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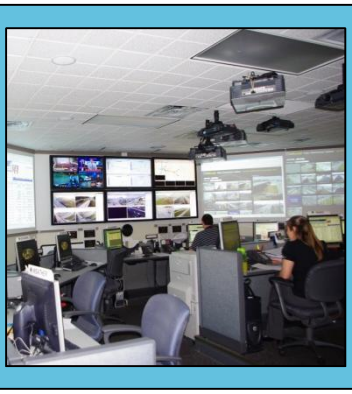
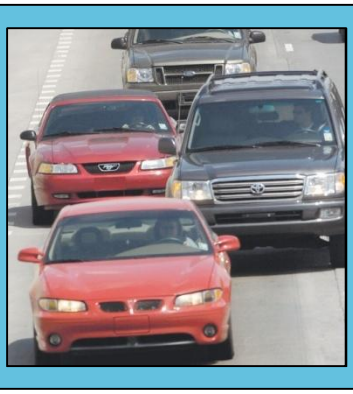
FINAL

Advanced Traffic Management System (ATMS) High Level Functional Requirements





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Acronyms

AEL	Alarm and Event Logger
ANSI	American National Standards Institute
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
C2C	Center-To-Center
CARS	Condition Acquisition and Reporting System
CCTV	Closed Circuit Television
COTS	Commercial Off The Shelf
DAR	Data Archiving and Reporting
DMS	Dynamic Message Sign
DOTD	Louisiana Department of Transportation and Development
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
GUI	Graphical User Interface
HAR	Highway Advisory Radio
IEEE	Institute of Electrical and Electronics Engineers
IM	Incident Management
IP	Internet Protocol
IR	Incident Response
ITS	Intelligent Transportation System
MMS	Maintenance Management System
NTCIP	National Transportation Communications for ITS Protocol
PDMS	Portable Dynamic Message Sign

PTZ	Pan/Tilt/Zoom
RDBMS	Relational Database Management System
RFQ	Request for Qualifications
RSIP	Roadway Safety Incident Program (formerly MAP)
TMC	Transportation Management Center
TMDD	Traffic Management Data Dictionary
TSS	Traffic Signal Systems
URL	Uniform Resource Locator
VD	Vehicle Detector
VDS	Vehicle Detection Subsystem
WYSIWYG	What You See Is What You Get
XML	Extensible Markup Language

1 Scope

This document was developed to provide high level functional and non-functional requirements for the DOTD to establish the foundation and vision for an ATMS software solution to be fully functional within a one-year time frame. The document was based on the Concept of Operations.

The high level functional requirements include performance, interface, data, non-functional, and enabling requirements. The performance requirements state performance parameters that should be achieved by the ATMS. The interface requirements identify the other systems that will interact with the ATMS software. The data requirements define data and data elements that will be passed to/from the ATMS and other systems. The non-functional requirements pertain to reliability, safety, and environmental issues. The enabling requirements define the development, testing, training, deployment, and support requirements for the ATMS.

Functional requirements identify what the system, or one of its subsystems, must achieve, but they do not address how the system will achieve the function. (The "how" will be addressed by the procured vendor/engineer in their proposal and ultimate solution.)

1.1 Identification of the System

The ATMS software will have the capabilities to support all the Statewide, Regional and District TMC functions, including network surveillance, traffic information dissemination, data collection, traffic incident management, traffic forecast and demand management, surface street control, and freeway control. The Statewide TMC operational functions also include CARS 511, statewide Intelligent Transportation System (ITS) operations and maintenance, hurricane emergency evacuation, Roadway Safety Incident Program (RSIP) and rural freeway management. The ATMS will add the interoperability and control sharing functions among the different levels of TMC within the state.

ITS field devices that will be controlled by the ATMS will include, but not be limited to, Closed Circuit Television (CCTV) cameras, Dynamic Message Signs (DMS), Vehicle Detectors (VD), Highway Advisory Radio (HAR), and traffic signal systems. The ATMS will have expansion capabilities to add additional field devices as DOTD completes their ultimate ITS deployment plan.

The existing communication infrastructure between the field devices and the central systems will allow for control of field devices from the TMCs. Center-to-Center (C2C) communications will allow control of devices from outside regions.

1.2 System Overview and Purpose

The DOTD operates the ITS program from its TMCs, the co-located statewide and regional Baton Rouge TMCs, and regional TMCs located in New Orleans and Shreveport and a local TMC in Houma. The primary functions of these TMCs are:

- Surveillance of the interstates and primary roadways, (interstates by regional TMCs only),
- Incident and traffic management,
- Dissemination of traveler information through the use of 511 and the other systems,

- Planned and unplanned incident data entry, and
- Roadway Safety Incident Program (RSIP) vehicle coordination (regional TMCs only).

To aid in these functions, DOTD operates and maintains several ITS field device types –such as CCTV cameras, dynamic message signs (DMS), vehicle detectors (VD), ramp meters, and highway advisory radio (HAR) –installed throughout the state. Currently, multiple software packages are operated independently to manage the various ITS devices within the TMCs. As these are independent system packages, they do not allow for efficient incident response, TMC coordination, and standard operations throughout the state.

The purpose of the ATMS software is to provide improved operator efficiency by consolidating many of the functions which currently utilize separate software applications into a single platform. This enhanced software will provide integrated control as well as improved incident management, operations and maintenance capabilities currently not available to the TMCs, and it will also consolidate current disparate databases.

1.3 General System Description

The vision of the ATMS software is to provide a standardized and efficient system for TMC operations to effectively detect and confirm incidents; track and maintain field resources (equipment and personnel); disseminate information to field devices as well as to the motoring public and other agencies; and do so all within a cost-effective solution that can be utilized statewide.

1.4 Background

1.4.1 System Development

This section provides an overview of the system to be developed, including its scope, the users of the system, and interfaces. The system overview provides a structure for describing the operations, in terms of where the operations will be conducted, and the lines of communication operations will use.

1.4.2 Operation and Maintenance

1.4.2.1 Regional TMC ITS Functions

The ATMS software will provide the majority of regional TMC functions, including network surveillance, traffic incident management, traffic information dissemination, traffic forecast and demand management, regional traffic control, freeway control, and surface street control.

- Traffic Network Surveillance
  - Monitor traffic and road conditions.
  - Identify and verify incidents.
  - Detect faults in operations.
  - Monitor work zone areas.
- Traffic Incident Management
  - Maintain incident reporting system. This system will require minimum operator interaction, except the acknowledgment/selection of an incident, appropriate response, updating incident conditions and incident closure.
  - Manage both expected (planned incidents) and unexpected incidents.

  - Provide incident detection and verification through ITS devices and through regional coordination.
  - Automatically provide appropriate response scenarios and detour routing to be acknowledged by the operators.
  - Coordinate with RSIP vehicles.
  - Coordinate with local public agencies, tow trucks, and other response agencies.

- Traffic Information Dissemination
  - Provide a range of information to the public using roadside equipment (e.g., HAR and DMS), the 511 phone and Website, other service providers, and social media. This information includes:

    - Traffic and road conditions.
    - Travel times along corridors.
    - Closure and detour information.
    - Incident information.
    - Emergency alerts and driver advisories.
    - Emergency evacuation routes.
    - Bridge openings.
    - Ferry status.

- Rural Freeway Incident Management
  - Maintain incident reporting system.
  - Provide surveillance.
  - Coordinate with emergency response.
  - Provide traffic diversion information.

- Statewide Traveler Information (511)
  - Enter real-time incident and construction data into the 511 system.

- Traffic Forecast and Demand Management
  - Implement congestion management strategies.
  - Provide recommendations based on historical evaluation, real-time assessment, and forecast of the roadway network performance based on predicted travel demand patterns.

- Regional Traffic Control
  - Sharing of traffic information and control among regional TMCs to coordinate regional traffic management strategies.
  - Coordinate signal control within metropolitan areas.
  - Coordinate between freeway operations and arterial signal control within a corridor.

1.4.2.2 Statewide TMC ITS Functions

The statewide ITS functions include all regional TMC capabilities, in addition to hurricane evacuation coordination, statewide traveler information (511) and statewide ITS operations and maintenance.

- Traffic Network Surveillance:
  - Monitor traffic and road conditions.
  - Identify and verify incidents.
  - Detect faults in operations.

  - Monitor and control work zone areas.

- Statewide Coordination for Hurricane Evacuation
  - Monitor CCTV camera images at critical evacuation locations.
  - Provide real-time traffic information on major evacuation routes.
  - Archive traffic count data for post-incident evaluation.
  - Monitor and control contra-flow lane operations on freeway evacuation routes.
  - Monitor (by CCTV cameras) cross-over operations involved in reversible freeway operations.
  - Operate strategically located DMS and HAR to direct evacuees to available routes and shelters.
- Rural Freeway Incident Management
  - Maintain incident reporting system.
  - Provide surveillance.
  - Coordinate with emergency response.
  - Provide traffic diversion.
- Statewide Traveler Information (511)
  - Maintain statewide traveler information Website operations and maintenance.
  - Provide rural traveler information devices (i.e. DMS and HAR).
  - Provide interstate freeway data exchange (construction, congestion and incidents).
- ITS Operations and Maintenance
  - Manage telecommunication system maintenance and repair.
  - Manage ITS device maintenance and repair.

1.5 Project Audience

This document is intended to be read by:

- Federal Highway Administration (FHWA) and DOTD staff responsible for project funding and procurement of ATMS software.
- Managerial staff in DOTD's ITS Section 56.
- DOTD staff involved in ITS planning, deployment, operations, incident management, communications infrastructure, asset management of ITS as well as roadway safety.
- TMC operators and supervisors who will be utilizing the enhanced ATMS software on a routine basis.
- TMC system support staff.
- Potential vendors bidding on the ATMS software contract.

1.6 Current and Planned Operating Sites

Currently, DOTD operates four TMCs within the state – a co-located statewide and regional TMC located in Baton Rouge, and regional TMCs in New Orleans, Shreveport, and a local TMC in Houma. Both the statewide TMC and New Orleans Regional TMC operate 24 hours per day, 7 days per week, and 365 days per year. Regional TMCs operate Monday through Friday, 6:00 a.m.–10:00 p.m., while the Houma TMC is staffed 6:00 a.m.–2:00 p.m. Monday through Friday. The statewide TMC and New Orleans regional TMC assume control of the other TMCs when they are not staffed.

2 Reference Documents

The following documents have been utilized as references during the development of this High Level Functional Requirements document:

2.1 Studies Identifying Operational Needs

Louisiana DOTD 5-Year ITS Strategic Business Plan, October 13, 2010 – This plan provides specific initiatives on the projects, processes, and strategies needed to achieve the vision and business goals of the DOTD ITS program. These initiatives will be incorporated into current and future contracts, as well as work program updates, then tracked on an annual basis to ensure that they are being accomplished.

2.2 Other Reference Documents

Louisiana Statewide ITS Implementation & Telecommunication Plan, January, 2002 – This plan builds upon the strategic vision and needs identified in the Louisiana ITS Business Plan. It furnishes specific projects as well as a statewide telecommunications design to implement the ITS services presented in the Concept of Operations and described in the functional requirements developed for Louisiana ITS implementation. This plan is accessible at: http://www.dotd.la.gov/operations/its/documents/ITS%20Deployment%20Plan/Statewide%20ITS%20Implementation%20Plan.pdf

DOTD Policy on Management and Operations of Traffic Management Centers (TMCs) and Intelligent Transportation Systems (ITS), March, 2001 – This document states that DOTD will develop a regional and centralized TMC concept of operations. This document will be based on traffic and incident management in both urban and rural areas and will address local traffic management, emergency response, law enforcement, as well as DOTD representation.

Louisiana ITS Statewide Business Plan, Updated January 2006 – The initial and updated versions of this document defined the original ITS market packages considered by DOTD.

2.3 Concept of Operations Documents

The following section lists the reference documents utilized to prepare this Concept of Operations.

DOTD Advanced Traffic Management System (ATMS) Concept of Operations, April 2011.

Systems Engineering Guidebook for Intelligent Transportation System version 3.0, created by Caltrans and FHWA in November 2009.

ANSI/AIAA G-043-1992 standard and IEEE Standard 1362 for Concept of Operations Development.

3 Requirements

3.1 Functional Requirements

This section provides the high level functional requirements of the ATMS software system and its various subsystems, as follows:

1. General Requirements
2. System Administration
3. Security
4. Interactive Geographical Information System (GIS) Map User Interface
5. Closed Circuit Television (CCTV)
6. Dynamic Message Sign (DMS)
7. Incident Management (IM)
8. Incident Response (IR) Plans
9. Vehicle Detection Subsystem (VDS)
10. Travel Times
11. Alarm and Event Logger (AEL)
12. Highway Advisory Radio (HAR)
13. Ramp Metering
14. Traffic Signal Subsystem (TSS)
15. GPS Asset Tracking (GAT)
16. Data Archiving and Reporting (DAR)
17. External System Integration/Data Sharing
18. Center-to-Center (C2C)

3.1.1 General Requirements

3.1.1.1 The ATMS shall be a Commercial-off-the-shelf (COTS) software product.

3.1.1.2 The ATMS shall be designed and built in a modular fashion, consisting of a base system and optional subsystems or functional components that are licensed individually.

