than from ordinary use or failure to properly use the Product in the application for which said Product was intended.

Remanufactured Products and Software Products are exempt from the foregoing Limited Warranty. Please refer to the appropriate Remanufactured Product Limited Warranty or Software Product Limited Warranty for applicable Warranty information.

IN NO EVENT WILL SPEEDINFO BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, OR PUNITIVE DAMAGES, OR ANY DAMAGES FOR LOST DATA, BUSINESS INTERRUPTION, LOST PROFITS, LOST REVENUE, OR LOST BUSINESS, ARISING OUT OF OR IN CONNECTION WITH USE OF THE DATA OR THIS AGREEMENT.

DISCLAIMER OF UNSTATED WARRANTIES

THE WARRANTY PRINTED ABOVE IS THE ONLY WARRANTY APPLICABLE TO THIS PRODUCT. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE DISCLAIMED. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF AND THE FOREGOING WARRANTY SHALL NOT BE EXTENDED, ALTERED OR VARIED EXCEPT BY WRITTEN INSTRUMENT SIGNED BY SPEEDINFO. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY MAY LAST, SO SUCH LIMITATIONS MAY NOT APPLY.

DTS

DTS is the exclusive contractor responsible for the service, installation, maintenance and repair of more than 400 statewide traffic monitoring sites for VDOT's Statewide Data Collection and Services Program. DTS has been providing services to VDOT in this capacity since 2001 and is under contract through 2010 (including option years). With DTS as part of the INRIX team for this project, the Coalition or any member agency, can utilize DTS's capabilities to convert traditional traffic count stations that do not report in real-time, to fully functional real-time sensor stations.

The attached price list of Pay Items from the Virginia DOT contract will be the basis for all task order pricing to the Coalition or any member agency that wishes to adapt its count stations for dual use. Each task would be scoped separately as it is likely no two agency configurations would require the same items. DTS would provide a fee estimate along with the scope based upon this pay item list. As noted at the bottom of the list, these prices are valid through the end of calendar year 2010 with defined escalation rates the remaining life of the contract between INRIX and the University of Maryland. This is a significant value-added enhancement as it makes available to all Coalition member agencies the nation's foremost experts in leveraging traffic count stations for real-time use in a cost-effective manner that does not impact the primary purposes of the stations, and it does so in a manner that both locks in pricing and gives the Coalition and its members the flexibility needed to match defined pay items to each project's scope. Further, INRIX will not place an additional management fee on the pay item prices, making this asset available beyond Virginia at no additional cost.

Following the Pay Items and Descriptions below are five sample task work orders illustrating a range of potential scenarios in which DTS could upgrade existing count stations. The scenarios are:

- √ DTS upgrades existing CCS site to provide real time data, with IP modem, larger solar panel if not currently installed. (e.g., Virginia)
- √ Assume existing site with functioning sensors, solar panel and IP modem – DTS provides Stopwatch enabled counter paid for via a monthly data payment which includes ongoing maintenance of electronics. (e.g., Florida)
- √ Member agency already owns ADR – PLUS Peek counters enabled for this real time data application. Therefore use Pay Item 6 to provide data support. (e.g., Georgia and North Carolina)
- √ Supply and install new electronics, solar and modem. (e.g., South Carolina and all states north of Virginia)
- √ A brand new non intrusive site using a Wavetronix sensor

Pay Item No.	Pay Item	Unit Price
1	ATR Annual Lease - Classification / Volume / Speed collection	$3,600.00
2	ATR Annual Lease -Volume / Speed collection	$3,300.00
3	ATR Annual Lease - WIM data addition	$7,200.00
4	ATR - Annual Lease - Real-Time data addition	$600.00
5	Modem annual lease	$600.00
6	Operation and Maintenance of all VDOT ATR & Modem Equipment	$3,240.00
7	CDMA Modem and Associated Components	
7A	CDMA Modem & Maintenance (0 - 99 units) Annual	$720.00
7B	CDMA Modem & Maintenance (100 - 149 units) Annual	$600.00
7C	CDMA Modem & Maintenance (150 - 199 units) Annual	$480.00
7D	CDMA Modem & Maintenance (>200 units) Annual	$360.00
8	Mobilization - Interstate Location	$4,750.00
9	Mobilization - Non-Interstate Location	$2,750.00
10	Mobilization - Outside Contract Area	$500.00
11	Mobilization - Flaggers Required	$2,500.00
12	Mobilization - No MOT	$1,100.00
13	Install complete new 2 lane CCS	$15,499.00
14	Install complete new 3 lane CCS	$19,097.00
15	Install complete new 4 lane CCS	$22,600.00
16	Install complete new 5 lane CCS	$26,000.00
17	Install complete new 6 lane CCS	$29,800.00
18	Install complete new 1 lane WIM Station	$33,234.00
18A	Install complete new 1 lane WIM Station (Staggered configuration)	$24,234.00
19	Install complete new 2 lane WIM Station	$60,078.00
19A	Install complete new 2 lane WIM Station (Staggered configuration)	$42,078.00
20	Install complete new 3 lane WIM Station	$88,212.00
20A	Install complete new 3 lane WIM Station (Staggered configuration)	$61,212.00
21	Install complete new 4 lane WIM Station	$113,849.00
21A	Install complete new 4 lane WIM Station (Staggered configuration)	$77,849.00
22	Calibrate 1 lane WIM station	$3,162.00
23	Calibrate Additional WIM Lanes; Per Lane	$500.00
24	Inspection of WIM installed by a certified representative from the manufacturer (initial day)	$1,700.00
24A	Inspection of WIM installed by a certified representative from the manufacturer each additional day)	$1,200.00

25	Special Project Labor & Materials Cost	
25A	Laborer Service Rate	$45.00
25B	Technician / Electrician Service Rate	$85.00
25C	Sr. Technician	$115.00
25D	Application Specialist	$130.00
26	Additional cost for each WIM lane wider than 11'8-3/8"	$250.00
27	Install / replace complete set of CCS road sensors per lane	$3,800.00
28	Install / replace complete set of WIM road sensors per lane	$26,450.00
28A	Install / replace complete set of WIM road sensors per lane (Staggered Configuration)	$17,450.00
29	Install / replace inductive loop	$875.00
30	Install / replace piezoelectric sensor	$2,002.00
31	Install / replace WIM sensor	$12,750.00
31A	Install / replace WIM sensor (Staggered Configuration)	$8,250.00
32	Piezoelectric sensor cable lead wire, per foot, over standard length (>400 foot)	$0.15
33	Install / replace cabinet	$3,500.00
33A	Type 336S UNF Aluminum Solar Cabinet (F&I) on existing pole	$3,615.00
33B	Install / Replace Type 4 Cabinet on existing metal pole.	$1,987.00
34	Install / replace post	$800.00
34A	Install / Replace Pole & Base on existing concrete foundation	$1,518.00
34B	Install / Replace Pole & Base w/ concrete foundation	$1,846.00
35	Remove / dispose of post and cabinet	$500.00
36	Remove / dispose of post and cabinet (in quantities > 10)	$475.00
37	Install / replace solar panel	$1,200.00
38	Upgrade / Oversize Solar Panel	$1,800.00
38A	Upgrade / Install Large Solar Panel (F&I) 80W	$2,549.00
39	Remove sensor and fill with grout	$450.00
40	Remove WIM sensor and fill with grout	$600.00
41	Install / replace junction box	$720.00
42	Install / replace concrete platform	$250.00
43	Mark Buried Sensors	$300.00
44	On-site Data Retrieval	$300.00
45	Install Site Grounding Electrodes	
45A	Standard / Preferred Method	$150.00
45B	Modified / Preferred Method	$175.00
45C	Trench Burial Method	$200.00
46	Pavement Repair (Seal/Fill Cracks at CCS)	$950.00
47	Maintain Vegetation	$500.00
48	Initial CCS Inspection	$250.00
49	CCS Preconstruction Inspection	$400.00

