New York State Department of Transportation
Request for Information (RFI) for ‘Enterprise Transportation Systems Management and Operations (TSMO)’ Initiative
RFI #2019-01
April 17, 2019

The New York State Department of Transportation (NYSDOT) hereby issues this “Request for Information” (or RFI) to collect available information and determine interest and capabilities to support the development of enterprise-level systems and services to progress NYSDOT’s Transportation Systems Management and Operations (TSMO) initiative.

Note: This is not a Request for Proposals.

1. Introduction

The New York State Department of Transportation (NYSDOT) is responsible for ensuring that those who live, work and travel in New York State have a safe, efficient, balanced and environmentally sound transportation system.

NYSDOT is increasing the use of Transportation Systems Management and Operations (TSMO) to support its operational strategies across the state. As the State advances its capability for TSMO, a need for enterprise-level systems and services to address common problems faced by various regions within the State has become evident. To achieve TSMO program objectives a new approach is required to facilitate the collection and sharing of data across NYSDOT Regions and between NYSDOT and agency partners and other third parties.

Each Region has deployed Advanced Traffic Management Systems (ATMS) and Advanced Traveler Information Systems (ATIS) technology differently. NYSDOT supports a complex mix of management systems and applications at different levels of maturity and use.

NYSDOT has identified several common enterprise-level services as critical to the continued growth of TSMO. These include:

1. Situational Awareness and Event Recording Systems – Systems that allow NYSDOT to monitor, collect, report and manage unplanned and planned event information in a consistent, timely, and high-quality manner.
2. Next Generation traveler information systems/511 System – A public facing system that builds on developments in the travel information market place, incorporates new emerging modes of travel and strengthens NYSDOT’s role as a trusted information source statewide.
3. A robust TSMO data platform (“TSMO Engine”) - that can process and broker data from a diverse range of operational systems and services currently operated within the Department and available from external sources (agencies and third party).
NYSDOT is interested in implementing efficient, modern, enterprise-wide data brokerage and API management tools providing enhanced capabilities, and minimizing the need for customized installation. NYSDOT is interested in understanding the availability and applicability of existing and developing infrastructure platforms, data exchange tools, and open source software components to support statewide enterprise TSMO functions and travel information services.

This RFI seeks information from interested entities for current capabilities to support each of the three services or to provide a one-stop capability that can support all services. Responders to the RFI are encouraged to recommend solutions and products based on open source software and off the shelf tools that meet open standards and protocols to implement one or more of the three enterprise-level services identified above.

In seeking responses to this RFI, NYSDOT is looking to understand available best-of-breed API/service platforms with data processing, brokerage and governance functionality to support near term and future procurements. This includes potential frameworks for future development and flexible integration with third parties, vendors and developers of TSMO systems that may be external to the TSMO Engine procurement.

Although the three services described previously are integrally connected, these services may be procured and deployed separately by NYSDOT. NYSDOT is seeking information on the following:

- Current platforms and products that meet the above stated needs with an emphasis on solutions that leverage open source software and cloud platforms.
- System providers who are knowledgeable about Intelligent Transportation System (ITS) and Information Technology (IT) standards and protocols that can support efficient data exchange among disparate management systems and applications.
- Capabilities to support transportation data analytics and performance measurement.

2. Background

Enterprise-level TSMO services are required to manage and integrate current and future transportation systems management. Through these services, NYSDOT seeks to be more:

- Responsive to planned and unplanned events.
- Cost effective – not duplicating similar services across the agency with similar but different services.
- Efficient – system operates and addresses bottlenecks in an optimized manner.
- Effective in informing the traveling public and other stakeholders about ongoing, planned and expected travel conditions.
- Flexible in integrating and delivering innovative services among internal and external stakeholders and travelers.

This RFI requests information on three main areas of enterprise-level services (2.1 to 2.3) and/or an integrated offering (2.4). An integrated offering provides all the capabilities required for service areas described in Section 2.1 to 2.3.

2.1.0 Service Area #1 – Situational Awareness Tools and Event Recording Systems

NYSDOT uses a wide variety of tools and event recording systems to continuously monitor ongoing road conditions for routine and emergency situational awareness. For example, four major tools used are:
1. **OpenReach** – a tool used by TMC operators to manually enter ongoing incident and event condition and status. Information entered into OpenReach is shared with other services including traveler information and to external agencies.