3.1.1.3 The ATMS shall be scalable to include a minimum of 500 CCTV Cameras, 240 DMS, 360 vehicle detectors, 100 ramp meters, and 20 HAR transmitters, while providing for emerging technologies.

3.1.1.4 The ATMS shall be configured in such a way that DOTD personnel can add, delete, or edit a device or device type without any vendor intervention.

3.1.1.5 The COTS product shall require minimal customization on high-priority function modules to meet DOTD requirements.

3.1.1.6 The ATMS shall run on a statewide license, allowing DOTD to access and operate in any:

- 3.1.1.6.1 TMC facility,
- 3.1.1.6.2 Approved remote location, or
- 3.1.1.6.3 Approved government agency.

3.1.1.7 The ATMS shall provide the ability to:

- 3.1.1.7.1 Allow the regional and local TMCs to have primary command and control of their regional devices during normal operating hours, with statewide TMC oversight.
- 3.1.1.7.2 Allow the statewide TMC to have primary command and control of any device, when necessary.

3.1.1.8 The ATMS shall allow for secure remote access to provide system support and TMC operations.

3.1.1.9 The ATMS shall allow for multiple users within the same district, at the same time, with no degradation of response time.

3.1.1.10 The ATMS shall be a web-based system capable of being launched and operated within a standard Internet browser, Microsoft Internet Explorer Version 7, or equivalent.

3.1.1.11 The ATMS application shall be launched and operated natively within a web browser and shall not utilize any 3rd party remote web access, web application delivery, or virtual networking tools to achieve/simulate a web application.

3.1.1.12 The ATMS shall contain all data in a commonly accepted enterprise class relational database system such as MS SQL Server.

3.1.1.13 The ATMS shall integrate all subsystems' Graphical User Interfaces (GUI) into a common look and feel.

3.1.1.14 The ATMS shall allow for any device selected, in either the map or list, to be highlighted in both.

3.1.1.15 The ATMS shall provide a single integrated interface to access all modules.

3.1.1.16 The ATMS shall allow for common data to be shared across all subsystems.

3.1.1.17 The ATMS shall provide spell check, text wrapping, and copy/cut/paste capabilities.

3.1.1.18 The ATMS shall have the capabilities to add, modify, and delete custom user scripts for subsystem functions.

3.1.2 System Administration

3.1.2.1 The ATMS shall include automatic procedures for start up of subsystems.

3.1.2.2 The ATMS shall provide the capability to start or stop a single subsystem without affecting any of the other subsystems.

3.1.2.3 The system shall only require a reboot when Operating System upgrades or modifications are created, or upgrades to executable applications are installed.

3.1.2.3.1 The ATMS shall not require a subsystem reboot when a device is added, modified, or deleted.

3.1.2.4 The ATMS shall include configurable procedures for creating backups.

3.1.2.5 The ATMS shall include configurable procedures for restoring from a backup.

3.1.2.6 The ATMS shall provide system updates at one location to be propagated to all other locations.

3.1.2.7 The ATMS shall provide for the capability to create templates for commonly used process scripts.

3.1.2.8 The ATMS shall allow updates to the database without affecting the current operators' session with the ATMS.

3.1.2.9 The ATMS shall not require a user to log off and back on to view devices that were added, modified, or deleted.

3.1.3 Security

3.1.3.1 The ATMS shall conform, at a minimum, to the DOTD's rules-based administration for access and security at all levels of system use.

3.1.3.2 The ATMS shall encode/encrypt the user's password.

3.1.3.3 The ATMS shall allow only authorized and validated users into the system.

3.1.3.4 The ATMS shall allow the system administrator the ability to add, modify, and delete user accounts while maintaining historical information.

3.1.3.5 The ATMS shall allow the system administrator the ability to add, modify, and delete user passwords and privileges while maintaining historical information.

3.1.3.6 The ATMS shall allow the system administrator the ability to assign unique user accounts and passwords to each individual user.

3.1.3.7 The ATMS shall allow the system administrator the ability to determine which users are currently logged onto the system and where they are located.

3.1.3.8 The ATMS shall prioritize users by providing different privileges on a per-subsystem level.

3.1.3.9 The ATMS shall validate each command from a user for the proper privileges.

3.1.3.10 The ATMS shall allow the system administrator the ability to add, modify, and delete group privileges.

3.1.3.11 The ATMS shall allow the system administrator the ability to add or delete a user from one or more group while maintaining historical information.

3.1.3.12 The user shall be able to modify their password.

3.1.3.13 The ATMS shall log an event message to the alarm and event logger (AEL) whenever a user logs in.

3.1.3.13.1 The message shall contain the date, time, operator name, and log in location.

3.1.3.14 The ATMS shall provide a method to log system, device and security activity for online reporting and archival storage to the alarm and event logger.

3.1.4 Interactive Geographical User Interface (GUI) Map User Interface

3.1.4.1 The ATMS shall provide the following base map functions:

3.1.4.1.1 The ATMS GUI shall have an interactive map that displays current status of the roadway network and ITS field devices.

3.1.4.1.1.1 Current incidents

3.1.4.1.1.2 Device type

3.1.4.1.1.3 Congestion/Speed

3.1.4.1.2 The map shall be GIS based, using standard GIS files (e.g. shape files or other equivalent) to render a geographically accurate, to scale map.

3.1.4.1.3 The map shall display all major interstates and arterials with appropriate classification identified (i.e. interstate shield, state route shield).

3.1.4.1.4 A default view shall be incorporated into the map so that the user, based on user name and password, can set the initial view when the map is first started.

3.1.4.1.5 The map shall include the capability to zoom in and out with multiple zoom levels.

3.1.4.1.6 The map shall include pre-defined statewide and regional zoomed areas (such as, but not limited to, Baton Rouge, New Orleans, Houma, and Shreveport). The vendor shall work with DOTD to define these pre-defined areas.

3.1.4.1.7 The map icons shall be proportional to the zoom reference of the map.

3.1.4.1.8 At minimum zoom extension:

- 3.1.4.1.8.1 Roadway congestion conditions shall appear as line segments or vehicle detection points that are colorized by current traffic conditions.
- 3.1.4.1.8.2 ITS devices, e.g. cameras, message signs, vehicle detectors, each incident type, etc., shall appear as icons in their relative location.
  - 3.1.4.1.8.2.1 Icons in the ATMS shall be user configurable and ideally resemble the icons in the CARS/511 software.

3.1.4.1.9 At maximum zoom extension:

- 3.1.4.1.9.1 ATMS devices appear as a graphical representation of the actual device. A DMS shall look like a DMS, in the correct position relative to the roadway, and shall display the message within the map graphic as it is displayed on the actual DMS. Cameras, traffic signals, and ramp meters shall be realistic graphical representations of the actual devices.

3.1.4.1.10 The map shall include the capability to pan in any direction with a smooth transition.

3.1.4.1.11 Panning the map will be accomplished via clicking and dragging the map in the desired direction, including simultaneous movement of both x- and y-axis.

3.1.4.2 The GUI shall be capable of receiving and displaying data from the local subsystems, as well as any other systems connected over the network via a standard C2C interface.

3.1.4.3 The ATMS shall provide the following map device interaction:

3.1.4.3.1 The map shall present data, based on layers that can be individually enabled or disabled by the user.

3.1.4.3.2 Each discrete data type represented within the map shall be contained within its own layer, including roadway classification, device, and incident types.

3.1.4.3.3 The map shall provide a unique icon for all ITS device types in the system.

3.1.4.3.4 The map shall provide a unique user-defined icon color for all ITS device type status in the system, as a minimum, but not limited to:

3.1.4.3.4.1 Communications or power error

3.1.4.3.4.2 Offline

3.1.4.3.4.3 Operational or active

3.1.4.3.5 The system shall allow the user to place an incident icon on the map and automatically provide the location coordinates.

3.1.4.3.6 The system shall logically place a device or incident icons on the map when GPS coordinates are included in the device or incident configuration information is provided.

3.1.4.3.7 The map shall allow for selection of any device or incident icon.

3.1.4.3.8 The user shall be capable of selecting one or more devices or incidents.

3.1.4.3.9 The user shall be capable of performing an action on the one or more selected devices or incidents.

3.1.4.3.10 The map interface shall provide for quick control of devices through a device control dialog box, which shall include:

3.1.4.3.10.1 CCTV camera

3.1.4.3.10.1.1 Pan, tilt, and zoom a CCTV camera

3.1.4.3.10.1.2 Hovering over the CCTV camera icon shall result in display of a current image snapshot

3.1.4.3.10.2 DMS

3.1.4.3.10.2.1 Add/Modify/Delete the message on a DMS

3.1.4.3.10.2.2 Hovering over the DMS shall result in display of the current DMS message

3.1.4.3.10.3 HAR

3.1.4.3.10.3.1 Add/Modify/Delete the message on a HAR station

3.1.4.3.10.4 Ramp Metering

3.1.4.3.10.4.1 Update a pre-determined plan for ramp metering

3.1.4.3.10.5 Vehicle Detection

3.1.4.3.10.5.1 Incident detector current polled data (volume, speed, occupancy)

3.1.4.3.10.6 Incidents

3.1.4.3.10.6.1 Create/View/Edit an incident

3.1.4.3.11 The map shall support the opening of a viewer window for additional information on the device:

3.1.4.3.11.1 Detailed device status and control

3.1.4.3.11.2 Incident data entry and control

3.1.4.3.11.3 Configuration information

3.1.4.3.12 The base map shall be configurable to display either speed or congestion data, based on instrumented roadways.

3.1.4.4 The user interface shall provide a sortable, filterable list of all ITS device types to be accessed by the operator to provide the following functionality:

3.1.4.4.1 Control capabilities,

3.1.4.4.2 Status (power, communications, online/offline),

3.1.4.4.3 Device configuration parameters.

3.1.5 Closed Circuit Television (CCTV) Cameras

3.1.5.1 The CCTV cameras shall be able to utilize quick commands as per section 3.1.4.3.11.

3.1.5.2 The CCTV subsystem shall store communication status from cameras and log the information to the alarm and event logger including, but not limited to:

3.1.5.2.1 Operational status (in or out of service),

3.1.5.2.2 PTZ status, and

3.1.5.2.3 Communication failures to the camera.

3.1.5.3 The CCTV subsystem shall allow users to select, view, and control one or more cameras on the system from the CCTV list or GUI map.

3.1.5.4 The CCTV subsystem shall allow users to display up to 16 simultaneous streaming video images on a single user workstation, using any combination of video decoding standards without degradation in workstation performance.

3.1.5.5 The CCTV subsystem shall be capable of controlling camera pan, tilt (up/down/diagonal), zoom, focus, presets, patterns, and iris adjustments.

3.1.5.6 The CCTV subsystem shall activate all configured preset camera positions available to operators.

3.1.5.7 The CCTV subsystem shall be capable of adding, modifying, or deleting presets.

3.1.5.8 The preset names shall be available for use in other external operations, such as a script that runs on a scheduled basis to move the cameras to view a different direction.

3.1.5.9 The CCTV subsystem shall have the ability to add, modify, delete, play, pause, resume, and stop video tours.

3.1.5.10 The CCTV subsystem shall be capable of at least 16 independent camera tours per workstation without degradation in workstation performance.

3.1.5.11 The CCTV subsystem shall allow for selection and routing of video to:

3.1.5.11.1 Auxiliary monitors or display devices, and

3.1.5.11.2 Images to the video wall controller (i.e. Jupiter Pixelnet/SVS8).

3.1.5.12 The CCTV subsystem shall allow users with a higher priority level to lock camera control for a specific length of time. During this period of time, other users shall not be allowed to control the locked camera.

3.1.5.13 The CCTV subsystem shall allow the existing operator to lock the camera, but a user with a higher priority may operate/release the camera.

3.1.5.14 The CCTV subsystem shall indicate the owner of a locked camera.

3.1.5.15 The CCTV subsystem shall have the capability to place a camera offline from system access.

3.1.5.16 The CCTV subsystem shall have the capability to place a camera online for system access or to change the current status of its operational state.

3.1.5.17 The CCTV subsystem shall have the capability to block the video output of one or more cameras from specific users.

3.1.5.18 The CCTV subsystem shall have the capability to unblock the video output of one or more cameras from specific users.

3.1.5.19 The CCTV subsystem shall be capable of decoding video that is encoded, using standard or common video compression algorithms. These include, but are not limited to:

3.1.5.19.1 MJPEG

3.1.5.19.2 MPEG2

3.1.5.19.3 MPEG4

3.1.5.19.4 H.264

3.1.5.20 The CCTV subsystem shall provide the same functionalities of the vendor software and device drivers for the operators/support staff.