50	Preventative Maintenance Inspection (CCS)	$400.00
51	WIM - Routine Inspection (non-MOT)	$500.00
52	WIM - Sensor Profile Inspection & Correction	$1,200.00
53	Welcome Center Inspection/Plan ea.	$1,500.00
54	Service Call Charge	$100.00
55	Service Call Response - 24 Hour	$450.00
56	Service Call Response - 48 Hour	$400.00
57	RTMS Support Installation	$750.00
58	Non-Intrusive Sensor Station Installation	$14,788.00
58A	Galvanized Steel 35' Pole with Concrete Foundation (F&I)	$7,196.00
58A	Galvanized Steel 35' Pole with Concrete Foundation (F&I) Power coat finish	$8,275.40
58B	Soil tests and design submittals	$1,025.00
58C	Heavy Duty BX Series 40' Self Supporting Tower with Hinged Base (F&I)	$5,861.00
59	Additional Trenching and Conduit	
59A	Trenching (in units of 10 ft.)	$25.00
59B	Conduit (in units of 10 ft.)	$5.00
60	Standard Directional Boring for conduit installation, single location, 3" Schedule 80 conduit included, per foot (F&I)	$58.00
61	Standard Directional Boring for conduit installation, single location, 2" Schedule 40 conduit included, per foot (F&I)	$50.00
62	Standard Directional Boring for conduit installation, single location, (2) 2" Schedule 40 conduits included, per foot (F&I)	$54.00
67	Wavetronix Non-Intrusive SS-125 Annual Lease - Volume and/or Speed collection	$3,600.00
68	SmarTek SAS-1 Non-Intrusive Annual Lease – Volume and/or Speed collection	$3,600.00
69	License free 902-928 MHz 900 SS Radio Modem (Freewave FGR-115RC Radio Modem or equivalent) w/ antenna, cable, and wall transformer. (F&I)	$1,500.00
70	Upgrade ADR with 4MB of additional memory to facilitate increased storage for complex traffic studies.	$1,444.00

Pay Item Descriptions

1) ATR Annual Lease – Classification / Volume / Speed collection – This pay item will be for the lease of contractor provided ATR equipment. The pay item includes all costs associated with connection, operation andmaintenance of the equipment. The lease payment will be based on the amount of valid data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate. The contractor shall identify in its proposal any proposed price increases for the addition of new counters at various points in the contract. If

none are made, the price quoted shall be valid for all new counters added for the length of the contract.

2) ATR Annual Lease – Volume / Speed collection – This pay item will be for the lease of contractor provided ATR equipment. The pay item includes all costs associated with connection, operation and maintenance of the equipment. The lease payment will be based on the amount of valid data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate. The contractor shall identify in its proposal any proposed price increases for the addition of new counters at various points in the contract. If none are made, the price quoted shall be valid for all new counters added for the length of the contract.

3) ATR Annual Lease – WIM data addition – This pay item is for the additional fee for lease of contractor provided ATR equipment that includes the WIM electronics. For WIM sites that are also collecting classification, volume and speed data, this will be paid in addition to pay item 1. The lease payment will be based on the amount of valid WIM data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate. The contractor shall identify in its proposal any proposed price increases for the addition of new counters at various points in the contract. If none are made, the price quoted shall be valid for all new counters added for the length of the contract.

4) ATR Annual Lease – Real-Time data addition – This pay item is for the additional fee for lease of contractor provided ATR equipment that has the Real-Time feature enabled. This pay item will be paid in addition to pay item 1. The lease payment will be based upon the amount of valid Real-Time data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate. The contractor shall identify in its proposal any proposes price increases for the addition of Real-Time data at various points in the contract. If none are made, the price quoted shall be valid for all new additions added for the length of the contract.

5) Modem Annual Lease – This pay item will be for the lease of contractor provided landline modem equipment. The pay item includes all costs associated with connection, operation and maintenance of the equipment. The lease payment will be based on the amount of valid data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate.

6) Operation and Maintenance of VDOT ATR & Modem Equipment – This pay item will be for the operation and maintenance of VDOT provided ATR and modem equipment. The contractor will be responsible for all counter activity, to include parts replacement and repair, just as they would under pay items 1 and 2. The lease payment will be based on the amount of valid data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate.

7) CDMA Modem – This pay item will be for the lease of contractor provided CDMA modem equipment and associated components (12volt solar panel and regulator). The pay item includes all costs associated with connection, operation

and maintenance of the equipment. The lease payment will be based on the amount of valid data produced as per paragraph 3.11. Payment will be made monthly at 1/12th the annual rate.

8) Mobilization; Interstate Location – This pay item is for mobilization to an Interstate CCS for installation or repair. Mobilization is defined as the charge to take one fully outfitted maintenance/construction work crew to the work site for the duration of time necessary to complete all work assignments at that work site. Mobilization charges shall include Maintenance of Traffic (MOT) costs.

9) Mobilization; NonInterstate Location – This pay item is for mobilization to a nonInterstate CCS for installation or repair. Mobilization is defined as the charge to take one fully outfitted maintenance/construction work crew to the work site for the duration of time necessary to complete all work assignments at that work site. Mobilization charges shall include Maintenance of Traffic (MOT) costs.

10) Mobilization; Outside Contract Area – This pay item is for mobilization to a location outside the contracted districts. The pay item will be paid in addition to the amount paid for the mobilization by type of CCS (Pay Items 8 or 9). The offeror may provide one price for all districts, or may further break this pay item down by cost per each of VDOT's other districts.

11) Mobilization; Flaggers required – This pay item is for use at CCSs where flag personnel are required by the Virginia Work Area Protection Manual. This pay item will be in addition to the amount paid for the mobilization by type of CCS (Pay Items 8 or 9). The purpose of this pay item is to reimburse for costs related to the required flagging operations. VDOT will not pay "Mobilization; Flaggers required" if personnel who are normally assigned to the construction crew are diverted to flagging operations or if contract management, technical or administrative personnel are used as flaggers. The intent is to cover costs related to hiring additional personnel on a short-term basis used only to perform the flagging operation.

12) Mobilization; No MOT – This pay item is for mobilization to a location for work that does not include lane closures. Shoulder closures may be required as part of the pay item. This pay item would normally be associated with a work crew performing tasks on the shoulder of the road only such as replacement of cabinets, poles, grounding or maintaining vegetation. The pay item will be per work crew per day. If multiple locations are visited in one day, the pay item will be paid only once per day. It is not for technician work performing service calls, counter repair, site inspections, sensor marking, data retrieval, solar panel replacement or other work associated with a single technician working alone.

13) Install complete new 2 lane CCS – This pay item is for furnishing materials and installing a 2 lane CCS. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be

included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

14) Install complete new 3 lane CCS – This pay item is for furnishing materials and installing a 3 lane CCS. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

15) Install complete new 4 lane CCS – This pay item is for furnishing materials and installing a 4 lane CCS. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

16) Install complete new 5 lane CCS – This pay item is for furnishing materials and installing a 5 lane CCS. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

17) Install complete new 6 lane CCS – This pay item is for furnishing materials and installing a 6 lane CCS. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item

also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

18) Install complete new 1 lane WIM station – This pay item is for furnishing materials and installing a 1 lane WIM. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

19) Install complete new 2 lane WIM station – This pay item is for furnishing materials and installing a 2 lane WIM. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

20) Install complete new 3 lane WIM station – This pay item is for furnishing materials and installing a 3 lane WIM. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

21) Install complete new 4 lane WIM station – This pay item is for furnishing materials and installing a 4 lane WIM. All materials and labor including but not limited to metal pole, cabinet, solar panel, in road sensors and pull boxes will be provided and installed in a professional manner. All conduit and trenching will be included if the physical distance is less than 75 feet. The distance will be measured in a straight-line fashion starting at the sensor array midpoint on the shoulder of the roadway to the cabinet post. After the 75 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

22) Calibrate 1 lane WIM station – This pay item is for calibrating a newly installed 1 lane WIM station and also for periodic recalibration of existing 1lane

WIM stations. Contractor shall calibrate WIM station according to ASTM E131802 which requires two test trucks, at least one of which is a class 9, 5 axle tractor trailer, loaded to at least 90% of GVWR, making multiple test runs at various speeds. Contractor is responsible for providing the loaded test trucks and drivers, static weighing and measuring the trucks, recording the data for each run, and making adjustments to the WIM calibration. All data recorded shall be provided to VDOT including documentation of any calibration adjustments

23) Calibrate additional lanes of WIM equipment; per lane – This pay item is for calibrating a newly installed WIM lane and also for periodic recalibration of existing WIM lanes. The pay item will be for all lanes of WIM after the first WIM lane pay item (Item 22) and will be paid for each additional WIM lane calibrated. Contractor shall calibrate WIM lanes according to ASTM E131802 which requires two test trucks, at least one of which is a class 9, 5 axle tractor trailer, loaded to at least 90% of GVWR, making multiple test runs at various speeds. Contractor is responsible for providing the loaded test trucks and drivers, static weighing and measuring the trucks, recording the data for each run, and making adjustments to the WIM calibration. All data recorded shall be provided to VDOT including documentation of any calibration adjustments.