2. **Advanced Traffic Management Systems (ATMS)** – This system supports Transportation Management Centers (TMCs) in managing field devices and incident response. ATMS supports functions that depend on and support situational awareness (cameras, HELP truck dispatch response, detectors, etc.).

3. **Incident Information Management System (IIMS)** - IIMS is a web and mobile-based application that enables real-time, on-scene, geo-tagged incident data collection and seamless information distribution from first responders to other field and center personnel. Currently this tool is being piloted in Region 11.

4. **Roadway Status/Damage Assessment (RSDA)** - RSDA coordinating and assembling road status information during emergency events and capturing a high-level assessment of damaged transportation infrastructure assets.

As part of this RFI, NYSDOT is interested in understanding best practices in situational awareness and reporting systems that can be used for continually monitoring ongoing operations and road conditions for a range of use cases (see appendix A) from weather, incidents, routine maintenance, construction and special events.

NYSDOT is interested in the ability of tools to support various agency functions such as

1. TMC staff incident data entry and update (enhancing/expanding capabilities currently served by OpenReach).
2. Field data collection directly from vehicles and field personnel on the scene.
3. Information sharing across data systems within the agency to field and Transportation Management Center personnel.
4. Interfaces to supply traveler information services with incident and event information.

### 2.1.1 Key Questions of Interest

1. What tools do you have or recommend that support key aspects of the functions described above?
2. What approaches do you recommend to developing and supporting evolution of these tools to operate effectively as innovations occur in TSMO, open source software, crowd-sourcing, data brokering and connected/automated vehicle technology?
3. How do the tools you have or recommend approach the need to correlate different incident detection/reporting channels to associate multiple reports to a single event (incident, road weather, special events, construction or maintenance work zones and lane closures)?
4. How is the referential integrity of the single incident maintained during status updates, from multiple reporting channels (automated and manual) over the duration of the incident (detection-identification-response-resolution)?
5. How is the referential integrity of the single incident maintained to support providing incident status information to travel information systems, devices and management and reporting tools?

### 2.2.0 Service Area #2 – Next Generation traveler information systems/511 System

New York’s 511 system (see Figure 1 and [https://511ny.org](https://511ny.org)) provides transportation information via phone, website, app, text alerts, and data feeds available for external consumers. It provides real-time
travel and delay information, information about ongoing construction and route impairments, weather related impacts and information about transportation solutions, such as carpooling and transit.

511NY is a one-stop service to view this type of travel information for the entire state and on a map. 511NY also pulls multi-agency data (reported via Open Reach) from TRANSCOM to display.

511NY’s website offers a map with real-time information about various elements, including incidents, construction, cameras, message signs, and traffic speeds. The site also offers a trip planner that enables the user to choose a driving, transit, or park and ride route. Because 511NY is the state’s 511 system, the website provides links to other regional transit systems’ websites.

Under the 511NY umbrella is the 511NY Rideshare statewide transportation demand management (TDM) program. This program encourages mode shifts by providing traveler information about alternative modes. 511NY Rideshare provides traveler information through its ride matching system components, its member support call center, its social media platforms, and its outreach teams.

Figure 1. TSMO Engine General Business Process

NYSDOT is particularly interested in evolution of the 511NY traveler information system to account for emerging trends in traveler information and decision-making. New business models, partnerships, and data use agreements are of interest (see use cases in Appendix A). NYSDOT is looking for ideas on how best to make its operational data more visible and used by private sector information service providers.

2.2.1 Key Questions of Interest

1. What tools and approaches do you recommend for developing and maintaining a modern public-sector travel information system that adds value in the current and emerging travel information marketplace?
2. What is your proposed approach to make NYSDOT and agency partner operational data available to third party Information Service Providers (ISPs)?

3. What partnerships with private sector ISPs are needed to make better use of NYSDOT data presented in 511NY?

4. What new or innovative services should be included in or excluded from the next generation of travel information including public sector outlets, such as 511NY?

5. What would you recommend as a business model or partnership to deploy, market, operate and maintain current and future travel information services, such as 511NY?

6. How do you envision the next generation of 511/travel information systems supporting and integrating into connection vehicles?

