COVER LETTER

Issuing Authority

Maryland Department of Transportation
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Responder Information

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Kapsch TrafficCom (“Kapsch”) hereby presents the following response to the Maryland Department of Transportation ("MDOT") in response to the Request for Information: I-495/I-95 (Capital Beltway) Congestion Relief Improvements from the American Legion Bridge to the Woodrow Wilson Bridge, and I-270 Congestion Relief Improvements from I-495 to I-70. Kapsch appreciates the opportunity to present our responses to MDOT as it seeks to evaluate how industry best practices may enhance how MDOT proceeds with the potential procurement for development of congestion relief improvements. Kapsch believes the foresight of MDOT to seek initial industry feedback with respect to congestion relief is critical in laying the foundation for a successful procurement strategy.

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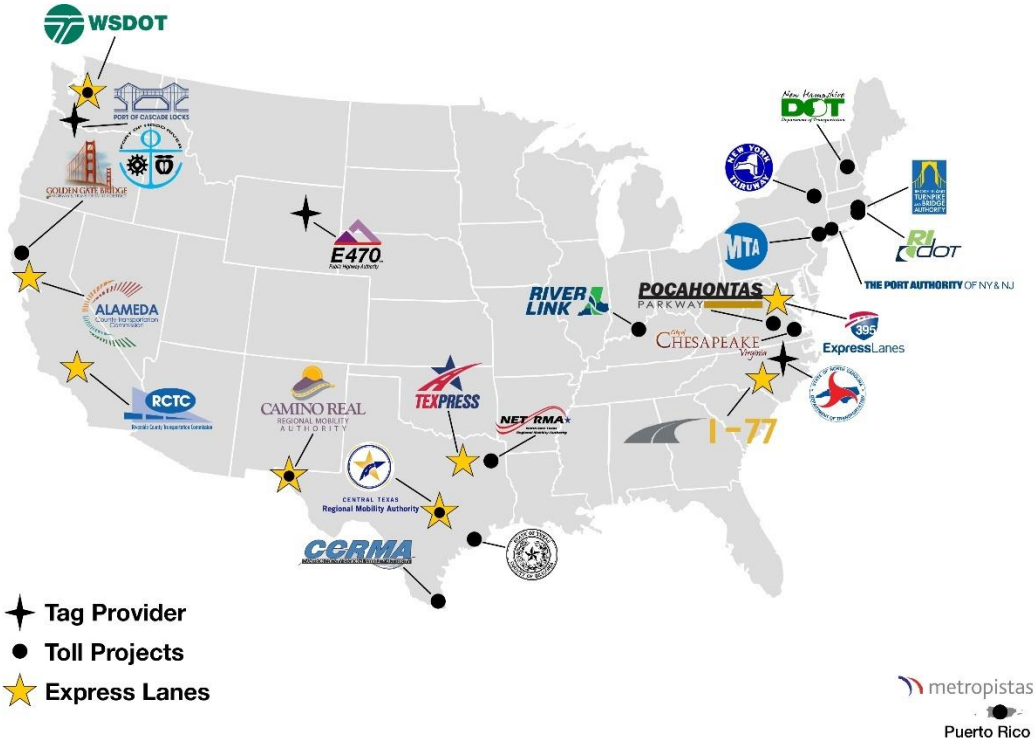
MDOT REQUEST FOR INFORMATION: CONGESTION RELIEF IMPROVEMENTS FOR I-495/I-95 AND I-270

A.1 Please describe your firm, its experience in relation to P3 projects, and its potential interest in relation to these potential congestion relief improvements.