24) Inspect WIM station installation, per lane – This pay item is an additional quality control measure and is for inspection of a WIM installation by a certified representative from the manufacturer. This representative shall not be on the contractor's staff/payroll. The representative shall provide the VDOT Contract Administrator with an installation inspection report which verifies that each lane of the installation was completed according to the manufacturer's standards and/or VDOT specifications.

25)* Information Only: *Special Project Labor & Materials Cost – This pay item is for the cost of performing general labor for additional tasks upon the request of the Contract Administrator. The labor rate calculation shall be provided along with the bid price. The labor rate should be calculated so as to recover all direct and indirect labor costs, supervision costs as well as all associated overhead. Labor costs shall be calculated by multiplying the estimated hours needed for the task by the bid rate for each labor category. This rate will only be paid in one hour increments. The total labor cost for each assigned project may not exceed the estimate by more than 15%. 25 A) Laborer – The laborer shall be a member of a crew that generally performs the roadway construction work and or other hands-on tasks (i.e. digging, mixing and forming concrete)

25 B) Technician / Electrician – The technician or electrician shall be skilled in the use of the ATR and/or modem, solar panel and general electronics.

26) Additional cost for each WIM lane wider than 11'83/ 8" – This pay item is for the additional cost for installing WIM sensors in wide lanes. For a typical lane up to 11'83/ 8", 4 quartz sensors will be installed in each piezo slot, 2 each 0.75m and 2 each 1.00m. Sensors shall be lane edge to lane edge with a gap

between the middle two sensors up to 25/ 8". For lanes over 11’83/ 8", 1 each 0.75m and 3 each 1.00m sensors shall be used.

27) Install / replace complete set of CCS road sensors per lane – This pay item is for furnishing and installing all road sensors for a single lane (two inductive loops and one piezoelectric sensor) and make connections through existing junction boxes to existing traffic cabinet. All conduit and trenching will be included if the physical distance is less than 10 feet. After the 10 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

28) Install / replace complete set of WIM road sensors per lane – This pay item is for furnishing and installing all road sensors for a single lane (one inductive loop and two quartz piezoelectric sensors) and making connections through existing junction boxes to existing traffic cabinet. All conduit and trenching will be included if the physical distance is less than 10 feet. After the 10 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

29) Install / replace inductive loop – This pay item is for furnishing and installing one inductive loop and make connections through existing junction boxes to existing traffic cabinet. All conduit and trenching will be included if the physical distance is less than 10 feet. After the 10 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

30) Install / replace piezoelectric sensor – This pay item is for furnishing and installing one piezoelectric sensor and making connections through existing junction boxes to existing traffic cabinet. All conduit and trenching will be included if the physical distance is less than 10 feet. After the 10 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

31) Install / replace Weigh in Motion (WIM) sensor – This pay item is for furnishing and installing one WIM sensor and making connections through existing junction boxes to existing traffic cabinet. All conduit and trenching will be included if the physical distance is less than 10 feet. After the 10 foot point, any additional trenching and conduit will be paid in 10 foot units. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

32) Piezoelectric sensor cable lead wire, per foot, over standard length (200foot) – Each sensor shall normally be provided with a 100200 foot length. This pay item is for lead-in lengths required in excess of 200 feet. The unit of measure is per foot over the standard 200foot length.

33) Install / replace cabinet and metal post assembly – This pay item is for furnishing and installing one cabinet and metal pole and making all connections within the cabinet. The pay item also includes removal of old pole and cabinet as necessary and all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

34) Install / replace post – This pay item is for furnishing and installing one wood post and connecting an existing cabinet. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

35) Remove / dispose of post and cabinet – This pay item is for removing and disposing of an existing traffic cabinet and wood or metal pole and associated equipment.

36) Remove / dispose of wooden post and cabinet – This pay item is for removing and disposing of existing traffic cabinet and wood or metal pole and associated equipment in quantities of 10 or more.

37) Install / replace solar panel – This pay item is for furnishing and installing one solar panel and making connections.

38) Upgrade / Oversize Solar Panel – This pay item is for furnishing and installing one oversize solar panel and making connections. The contractor shall use a 60watt size for price planning purposes. Variations on that size will be individually negotiated prior to installation.

39) Remove Sensor / Fill With Grout – This pay item is for removing an existing Phillips channel piezoelectric sensor and filling the slot with grout material. 40) Remove WIM Sensor / Fill With Grout. This pay item is for removing an existing Kistler WIM sensor and filling the slot with grout material.

41) Install / replace junction box – This pay item is for furnishing and installing one junction box. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

42) Install / replace concrete platform – This pay item is for installing one concrete platform. The platform shall be installed using A3 concrete 4 inches thick and 2 foot by 3 foot in dimension. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to preconstruction condition.

43) Mark Buried Sensors – This pay item is for the marking of buried VDOT TMS sensors. Normally this will be used in response to a call for marking utilities for a project not related to this contract. When requested by the VDOT Contract Administrator, the contractor shall have at least 24 hours to respond. This pay item is not for use when the contractor is marking a location for its own contract construction work.

44) On Site Data Retrieval – This pay item is for the manual onsite retrieval of traffic data if the contractor is required to retrieve data during periods when

auto poll communications with the counter are not possible due to telephone line problems. The pay item will be per CCS and per visit as requested by the VDOT Contract Administrator. Note that this may include data collection from two co-located ATRs if the CCS operates with two. This pay item shall not be used for situations where contractor maintained communications equipment is the cause for the communication failure. If downtime due to an ATR, modem or electronic issue occurs, the data download shall occur without cost to VDOT.

45)* Information Only: *Install Site Grounding Electrodes using three different methods.

45 A) Standard / Preferred Method – This pay item is for installation of grounding materials at an existing CCS or WIM. The pay item is not for inclusion as an additional cost item at a new installation, as grounding is to be included in new installations. See Paragraph 3.20 for a description of the installation method required. Pricing is per 8foot ground rod installed using this method.

45 B) Modified / Preferred Method – This pay item is for installation of grounding materials at an existing CCS or WIM. The pay item is not for inclusion as an additional cost item at a new installation, as grounding is to be included in new installations. See Paragraph 3.20 for a description of the installation method required. Pricing is per 8foot ground rod installed using this method.

45 C) Trench Burial Method –This pay item is for installation of grounding materials at an existing CCS or WIM. The pay item is not for inclusion as an additional cost item at a new installation, as grounding is to be included in new installations. See Paragraph 3.20 for a description of the installation method required. Pricing will be per 8foot units using this method.

46) Pavement Repair (Seal / Fill Road cracks at CCS) – This pay item is for completing filling road cracks in the area of CCS sensors as per Paragraph 3.16.a.

47) Maintain Vegetation – This pay item is for maintaining vegetation around CCS locations as per Paragraph 3.16.b. Routine trimming and maintenance to ease access, is expected as part of inspection and service call activity where site visits are made and is not to be invoiced under this pay item.

48) Initial CCS Inspection – This pay item is for an initial site inspection visit and is to be used one time only for existing CCSs and at the beginning of the contract. All sensors are to be evaluated, new equipment installed and operations verified. This pay item is not for use at new sites as they are installed, as the set up and installation of equipment shall be included in the install price.

49) CCS Pre-construction Inspection – This pay item is for conducting CCS inspections prior to maintenance and shall be performed in accordance with the specifications described in Paragraph 3.15.b.

50) Preventative Maintenance Inspection – This pay item is for conducting a preventative maintenance inspection when requested to do so by the VDOT Contract Administrator. The inspection shall be performed in accordance with the specifications described in Paragraph 3.16.d.

51) WIM - Routine Inspection (non-MOT) – This pay item is for conducting a review and maintenance inspection of Kistler sensor and inspection of weigh electronics found in 3.16.d.