3.1.5.21 The CCTV subsystem shall support pan/tilt/zoom (PTZ) control interfaces for a wide variety of camera interfaces, including, but not limited to:

3.1.5.21.1 NTCIP 1205 model cameras (Pelco, Cohu, Bosch, etc.)

3.1.5.21.2 Pelco cameras using the Pelco-D or NTCIP 1205 protocols

3.1.5.21.3 Cohu cameras using the Cohu, Pelco-D or NTCIP 1205 protocols

3.1.5.21.4 SONY CCTV with embedded encoder

3.1.5.22 The CCTV subsystem shall display the camera location information, such as, but not limited to, camera ID, camera location, preset position, and status.

3.1.5.23 The CCTV subsystem shall capture snapshot video images (JPEGs) from available cameras.

3.1.5.24 The CCTV subsystem shall have the ability to save and overwrite to a file the current snapshot image of every camera within the system at a definable interval.

3.1.5.25 The CCTV subsystem shall allow for capturing one or more streaming images that will be made available in a standard video file format to be accessible by DOTD staff for analytical purposes.

3.1.5.26 The CCTV subsystem shall log an event message to the alarm and event logger whenever:

3.1.5.26.1 A camera tour is added/edited/deleted,

3.1.5.26.2 A camera preset is added/edited/deleted,

3.1.5.26.3 A camera is added to the system,

3.1.5.26.4 A camera is turned on/off.

3.1.5.27 The CCTV subsystem shall be capable of detecting and reporting to the IM subsystem any roadway congestion, incidents and anomalies through the use of video detection software.

3.1.5.28 The CCTV subsystem shall allow the operator to size the video image window, without distorting the video image.

3.1.5.29 The CCTV subsystem shall log an alarm message to the alarm and event logger with an error message when an action cannot be performed on a camera. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.6 Dynamic Message Sign (DMS)

3.1.6.1 The DMS subsystem shall support all fixed and portable DMSs.

3.1.6.2 The DMSs shall be able to utilize quick commands as per section 3.1.4.3.11.

3.1.6.3 The DMS subsystem shall retrieve status information from signs and log the information to the alarm and event logger, including, but not limited to:

3.1.6.3.1 Operational status (in or out of service),

3.1.6.3.2 Module status,

3.1.6.3.3 Pixel status,

3.1.6.3.4 Voltage,

3.1.6.3.5 Temperature,

3.1.6.3.6 Door open/close status,

3.1.6.3.7 Any other internal malfunction,

3.1.6.3.8 Any configurable parameters,

3.1.6.3.9 Date/time of last successful poll,

3.1.6.3.10 Date/time of last failed poll,

3.1.6.3.11 Device failures, and

3.1.6.3.12 Communication failures.

3.1.6.4 The DMS subsystem shall have the capability to poll one or more DMSs in a single operation in order to test communications.

3.1.6.5 The DMS subsystem shall have a configurable polling rate.

3.1.6.6 The DMS subsystem shall allow the user to initiate a poll at any time.

3.1.6.7 The DMS subsystem shall allow users to select, view, and control one or more signs on the system from the DMS list or GUI map.

3.1.6.8 The DMS subsystem shall allow users to add, remove, and edit configuration parameters for one or more signs from the DMS list or GUI map.

3.1.6.9 The DMS subsystem shall utilize one central sign library accessible by all statewide, regional, and local TMCs.

3.1.6.10 The DMS subsystem shall be able to create a single phase message in the DMS message library.

3.1.6.11 The DMS subsystem shall be able to create a multi-phase message in the DMS message library.

3.1.6.12 The DMS subsystem shall be able to open a message stored in the DMS message library.

3.1.6.13 The DMS subsystem shall be able to save an existing message to the DMS message library.

3.1.6.14 The DMS subsystem shall be able to save a message to the DMS message library under a new name.

3.1.6.15 The DMS subsystem shall be able to delete a message stored in the DMS message library.

3.1.6.16 The DMS subsystem shall have the capability to display a message stored in the DMS message library on one or more DMSs.

3.1.6.17 The DMS subsystem shall maintain a list of prohibited words.

3.1.6.18 The DMS subsystem shall check any message before displaying or queuing for prohibited words.

3.1.6.19 The DMS subsystem shall allow for an updatable dictionary to be used in the spell check.

3.1.6.20 The DMS subsystem shall have the capability to manually compose a message for a DMS and then send/post it to one or more signs in a single operation.

3.1.6.21 The DMS subsystem shall have the capability to blank one or more DMSs in one command.

3.1.6.22 The DMS subsystem shall have the capability to edit, or remove the current message displayed on one or more DMSs.

3.1.6.23 The DMS subsystem shall have the capability to add a message stored in the DMS message library to one or more DMSs' priority message queue.

3.1.6.24 The DMS subsystem shall have the capability to remove a message from one or more DMSs' priority message queue.

3.1.6.25 The DMS subsystem shall have the capability of editing a message prior to queuing and displaying and the message.

3.1.6.26 The DMS subsystem shall be able to preview a message exactly as it would appear on a targeted DMS via a what-you-see-is-what-you-get (WYSIWYG) format. (This should take into account the pixel count, font, line spacing, and all other formatting settings.)

3.1.6.27 The DMS subsystem shall allow the user to review messages stored in the priority message queue of a DMS.

3.1.6.28 The DMS subsystem shall maintain a message priority hierarchy containing at least 4 levels of priority within the message queue.

3.1.6.29 The highest priority slot in a DMS message queue shall be the override priority. The lowest priority slot in a DMS message queue shall be the manual priority.

3.1.6.30 The DMS subsystem shall provide a sortable, filterable list of all signs with their current message, as well as a configurable number of messages in the priority message queue for that DMS.

3.1.6.31 The DMS subsystem shall be able to set the display time for phases of a message.

3.1.6.32 The DMS subsystem shall support text messages, graphic messages, and a hybrid of the two.

3.1.6.33 The DMS subsystem shall support monochrome and color messages.

3.1.6.34 The DMS subsystem shall support the capability to perform all actions on a simulated DMS.

3.1.6.35 The DMS subsystem shall support interfaces (sign type, size, firmware, controller type, NTCIP version) for a wide variety of DMS and PDMS vendors including:

- 3.1.6.35.1 Daktronics
- 3.1.6.35.2 Mark IV
- 3.1.6.35.3 Adaptive
- 3.1.6.35.4 Skyline
- 3.1.6.35.5 Addco
- 3.1.6.35.6 Wanco
- 3.1.6.35.7 Display Solutions

3.1.6.35.8 National Signal

3.1.6.35.9 Vermac

3.1.6.35.10 Precision Solar

3.1.6.35.11 American Signal

3.1.6.35.12 3M

3.1.6.36 The DMS subsystem shall support the NTCIP 1203 protocol for permanent and portable DMS of all typical sizes.

3.1.6.37 The DMS subsystem shall support proprietary DMS control protocols, as required.

3.1.6.38 The DMS scheduler shall allow for future scheduling of DMS messages for a single sign or multiple signs.

3.1.6.39 The DMS scheduler display shall show the current active DMS messages on the selected signs.

3.1.6.40 The DMS scheduler shall allow for different messages to be scheduled at different times on a single sign or multiple signs.

3.1.6.41 The DMS scheduler shall alert the user that a scheduled message is about to be displayed.

3.1.6.42 The DMS subsystem shall include support for automated messaging from other subsystems or manual messaging from an operator.

3.1.6.43 The DMS subsystem shall allow the performance of a pixel test.

3.1.6.44 The DMS subsystem shall allow users with a higher priority level to lock sign control for a specific length of time. During this period of time other users shall not be allowed to control the locked sign.

3.1.6.45 The DMS subsystem shall allow the existing operator to lock the sign, but a user with a higher priority may operate/release the sign.

3.1.6.46 The DMS subsystem shall indicate the owner of a locked sign.

3.1.6.47 The DMS subsystem shall have the capability to place a DMS offline from system access.

3.1.6.48 The DMS subsystem shall have the capability to place a DMS online for system access or change the current status of its operational state.

3.1.6.49 The DMS subsystem shall have the capability to reset a DMS.

3.1.6.50 The DMS subsystem shall provide an error message to the alarm and event logger if the message to be sent exceeds the number of allowable characters for this DMS.

3.1.6.51 The DMS subsystem shall allow configuration of all sign parameters.

3.1.6.52 The DMS subsystem shall log an event message to the alarm and event logger whenever a sign is manipulated. The message shall contain the date, time, operator name, sign, and action taken.

3.1.6.53 The DMS subsystem shall log an alarm message to the alarm and event logger with an error message when an action cannot be performed on a sign. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.7 Incident Management (IM)

3.1.7.1 The IM shall be able to utilize quick commands as per section 3.1.4.3.11.

3.1.7.2 The IM subsystem shall be capable of detecting unplanned incidents through the implementation of the Automatic Incident Detection algorithms.

3.1.7.3 The IM subsystem shall be capable of detecting incidents on all roadway segments for which data and/or detection is available.

3.1.7.4 The IM subsystem shall track unplanned incidents (accidents), and planned incidents (e.g. work zones, VIP visit, ball game, Mardi Gras, etc.).

3.1.7.5 The IM subsystem shall allow users to create, modify, and terminate incidents.

3.1.7.6 The IM subsystem shall allow for the creation of an incident from a new incident template, or by clicking on a location on the map GUI.

3.1.7.7 The IM subsystem shall allow users to select, view, or control one or more incident from the IM list or GUI map.

3.1.7.8 The IM subsystem shall allow for the creation of multiple incident types.

3.1.7.9 The IM subsystem shall provide unique icons for each incident type.

3.1.7.10 Icons shall be user-configurable and try to match CARS/511 System.

3.1.7.11 The IM subsystem shall allow each incident type to be toggled on or off independently on the IM list or GUI map.

3.1.7.12 The IM subsystem shall automatically log detected incidents and notify the user for further verification and processing of the event to the alarm and event logger.

3.1.7.13 The IM subsystem shall allow incident records to be modified by only a single user at a time.

3.1.7.14 The IM system shall share data with the CARS/511 system and other subsystems, such that any incident or event entered or modified in either system shall automatically be updated in the other system.

3.1.7.15 The IM subsystem shall archive all incident records, including time/date stamps for every modification to the incident record throughout the life of the incident.

3.1.7.16 The IM subsystem shall recognize control sections, mile markers, and roadway interchanges, as a method for locating incidents.

3.1.7.17 The IM subsystem shall capture date/time stamp information associated with the various events which transpire through the duration of an incident.

3.1.8 Incident Response (IR) Plans

3.1.8.1 The IR subsystem shall provide an automated response mechanism to planned and unplanned incidents and/or events.

3.1.8.2 The IR subsystem shall generate a suggested plan in response to an unplanned or planned incident/event that can be implemented, in part or in whole, by a user with the appropriate permissions.

3.1.8.3 The IR subsystem shall generate automatic response actions, for review by the operator based on the IM input and a user-configurable set of distance constraints, including, but not limited to, the following:

3.1.8.3.1 Recommended DMS to use in response to an incident,

3.1.8.3.2 Recommended messages for DMS,

3.1.8.3.3 Recommended HAR to use in response to an incident,

3.1.8.3.4 Recommended messages for HAR,

3.1.8.3.5 Public messages for CARS/511 traveler information and Twitter distribution, and

3.1.8.3.6 Recommendations for electronic notifications for staff via e-mail, text message, pager, phone, fax, or Twitter.

3.1.8.4 The IR subsystem shall provide a mechanism to create, store, modify, and implement response plans for special situation events.

3.1.8.5 The IR subsystem shall allow the user to select any one of the stored response plans or to generate a new one.

3.1.8.6 The IR subsystem shall provide for notification to outside agencies via an email distribution list (from ATMS) for each incident.

3.1.8.7 The IR subsystem shall provide for notification to the public via a Twitter distribution list (from ATMS) for each incident.

3.1.8.8 The IR subsystem shall allow the incident notification email and Twitter distribution lists to be configurable.

3.1.8.9 The IR subsystem shall log an event message to the alarm and event logger whenever an incident response plan is manipulated. The message shall contain the date, time, operator name, incident response plan, and action taken.

3.1.9 Vehicle Detection Subsystem (VDS)

3.1.9.1 The VDS shall provide the ability to view, collect, and archive real-time data from detectors such as, but not limited to, volume, speed, occupancy, and classification on a lane-by-lane basis, if available.

3.1.9.2 The VDS shall be able to utilize quick commands as per section 3.1.4.3.11.

3.1.9.3 The VDS shall retrieve status information from sensors and log the information to the alarm and event logger, including, but limited to:

3.1.9.3.1 Operational status (in or out of service),

3.1.9.3.2 Internal malfunction,

3.1.9.3.3 Any configurable parameters,

3.1.9.3.4 Date/time of last successful poll,

3.1.9.3.5 Date/time of last failed poll,

3.1.9.3.6 Device failures, and

3.1.9.3.7 Communication failures.

3.1.9.4 The VDS shall be able to interface with a variety of VDS sensors, including:

3.1.9.4.1 Inductive Loops

3.1.9.4.2 Remote Traffic Microwave Sensors (X2/X3/G4)

3.1.9.4.3 Wavetronix Microwave Sensors

3.1.9.4.4 Speedinfo Sensors

3.1.9.4.5 3M Microloops

3.1.9.4.6 Autoscope Solo/Solo Terras

3.1.9.4.7 Sensys Networks magneto resistive sensors

3.1.9.4.8 BlueToad Sensors

3.1.9.4.9 Traficon Video

3.1.9.5 The VDS shall have the capability to automatically poll one or more VDS sensors in order to test device communications.