Founded in 1892, Kapsch is an enterprise that has evolved, through both organic growth and acquisitions, into a truly global transportation system provider. Our company has supported toll systems design, integration, implementation and maintenance projects for more than 30 years, including support to some of the largest systems in North America. Throughout our history, the true foundations of our business and financial success have remained unchanged - they are the spirit of innovation, engaging customer partnerships, mature corporate values, and delivering high quality solutions

Kapsch TrafficCom is a company focused on providing state and local governments access to congestion relief options via the technologies of Electronic Toll Collection (ETC), Intelligent Transportation Systems (ITS) and Traffic Management. These technologies often are combined to provide customers Express Lane and High Occupancy Vehicle (HOV) options for roadways. Kapsch has worked throughout the contiguous United States in partnering with state and local governments, as well as technology provider and integrator in Public-Private Partnerships, as shown in the figure below:



As shown above, Kapsch has provided technology, software, and services in the field of cash and ETC, provisions of tags and transponders, as well as primary system integration for Express Lanes projects. Since 1994, Kapsch has served as the primary technology partner to the E-ZPass group, the largest interoperable toll system in the United States and the world. ***There are approximately 7,000 toll lanes in the United States, and more than half of them are equipped with Kapsch equipment.*** Kapsch equipment is collecting $7.3 Billion of the approximate $9.5 Billion revenue from all electronic toll collection systems in the United States.

Kapsch has had many partnerships and currently acts as a tolling systems integrator on a number of P3 projects aimed at providing congestion relief, including:

- **Lyndon Banes Johnson (LBJ) Expressway**
  - Location: Dallas, Texas
  - Concessionaire: Cintra
  - Government
  - Project status: In revenue collection
- **North Tarrant Express (NTE)**
  - Location: Dallas, Texas
  - Concessionaire: Cintra
  - Government
  - Project status: In revenue collection
- **I-77 Express Lanes**
  - Location: Charlotte area, North Carolina
  - Concessionaire: Cintra
  - Project status: In revenue collection
- **I-395 /I-95 Express Lanes**
  - Location: Northern Virginia
  - Concessionaire: Transurban
  - Project status: In design phase

A.5 Would it be feasible to have a single solicitation for both corridors? If not, would you recommend any specific phasing for the solicitations including the corridor(s) and limits and why? What would your recommendation be for staggering multiple solicitations and why?

From an ETC and ITS perspective, MDOT should consider how it or your P3 vendor(s) expects to manage and operate the systems.

Customer Service: From a road user perspective, drivers will want a seamless drive no matter how many different vendor(s) gantries they may pass. MDOT most likely will want a centralized, single phone number for drivers to call with issues or centralized chat. Issues from any linked toll facilities, including existing MDTA facilities should be included as part of the service.

ETC ITS/ ATMS operations: MDOT should consider the operating issues associated with many P3 operators and solutions along both corridors. The more vendors, the greater the risk that operations could be fractured. Business rules, algorithms to set the toll rate, trip building, incident management would have to have a high level of coordination to ensure that the drive is seamless for your users.

B.4 What is the minimum amount of time that your firm would require to develop and submit a response after the issuance of a potential RFQ?

Kapsch would require between 90-120 days to submit a qualified response after the issuance of a potential RFQ.

B.5 What is the minimum amount of time that your firm would require to develop and submit a detailed proposal after the issuance of a potential RFP?

Kapsch would require between 90-120 days to submit a qualified response after the issuance of a potential RFP.

B.6 What information would your firm need in order to prepare a response to a potential RFP? What information should MDOT, the offeror, or others provide?

We would prefer a performance-based RFP based on specific Key Performance Indicators (KPIs) rather than a prescriptive RFP and specifications. A performance-based RFP would allow us more innovation and flexibility on the ETC and ITS elements, something we believe is a strong suit for Kapsch.

C.2 Are there recommendations that you may be willing to share concerning the project scope or development strategies to reduce the upfront capital costs and/or the lifecycle costs of potential corridor congestion relief improvements?

Kapsch recommendations the following options for the scope of the project to reduce upfront capital and lifecycle costs of any corridor congestion relief efforts:

Auditability and Security

We view our toll systems as revenue systems and as such, we design them to provide the same level of accuracy and auditability as a banking or retail system. The architecture of our potential solution for MDOT would safeguard the collection of all transactional data by eliminating any single point of failure or failover latency by providing parallel data processing using redundant hosts and lane controllers, and independently producing and processing dual data streams.