52) WIM - Sensor Profile Inspection & Correction – This pay item is for conducting a review and maintenance inspection of Kistler sensor and inspection of weigh electronics and to include roadway sensor maintenance repairs found in 3.16.d.

53) Welcome Center Inspection – This pay item is for conducting a survey of the conditions at a VDOT Welcome Center, developing a data collection plan and presenting the plan to the VDOT Contract Administrator. See Paragraph 3.30 for detail.

54) Service Call Charge – This pay item is for service calls that meet the criteria for separate payment as detailed in paragraph 3.12.

55) Service Call Response – 24 Hour. This pay item is for costs related to a faster than normal contract specification (10 days) service call response time. When requested by the VDOT Contract Administrator, the contractor shall respond to and resolve the data problem, which generated the service call within 24 hours of notice. See paragraph 3.12 for more detail.

56) Service Call Response – 48 Hour. This pay item is for costs related to a faster than normal contract specification (10 days) service call response time. When requested by the VDOT Contract Administrator, the contractor shall respond to and resolve the data problem, which generated the service call within 48 hours of notice. See Paragraph 3.12 for more detail.

57) RTMS Support Installation – This pay item is for installing the support system required by VDOT's portable nonintrusive traffic data collection program. See paragraph 3.16.e for details.

58) NonIntrusive Sensor Station Installation – This pay item is for costs related to the installation of a traffic data collection station using nonintrusive technology. The contractor shall include all costs, to include all materials, electronics, installation and operation along with a detailed product description. See paragraph 3.29.

59) **Information Only:** ***Additional Trenching and Conduit pay items.***

59A) Trenching – This pay item is for additional trenching above and beyond the listed amounts in the pay items above to be paid in increments of 10 foot.

59B) Conduit – This pay item is for additional installation of conduit above and beyond the listed amounts in the pay items above to be paid in increments of 10 foot.

60) ATR Purchase Option – This pay item is for VDOT's optional purchase of contractor owned ATR equipment at the end of contract. If exercised, the purchase will include ATR as well as all peripheral items required to operate the equipment such as batteries connections, regulators and etc.

61) Modem Purchase Option – This pay item is for VDOT's optional purchase of contractor owned landline modem communication equipment at the end of contract. If exercised, the purchase will include modem as well as all peripheral items required to operate the equipment.

62) ATR Purchase Option – This pay item is for VDOT's optional purchase of contractor owned WIM ATR equipment at the end of contract. If exercised, the purchase will include ATR as well as all peripheral items required to operate the equipment such as batteries connections, regulators and etc.

63) CDMA Modem Purchase Option – This pay item is for VDOT's optional purchase of contractor owned Modem communications equipment at the end of contract. If exercised, the purchase will include modem as well as all peripheral items required to operate the equipment.

Recently Added / New Pay Items

A. Non-Intrusive Sensor Infrastructure Components
B. Large Solar Panel
C. Non-Intrusive Data Lease
   - Wavetronix SS-125 HD Sensor
   - SmarTek SAS-1
D. Spread Spectrum RM
E. ADR Memory Upgrade
F. Cabinet Components

The pay item descriptions and their pricing are presented as an addendum to the current contract. Mobilization is not included in any item unless specifically listed and will be added as required. System calibrations, professional engineering studies, soil samples, cabinets, conduits, solar panels, batteries, lighting protection, pull boxes, etc. are only included where specifically listed.

A. Quotation for Non-Intrusive Sensor Infrastructure Components

Pay Item	Description	Price ea.
58A	Galvanized Steel 35' Pole with Concrete Foundation (F&I) 10" Diameter Wall thickness 0.179" Length = 35' Finish = Galvanized Powder-coated pole add 15% Pole will have one hand hole and a pole-cap LF-1 provided (VDOT Spec 1301.10) Installed with breakaway bolts if within 30' of edge of vehicular travel.	$7,196.00 (F&I) Standard Finish $8,275.40 (F&I) Powder-coated Finish
58B	Soil tests and design submittals	$1,025.00

58C	Heavy Duty BX Series 40' Self Supporting Tower with Hinged Base (F&I) Includes: HDBX40 Tower BXHC78 Hinged Base Finish = Galvanized Concrete Base (4.5'W x 4'D)	$5,861.00 (F&I)
33A	Type 336S UNF Aluminum Solar Cabinet (F&I) on existing pole Includes 2 19" Rack 2 Shelves 1 Document Drawer 1 Angle-Bracket Mounting Shelf 1 Dual Door #2 Lock 1 Pair of pole mounting brackets 1 Back panel w/ terminal strips 1 EDCO Solar surge protector 1 Ground buss bar	$3,615.00 (F&I)

B. Quotation for 80 Watt Solar Panel Installation

Pay Item	Description	Price ea.
38A	Upgrade / Install Large Solar Panel (F&I) Includes bracket, connections, (1) 12Vdc 100AH Battery (MK8A31 or equivalent), and (1) solar regulator (SUNSAVER SS-10L-12 or equivalent) Panel Electrical Specifications (Example) Maximum power (Pmax) 80W Voltage at Pmax (Vmp) 17.6V Current at Pmax (Imp) 4.55A Warranted minimum Pmax 76W Short-circuit current (Isc) 4.8A Open-circuit voltage (Voc) 22.1V Temperature coefficient of Isc (0.065±0.015)%/ °C Temperature coefficient of Voc -(80±10)mV/°C Temperature coefficient of power -(0.5±0.05)%/ °C NOCT (Air 20°C; Sun 0.8kW/m2 ; wind 1m/s) 47±2°C Maximum series fuse rating 15A (20A for U version) Maximum system voltage 600V (U.S. NEC) 1000V (TÜV Rheinland & IEC 61215)	$2,549.00 (F&I)

C. Quotation for Non-Intrusive Data: Wavetronix SS-125 HD Sensor / SmarTek SAS-1

Pay Item	Description	Price ea.
67	Wavetronix Non-Intrusive SS-125 Annual Lease – Volume and/or Speed collection *VDOT is the party responsible for downloading, converting, and importing the data into a format that can be used by their traffic database management system.*	$3,600.00
67A	Wavetronix Non-Intrusive SS-125 Purchase Option – Volume and/or Speed collection (exercisable after 1 year of operation)	$5,152.00
67B	Wavetronix Non-Intrusive SS-125 Purchase Option – Volume and/or Speed collection (exercisable after 2 years of operation)	$3,864.00
67C	Wavetronix Non-Intrusive SS-125 Purchase Option – Volume and/or Speed collection (exercisable after 3 years of operation)	$2,576.00
67D	Wavetronix Non-Intrusive SS-125 Purchase Option – Volume and/or Speed collection (exercisable after 4 years of operation)	$1,788.00
67E	Wavetronix Non-Intrusive SS-125 Purchase Option – Volume and/or Speed collection (exercisable after 5 years of operation)	$1,588.00
68	SmarTek SAS-1 Non-Intrusive Annual Lease – Volume and/or Speed collection *VDOT is the party responsible for downloading, converting, and importing the data into a format that can be used by their traffic database management system.*	$3,600.00
68A	SmarTek Non-Intrusive SAS-1 Purchase Option – Volume and/or Speed collection (exercisable after 1 year of operation)	$4,152.00
68B	SmarTek Non-Intrusive SAS-1 Purchase Option – Volume and/or Speed collection (exercisable after 2 years of operation)	$2,864.00
68C	SmarTek Non-Intrusive SAS-1 Purchase Option – Volume and/or Speed collection (exercisable after 3 years of operation)	$1,576.00
68D	SmarTek Non-Intrusive SAS-1 Purchase Option – Volume and/or Speed collection (exercisable after 4 years of operation)	$788.00

D. Quotation for License Free SS Radio Modem

Pay Item	Description	Price ea.
69	License free 902-928 MHz 900 SS Radio Modem (Freewave FGR-115RC Radio Modem or equivalent) w/ antenna, cable, and wall transformer. (Furnish & Install) – Includes all freight, materials, and equipment. This price for this item does not include any monthly service charges and/or programming charges. Mobilization is extra. DTS will program SSRM with channel information provided by the customer. Specifically, this item includes: (1) License free 902-928 MHz, 115Kbps Spread Spectrum Wireless Data Radio Modem in ruggedized enclosure, 6-30 volts with RS232 / RS485 interface, N Type RF Connector (1) External Omni-directional antenna with cable and magnetic or permanent mount base (1) AC wall transformer	$1,500.00