3.1.9.6 The VDS shall have a configurable polling rate.

3.1.9.7 The VDS subsystem shall allow the user to initiate a poll at any time.

3.1.9.8 The VDS shall provide a map layer that allows operators to manage and view a summary of information from roadway sensors to easily see and understand the congestion status of the entire roadway network.

3.1.9.9 The VDS shall allow for the operator to utilize "VCR Controls" to rewind, pause, and play the congestion/flow map to understand when congestion started and the impacts over a period of time.

3.1.9.10 The VDS shall allow users to select one or more sensors from the VDS list or GUI map.

3.1.9.11 The VDS shall allow users with the required privileges to view and set multiple threshold values on one or more sensors in one operation.

3.1.9.12 The VDS shall allow users with the required privileges access to modify the VDS color thresholds for the purposes of display on the GUI system map.

3.1.9.13 The VDS shall allow users with the required privileges to define the data interval to be used in threshold calculation. For example, 20-second data interval, 60-second data interval, or a rolled-up data interval.

3.1.9.14 The VDS subsystem shall be capable of detecting and reporting to the IM subsystem any roadway congestion, incidents and anomalies through the use of an incident detection algorithm.

3.1.9.15 The VDS shall have the capability to interface with sensors conforming to the NTCIP 1209 protocol.

3.1.9.16 The VDS shall be capable of obtaining traffic data from GPS or cell probe data systems/brokers (e.g. Inrix).

3.1.9.17 The VDS shall be capable of obtaining data from external data feeds such as TrafficCast, Navteq, etc.

3.1.9.18 The VDS subsystem shall provide a sortable, filterable list of configurable sensors with the system displaying the current volume, speed, occupancy, and classification data.

3.1.9.19 The VDS shall aggregate lane-by-lane data into station data.

3.1.9.20 The VDS shall publish station data to other subsystems, such as, but not limited to, the travel time subsystem.

3.1.9.21 The VDS shall allow the user to define a link, which consists of a start and end point on the roadway and contains a station.

3.1.9.22 The VDS shall have the capability to place a sensor offline from system access.

3.1.9.23 The VDS shall have the capability to place a sensor online for system access or change the current status of its operational state.

3.1.9.24 The VDS shall allow configuration of all sensor parameters.

3.1.9.25 The VDS shall log an event message to the alarm and event logger whenever a sensor is manipulated. The message shall contain the date, time, operator name, sensor, and action taken.

3.1.9.26 The VDS shall log an alarm message to the alarm and event logger with an error message when an action cannot be performed on a sensor. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.10 Travel Times

3.1.10.1 The travel time subsystem shall be capable of obtaining internal VDS data and external data feeds such as TrafficCast, Navteq, Inrix, etc., for use in calculating travel times for display on DMS and other dissemination methods (website, CARS/511, Twitter).

3.1.10.2 The travel time subsystem shall not interfere with the timely display of any other operator-generated message on the DMS when displaying travel time messages.

3.1.10.3 The travel time subsystem shall generate a single view of all calculated travel times throughout the system for internal and external stakeholders.

3.1.10.4 Travel times shall be available for definable routes that include links consisting of a start, multiple middle, and end points.

3.1.10.5 The travel time subsystem shall calculate travel times based on information obtained from the vehicle detectors, historical data, external data, or any predictive algorithm data for each link between the selected start and end points of a route. The calculated travel time for a route shall be the sum of the travel times for each link within that route.

3.1.10.6 The travel time subsystem shall allow the user to configure the frequency at which an automated travel time message is posted to a sign.

3.1.10.7 The travel time subsystem shall allow the operator to disable one or more travel time messages from displaying on a DMS.

3.1.10.8 The travel time subsystem shall provide the capability to schedule travel time messages to be displayed on one or more DMSs.

3.1.10.9 Where a route contains failed links, the travel time for the distance of all non-failed links shall be interpolated to cover the distance of all links in that route. If the number of working links for a route drops below a configurable threshold, then no travel time shall be available for that route.

3.1.10.10 The travel time subsystem shall assign zero or more routes to DMS. A DMS may have zero or more routes bound to it, and will only be able to display travel times for those routes.

3.1.10.11 The travel time subsystem shall only display travel times greater than 1 minute and less than 99 minutes as a range +/- 1 minute.

3.1.10.12 The travel time subsystem shall blank a sign if a travel time that is currently being displayed drops or raises outside the allowable range. This range shall be configurable for each route.

3.1.10.13 The travel time subsystem shall default to display no travel time when there is no data being collected on a route.

3.1.10.14 The travel time subsystem shall account for the number of characters on the DMS displaying the travel time, in order to display a clear message.

3.1.10.15 The travel time subsystem shall store the calculated route travel times in the database, along with the parameters used to perform that calculation.

3.1.10.16 The travel time subsystem shall be capable of exporting the raw travel time data via an XML feed.

3.1.10.17 The travel time subsystem shall log an alarm message to the alarm and event logger with an error message when there is no data being collected on a route. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.11 Alarm and Event Logger (AEL)

3.1.11.1 The AEL user interface shall display configurable subsystem alarms.

3.1.11.2 The AEL shall display alarms and events received from any subsystem or interface to the ATMS that generated alarms.

3.1.11.3 The AEL display shall allow the user to configure, sort and filter the alarm and event list based on different parameters, such as, but not limited to, alarm type, severity, date/time, action, region, etc.

3.1.11.4 The AEL shall allow an alarm to be confirmed by a user.

3.1.11.5 The AEL shall allow a custom action to be executed when an alarm is triggered.

3.1.11.6 The AEL shall maintain a copy of each alarm, error condition, or operation reported.

3.1.11.7 The AEL shall provide a historical record of ATMS module activity.

3.1.11.8 The AEL shall provide a means to display alarms and events on a user workstation.

3.1.11.9 The AEL shall provide a means to respond to alarms and events.

3.1.11.10 The AEL shall provide a means to generate reports.

3.1.11.11 When an alarm is displayed, it is an active alarm and the AEL shall provide multiple acknowledgement options.

3.1.11.12 The AEL shall permit a user to select an alarm from the scrollable active alarm list and add a comment which includes the time and the user.

3.1.11.13 Each subsystem shall generate a configurable alarm, which is sent to the AEL when the software cannot communicate with the ITS devices for a configurable number of successive poll cycles.

3.1.11.14 Each subsystem shall log the user ID, device descriptor, current action, and date/time when an operator is accessing any device.

3.1.12 Highway Advisory Radio (HAR)

3.1.12.1 The HAR subsystem shall have the ability to record and transmit messages to roadside HAR devices.

3.1.12.2 The HAR subsystem shall have an interface with the Highway Information Systems (HIS) Platinum software currently utilized by the DOTD.

3.1.12.3 The HAR subsystem shall be able to utilize quick commands as per section 3.1.4.3.11.

3.1.12.4 The HAR subsystem shall retrieve status information from HAR devices and log the information to the alarm and event logger, including, but not limited to:

3.1.12.4.1 Operational status (in or out of service),

3.1.12.4.2 Activation times,

3.1.12.4.3 Internal malfunction,

3.1.12.4.4 Any configurable parameters,

3.1.12.4.5 Date/time of last successful poll,

3.1.12.4.6 Date/time of last failed poll,

3.1.12.4.7 Device failures, and

3.1.12.4.8 Communication failures.

3.1.12.5 The HAR subsystem shall have the capability to poll one or more HAR devices in order to test communications.

3.1.12.6 The HAR subsystem shall have a configurable polling rate.

3.1.12.7 The HAR subsystem shall allow the user to initiate a poll at any time.

3.1.12.8 The HAR subsystem shall allow users to select, view, and control one or more HAR devices from the HAR list or GUI map.

3.1.12.9 The HAR subsystem shall have the capability to add, modify, and delete messages in a central HAR library accessible by all statewide, regional, and local TMCs.

3.1.12.10 The HAR subsystem shall have the ability to initiate and terminate the transmission of messages to the roadside HAR devices.

3.1.12.11 The HAR subsystem shall be able to play a prerecorded voice message.

3.1.12.12 The HAR subsystem shall be able to record a HAR message.

3.1.12.13 The HAR subsystem shall be able to create a HAR message via text-to-speech.

3.1.12.14 The HAR subsystem shall be capable of sending one message to a grouping of HAR devices with one command.

3.1.12.15 The HAR subsystem shall have the capability to do an audible preview of the composed HAR message before sending the message to the HAR device.

3.1.12.16 The HAR subsystem shall have the capability to activate HAR beacon signs.

3.1.12.17 The HAR subsystem shall have the capability to deactivate HAR beacon signs.

3.1.12.18 The HAR subsystem shall allow users with a higher priority level to lock HAR control for a specific length of time. During this period of time other users shall not be allowed to control the locked HAR.

3.1.12.19 The HAR subsystem shall allow the existing operator to lock the HAR, but a user with a higher priority may operate/release the HAR.

3.1.12.20 The HAR subsystem shall indicate the owner of a locked HAR.

3.1.12.21 The HAR subsystem shall have the capability to place a HAR offline from system access.

3.1.12.22 The HAR subsystem shall have the capability to place a HAR online for system access or change the current status of its operational state.

3.1.12.23 The HAR subsystem shall allow configuration of all HAR parameters.

3.1.12.24 The HAR subsystem shall log an event message to the alarm and event logger whenever a HAR is manipulated. The message shall contain the date, time, operator name, HAR, and message information.

3.1.12.25 The HAR subsystem shall alert the user with an error message when an action cannot be performed on a HAR. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.13 Ramp Metering

3.1.13.1 The ramp metering subsystem shall have the capability of interfacing with the StreetWise software.

3.1.13.2 The ramp metering subsystem shall be able to utilize quick commands as per section 3.1.4.3.11.4.

3.1.13.3 The ramp metering subsystem shall retrieve status information from ramp meters and log the information to the alarm and event logger, including, but not limited to:

3.1.13.3.1 Operational status (in or out of service),

3.1.13.3.2 When the ramp meter is turned on or off automatically through the controller,

3.1.13.3.3 Timing plans,

3.1.13.3.4 Signal illumination (error message on bulbs),

3.1.13.3.5 Any configurable parameters,

3.1.13.3.6 Device failures, and

3.1.13.3.7 Communication failures.

3.1.13.4 The ramp metering subsystem shall have the capability to poll one or more ramp meter controllers in order to test communications.

3.1.13.5 The ramp metering subsystem shall have a configurable polling rate.

3.1.13.6 The ramp metering subsystem shall allow the user to initiate a poll at any time.

3.1.13.7 The ramp metering subsystem shall allow users to select one or more ramp meter controllers from the ramp metering list or GUI map.

3.1.13.8 The ramp metering subsystem shall display a summary overview of all ramp metering controllers, viewable from one window that contains the current ramp meter status.

3.1.13.9 The ramp metering subsystem summary overview shall include streaming camera video, if available.

3.1.13.10 The ramp metering subsystem summary overview shall include the ability to turn off or on one or more ramp meter controllers.

3.1.13.11 The ramp metering subsystem shall have the ability to turn on one or more ramp meter controllers in a single operation.

3.1.13.12 The ramp metering subsystem shall have the ability to change ramp meter timing plans for one or more ramp meter controllers in a single operation.

3.1.13.13 The ramp metering subsystem shall have to ability to turn off one or more ramp meter controllers in a single operation.

3.1.13.14 The ramp metering subsystem shall allow users with a higher priority level to lock ramp metering control for a specific length of time. During this period of time other users shall not be allowed to control the locked ramp meter controller.

3.1.13.15 The ramp metering subsystem shall allow the existing operator to lock the ramp meter controller, but a user with a higher priority may operate/release the ramp meter controller.

3.1.13.16 The ramp metering subsystem shall indicate the owner of a locked ramp meter controller.

3.1.13.17 The ramp metering subsystem shall have the capability to place a ramp meter controller offline from system access.

3.1.13.18 The ramp metering subsystem shall have the capability to place a ramp meter controller online for system access or change the current status of its operational state.

3.1.13.19 The ramp metering subsystem shall allow configuration of all ramp meter controller parameters.

3.1.13.20 The ramp metering subsystem shall log an event message to the alarm and event logger whenever a ramp meter controller is manipulated. The message shall contain the date, time, operator name, ramp meter controller, and action taken.