7. What are the estimated costs for initial deployment, ongoing annual marketing, operations and maintenance costs? Please include the type of business model and identify your assumptions.

2.3 Service Area #3– An integrated TSMO data brokerage platform (“TSMO Engine”)

NYSDOT has identified a need for a “TSMO Engine,” (Figure 2) a data broker that will act as a repository and exchange platform for NYSDOT data from all regions, as well as data from external sources, accessed via standardized interfaces. This data broker will consume standard data inputs from applications, enable sharing of data among regions, make it easy to deploy IT Industry based Commercial Off the Shelf, Open Source Software or best of breed API Management applications without complex procurement specifications, and allow each region freedom to continue to use own systems as desired.
As a data broker, the TSMO Engine will collect, receive, route or transfer data from several sources, and store and forward the data where appropriate to downstream systems that request or need to access the data. Key data consumers and suppliers that would need to interact with the system include:

- **State and Regional Data Sources** – NYSDOT and local/regional transportation agencies that have data sources that describe planned, existing and active/operational transportation network conditions, assets and elements.
- **Public Facing and Downstream Apps** – Applications procured or offered by NYSDOT to provide services and applications to three types of users: i) the traveling public; ii) internal regional operations needing normalized data from multiple sources; and iii) services and microservices supported by the Engine such as analytics, forecasting, transit trip planning (see Transit Service Information Portal use case E) and more.
- **External Data Sources** – Data subscriptions or open data sources that support NYSDOT applications. These may include private data or crowdsourced data procured by NYSDOT, big data such as weather data transformed to align with NYSDOT's transportation network, TRANSOCM Data Fusion Engine (DFE) Traffic Incident Management and Selected Priorities Applied to Evaluated Links (SPATEL).

The TSMO Engine will broker and share information among current applications and be designed to evolve to integrate with updated and new systems as they come online. Information is requested on the governance rules and business processes for operations and expansion of the system so it will ensure the system can be sustained over its lifecycle, including adding new and updating legacy interfaces.

The TSMO Engine will implement a general process for receiving, transforming, servicing and distributing data through standardized interfaces (APIs). The data engine process consists of four stages – collecting, transforming, providing services, and distributing data as illustrated in Figure 33. The data collection process (Process 1) needs to consume different types of data processes at various frequencies and speeds including real time data feeds (1.1), static data (1.2) that is updated infrequently, periodic data (1.3) that have set schedules or be updated as needed, and data entered manually (1.4). The data may be extracted and transformed from its current format to another format (2.1), and then stored for access by internal or external users, or forwarded to a subscriber (2.2). The data may also be applied to a service provided by the Engine such as an operational dashboard (3.1) or future TSMO system (3.2). Finally, when the data is forwarded, it may be forwarded to public facing actors (4.1), internal applications (4.2), or internal NYSDOT constituent actors (4.3).
2.3.1 Key Questions of Interest

1. What tools or approaches do you recommend to develop the TSMO Engine?

2. Given the set of use cases (see Appendix A for a high-level list of use cases) what features / functions would you include in the TSMO Engine? What would you avoid and why?

3. How would you manage the interfaces and services for the TSMO Engine?

4. How would you set up security provisions for protecting and sharing information? With regard to the service model identified, at a minimum, please address the following issues:
   a. Data protection in transit and at rest
   b. System security policies
   c. Denial of service and other intrusions

5. Describe how this system will support emerging technologies and TSMO strategies over its lifecycle. Include systems such as Connected and Autonomous vehicles, block chain, Internet of Things (IoT)

6. What are the estimated costs for initial deployment, ongoing annual operation and maintenance costs? Please identify your assumptions.

2.4 Integrated Enterprise TSMO Services

This area recognizes that there may be a benefit in combining service areas #1- #3 into one effort. While there is no preference or decision on whether to go with an integrated procurement or separate procurements for each of the service areas, interested entities are requested to provide the benefits of integration in their response to this service area.
2.4.1 Key Questions of Interest
1. What are and describe the advantages / disadvantages of combining multiple efforts? Identify the specific Service Areas that benefit from a combined procurement.
2. Is there a different approach, business model, platform/infrastructure, allocation of functionality or other strategy that would be more optimal with the integrated enterprise TSMO Services?
3. What would be the recommended roadmap and timeline for the combined effort?