E. ADR Memory Upgrade

Pay Item	Description	Price ea.
70	Upgrade ADR with 4MB of additional memory to facilitate increased storage for complex traffic studies Specifically, this item includes: Installation of (1) PCMCIA Memory Slot into the ADR Installation of (1) 2MB or 4MB SRAM Memory Expansion Card Reallocate the ADR memory	$1,444.00

F. Cabinet Components

Pay Item	Description	Price ea.
33B	Install / Replace Type 4 Cabinet on existing metal pole.	$1,987.00
34A	Install / Replace Pole & Base on existing concrete foundation Specifically, this item includes: Installation of a 4" Aluminum pole up to 16' in height with break-way frangible base.	$1,518.00
34B	Install / Replace Pole & Base w/ concrete foundation Specifically, this item includes: Installation of concrete foundation (24"W X 30"D) Installation of a 4" Aluminum pole up to 16' in height with break-way frangible base.	$1,846.00

Additional Notes:

1. Task Pricing valid through 12/31/2010

2. **Task Pricing Escalation** - The Task prices will be adjusted in each additional year of the contract beyond 2010. Any changes would either be based on the latest 12 months CPIW services sector of the Consumer Price Index of the US Bureau of Labor versus the base year index, or a mutually agreed upon price that has been negotiated. The base year index for this calculation will be 2008.

DIGITAL TRAFFIC SYSTEMS, INC.
2700-A POCAHONTAS TRAIL
QUINTON, VA 23141
OFFICE: 804.381.5300
FAX: 804.932.5009

June 18, 2007

SCENARIO 1: DTS upgrade to field infrastructure of existing Continuous Count Station (already equipped with a Peek ADR+ Counter) to provide real time data, with IP modem, and larger solar panel if not currently installed. Assumes State already has Stopwatch application license.

DOT Contract Administrator
Traffic Engineering
Department of Transportation
123 USA Street
Anywhere, US 12345

RE: Site ID: 12345678
Work Order: 123-D1-12345678

Dear Contract Administrator:

Subject: Station ID **12345678** Request for Authorization to Perform Upgrade

DTS will upgrade an existing count station site to provide real time data, install IP based wireless modem with antenna, install dual 65 watt solar panels with bracketing, install (1) 12VDC 100AH battery, and (1) new 12VDC 10Amp solar low voltage disconnect charge controller and program existing Peek ADR+ traffic recorder for dual use.

The contract pay items to perform the recommended upgrades are (one-time upgrade cost):

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price
1	12	Mobilization - Shoulder Work Required	$1,100.00	$1,100.00
2	38	Upgrade / Oversize Solar Panel Includes: 2 65 Watt Solar panels 1 12Vdc 100AH battery 1 12V 10Amp Solar Charge Controller 1 Wiring	$1,800.00	$3,600.00
1	50	Preventative Maintenance Inspection Includes and physical and electrical inspection of existing sensors, all sensor and power connections, grounding, and electronics.	$400.00	$400.00
		The total estimated contract price to bring about this upgrade is:		**$5,100.00**

Best regards,
David Newman
Program Manager
Digital Traffic Systems

_____ June 18, 2007
Approved Date
DOT Contract Administrator
Print Name:

DIGITAL TRAFFIC SYSTEMS, INC.
2700-A POCAHONTAS TRAIL
QUINTON, VA 23141
OFFICE: 804.381.5300
FAX: 804.932.5009

June 18, 2007

Scenario 2: Assumes an existing site with functioning sensors, solar panel and IP modem – DTS to commission and maintain a Stopwatch enabled counter at the site, and receives a monthly data payment which includes ongoing maintenance of electronics.

DOT Contract Administrator
Traffic Engineering
Department of Transportation
123 USA Street
Anywhere, US 12345

RE: Site ID: 12345678
Work Order: 123-D1-12345678

Dear Contract Administrator:

Subject: Station ID **12345678** Request for Authorization to Perform Upgrade

DTS leases a real-time (Stopwatch) enabled automatic traffic data recorder at an existing count station site where an IP based wireless modem and sufficient power is already available and in good working condition. Prior to installing the new equipment DTS will perform a preventative maintenance inspection to verify that all sensors, power, and grounding meet the minimum specifications.

The contract pay items to perform the one-time recommended upgrades are:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price
1	12	Mobilization - Shoulder Work Required	$1,100.00	$1,100.00
1	50	Preventative Maintenance Inspection	$400.00	$400.00
		The total estimated contract price to bring about this upgrade is:		**$1,500.00**

Annual data, maintenance, and operational costs:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price (Annual)
1	1	ATR Annual Lease - Classification / Volume / Speed collection*	$3,600.00	$3,600.00
			Total:	**$3,600.00**

*The lessor shall bear all costs associated with connection, operation and maintenance of the equipment. Payment will be made monthly at 1/12th the annual rate.

Best regards,
David Newman
Program Manager
Digital Traffic Systems

_____ June 18, 2007
Approved Date
DOT Contract Administrator
Print Name:

DIGITAL TRAFFIC SYSTEMS, INC.
2700-A POCAHONTAS TRAIL
QUINTON, VA 23141
OFFICE: 804.381.5300
FAX: 804.932.5009

June 18, 2007

Scenario 3: Customer already owns ADR –PLUS Peek counters enabled for this real time data application. Therefore use Pay Item 6 to provide ongoing field technical support and traffic data.

DOT Contract Administrator
Traffic Engineering
Department of Transportation
123 USA Street
Anywhere, US 12345

RE: Site ID: 12345678
Work Order: 123-D1-12345678

Dear Contract Administrator:

Subject: Station ID **12345678** Request for Authorization to Perform Upgrade

DTS assumes responsibility for DOT owned real-time (Stopwatch) enabled automatic traffic data recorder at an existing count station site where an IP based wireless modem and sufficient power is already available and in good working condition. Prior to assuming responsibility of the DOT owned equipment DTS will perform a preventative maintenance inspection to verify that all sensors, power, and grounding meet the minimum specifications. Items found to be outside of acceptable tolerances or that need repair will be billed separately.

The contract pay items to perform the recommended inspection are (one-time cost):

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price
1	12	Mobilization - Shoulder Work Required	$1,100.00	$1,100.00
1	50	Preventative Maintenance Inspection	$400.00	$400.00
		The total estimated contract price to bring about this upgrade is:		**$4,740.00**

Annual reoccurring data, maintenance, and operational costs:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price (Annual)
1	6	Operation and Maintenance of DOT ADR & Modem Equipment	$3,240.00	$3,240.00
			Total:	**$3,240.00**

*Operation and Maintenance of DOT owned Automatic Data Recorder & Modem equipment. This pay item will be for the operation and maintenance of DOT provided ADR and modem equipment. The contractor will be responsible for all counter activity, to include parts replacement and repair (installation of new equipment extra). Payment will be made monthly at 1/12th the annual rate.

Best regards,
David Newman
Program Manager
Digital Traffic Systems

_____ June 18, 2007
Approved Date
DOT Contract Administrator
Print Name:

DIGITAL TRAFFIC SYSTEMS, INC.
2700-A POCAHONTAS TRAIL
QUINTON, VA 23141
OFFICE: 804.381.5300
FAX: 804.932.5009

June 18, 2007

Scenario 4: DTS supplies and install new counter, solar and modem at an existing sensor site.

DOT Contract Administrator
Traffic Engineering
Department of Transportation
123 USA Street
Anywhere, US 12345

RE: Site ID: 12345678
Work Order: 123-D1-12345678

Dear Contract Administrator:

Subject: Station ID **12345678** Request for Authorization to Perform Upgrade

DTS leases a real-time (Stopwatch) enabled automatic traffic data recorder at an existing count station site. DTS installs IP based wireless modem with antenna, install dual 65 watt solar panels with bracketing, install (1) 12VDC 100AH battery, and (1) new 12VDC 10Amp solar low voltage disconnect charge controller. Prior to installing the new equipment DTS will perform a preventative maintenance inspection to verify that all sensors, power, and grounding meet the minimum specifications.