3.1.13.21 The ramp metering subsystem shall log an alarm message with the alarm and event logger with an error message when an action cannot be performed on a ramp meter controller. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.14 Traffic Signal Subsystem (TSS)

3.1.14.1 The TSS shall have the capability to interface with the Streetwise software.

3.1.14.2 The TSS subsystem shall be able to utilize quick commands as per section 3.1.4.3.11.

3.1.14.3 The TSS shall retrieve status information from traffic signal controllers and log the information to the alarm and event logger, including, but not limited to:

3.1.14.3.1 Operational status (in or out of service),

3.1.14.3.2 Timing plan activation,

3.1.14.3.3 Device failures, and

3.1.14.3.4 Communication failures.

3.1.14.4 The TSS shall have the capability to poll one or more traffic signal controllers in order to test communications.

3.1.14.5 The TSS shall have a configurable polling rate.

3.1.14.6 The TSS subsystem shall allow the user to initiate a poll at any time.

3.1.14.7 The TSS shall have the capability to access one or more traffic signal controllers to engage pre-engineered timing plans.

3.1.14.8 The TSS subsystem shall have the ability to change the signal timing plans for one or more traffic signal controllers in a single operation.

3.1.14.9 The TSS shall allow users to select one or more traffic signal controllers from the TSS list or GUI map.

3.1.14.10 The TSS shall allow users with a higher priority level to lock traffic signal control for a specific length of time. During this period of time other users shall not be allowed to control the locked traffic signal controller.

3.1.14.11 The TSS shall allow the existing operator to lock the traffic signal controller, but a user with a higher priority may operate/release the traffic signal controller.

3.1.14.12 The TSS shall indicate the owner of a locked traffic signal controller.

3.1.14.13 The TSS shall have the capability to place a traffic signal controller offline from system access.

3.1.14.14 The TSS shall have the capability to place a traffic signal controller online for system access or change the current status of its operational state.

3.1.14.15 The TSS shall log an event message to the alarm and event logger whenever a traffic signal controller is manipulated. The message shall contain the date, time, operator name, traffic signal controller, and action taken.

3.1.14.16 The TSS shall log an alarm message with the alarm and event logger with an error message when an action cannot be performed on a traffic signal controller. The message shall contain a suggested course of action to bypass or correct the problem.

3.1.15 GPS Asset Tracking (GAT)

3.1.15.1 The GAT subsystem shall have the capability to track vehicles and portable ITS devices in real-time, using GAT/GPS data and displaying the locations of these devices on the GUI map.

3.1.15.2 The GAT shall have the ability to interface with LocateIM software.

3.1.15.2.1 Hovering over a vehicle shall result in the display of status information made available through LocateIM, including, but not limited to, unit ID, status, and driver.

3.1.15.3 The GAT subsystem shall allow users to select a vehicle or portable device from the GAT list or GUI map.

3.1.15.4 GAT/GPS data shall be time stamped with the date/time the GAT/GPS data was received.

3.1.15.5 The GAT subsystem shall display devices with a unique ID and the current GPS/GAT location.

3.1.16 Data Archiving and Reporting (DAR)

3.1.16.1 The DAR subsystem shall archive all data retrieved from all ITS field device types, as well as all subsystem-generated data, such as, but not limited to, events, alarms, and travel times.

3.1.16.2 The DAR subsystem shall include the date and timestamp when the data was collected and archived.

3.1.16.3 The DAR subsystem shall limit access to the archiving and reporting module by user- and group-level security to ensure trusted access.

3.1.16.4 The DAR subsystem shall include, but not be limited to, the following reports:

3.1.16.4.1 VDS Traffic Data Report,

3.1.16.4.2 5-minute Traffic Data Report per device,

3.1.16.4.3 15-minute Traffic Data Report per device,

3.1.16.4.4 Hourly Traffic Data Report per device,

3.1.16.4.5 Daily Traffic Data Report per device,

3.1.16.4.6 DMS Message History,

3.1.16.4.7 DMS Status,

3.1.16.4.8 CCTV Activity,

3.1.16.4.9 Incident Summary,

3.1.16.4.10 HAR Message History,

3.1.16.4.11 HAR Status,

3.1.16.4.12 User Activity,

3.1.16.4.13 Ramp Metering Activity,

3.1.16.4.14 Travel Time Segment Report,

3.1.16.4.15 ITS Device Downtime Reports,

3.1.16.4.16 ITS Device Failure Reports,

3.1.16.4.17 Daily chronological report of all roadway incidents, and

3.1.16.4.18 ATMS Module Failure Report.

3.1.16.5 The DAR subsystem shall provide the capability for generating and exporting file format data, such as, but not limited to, Excel, Word, CSV, PDF, and XML for custom reports.

3.1.16.6 The DAR subsystem shall provide the capability for generating Ad-Hoc reports.

3.1.16.7 The DAR subsystem shall provide the capability for generating automated reports.

3.1.16.8 The DAR subsystem shall provide the capability for Ad-Hoc database queries.

3.1.16.9 The DAR subsystem shall be able to save a custom or Ad-Hoc report.

3.1.16.10 The DAR subsystem shall be able to save all Ad-Hoc database queries.

3.1.16.11 The DAR subsystem shall support printing for all reports types.

3.1.16.12 The DAR subsystem shall accommodate retrieval and report generation for archived data covering a period of up to 18 months without impact to existing online data storage.

3.1.16.13 The DAR subsystem shall be able to automatically push daily traffic and operations data to an external data warehouse.

3.1.17 External System Integration/Data Sharing

3.1.17.1 The external system integration shall provide, at a minimum, the ability to generate an XML formatted file for exporting to other external stakeholders.

3.1.17.2 The external system integration shall be able to interface and share data to/from CARS/511.

3.1.17.3 The external system integration shall be able to receive XML formatted files from other external systems for integration into the system.

3.1.17.4 The external system integration shall log an event message to the alarm and event logger whenever a file is imported or exported. The message shall contain the date, time, operator name, file information, and action taken.

3.1.18 Center-to-Center (C2C) Interface

3.1.18.1 The C2C interface shall be national ITS standards based.

3.1.18.2 The C2C interface shall support C2C standard data types and transmission protocols.

3.1.18.3 The C2C interface shall support input and output of data based on the Traffic Management Data Dictionary (TMDD).

3.1.18.4 The C2C interface shall support all subsystem interfaces.

3.1.18.5 The C2C interface shall support legacy systems' proprietary communication interfaces.

3.1.18.6 The C2C shall provide security for data exchange of all data types, so that data may be selectively included or excluded from transfer to an external agency.

3.1.18.7 The C2C shall provide a mechanism for automatically publishing data and video images from multiple sources to various traveler information web sites at specific intervals.

3.1.18.8 The C2C interface shall provide a mechanism to immediately restrict access to all ATMS data to external agencies.

3.2 Performance Requirements

Performance requirements are those that define how well the system should perform. There are performance requirements for the ATMS as an entire system, as well as performance requirements for each of the subsystems within the ATMS. These define important parameters necessary for smooth and efficient TMC operations.

Table 1 – Performance Requirements Matrix

Performance Parameter	System/Subsystem	Performance Standard
Availability	ATMS	24 hours a day, 7 days a week, except during scheduled maintenance.
Launch Application (Cold Start)	ATMS	20 seconds or less.
Refresh Rate	All ATMS Windows	User configurable, minimum of every 10 seconds.
Data Loss	All ATMS Data Entry Windows	No loss of data.
Required Restart/Reboot	ATMS	Upon Major System Upgrade Only
System Up Time	ATMS	99.95% available.
Field Device Communication	ATMS Reliability	100% to field device based on communications availability to the device.
Number of Users	ATMS	Minimum of 100 users operating at the same time.
Database Continuity	ATMS Database	No loss of current or past data when adding, modifying, or deleting equipment, users, incidents, or any other configuration information.
Cameras	CCTV	Support a minimum of 500 cameras.
Pan, Tilt, Zoom, Iris, Focus, and Preset Latency	CCTV	< 1 second.
Subtitles to be visible after being entered from TMC	CCTV	<5 seconds.
CCTV Camera Fault Detection	CCTV	<30 seconds.

DMSs (Permanent and Portable)	DMS	Support a minimum of 240 signs.
Message Display Latency	DMS	< 10 seconds based on communications availability to the device.
Activate/Deactivate Beacons	DMS	< 10 seconds based on communications availability to the device.
Incident Detection (Automatic)	Incident Management	Within 1 minute.
Operator Incident Creation	Incident Management	An operator shall be able to create incident, fill in basic information, and select and/or modify a response plan within 1 minute.
Incident Response Plan Generation	Incident Response Plans	An operator shall be able to edit an existing or create an incident response plan within 1 minute of incident creation.
Incident Response Plan Execution	Incident Response Plan	An operator shall be able to execute all portions of a plan within 1 minute of execution command.
Vehicle Detectors	VDS	Support up to 360 vehicle detectors.
Retrieving Sensor Data	VDS	Data must be retrieved from sensors within 3 seconds of the configured rate.
Display Live Data from Detectors	VDS	< 10 seconds.
VDS Fault Detection	VDS	<30 seconds.
Calculated Travel Times	Travel Times	98% accuracy.
Alarm and Event Message Display	AEL	Within 5 seconds of being sent from another subsystem.
HARs	HAR	Support up to 20 HARs.
Message Display Latency	HAR	30 seconds.
Ramp Meter Controllers	Ramp Metering	Support up to 100 ramp meter controllers.

Ramp Meter Controller Latency	Ramp Metering	10 seconds.
Traffic Signal Controllers	TSS	Support up to 500 traffic signal controllers.
Traffic Signal Controller Latency	TSS	10 seconds.
Data Integrity	DAR	No loss of data.
Continuous Communication	C2C	No loss of data.

3.3 Interface Requirements

Interface requirements are those that define what interfaces are necessary to and/or from external systems and applications. These interfaces are crucial to disseminating data to other subsystems and applications, as well as external organizations and personnel. The interfaces also keep the public informed of incidents and roadway conditions.

3.3.1 External Interfaces

3.3.1.1 The ATMS and the CARS/511 system shall provide a two-way interface to provide traffic incident information between the ATMS to the CARS/511 system which displays this incident data to the public via a website. The Interface Control Document for the CARS interface and contact information for Castle Rock Consultants, Inc., the developers of the CARS system, will be provided.

3.3.1.2 The ATMS shall provide an interface for obtaining traffic data from GPS, Bluetooth technology or cell probe data systems/brokers (e.g. Inrix).

3.3.1.3 The ATMS shall provide an interface capable of obtaining data from external data feeds such as TrafficCast, Navteq, etc.

3.3.1.4 The ATMS shall provide the programming capability to generate an automatic or manual alert from the ATMS to Twitter, and/or other real-time short-term messaging services that function across multiple networks and multiple devices.

3.3.1.5 The ATMS shall provide the ability to automatically or manually create an email to allow for the notification of key personnel during an incident or of other important events.

3.3.2 Data Warehousing

3.3.2.1 The ATMS shall provide an interface to the State's traffic data warehouse site at LSU for storing data on a daily basis for the purposes of storing and analyzing historical data.

3.3.3 Future Interfaces

3.3.3.1 The ATMS shall allow for the growth of existing interfaces and the addition of new ones.

3.4 Data Requirements

The data requirements are those that define the data types required for distribution within the ATMS and to external applications or personnel. These requirements also define the data that is stored in the database and any restraints or requirements placed on that data.

3.4.1 Incident Data

3.4.1.1 The ATMS shall collect and distribute incident data, including but not limited to traffic volumes, speeds, occupancy, location, type, severity, and response. This data shall be available for export at minimum, but not limited to, Excel, CSV, and an XML format.

3.4.2 Traffic Data

3.4.2.1 The ATMS shall collect and distribute traffic data, including but not limited to speed, volume, and occupancy. This data shall be available for export via Excel, CSV, or an XML format.

3.4.3 Travel Time Data

3.4.3.1 The ATMS shall collect and distribute travel time data, including but not limited to travel time, route starting point, route ending point, and sign(s) used to post this information. This data shall be available for export via Excel, CSV, or an XML format.

3.4.4 User Data

3.4.4.1 The ATMS shall collect and distribute user interaction data, including but not limited to commands sent to field devices and internal user actions. This data is stored in the database.

3.4.5 Database Data

3.4.5.1 The ATMS shall allow for user-visible values to be editable without affecting the functionality of the system.

3.4.5.2 The ATMS shall allow for the deletion of objects without breaking existing links in the database that exist for historical purposes.

3.4.5.3 The ATMS shall provide that upgrades in software maintain backward compatibility with previous databases.

3.5 Non-Functional Requirements

The non-functional requirements are the environmental requirements for the ATMS hardware and software requirements necessary to provide the optimum environmental surroundings for maintaining hardware integrity. All hardware and systems procured for the ATMS are to be in compliance with DOTD polices, standards and security features.

3.6 Enabling Requirements

The enabling requirements include those documents, plans, and milestones that provide for the successful installation and delivery of the ATMS.