3. RFI Response Requirements and Schedule
3.1 Response Requirements
The following response requirement should be strictly followed by interested entities.

Note: This is NOT a request for proposals. It is an invitation to provide NYSDOT with information to enable gathering of needs and capabilities upon which future procurements in this area may be based. NYSDOT, at its discretion may invite interested parties to participate in a webinar-type meeting and/or visit the Department at its main offices at 50 Wolf Road, Albany NY 12232, for further discussions pursuant to NYSDOT’s further interests in the information provided by RFI responses.

3.1.1 Cover Letter
Interested entities are encouraged to submit a written Letter of Interest, including a cover letter on company letter head, characterizing the entity’s interest and background in this area. The cover letter should be no more than two (2) pages. In the cover page, please describe the service area or areas that the entity is providing a response. The following corporate information should be included in the cover letter:
- Company Name (full legal name)
- Technical Point of Contact(s)
- Phone, Email, Mailing Address

3.1.2 Qualifications Summary (3 pages limit)
A summary of qualifications, limited to three (3) pages, should be included to highlight the entity’s prior experience and capabilities in this area. If multiple entities are teaming together for this response, the qualification summary should cover the capabilities of all participating entities within the three-page limit.

3.1.3 Response to Service Area (5 pages max per Service Area, 10 pages for Integrated Services)
Interested entities can provide a response to one or more of the service area categories in the Background Section. For example, an entity can provide two responses for Service Areas #1 and #2 or just a response for one service area. Each service area response should be limited to five pages. Note that if an entity is providing information on Integrated Services, they must address all three service areas in their response. The response to the integrated service offering is limited to ten pages.

In preparing for the response, interested entities are encouraged to consider the key questions in each service area. NYSDOT does not expect interested entities to answer all questions in sequence. Other pertinent information identified by the entity beyond these questions are also encouraged.
3.2 RFI Due Date

RFI responses are due by 2:00 PM May 20, 2019. Please email your RFI responses to the address listed below. Given that this is not a competitive solicitation but a request for general information, NYSDOT reserves the right to consider and include late submissions.

3.3 RFI Questions, Contact Information and Response E-Mail Address

Questions regarding this RFI are due by COB May 1, 2019. Should sufficient questions be posed regarding the RFI, NYSDOT may publicly provide answers, posting Q&A to https://www.dot.ny.gov/portal/page/portal/doing-business/opportunities/consult-opportunities before the RFI submission deadline. NYSDOT will endeavor to post answers to question on May 7, 2019. NYSDOT is under no obligation to respond to questions submitted after the deadline yet may consider late questions, if in the best interest of all parties. NYSDOT also reserves the right to amend the RFI response submission schedule, depending on the extent of questions received.

Email your questions regarding NYSDOT’s RFI #2019-01 and e-mail your RFI #2019-01 electronic response in Word and/or PDF formats to: alfred.hasenkopf@dot.gov. NYSDOT will acknowledge receipt.

For this RFI, NYSDOT’s designated contact person is:
    Mr. Al Hasenkopf
    Contract Management Specialist II
    NYSDOT Contract Management Bureau
    50 Wolf Road, 6th Floor
    Albany, NY, 12232
    Email: alfred.hasenkopf@dot.ny.gov
    Phone: 518 457 1560

NYSDOT may issue announcements amending this RFI in response to vendor questions. In addition, after reviewing the RFI responses, NYSDOT may request clarifying information from vendors who offer information of specific interest to NYSDOT following the receipt and consideration of RFI responses. NYSDOT also reserves the right to interview firms providing RFI responses to which NYSDOT may seek further information. Additional information may be sought through phone discussions, meetings, or correspondence, and may be with an individual respondent, a subset of respondents, or all respondents.

NYSDOT will not be liable for any costs incurred by any respondent pertaining to the preparation and submittal of any written responses or for participation in a demonstration in response to this RFI.