The contract pay items to perform the one-time recommended upgrades are:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price
1	12	Mobilization - Shoulder Work Required	$1,100.00	$1,100.00
2	38	Upgrade / Oversize Solar Panel	$1,800.00	$3,600.00
1	50	Preventative Maintenance Inspection	$400.00	$400.00
		The total estimated contract price to bring about this upgrade is:		**$5,100.00**

Annual data, maintenance, and operational costs:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price (Annual)
1	1	ATR Annual Lease - Classification / Volume / Speed collection*	$3,600.00	$3,600.00
1	7A	CDMA Modem & Maintenance (0 - 99 units)**	$720.00	$720.00
			Total:	**$4,320.00**

*DTS leases a real-time automatic traffic data recorder. The lessor (DTS) shall bear all costs associated with connection, operation and maintenance of the equipment. Payment will be made monthly at 1/12th the annual rate.
**DTS leases a IP based wireless modem. The DOT is responsible for the monthly connection or communication charges. The lessor (DTS) shall bear all costs associated with connection, operation and maintenance of the equipment. Payment will be made monthly at 1/12th the annual rate.

Best regards,
David Newman
Program Manager
Digital Traffic Systems

_____ June 18, 2007
Approved Date
DOT Contract Administrator
Print Name:

DIGITAL TRAFFIC SYSTEMS, INC.
2700-A POCAHONTAS TRAIL
QUINTON, VA 23141
OFFICE: 804.381.5300
FAX: 804.932.5009

Scenario 5: Install a brand new non intrusive site with DTS owned Wavetronix sensor.

June 18, 2007

DOT Contract Administrator
Traffic Engineering
Department of Transportation
123 USA Street
Anywhere, US 12345

RE: Site ID: 12345678
Work Order: 123-D1-12345678

Dear Contract Administrator:

Subject: Station ID **12345678** Request for Authorization to Perform Upgrade

Project Scope: Install a Traffic Monitoring System for use with a Wavetronix sensor. The non-intrusive count station to be installed for the collection of traffic count data. All materials and labor including but not limited to metal pole, cabinet, solar panel, and pull boxes will be provided and installed in a professional manner. The pay item also includes all labor and materials such as grass seed and straw required for grounds keeping to return the location to a preconstruction condition.

The estimate to perform this work includes:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price
1	12	Mobilization – Shoulder Work	$1,100.00	$1,100.00
1	33B	Install / Replace Type 4 Cabinet on existing metal pole.	$1,987.00	$1,987.00
2	38A	Upgrade / Install Large Solar Panel (F&I) 80W	$2,549.00	$5,098.00
4	45B	Grounding Modified / Preferred Method	$175.00	$700.00
1	48B	Initial ATR/WIM/CDMA Site Inspection	$1,500.00	$1,500.00
1	58A	Galvanized Steel 35' Pole with Concrete Foundation (F&I)	$7,196.00	$7,196.00
1	58B	Soil tests and design submittals	$1,025.00	$1,025.00
1	59A	Trenching (in units of 10 ft.)	$25.00	$25.00
1	59B	Conduit (in units of 10 ft.)	$5.00	$5.00
		The total estimated contract price to complete this work:		**$18,636.00**

Annual data, maintenance, and operational costs:

Estimated Qty	Pay Item No.	Pay Item	Unit Price	Total Price (Annual)
1	1	ATR Annual Lease - Classification / Volume / Speed collection*	$3,600.00	$3,600.00
1	7A	CDMA Modem & Maintenance (0 - 99 units)**	$720.00	$720.00
		Total:		**$4,320.00**

*DTS leases a real-time non-intrusive sensor / automatic traffic data recorder. The lessor (DTS) shall bear all costs associated with connection, operation and maintenance of the equipment. Payment will be made monthly at 1/12th the annual rate.
**DTS leases a IP based wireless modem. The DOT is responsible for the monthly connection & communication charges. The lessor (DTS) shall bear all costs associated with connection, operation and maintenance of the equipment. Payment will be made monthly at 1/12th the annual rate.

Best regards,
David Newman
Program Manager
Digital Traffic Systems

_____ June 18, 2007
Approved Date
DOT Contract Administrator
Print Name:

THIS PAGE CONTAINS REDACTED INRIX CONFIDENTIAL INFORMATION

Consulting Services Costs

The category labor rates submitted for the consulting services portion of Volume II – Financial are presented as blended, fully loaded, hourly labor rates for each category and offer an accurate, yet simplified representation, of what hourly rates for task order work are likely to be over the initial three years and seven optional years of the contract.

The purpose of developing blended rates is to provide a weighted average (not a simple arithmetic mean) category rate that properly reflects which team member is most likely to do a particular type of work. In addition to the blended rates provided, attached is also a one-page rate sheet for each of the companies described in the Consulting Services portion of the Volume I –Technical Proposal. This way, each company is represented fairly and equitably (through weighted blending) during the evaluation of the proposal, while also maintaining its individual rate structure through the duration of the project.

You will notice that not every firm offered rates in every labor category. The primary reason for this is that each firm is playing to their strengths and is expected to be a strong contributor in their particular area(s) of expertise. However, knowing that there could be a variety of tasks and that all levels of experience and skill sets could be needed, even within a given labor category, a quick review and comparison reveals that within categories, rates can vary widely. It is this variation that the weighted, blended rates help address.

For each task performed under Consulting Services, the appropriate firm, skill set and level of experience will necessitate which firm(s) and labor categories are used. This process will ensure that the Coalition and its members receive the right solution and for each and every task.

PBS&J		Fully Loaded Hourly Rate				
Project Role	Company	Base Year 1	Base Year 2	Base Year 3	Option Year 1	Option Year 2
Project Manager	PBS&J	$167.00	$172.01	$177.17	$182.49	$187.96
Sr. Engineer/Analyst	PBS&J	$143.17	$147.46	$151.89	$156.44	$161.14
Engineer/ Analyst	PBS&J	$120.00	$123.60	$127.31	$131.13	$135.06
Jr. Engineer/ Analyst	PBS&J	$90.00	$92.70	$95.48	$98.35	$101.30
Sr. Programmer	PBS&J	$158.00	$162.74	$167.62	$172.65	$177.83
Programmer	PBS&J	$125.00	$128.75	$132.61	$136.59	$140.69
Jr. Programmer	PBS&J	$85.00	$87.55	$90.18	$92.88	$95.67
Systems Engineer	PBS&J	$183.00	$188.49	$194.14	$199.97	$205.97
D'base Specialist	PBS&J	$90.00	$92.70	$95.48	$98.35	$101.30
Clerical/ Admin	PBS&J	$63.00	$64.89	$66.84	$68.84	$70.91
		Option Year 3	Option Year 4	Option Year 5	Option Year 6	Option Year 7
Project Manager	PBS&J	$193.60	$199.41	$205.39	$211.55	$217.90
Sr. Engineer/Analyst	PBS&J	$165.97	$170.95	$176.08	$181.36	$186.80
Engineer/ Analyst	PBS&J	$139.11	$143.29	$147.58	$152.01	$156.57
Jr. Engineer/ Analyst	PBS&J	$104.33	$107.46	$110.69	$114.01	$117.43
Sr. Programmer	PBS&J	$183.17	$188.66	$194.32	$200.15	$206.15
Programmer	PBS&J	$144.91	$149.26	$153.73	$158.35	$163.10
Jr. Programmer	PBS&J	$98.54	$101.49	$104.54	$107.68	$110.91
Systems Engineer	PBS&J	$212.15	$218.51	$225.07	$231.82	$238.77
D'base Specialist	PBS&J	$104.33	$107.46	$110.69	$114.01	$117.43
Clerical/ Admin	PBS&J	$73.03	$75.23	$77.48	$79.81	$82.20