3.6.1 System Design and Development

3.6.1.1 The Contractor shall establish and maintain a System Design and Development Program document in accordance with the FHWA's ITS System Engineering process. This document is to ensure compliance with the technical requirements of this RFQ. The System Design and Development Program document will be reviewed and approved by the DOTD Project Manager.

3.6.1.2 The Contractor's traffic operations engineer shall work with DOTD operations staff to identify and create specific incident response plans for use in the ATMS for all primary roadways to be equipped by 2013 with ITS field device types.

3.6.1.3 The Contractor shall provide the DOTD a complete list of required system hardware equipment for each TMC location to operate the new ATMS software. The DOTD will procure all required hardware equipment listed by the Consultant. The DOTD will coordinate with the Consultant on the shipping logistics and/or on-site installation of the equipment procured.

3.6.1.4 The Contractor shall create two levels of Interface Control Documents (ICDs), external and internal. External ICDs specify the interfaces to external systems that are not the responsibility of the Consultant to design, furnish. and install (i.e. Maintenance Management System-MMS). Internal ICDs are those that are required for the design and integration of the system elements the Consultant is responsible for providing.

3.6.1.5 The ICDs shall establish and maintain compatibility at the common boundary between the subsystems, data elements, devices, and networks. The ICD shall coordinate and control the interface and shall be used for the purpose of change control at the interface point. The ICD specifications shall be tested by the Consultant and shall be part of Site Acceptance Testing (SAT).

3.6.2 ATMS Laboratory Testing

3.6.2.1 The Contractor shall develop and prepare an ATMS Laboratory Test Plan for each subsystem module, as well as the entire ATMS solution, and submit it to the DOTD Project Manager for approval. The purpose of this test is for the Consultant to demonstrate that their ATMS solution provides all the functional requirements and is operationally stable in a laboratory environment, prior to installation at the TMCs. The

ATMS Laboratory Test Plan shall map and test all functional elements of the ATMS to demonstrate they are in conformance with the DOTD's Concept of Operations, Functional Requirements, the Consultant's design documents, and ICDs.

3.6.2.2 The ATMS Laboratory Test Plan shall include all procedures necessary to conduct the testing. The test shall be conducted by the Consultant, either at the Consultant's facility in Louisiana or at a facility agreed upon between the Consultant and DOTD in accordance with the approved test procedures. The DOTD must witness and approve the ATMS Laboratory Test for each subsystem, as well as the entire ATMS solution.

3.6.2.3 The Contractor shall provide the required support personnel, test equipment and test environment, and testing shall be conducted by the Consultant in accordance with the approved test procedures, design documents, and ICDs. Upon completion of this test, the Consultant shall submit a certified test report to the Project Manager for approval that details the results of the test. Upon the completion of any re-tests and approval of the ATMS Laboratory Test by the Project Manager, the Consultant shall be given the authorization to move forward to installation of the ATMS.

3.6.3 ATMS Installation

3.6.3.1 The Contractor shall provide an ATMS Installation Plan for review and approval by the DOTD Project Manager. This plan shall detail the sequence and process of the ATMS installation at the TMCs. The Consultant shall not install the ATMS until the Installation Plan is approved by the DOTD Project Manager and the Laboratory Tests are completed.

3.6.3.2 All local and regional TMCs shall have the ATMS installed during non-operational hours. The regional and statewide TMCs that function 24/7 shall have the ATMS installed between the period after the PM traffic peak (3:30 PM–7:00 PM) and before the AM traffic peak (6:00 AM–9:00 AM).

3.6.3.3 The Contractor shall not be permitted to take any ITS device type off-line for more than a 5-minute period during the installation.

3.6.3.4 The Contractor shall submit an installation plan and receive approval by the Project Manager and TMC Supervisor a minimum of 14 days before the commencement of the ATMS at any TMC. The Consultant shall supply the DOTD Project Manager and TMC supervisor with an installation plan which details the installation tasks, personnel involved, and the duration of the tasks for the installation. The Consultant shall not be permitted to work in any DOTD facility without a DOTD staff member present.

3.6.4 ATMS Site Acceptance Testing (SAT)

3.6.4.1 The Contractor shall develop and submit for approval by the DOTD Project Manager a SAT Plan for each subsystem module, as well as the entire ATMS solution for each TMC. The SAT shall be conducted by the Consultant at the TMCs in accordance with the approved installation and test procedures. The DOTD must witness and approve the SAT for each subsystem, as well as the entire ATMS solution at each TMC. Upon the

completion of any re-tests and approval of the TMC SAT by the DOTD, the Consultant shall be given the authorization to move forward to install the ATMS at another TMC.

3.6.5 Training and Documentation

3.6.5.1 The Contractor shall develop a structured training program that will be reviewed and approved by the DOTD Project Manager. This training program shall include formal instruction in all applicable components of the ATMS, as well as system administration and support. Training shall include, at a minimum, the following topics:

3.6.5.1.1 System Operation Overview

3.6.5.1.2 ATMS Administration

3.6.5.1.3 System User

3.6.5.1.4 Maintenance

3.6.5.2 The Contractor shall provide comprehensive training for the operation, audit, reconciliation, and maintenance of the ATMS. All training shall occur before the commencement of the burn-in period. All staff shall be adequately trained by the Consultant as necessary in the ATMS application operations and maintenance at the following locations:

3.6.5.2.1 Combined Statewide and Baton Rouge Regional TMC, Baton Rouge, LA

3.6.5.2.2 Shreveport Regional TMC, Bossier City, LA

3.6.5.2.3 New Orleans Regional TMC, New Orleans, LA

3.6.5.2.4 Houma Local TMC, Houma, LA

3.6.5.3 The Contractor's program shall include formal and informal instruction, models, manuals diagrams and component manuals and catalogs as required. Where practical and useful, training should be hands-on classroom training supplemented with computer-based training.

3.6.5.4 The Contractor shall anticipate training up to four TMC operators and two system support staff at each of the local and regional TMCs. The Contractor shall anticipate training up to eight TMC operators and two system support staff at the statewide and New Orleans TMCs.

3.6.5.5 During the training, the Contractor shall provide all final project documents to the DOTD, including, but limited to, all training and final system manuals (System, Administration, User and Maintenance), all final system design documentation, all installation diagrams and processes, applicable software code, completed testing reports (with the exception of the burn-in period report), installation summaries, and warranty certificates for review and approval by the DOTD Project Manager.

3.6.5.6 Upon the completion of the operational and system support training, and the review and approval of all final system documentation, the Contractor shall be given written authorization to move forward to the 60-day burn-in period.

3.6.6 60-Day Burn-In Period

3.6.6.1 The objective of the burn-in period is to ensure that the ATMS functions on the DOTD hardware and network over a period of 60 days with limited manual intervention. It is intended to confirm that all field locations, integrations with all DOTD software and systems, and the network are sized and configured correctly and data is processed without interruption.

3.6.6.2 The Contractor shall develop and prepare the burn-in period plan and submit it to the DOTD Project Manager for approval. The burn-in period shall map and verify that all functional elements of the ATMS provided by the Consultant can operate for at least 60 days with minimal manual intervention and remain in compliance with the DOTD's technical, operational and performance requirements and the final System Design Document as approved by the DOTD Project Manager.

3.6.6.3 The burn-in period plan shall include all procedures necessary to operate the system by DOTD TMC operators. The Contractor shall provide a trouble ticket/reporting system to each TMC for documenting any system irregularities or anomalies during the burn-in period. The DOTD Project Manager will periodically witness the ATMS operators during this period. The results of the testing shall be subject to the DOTD's approval.

3.6.6.4 Upon completion of the burn-in period, the Contractor shall submit a certified test report to the DOTD for approval that details the results of the test for the ATMS. Upon the completion of any re-tests and approval of the burn-in period by the DOTD for the ATMS, the Maintenance/Warranty Period shall start.

3.6.7 Warranty and Maintenance

3.6.7.1 The Contractor shall warranty the ATMS for a period of one year from the date that the burn-in period is approved in writing by the DOTD Project Manager. During the warranty period the Consultant shall perform all preventative, corrective, and emergency maintenance and repairs required to make the ATMS operate and meet the requirements of this project.

3.6.7.2 The Contractor shall develop a detailed maintenance plan (MP) that covers all aspects of the maintenance operation and services to be provided. The maintenance plan shall be submitted to the Project Manager for approval, but no later than thirty days prior to commencement of the maintenance period.

3.7 Constraints

The constraints are requirements that place limits on the ATMS hardware and software. They are necessary for providing similar hardware throughout the TMC and for allowing evolving software needs.

3.7.1 Hardware

3.7.1.1 The ATMS shall use Windows operating systems, no UNIX or Linux.

3.7.1.2 The ATMS shall use Dell or IBM servers and workstations. The servers shall use the Windows 2008 operating system, the workstations shall use the Windows 7 operating system.

3.7.2 Software

3.7.2.1 All field device communications shall use NTCIP protocol, TMDD, a URL for IP communications or a static IP address when configuring the communications for a device.

4 Verification Methods

For each of the requirements, one of the following methods of verification will be used: (D) Demonstration, (T) Testing, (A) Analysis, or (I) Inspection.

4.1 Demonstration

The Contractor shows that the requirement has been met by using the subsystem GUIs, relational database GUIs, or any Operating System GUIs (for showing environment variables or registry settings) and following some predetermined manual steps. This method does not require any external test equipment. Most of the requirements will fall into this category.

4.2 Testing

The Contractor shows that a requirement has been met by utilizing some external piece of test equipment, external software, or script that has been written to automate a process. For example, a logic analyzer, a volt meter, or a port sniffer may be used.

4.3 Analysis

The Contractor shows that the requirement has been met indirectly through a logical conclusion or mathematical analysis of a result by performing some calculations to support the subsystem. For example, the vendor may need to show that a congestion requirement is met through the analysis of count and occupancy calculations in software or firmware.

4.4 Inspection

The Contractor shows that a requirement has been met by providing a code walkthrough over a snippet of code from the appropriate subsystem, such as displaying the source code where a call is made to protocol a specific code or where a subsystem limitation has been incorporated. Any requirement that references protocol-specific code, Operating System ports (RS-232), or LAN communication (Ethernet) that could not be demonstrated using a system, database, or Operating System GUI, could be met by inspection.

5 Support Documentation

The following matrix summarizes all of the functional requirements that the Contractor is required to provide in its ATMS solution to the DOTD. During the selection process, the Contractor shall complete this matrix to demonstrate its software solution's ability to comply with the functional requirements. The Contractor shall indicate if their software solution (F)ully complies, complies with (M)odifications, or does (N)ot comply with the functional requirement stated.

Table 2 – Compliance Matrix

Need	Requirement Number	Requirement	DOTD Priority	Contractors Response	Contractor Compliance Comment/Clarification	Verification Method (D, T, A, I)
Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.1	General Requirements				
	3.1.1.1	The ATMS shall be a Commercial-off-the-shelf (COTS) software product.	1			I
	3.1.1.2	The ATMS shall be designed and built in a modular fashion, consisting of a base system and optional subsystems or functional components that are licensed individually.	1			D
	3.1.1.3	The ATMS shall be scalable to include a minimum of 500 CCTV Cameras, 240 DMS, 360 vehicle detectors, 100 ramp meters, and 20 HAR transmitters, while providing for emerging technologies.	2			T
	3.1.1.4	The ATMS shall be configured in such a way that DOTD personnel can add, delete, or edit a device or device type without any vendor intervention.	1			D
	3.1.1.5	The COTS product shall require minimal customization on high-priority function modules to meet DOTD requirements.	1			D
	3.1.1.6	The ATMS shall run on a statewide license, allowing DOTD to access and operate in any:	1			D
	3.1.1.6.1	TMC facility,	1			D
	3.1.1.6.2	Approved remote location, or	1			D
	3.1.1.6.3	Approved government agency.	2			D
	3.1.1.7	The ATMS shall provide the ability to:	1			
1,2,3,4,5,6	3.1.1.7.1	Allow the regional and local TMCs to have primary command and control of their regional devices during normal operating hours, with statewide TMC oversight.	1			D
1,2,3,4,5,6	3.1.1.7.2	Allow the statewide TMCs to have primary command and control of any device, when necessary.	1			D
	3.1.1.8	The ATMS shall allow for secure remote access to provide system support and TMC operations.	1			I
	3.1.1.9	The ATMS shall allow for multiple users within the same district, at the same time, with no degradation of response time.	1			D
	3.1.1.10	The ATMS shall be a web-based system capable of being launched and operated within a standard Internet browser, Microsoft Internet Explorer Version 7, or equivalent.	1			D
	3.1.1.11	The ATMS application shall be launched and operated natively within a web browser and shall not utilize any 3rd	1			I