3.4 Confidentiality

All materials submitted by a respondent shall become the property of NYSDOT. All materials submitted by respondents are considered agency records pursuant to New York State’s “Freedom of Information Law” (FOIL) (See, Public Officers Law, Article 6). Agency records are generally available to the public upon request. However, pursuant to Public Officers Law, Section 87(2)(d), NYSDOT may “deny access to records or portions thereof that: are trade secrets or are submitted to NYSDOT by a commercial enterprise or derived from information obtained from a commercial enterprise and which if disclosed would cause substantial injury to the competitive position of the subject enterprise.” In order for respondents to claim the exemption from disclosure provided by this provision of law, respondents must mark as “CONFIDENTIAL” any proprietary information contained in their RFI response that they wish to protect from further disclosure or dissemination. By the act of submitting a response to this RFI,
respondents acknowledge that (1) the submission of the response shall be the respondent’s sole opportunity to claim such exemption from disclosure or dissemination of information contained in their response, and (2) failure to mark such information as “confidential” will constitute a waiver of confidentiality, and will release NYSDOT and the State from any liability for disclosure or dissemination thereof. NYSDOT is charged with making the final determination concerning any exemption from disclosure claimed by respondents. In addition to so marking the information, respondents must provide NYSDOT with a detailed written justification for classifying the information as “CONFIDENTIAL”. Undocumented and unexplained claims for exemption from disclosure or dissemination shall not be binding upon NYSDOT or the State. A conclusory declaration that disclosure would be injurious will not suffice. Respondents must assert that disclosure of claimed proprietary information, their written justification for exemption, or any portion thereof would be injurious, and must provide sufficient detail to support their claim for exemption from disclosure or dissemination under FOIL. Respondents acknowledge that NYSDOT may be required to release any such information if so ordered by a court of competent jurisdiction. In such event, the Respondent will be notified of the commencement of legal action to compel disclosure, and the Respondent must either participate in the defense of such action or waive its claim of confidentiality. Failure to participate in the defense of such action shall be deemed a waiver of any claim of confidentiality.

4.0 Appendix A: Sample TSMO Engine Use Cases

The following list of use cases are provided as illustrative examples of desired TSMO engine functions. The list of use cases is not meant to be exhaustive or complete.

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<th>Use Case</th>
<th>Description</th>
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| A. Support Event Data Entry and Verification | This use case describes the data entry and verification methods that are associated with the TSMO Engine. Templates for several types of network events and their lifecycles will include, but are not limited to:  
  - Special events  
  - Crashes  
  - Work zones  
  - Weather  
  The templates may be completed through manual, drop down libraries, automated requests (through a manual request), and automatic methods. Data outputs may be configured by different actors and/or formats based on SLAs or schedules as specified by the user. |
| B. Enable Collection, Sharing and Aggregation of Network Data | This use case collects, processes and aggregates network condition data for subscription and requested data feeds. Data may come from various existing NYSDOT systems, partner agencies, and third-party providers or be manually entered by TMC operators. The data may include (though not exclusively):  
  - Incidents  
  - Travel times  
  Active work zone, special event and lane closure information. |
<p>| C. Support Data Publication, Request and Subscription | This use case provides access to APIs based on publication of an API or data streams through a secure weblink, message subscription or request/response. Access to the data will be based on security policies. Users may filter their subscriptions and requests. All access will be subject |</p>
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<td>to Service Level Agreements (SLA) between the TSMO Engine and subscriber or published on the portal where the request/response or weblink are posted.</td>
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**D. Support Dashboards for Performance Management**

This use case describes how agencies can use the TSMO Engine to improve their dashboards with broader and more current, accurate, reliable and easy to obtain data. Potential examples include:

- Performance metrics calculations
- Road condition and incident tracking
- Impact of Maintenance/Work Zone activities
- Real-time monitoring of system impacts.
- Planning for Operations

**E. Support Transit Service Information Portal Services**

This use case will provide services on multimodal (bus, subway, commuter rail, active transport modes, shared services, rail hailing), including:

- Public transportation services and planned schedules and current status (e.g., availability, alerts, estimated time to arrival, congestion/load)
- Estimated corridor and specified (e.g., door to door) trip travel times Destinations, routes, lines, and paths (and available amenities along the paths).

**F. Open Data Portal Access**

This use case includes portal wherein developers, researchers and internal systems can register, be provided with access (e.g., through a token) to request, subscribe or “get” data formatted in standard APIs. Users can also access information about the APIs and other metadata from these portals. The portal functions also allow users to renew registrations and update their passwords as necessary.

Thank you. We look forward to hearing from you.