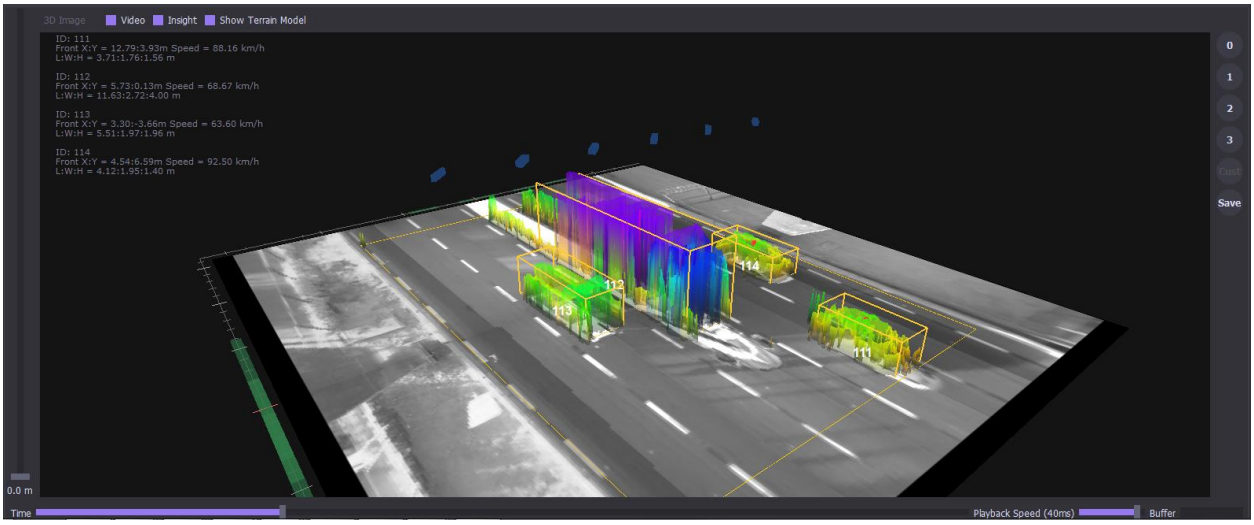
Single Gantry Solutions

A key to our innovation and flexibility is that our standard solution is a single gantry structure with no sensors in the roadway to classify or trigger events. Mounting all electronics on a single gantry saves up front capital costs of gantry fabrication, gantry setting, foundation design (including soil testing, borings, additional environmental impacts) and pouring the actual foundation.

LBJ/NTE Managed Lanes

ETC Systems With No Sensors in the Roadway

Our ability to deploy an ETC system with no sensors in the roadway is an innovation unique to Kapsch and utilizes technology that was originally used for missile targeting. The system implements detection and classification using Kapsch's unique nVDC sensor, an innovative stereoscopic video detection and classification system that is in its 4th generation. The system classifies vehicles by size (length, width and height) and vehicle characteristics (e.g. form, presence of a trailer etc.) by automatic processing of video images.



Example of Vehicle Representation in nVDC

A sample video can be found here: https://www.youtube.com/watch?v=twDgZ2S7934.

Additionally Kapsch has a wealth of experience with walkable gantries that permit maintenance to occur over live traffic with all equipment mounted to swing arms. A catwalk is included on the top of the gantry to facilitate maintenance and with safety being paramount, all maintenance can be performed without tools. A walkable gantry has higher upfront costs due to a larger foundation footprint (due to the weight of the swing arms and walkway) and the cost of the swing arms. The savings on walkable gantries occurs during the maintenance period where preventative and corrective maintenance can be performed with closing a lane. Saving Maintenance of Traffic (MOT) costs and most likely revenue loos due to the lane closure.

Passenger Detection Systems

Kapsch would encourage MDOT to consider including a passenger detection system with the RFP as a mean to confirm a drivers “declared” status as HOV or SOV. Studies have found that a large number of users cheat the system by declaring or assuming HOV status so as to not pay a toll when in reality they are a single occupant vehicle. Kapsch is currently testing a version of these systems.

We view our ITS systems as critical to the safe and efficient operation of managed lane facilities. Our ITS systems are built around a proven application which is not only widely deployed worldwide but is also in use by the current P3 roadway operators for the I-495 and I-95 express lanes in Virginia. Our DYNAC ATMS product is a fully integrated, robust and mature solution which will provide seamless and safe operation of the entire roadway network.