Need	Requirement Number	Requirement	DOTD Priority	Contractors Response	Contractor Compliance Comment/Clarification	Verification Method (D, T, A, I)
Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
		party remote web access, web application delivery, or virtual networking tools to achieve/simulate a web application.				
	3.1.1.12	The ATMS shall contain all data in a commonly accepted enterprise class relational database system such as MS SQL Server.	2			D
	3.1.1.13	The ATMS shall integrate all subsystems' Graphical User Interfaces (GUI) into a common look and feel.	1			D
	3.1.1.14	The ATMS shall allow for any device selected, in either the map or list, to be highlighted in both.	2			D
	3.1.1.15	The ATMS shall provide a single integrated interface to access all modules.	1			D
	3.1.1.16	The ATMS shall allow for common data to be shared across all subsystems.	1			D
	3.1.1.17	The ATMS shall provide spell check, text wrapping, and copy/cut/paste capabilities.	2			D
	3.1.1.18	The ATMS shall have the capabilities to add, modify, and delete custom user scripts for subsystem functions.	1			D
	3.1.2	System Administration				
	3.1.2.1	The ATMS shall include automatic procedures for startup of subsystems.	1			D
	3.1.2.2	The ATMS shall provide the capability to start or stop a single subsystem without affecting any of the other subsystems.	1			D
	3.1.2.3	The system shall only require a reboot when Operating System upgrades or modifications are created, or upgrades to executable applications are installed.	1			I
	3.1.2.3.1	The ATMS shall not require a subsystem reboot when a device is added, modified, or deleted.	1			D
	3.1.2.4	The ATMS shall include configurable procedures for creating backups.	1			I
	3.1.2.5	The ATMS shall include configurable procedures for restoring from a backup.	1			I
	3.1.2.6	The ATMS shall provide system updates at one location to be propagated to all other locations.	1			I
	3.1.2.7	The ATMS shall provide for the capability to create templates for commonly used process scripts.	2			D
	3.1.2.8	The ATMS shall allow updates to the database without affecting the current operators' session with the ATMS.	1			D
	3.1.2.9	The ATMS shall not require a user to log off and back on to view devices that were added, modified, or deleted.	1			D
	3.1.3	Security				
	3.1.3.1	The ATMS shall conform, at a minimum, to the DOTD's rules-based administration for access and security at all	1			D

Need	Requirement Number	Requirement	DOTD Priority	Contractors Response	Contractor Compliance Comment/Clarification	Verification Method (D, T, A, I)
Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
		levels of system use.				
	3.1.3.2	The ATMS shall encode/encrypt the user's password.	1			I
	3.1.3.3	The ATMS shall allow only authorized and validated users into the system.	1			D
	3.1.3.4	The ATMS shall allow the system administrator the ability to add, modify, and delete user accounts while maintaining historical information.	1			D
	3.1.3.5	The ATMS shall allow the system administrator the ability to add, modify, and delete user passwords and privileges while maintaining historical information.	1			D
	3.1.3.6	The ATMS shall allow the system administrator the ability to assign unique user accounts and passwords to each individual user.	1			D
	3.1.3.7	The ATMS shall allow the system administrator the ability to determine which users are currently logged onto the system and where they are located.	2			D
	3.1.3.8	The ATMS shall prioritize users by providing different privileges on a per-subsystem level.	1			D
	3.1.3.9	The ATMS shall validate each command from a user for the proper privileges.	1			D
	3.1.3.10	The ATMS shall allow the system administrator the ability to add, modify, and delete group privileges.	1			D
	3.1.3.11	The ATMS shall allow the system administrator the ability to add or delete a user from one or more group while maintaining historical information.	1			D
	3.1.3.12	The user shall be able to modify their password.	1			D
	3.1.3.13	The ATMS shall log an event message to the alarm and event logger (AEL) whenever a user logs in.	1			D
	3.1.3.13.1	The message shall contain the date, time, operator name, and log in location.	1			D
	3.1.3.14	The ATMS shall provide a method to log system, device and security activity for online reporting and archival storage to the alarm and event logger.	1			D
	3.1.4	Interactive GUI Map User Interface				
	3.1.4.1	The ATMS shall provide the following base map functions:	N/A			
2	3.1.4.1.1	The ATMS GUI shall have an interactive map that displays current status of the roadway network and ITS field devices.	1			D
2	3.1.4.1.1.1	Current incidents	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
2	3.1.4.1.1.2	Device type	1			D
2	3.1.4.1.1.3	Congestion/Speed	2			D
	3.1.4.1.2	The map shall be GIS based, using standard GIS files (e.g. shape files or other equivalent) to render a geographically accurate, to scale map.	1			D
2	3.1.4.1.3	The map shall display all major interstates and arterials with appropriate classification identified (i.e. interstate shield, state route shield).	1			D
	3.1.4.1.4	A default view shall be incorporated into the map so that the user, based on user name and password, can set the initial view when the map is first started.	3			D
	3.1.4.1.5	The map shall include the capability to zoom in and out with multiple zoom levels.	1			D
	3.1.4.1.6	The map shall include pre-defined statewide and regional zoomed areas (such as, but not limited to, Baton Rouge, New Orleans, Houma, and Shreveport). The vendor shall work with DOTD to define these pre-defined areas.	2			D
	3.1.4.1.7	The map icons shall be proportional to the zoom reference of the map.	1			D
	3.1.4.1.8	At minimum zoom extension:	N/A			D
	3.1.4.1.8.1	Roadway congestion conditions shall appear as line segments or vehicle detection points that are colorized by current traffic conditions.	1			D
	3.1.4.1.8.2	ITS devices, e.g. cameras, message signs, vehicle detectors, each incident type, etc., shall appear as icons in their relative location.	1			D
	3.1.4.1.8.2.1	Icons in the ATMS shall be user configurable and ideally resemble the icons in the CARS/511 software.	3			D
	3.1.4.1.9	At maximum zoom extension:	N/A			D
	3.1.4.1.9.1	ATMS devices appear as a graphical representation of the actual device. A DMS shall look like a DMS, in the correct position relative to the roadway, and shall display the message within the map graphic as it is displayed on the actual DMS. Cameras, traffic signals, and ramp meters shall be realistic graphical representations of the actual devices.	2			D
	3.1.4.1.10	The map shall include the capability to pan in any direction with a smooth transition.	1			D
	3.1.4.1.11	Panning the map will be accomplished via clicking and dragging the map in the desired direction, including simultaneous movement of both x- and y-axis.	1			D

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	3.1.4.2	The GUI shall be capable of receiving and displaying data from the local subsystems, as well as any other systems connected over the network via a standard C2C interface.	1			D
	3.1.4.3	The ATMS shall provide the following map device interaction:	N/A			D
2	3.1.4.3.1	The map shall present data, based on layers that can be individually enabled or disabled by the user.	1			D
	3.1.4.3.2	Each discrete data type represented within the map shall be contained within its own layer, including roadway classification, device, and incident types.	1			D
	3.1.4.3.3	The map shall provide a unique icon for all ITS device types in the system.	1			D
	3.1.4.3.4	The map shall provide a unique user-defined icon color for all ITS device type status in the system, as a minimum, but not limited to:	N/A			D
	3.1.4.3.4.1	Communications or power error	1			D
	3.1.4.3.4.2	Offline	1			D
	3.1.4.3.4.3	Operational or active	1			D
	3.1.4.3.5	The system shall allow the user to place an incident icon on the map and automatically provide the location coordinates.	1			D
	3.1.4.3.6	The system shall logically place a device or incident icons on the map when GPS coordinates are included in the device or incident configuration information is provided.	1			D
	3.1.4.3.7	The map shall allow for selection of any device or incident icon.	1			D
	3.1.4.3.8	The user shall be capable of selecting one or more devices or incidents.	1			D
2	3.1.4.3.9	The user shall be capable of performing an action on the one or more selected devices, device types, or incidents.	1			D
	3.1.4.3.10	The map interface shall provide for quick control of devices through a device control dialog box, which shall include:	N/A			D
1,2,3,5,6	3.1.4.3.10.1	CCTV camera	N/A			D
	3.1.4.3.10.1.1	Pan, tilt, and zoom a CCTV camera	1			D
	3.1.4.3.10.1.2	Hovering over the CCTV camera icon shall result in display of a current image snapshot	2			D

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1,2,3,4,5,6	3.1.4.3.10.2	DMS	N/A			D
	3.1.4.3.10.2.1	Add/Modify/Delete the message on a DMS	1			D
	3.1.4.3.10.2.2	Hovering over the DMS shall result in display of the current DMS message	1			D
1,2,3,4,5,6	3.1.4.3.10.3	HAR	N/A			D
	3.1.4.3.10.3.1	Add/Modify/Delete the message on a HAR station	1			D
	3.1.4.3.10.4	Ramp Metering	N/A			D
	3.1.4.3.10.4.1	Update a pre-determined plan for ramp metering	1			D
	3.1.4.3.10.5	Vehicle Detection	N/A			D
	3.1.4.3.10.5.1	Incident detector current polled data (volume, speed, occupancy)	1			D
1,2,3,4,5,6	3.1.4.3.10.6	Incidents	N/A			D
	3.1.4.3.10.6.1	Create/View/Edit an incident	1			D
	3.1.4.3.11	The map shall support the opening of a viewer window for additional information on the device:	N/A			D
	3.1.4.3.11.1	Detailed device status and control	1			D
	3.1.4.3.11.2	Incident data entry and control	1			D
	3.1.4.3.11.3	Configuration information	3			D
	3.1.4.3.12	The base map shall be configurable to display either speed or congestion data, based on instrumented roadways.	1			D
	3.1.4.4	The user interface shall provide a sortable, filterable list of all ITS device types to be accessed by the operator to provide the following functionality:	1			D
	3.1.4.4.1	Control capabilities,	1			D
	3.1.4.4.2	Status (power, communications, online/offline),	1			D
	3.1.4.4.3	Device configuration parameters.	2			D
	3.1.5	Closed Circuit Television (CCTV) Cameras				

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1,2,3,4,5,6	3.1.5.1	The CCTV cameras shall be able to utilize quick commands as per section 3.1.4.3.11	1			D
1,2,3,5,6	3.1.5.2	The CCTV subsystem shall store communication status from the cameras and log the information to the alarm and event logger including, but not limited to:	N/A			D
	3.1.5.2.1	Operational status (in or out of service),	1			D
	3.1.5.2.2	PTZ commands, and	1			D
	3.1.5.2.3	Communication failures to the camera.	1			D
2,3	3.1.5.3	The CCTV subsystem shall allow users to select, view, and control one or more cameras on the system from the CCTV list or GUI map.	2			D
2,3	3.1.5.4	The CCTV subsystem shall allow users to display up to 16 simultaneous streaming video images on a single user workstation, using any combination of video decoding standards without degradation in workstation performance.	1			D
2,3	3.1.5.5	The CCTV subsystem shall be capable of controlling camera pan, tilt (up/down/diagonal), zoom, focus, presets, patterns, and iris adjustments.	1			D
2,3	3.1.5.6	The CCTV subsystem shall activate all configured preset camera positions available to operators.	1			D
2,3	3.1.5.7	The CCTV subsystem shall be capable of adding, modifying, or deleting presets.	1			D
2,3	3.1.5.8	The preset names shall be available for use in other external operations, such as a script that runs on a scheduled basis to move the cameras to view a different direction.	1			I
2,3	3.1.5.9	The CCTV subsystem shall have the ability to add, modify, delete, play, pause, resume, and stop video tours.	1			D
2,3	3.1.5.10	The CCTV subsystem shall be capable of at least 16 independent camera tours per workstation without degradation in workstation performance.	1			D
1,2,3,5,6	3.1.5.11	The CCTV subsystem shall allow for selection and routing of video to:	N/A			D
	3.1.5.11.1	Auxiliary monitors or display devices, and	1			D
	3.1.5.11.2	Images to the video wall controller (i.e. Jupiter Pixelnet/SVS8).	1			D
2	3.1.5.12	The CCTV subsystem shall allow users with a higher priority level to lock camera control for a specific length of time. During this period of time, other users shall not be allowed to control the locked camera.	1			D
2	3.1.5.13	The CCTV subsystem shall allow the existing operator to lock the camera, but a user with a higher priority may	1			D

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		operate/release the camera.				
2	3.1.5.14	The CCTV subsystem shall indicate the owner of a locked camera.	2			D
2	3.1.5.15	The CCTV subsystem shall have the capability to place a camera offline from system access.	1			D
2	3.1.5.16	The CCTV subsystem shall have the capability to place a camera online for system access or to change the current status of its operational state.	1			D
2	3.1.5.17	The CCTV subsystem shall have the capability to block the video output of one or more cameras from specific users.	1			D
2	3.1.5.18	The CCTV subsystem shall have the capability to unblock the video output of one or more cameras from specific users.	1			D
2	3.1.5.19	The CCTV subsystem shall be capable of decoding video that is encoded, using standard or common video compression algorithms. These include, but not limited to:	N/A			D
	3.1.5.19.1	MJPEG	1			D
	3.1.5.19.2	MPEG2	1			D
	3.1.5.19.3	MPEG4	1			D
	3.1.5.19.4	H.264	2			D
2	3.1.5.20	The CCTV subsystem shall provide the same functionalities of the vendor software and device drivers for the operators/support staff.	1			D
2	3.1.5.21	The CCTV subsystem shall support pan/tilt/zoom (PTZ) control interfaces for a wide variety of camera interfaces, including, but not limited to:	N/A			D
	3.1.5.21.1	NTCIP 1205 model cameras (Pelco, Cohu, Bosch, etc.)	1			D
	3.1.5.21.2	Pelco cameras using the Pelco-D or NTCIP 1205 protocols	1			D
	3.1.5.21.3	Cohu cameras using the Cohu, Pelco-D or NTCIP 1205 protocols	1			D
	3.1.5.21.4	SONY CCTV with embedded encoder	1			D
2	3.1.5.22	The CCTV subsystem shall display the camera location information, such as, but not limited to, camera ID, camera location, preset position, and status.	1			D
2,4	3.1.5.23	The CCTV subsystem shall capture snapshot video images (JPEGs) from available cameras.	1			D