Open Roads Consulting, Inc.		Fully Loaded Hourly Rate				
Project Role	Company	Base Year 1	Base Year 2	Base Year 3	Option Year 1	Option Year 2
Project Manager	ORCI	$172.00	$177.16	$182.47	$187.95	$193.59
Sr. Engineer/Analyst	ORCI	$165.00	$169.95	$175.05	$180.30	$185.71
Engineer/ Analyst	ORCI	$135.00	$139.05	$143.22	$147.52	$151.94
Jr. Engineer/ Analyst	ORCI	$98.00	$100.94	$103.97	$107.09	$110.30
Sr. Programmer	ORCI	$165.00	$169.95	$175.05	$180.30	$185.71
Programmer	ORCI	$135.00	$139.05	$143.22	$147.52	$151.94
Jr. Programmer	ORCI	$98.00	$100.94	$103.97	$107.09	$110.30
Systems Engineer	ORCI	$150.00	$154.50	$159.14	$163.91	$168.83
D'base Specialist	ORCI	$130.00	$133.90	$137.92	$142.05	$146.32
Clerical/ Admin	ORCI	$65.00	$66.95	$68.96	$71.03	$73.16
		Option Year 3	Option Year 4	Option Year 5	Option Year 6	Option Year 7
Project Manager	ORCI	$199.40	$205.38	$211.54	$217.88	$224.42
Sr. Engineer/Analyst	ORCI	$191.28	$197.02	$202.93	$209.02	$215.29
Engineer/ Analyst	ORCI	$156.50	$161.20	$166.03	$171.01	$176.14
Jr. Engineer/ Analyst	ORCI	$113.61	$117.02	$120.53	$124.14	$127.87
Sr. Programmer	ORCI	$191.28	$197.02	$202.93	$209.02	$215.29
Programmer	ORCI	$156.50	$161.20	$166.03	$171.01	$176.14
Jr. Programmer	ORCI	$113.61	$117.02	$120.53	$124.14	$127.87
Systems Engineer	ORCI	$173.89	$179.11	$184.48	$190.02	$195.72
D'base Specialist	ORCI	$150.71	$155.23	$159.88	$164.68	$169.62
Clerical/ Admin	ORCI	$75.35	$77.61	$79.94	$82.34	$84.81

EnterInfo		Fully Loaded Hourly Rate				
Project Role	Company	Base Year 1	Base Year 2	Base Year 3	Option Year 1	Option Year 2
Project Manager	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	EnterInfo	$130.00	$133.90	$137.92	$142.05	$146.32
Engineer/ Analyst	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Engineer/ Analyst	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Programmer	EnterInfo	$100.00	$103.00	$106.09	$109.27	$112.55
Programmer	EnterInfo	$87.50	$90.13	$92.83	$95.61	$98.48
Jr. Programmer	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Systems Engineer	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
D'base Specialist	EnterInfo	$80.00	$82.40	$84.87	$87.42	$90.04
Clerical/ Admin	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
		Option Year 3	Option Year 4	Option Year 5	Option Year 6	Option Year 7
Project Manager	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	EnterInfo	$150.71	$155.23	$159.88	$164.68	$169.62
Engineer/ Analyst	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Engineer/ Analyst	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Programmer	EnterInfo	$115.93	$119.41	$122.99	$126.68	$130.48
Programmer	EnterInfo	$101.44	$104.48	$107.61	$110.84	$114.17
Jr. Programmer	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
Systems Engineer	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00
D'base Specialist	EnterInfo	$92.74	$95.52	$98.39	$101.34	$104.38
Clerical/ Admin	EnterInfo	$0.00	$0.00	$0.00	$0.00	$0.00

Berkeley Transport. Systems		Fully Loaded Hourly Rate				
Project Role	Company	Base Year 1	Base Year 2	Base Year 3	Option Year 1	Option Year 2
Project Manager	BTS	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	BTS	$152.63	$160.26	$168.27	$176.68	$185.52
Engineer/ Analyst	BTS	$130.00	$136.50	$143.33	$150.49	$158.02
Jr. Engineer/ Analyst	BTS	$100.00	$105.00	$110.25	$115.76	$121.55
Sr. Programmer	BTS	$160.00	$168.00	$176.40	$185.22	$194.48
Programmer	BTS	$126.17	$132.48	$139.10	$146.06	$153.36
Jr. Programmer	BTS	$100.00	$105.00	$110.25	$115.76	$121.55
Systems Engineer	BTS	$122.29	$128.41	$134.83	$141.57	$148.65
D'base Specialist	BTS	$134.31	$141.03	$148.08	$155.48	$163.25
Clerical/ Admin	BTS	$75.00	$78.75	$82.69	$86.82	$91.16
		Option Year 3	Option Year 4	Option Year 5	Option Year 6	Option Year 7
Project Manager	BTS	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	BTS	$194.79	$204.53	$214.76	$225.50	$236.77
Engineer/ Analyst	BTS	$165.92	$174.21	$182.92	$192.07	$201.67
Jr. Engineer/ Analyst	BTS	$127.63	$134.01	$140.71	$147.75	$155.13
Sr. Programmer	BTS	$204.21	$214.42	$225.14	$236.39	$248.21
Programmer	BTS	$161.03	$169.08	$177.53	$186.41	$195.73
Jr. Programmer	BTS	$127.63	$134.01	$140.71	$147.75	$155.13
Systems Engineer	BTS	$156.08	$163.88	$172.08	$180.68	$189.72
D'base Specialist	BTS	$171.42	$179.99	$188.99	$198.44	$208.36
Clerical/ Admin	BTS	$95.72	$100.51	$105.53	$110.81	$116.35

Tele Atlas North America		Fully Loaded Hourly Rate				
Project Role	Company	Base Year 1	Base Year 2	Base Year 3	Option Year 1	Option Year 2
Project Manager	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	TANA	$180.00	$185.40	$190.96	$196.69	$202.59
Engineer/ Analyst	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Engineer/ Analyst	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Programmer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Programmer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Programmer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Systems Engineer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
D'base Specialist	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Clerical/ Admin	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
		Option Year 3	Option Year 4	Option Year 5	Option Year 6	Option Year 7
Project Manager	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	TANA	$208.67	$214.93	$221.38	$228.02	$234.86
Engineer/ Analyst	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Engineer/ Analyst	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Programmer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Programmer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Programmer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Systems Engineer	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
D'base Specialist	TANA	$0.00	$0.00	$0.00	$0.00	$0.00
Clerical/ Admin	TANA	$0.00	$0.00	$0.00	$0.00	$0.00

TRAC - UW		Fully Loaded Hourly Rate				
Project Role	Company	Base Year 1	Base Year 2	Base Year 3	Option Year 1	Option Year 2
Project Manager	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	TRAC	$132.11	$137.40	$142.89	$148.61	$154.55
Engineer/ Analyst	TRAC	$104.75	$108.94	$113.30	$117.83	$122.54
Jr. Engineer/ Analyst	TRAC	$68.21	$70.94	$73.78	$76.73	$79.80
Sr. Programmer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Programmer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Programmer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Systems Engineer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
D'base Specialist	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Clerical/ Admin	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
		Option Year 3	Option Year 4	Option Year 5	Option Year 6	Option Year 7
Project Manager	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Sr. Engineer/Analyst	TRAC	$162.28	$168.77	$175.52	$182.54	$189.84
Engineer/ Analyst	TRAC	$128.67	$133.82	$139.17	$144.74	$150.53
Jr. Engineer/ Analyst	TRAC	$83.79	$87.14	$90.62	$94.25	$98.02
Sr. Programmer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Programmer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Jr. Programmer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Systems Engineer	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
D'base Specialist	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00
Clerical/ Admin	TRAC	$0.00	$0.00	$0.00	$0.00	$0.00

Other Forms

Included in this tab are signed forms required by the RFP:

- √ Proposal Affidavit
- √ Conflict of Interest Affidavit
- √ Federal certifications
- √ Contract Administration Data

PART IV - REPRESENTATIONS AND INSTRUCTIONS
Section K - Representations, Certifications, and Other Statements of Contractors

UNIVERSITY OF MARYLAND PROPOSAL AFFIDAVIT

A. AUTHORIZED REPRESENTATIVE

I HEREBY AFFIRM THAT:

I am the (title) President and CEO and the duly authorized representative of (business) Inrix, Inc. and that I possess the legal authority to make this Affidavit on behalf of myself and the business for which I am acting.

B. 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):

_____

_____

_____.

C. 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;

(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; or

(8) 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(1)—(7) 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):

_____

_____

_____.

D. 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).

_____

_____

_____.

E. 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):

_____

_____

_____.

F. 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.

G. 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.

H. FINANCIAL DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, the provisions of Section 13-221 of the State Finance and Procurement Article of the 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.