C3. Please explain any technical solutions that you may be willing to share that may enhance the development of the potential congestion relief improvements. Identify risks associated with the solutions and, if possible, discuss estimated cost of the solutions.

Kapsch encourages MDOT to work with vendors who work in the spirit of partnership, collaboration and transparency. This includes the tools with which MDOT will use to operate and manage the system as well as monitor a vendors performance.

Kapsch Express Lanes Command Center

Kapsch approaches the issue of traffic management and toll rate management through the employment concept of automation control systems. ***Our dynamic pricing module is designed with an embedded intelligence that looks at more than a rate table to determine what a toll rate should be. The Kapsch solution has predictive capabilities to anticipate future congestion issues based on past and existing traffic patterns.***

The Kapsch Dynamic Pricing solution provides a flexible tool through which MDOT can achieve its eventual operational goals and traffic/ revenue optimization. Our solution provides multiple algorithms, flexible table-driven configuration, the power to manage the output of different optimization strategies, and the ability to maintain operational goals across diverse traffic

conditions during scheduled or non-scheduled roadway events. The combination of roadway factors (speed, traffic density, anticipated trip times, etc.).

The command center is rich with features and function. This web-used graphical user interface (GUI) provides monitoring and interactive functionality to authorized users. It is designed to allow customers to manage operational objectives and day-to-day operations of the dynamic pricing system by providing actionable information to the users. It allows real-time monitoring and provides for the opportunity to adjust toll operations performance criteria (including direct control of price), so that operators may respond to traffic and congestion issues. The command center also delivers the functionality to initiate manual overrides to restore an acceptable level of service in the event of an incident. Reporting served in the command center affords decision-makers the ability to make informed decisions, based on system performance and the current operational reality.

Kapsch Remote Operations and Management System (ROMS)

Kapsch's system design philosophy, providing our customers with comprehensive transparency and auditability down to each individual transaction, is unprecedented in the toll industry. Customizable operational dashboards provide full insight and visibility into day to day operations. Through our Remote Operations and Maintenance System (ROMS), you can review transaction creation and each individual device message to the zone controller that ultimately form the transaction. Once this transaction is formed its status can be tracked through the transaction processing lifecycle. This open approach reduces operational risk, permits dialogue based on real data/facts, allows for financial auditability and, coupled with system audit data, provides critical tools allowing the operational team to monitor, assess, and maintain control of the overall system performance.

ROMS, coupled with a team of trained professional maintenance personnel, is the most effective and transparent means of managing and maintaining your toll system. The single gantry design with no sensors in the roadway streamline maintenance processes. ***Most issues can be resolved remotely without having to close a lane to troubleshoot equipment.*** The goal is to minimize the cost of unscheduled Maintenance of Traffic (MOT) call outs. Our ROMS application provides a ***dashboard view into real-time, end-to-end system operation and performance, including video audit.*** ROMS provides a transparent reporting system supporting video audit capabilities in all lanes, detection and reporting system faults and errors, reporting on maintenance activities and inventory, and managing all aspects of the system maintenance and operations. ROMS tracks the use of each individual device and uses historical information including Mean-Time Between Failure (MTBF) data to predict its failure thus allowing us to proactively replace components.

The information available provides the ability to have detailed reports sent as requested or on a scheduled basis with regards to all maintenance operations activities. These reports provide

detail about how the system is performing, give historical data, leading to proactive improvements to the system.

A video sample of our ELCC and ROMS can be found at:
https://www.youtube.com/watch?v=fhyl1CMS-xY&feature=youtu.be

An effective means of minimizing right-of-way impacts is the use of reversible express lanes. Regionally this approach has been employed on the I-95 Express Lanes in Northern Virginia. While the use of reversible lanes helps to maximize throughput during heaviest flow periods (typically morning and evening commuter travel), safety to the Express and General Purpose Lane users is paramount. Kapsch has successfully delivered our DYNAC ATMS solution to manage such reversible managed lane facilities, including the one previously cited: I-95 Express. Using proven algorithms and safety interlocks, the DYNAC solution continues to provide P3 roadway operators with real-time features and tools to efficiently and safely manage the reversible lanes.