I. 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.

J. 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;
(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 whom 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' 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 §J(2)(b), above;
(h) Notify its employees in the statement required by §J(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 §J(2)(h)(ii), above, or otherwise receiving actual notice of a conviction;
(j) Within 30 days after receiving notice under §J(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 §J(2)(a)—(j), above.

(3) If the business is an individual, the individual shall certify and agree as set forth in §J(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.

K. CERTIFICATION OF CORPORATION REGISTRATION AND TAX PAYMENT

I FURTHER AFFIRM THAT:

(1) The business named above is a (domestic ___) (foreign __) corporation registered in accordance with the Corporations and Associations Article, Annotated Code of Maryland, and that it is in good standing and has filed all of its annual reports, together with filing fees, with the Maryland State

Department of Assessments and Taxation, and that the name and address of its resident agent filed with the State Department of Assessments and Taxation is: Name: Address: __ .

Inrix, Inc. is a Delaware corporation that is not yet registered to do business in Maryland. However, upon award of this contract, Inrix will promptly complete that registration.

(2) 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 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.

L. 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.

M. Repealed.

N. 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 convenants 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: 6/22/07 By:

Bryan Mistele
President and CEO

Contractor's Federal Employer Identification Number (FEIN): 201296081

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.

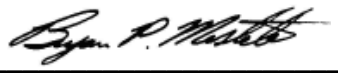
C. The bidder of offeror warrants that, except as disclosed in D below, there are no relevant facts or circumstances now giving rise or which could, in the future, give rise to a conflict of interest.

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: 6/22/07 By: 

Bryan Mistele
President and CEO

ATTACHMENT C6

CONTRACT-FUNDED

AFFIDAVIT FOR ANTI-LOBBYING CERTIFICATION, DEBARMENT CERTIFICATION, AND CLEAN AIR AND WATER CERTIFICATION

Contractors should review the instructions for certification included in the regulations before completing this form. Signature on this form denotes compliance with certification requirements under Federal Acquisition Regulation (FAR). The certifications shall be treated as material representations of fact upon which reliance will be placed by the University of Maryland in making a determination to award the order.

1. LOBBYING The undersigned certifies, to the best of his or her knowledge and belief, that:

(a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal load, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(b) If any funds other then Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an office or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instruction.

(c) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 13S2, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

2. DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
The undersigned certifies to the best of his knowledge and belief, that the company and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any offenses enumerated in paragraph (I)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

3. CLEAN AIR AND WATER. The undersigned certifies that

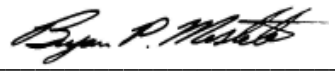
(a) Any facility to be used in the performance of this proposed contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;

(b) The undersigned will immediately notify the University buyer, before award, of the receipt of any communications from the Administrator, or a designee, of the EPA, indicating that any facility that the undersigned proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and

(c) The undersigned will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

I understand that a false statement on this certification may be grounds for rejection of this bid or proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

Inrix, Inc.
Name of Contractor



Signature of Authorized Representative

6/22/07
Date

Bryan Mistele, President and CEO
Printed Name and Title of Authorized Representative

[ ] I am unable to certify to the above statements. My explanation is attached.

Section G - Contract Administration Data

1. 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 Mr. Philip Tarnoff at 301-403-4619 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. Invoicing

The Contractor shall provide the following invoicing services. Invoices shall reflect the price structure as defined in Section B/Pricing, and.Section G, Subsection 3 below.

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:

a. Invoice Number
b. Invoice Date
c. The word ORIGINAL printed on the original copy of the document.
d. The full company or corporate name and address; payment address if it differs from corporate address.
e. The full nine (9) digit Federal Tax Identification number (for U.S. Contractors only) or Social Security Number.
f. 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. 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

4. 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. 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)

Rick Schuman
Vice President, Public Sector
Inrix
9832 Montclair Circle, Suite 201
Apopka, FL 32703
Telephone: 407-298-4346
Facsimile: 866-643-9301
Email: **rick@inrix.com**

MBE Participation

Included in this tab are signed forms required by the RFP related to Minority Business Enterprise Participation in the Project:

- √ MBE Affidavit
- √ MBE Participation Schedule

CERTIFIED MBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT

This document must be included with the bid or offer. If the bidder or offeror fails to submit this form with the bid or offer as required, the procurement officer shall deem the bid non-responsive or shall determine that the offer is not reasonably susceptible of being selected for award.

In conjunction with the bid or offer submitted in response to Project Name "Traffic Data and Associated Services along the I-95 Corridor", Solicitation No. "82085N", I affirm the following:

1. I acknowledge the overall certified Minority Business Enterprise (MBE) participation goal of **25** percent and, if specified in the solicitation, sub goals of ___ percent for MBEs classified as African American-owned and ____ percent for MBEs classified as women-owned. I have made a good faith effort to achieve this goal.

   OR

   After having made a good faith effort to achieve the MBE participation goal, I conclude I am unable to achieve it. Instead, I intend to achieve MBE participation of _____ percent and request a waiver of the remainder of the goal. Within 10 business days of receiving notice that our firm is the apparent low bidder or the apparent awardee, I will submit a written waiver request that complies with COMAR 21.11.03.11. I acknowledge that the MBE subcontractors/suppliers listed in the MBE Participation Schedule will be used to accomplish the percentage of MBE participation that I intend to achieve.

2. I have identified the specific commitment of certified MBEs by completing and submitting an MBE Participation Schedule with the bid or proposal.

3. I understand that if I am notified that I am the apparent awardee, I must submit the following documentation within 10 working days of receiving notice of the potential award or from the date of conditional award (per COMAR 21.11.03.10), whichever is earlier.

   Outreach Efforts Compliance Statement (Attachment C)
   MBE Subcontractor Project Participation Statement of Intent to Subcontract (Attachment D)
   MBE Waiver Request (if applicable) (Attachment E)
   MBE Unavailability Form (if applicable) (Attachment F)
   Any other documentation required by the Procurement Officer to ascertain bidder or offeror responsibility in connection with the certified MBE participation goal.

I acknowledge that if I fail to return each completed document within the required time, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award. If the contract has already been awarded and the required documentation is not submitted, the award is voidable**.**

4. In the solicitation of subcontract quotations or offers, MBE subcontractors were provided not less than the same information and amount of time to respond, as were non-MBE subcontractors.

I solemnly affirm under the penalties of perjury that the contents of this paper are true to the best of my knowledge, information, and belief.

Inrix, Inc.
Bidder/Offeror Firm Name

Signature of Authorized Representative

4055 Lake Washington Blvd, NE, Suite 200
Address

Bryan Mistele, President and CEO
Printed Name, Title

Kirkland, WA 98033
City, State, Zip

425-284-3800
Phone

866-643-9301
Fax

bryan@inrix.com
E-Mail

6/22/07
Date

Submit this MBE Affidavit with Bid or Offer

MBE PARTICIPATION SCHEDULE A001

This document must be included with the bid or offer. If the bidder or offeror fails to submit this form with the bid or offer as required, the Procurement Officer shall deem the bid non-responsive or shall determine that the offer is not reasonably susceptible of being selected for award.

Prime Contractor (Firm Name, Address, Phone) Inrix, Inc. 4055 Lake Washington Blvd, NE, Suite 200 Kirkland, WA 98033 425-284-3800	Project Name: Traffic Data and Associated Services Along the I-95 Corridor
Solicitation Number 82085N	Total Contract Amount $TBD

List Information for Each Certified MBE Subcontractor/Supplier on this Project	
Minority Firm Name Enterprise Information Solutions Inc.	MBE Certification Number & Classification 91-221; Asian American
Work to be Performed/NAICS or SIC Codes 541512SF; 541519SF	
Minority Firm Name	MBE Certification Number & Classification
Work to be Performed	
Minority Firm Name	MBE Certification Number & Classification
Work to be Performed	

USE ATTACHMENT B CONTINUATION PAGE AS NEEDED

SUMMARY

TOTAL MBE PARTICIPATION: **___25_____%**

___Inrix, Inc. _____
Bidder/Offeror Firm Name

Signature of Authorized Representative

___6/22/07_____
Date

Bryan Mistele, President and CEO_____
Printed Name, Title

Submit this MBE Participation Schedule with Bid or Offer