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2,4	3.1.5.24	The CCTV subsystem shall have the ability to save and overwrite to a file the current snapshot image of every camera within the system at a definable interval.	1			D
2,4	3.1.5.25	The CCTV subsystem shall allow for capturing one or more streaming images that will be made available in a standard video file format to be accessible by DOTD staff for analytical purposes.	1			D
2,4	3.1.5.26	The CCTV subsystem shall log an event message to the alarm and event logger whenever:	N/A			D
	3.1.5.26.1	A camera tour is added/edited/deleted,	3			D
	3.1.5.26.2	A camera preset is added/edited/deleted,	3			D
	3.1.5.26.3	A camera is added to the system,	1			D
	3.1.5.26.4	A camera is turned on/off.	1			D
1,2,3,4,5,6	3.1.5.27	The CCTV subsystem shall be capable of detecting and reporting to the IM subsystem any roadway congestion, incidents and anomalies through the use of video detection software.	2			D
	3.1.5.28	The CCTV subsystem shall allow the operator to size the video image window, without distorting the video image.	1			D
	3.1.5.29	The CCTV subsystem shall log an alarm message to the alarm and event logger with an error message when an action cannot be performed on a camera. The message shall contain a suggested course of action to bypass or correct the problem.	1			D
	3.1.6	Dynamic Message Signs				
1,2,3,4,5,6	3.1.6.1	The DMS subsystem shall support all fixed and portable DMSs.	1			D
1,2,3,4,5,6	3.1.6.2	The DMSs shall be able to utilize quick commands as per section 3.1.4.3.11	1			D
1,2,3,4,5,6	3.1.6.3	The DMS subsystem shall retrieve status information from signs and log the information to the alarm and event logger, including, but not limited to:	N/A			D
	3.1.6.3.1	Operational status (in or out of service),	1			D
	3.1.6.3.2	Module status,	1			D
	3.1.6.3.3	Pixel status,	1			D
	3.1.6.3.4	Voltage,	1			D

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	3.1.6.3.5	Temperature,	1			D
	3.1.6.3.6	Door open/close status,	1			D
	3.1.6.3.7	Any other internal malfunction,	2			D
	3.1.6.3.8	Any configurable parameters,	2			D
	3.1.6.3.9	Date/time of last successful poll,	1			D
	3.1.6.3.10	Date/time of last failed poll,	1			D
	3.1.6.3.11	Device failures, and	1			D
	3.1.6.3.12	Communication failures.	1			D
2,3,4	3.1.6.4	The DMS subsystem shall have the capability to poll one or more DMSs in a single operation in order to test communications.	1			D
2,3,4	3.1.6.5	The DMS subsystem shall have a configurable polling rate.	1			D
2,3,4	3.1.6.6	The DMS subsystem shall allow the user to initiate a poll at any time.	1			D
	3.1.6.7	The DMS subsystem shall allow users to select, view, and control one or more signs on the system from the DMS list or GUI map.				
1,2,3,4,5,6	3.1.6.8	The DMS subsystem shall allow users to add, remove, and edit configuration parameters for one or more signs from the DMS list or GUI map.	2			D
1,2,3,4,5,6	3.1.6.9	The DMS subsystem shall utilize one central sign library accessible by all statewide, regional, and local TMCs.	1			D
1,2,3,4,5,6	3.1.6.10	The DMS subsystem shall be able to create a single phase message in the DMS message library.	1			D
1,2,3,4,5,6	3.1.6.11	The DMS subsystem shall be able to create a multi-phase message in the DMS message library.	1			D
1,2,3,4,5,6	3.1.6.12	The DMS subsystem shall be able to open a message stored in the DMS message library.	1			D
1,2,3,4,5,6	3.1.6.13	The DMS subsystem shall be able to save an existing message to the DMS message library.	1			D
1,2,3,4,5,6	3.1.6.14	The DMS subsystem shall be able to save a message to the DMS message library under a new name.	1			D
1,2,3,4,5,6	3.1.6.15	The DMS subsystem shall be able to delete a message stored in the DMS message library.	1			D
1,2,3,4,5,6	3.1.6.16	The DMS subsystem shall have the capability to display a message stored in the DMS message library on one or	1			D

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		more DMSs.				
1,2,3,4,5,6	3.1.6.17	The DMS subsystem shall maintain a list of prohibited words.	1			D
1,2,3,4,5,6	3.1.6.18	The DMS subsystem shall check any message before displaying or queuing for prohibited words.	1			D
1,2,3,4,5,6	3.1.6.19	The DMS subsystem shall allow for an updatable dictionary to be used in the spell check.	1			D
1,2,3,4,5,6	3.1.6.20	The DMS subsystem shall have the capability to manually compose a message for a DMS and then send/post it to one or more signs in a single operation.	1			D
1,2,3,4,5,6	3.1.6.21	The DMS subsystem shall have the capability to blank one or more DMSs in one command.	1			D
1,2,3,4,5,6	3.1.6.22	The DMS subsystem shall have the capability to edit, or remove the current message displayed on one or more DMSs.	1			D
1,2,3,4,5,6	3.1.6.23	The DMS subsystem shall have the capability to add a message stored in the DMS message library to one or more DMSs priority message queue.	1			D
1,2,3,4,5,6	3.1.6.24	The DMS subsystem shall have the capability to remove a message from one or more DMSs' priority message queue.	1			D
1,2,3,4,5,6	3.1.6.25	The DMS subsystem shall have the capability of editing a message prior to queuing and displaying and the message.	1			D
1,2,3,4,5,6	3.1.6.26	The DMS subsystem shall be able to preview a message exactly as it would appear on a targeted DMS via a what-you-see-is-what-you-get (WYSIWYG) format. (This should take into account the pixel count, font, line spacing, and all other formatting settings.)	2			D
1,2,3,4,5,6	3.1.6.27	The DMS subsystem shall allow the user to review messages stored in the priority message queue of a DMS.	1			D
1,2,3,4,5,6	3.1.6.28	The DMS subsystem shall maintain a message priority hi1erarchy containing at least 4 levels of priority wit1hin the message queue.	1			D
1,2,3,4,5,6	3.1.6.29	The highest priority slot in a DMS message queue shall be the override priority. The lowest priority slot in a DMS message queue shall be the manual priority.	1			D
1,2,3,4,5,6	3.1.6.30	The DMS subsystem shall provide a sortable, filterable list of all signs with their current message, as well as a configurable number of messages in the priority message queue for that DMS.	1			D
1,2,3,4,5,6	3.1.6.31	The DMS subsystem shall be able to set the display time for phases of a message.	1			D
1,2,3,4,5,6	3.1.6.32	The DMS subsystem shall support text messages, graphic messages, and a hybrid of the two.	2			D

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1,2,3,4,5,6	3.1.6.33	The DMS subsystem shall support monochrome and color messages.	2			D
1,2,3,4,5,6	3.1.6.34	The DMS subsystem shall support the capability to perform all actions on a simulated DMS.	2			D
1,2,3,4,5,6	3.1.6.35	The DMS subsystem shall support interfaces (sign type, size, firmware, controller type, NTCIP version) for a wide variety of DMS and PDMS vendors including:	1			D
	3.1.6.35.1	Daktronics	1			D
	3.1.6.35.2	Mark IV	1			D
	3.1.6.35.3	Adaptive	1			D
	3.1.6.35.4	Skyline	1			D
	3.1.6.35.5	Addco	1			D
	3.1.6.35.6	Wanco	1			D
	3.1.6.35.7	Display Solutions	2			D
	3.1.6.35.8	National Signal	2			D
	3.1.6.35.9	Vermac	2			D
	3.1.6.35.10	Precision Solar	2			D
	3.1.6.35.11	American Signal	1			D
	3.1.6.35.12	3M	1			D
1,2,3,4,5,6	3.1.6.36	The DMS subsystem shall support the NTCIP 1203 protocol for permanent and portable DMS of all typical sizes.	1			D
1,2,3,4,5,6	3.1.6.37	The DMS subsystem shall support proprietary DMS control protocols, as required.	1			D
1,2,3,4,5,6	3.1.6.38	The DMS scheduler shall allow for future scheduling of DMS messages for a single sign or multiple signs.	1			D
1,2,3,4,5,6	3.1.6.39	The DMS scheduler display shall show the current active DMS messages on the selected signs.	1			D
1,2,3,4,5,6	3.1.6.40	The DMS scheduler shall allow for different messages to be scheduled at different times on a single sign or multiple signs.	1			D
1,2,3,4,5,6	3.1.6.41	The DMS scheduler shall alert the user that a scheduled message is about to be displayed.	1			D

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1,2,3,4,5,6	3.1.6.42	The DMS subsystem shall include support for automated messaging from other subsystems or manual messaging from an operator.	1			D
1,2,3,4,5,6	3.1.6.43	The DMS subsystem shall allow the performance of a pixel test.	1			D
1,2,3,4,5,6	3.1.6.44	The DMS subsystem shall allow users with a higher priority level to lock sign control for a specific length of time. During this period of time other users shall not be allowed to control the locked sign.	1			D
1,2,3,4,5,6	3.1.6.45	The DMS subsystem shall allow the existing operator to lock the sign, but a user with a higher priority may operate/release the sign.	3			D
1,2,3,4,5,6	3.1.6.46	The DMS subsystem shall indicate the owner of a locked sign.	3			D
1,2,3,4,5,6	3.1.6.47	The DMS subsystem shall have the capability to place a DMS offline from system access.	1			D
1,2,3,4,5,6	3.1.6.48	The DMS subsystem shall have the capability to place a DMS online for system access or change the current status of its operational state.	1			D
1,2,3,4,5,6	3.1.6.49	The DMS subsystem shall have the capability to reset a DMS.	1			D
1,2,3,4,5,6	3.1.6.50	The DMS subsystem shall provide an error message to the alarm and event logger if the message to be sent exceeds the number of allowable characters for this DMS.	1			D
1,2,3,4,5,6	3.1.6.51	The DMS subsystem shall allow configuration of all sign parameters.	1			D
1,2,3,4,5,6	3.1.6.52	The DMS subsystem shall log an event message to the alarm and event logger whenever a sign is manipulated. The message shall contain the date, time, operator name, sign, and action taken.	1			D
1,2,3,4,5,6	3.1.6.53	The DMS subsystem shall log an alarm message to the alarm and event logger with an error message when an action cannot be performed on a sign. The message shall contain a suggested course of action to bypass or correct the problem.	1			D
	3.1.7	Incident Management (IM)				
1,2,3,4,5,6	3.1.7.1	The IM shall be able to utilize quick commands as per section 3.1.4.3.11	1			D
1,2,3,4,5,6	3.1.7.2	The IM subsystem shall be capable of detecting unplanned incidents through the implementation of the Automatic Incident Detection algorithms.	1			D
1,2,3,4,5,6	3.1.7.3	The IM subsystem shall be capable of detecting incidents on all roadway segments for which data and/or detection is available.	1			D
1,2,3,4,5,6	3.1.7.4	The IM subsystem shall track unplanned incidents (accidents), and planned incidents (e.g. work zones, VIP visit,	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
		ball game, Mardi Gras, etc.).				
1,2,3,4,5,6	3.1.7.5	The IM subsystem shall allow users to create, modify, and terminate incidents.	1			D
1,2,3,4,5,6	3.1.7.6	The IM subsystem shall allow for the creation of an incident from a new incident template, or by clicking on a location on the map GUI.	1			D
1,2,3,4,5,6	3.1.7.7	The IM subsystem shall allow users to select, view, or control one or more incident from the IM list or GUI map.	1			D
1,2,3,4,5,6	3.1.7.8	The IM subsystem shall allow for the creation of multiple incident types.	1			D
1,2,3,4,5,6	3.1.7.9	The IM subsystem shall provide unique icons for each incident type.	1			D
1,2,3,4,5,6	3.1.7.10	Icons shall be user-configurable and try to match CARS/511 System.	3			D
1,2,3,4,5,6	3.1.7.11	The IM subsystem shall allow each incident type to be toggled on or off independently on the IM list or GUI map.	1			D
1,2,3,4,5,6	3.1.7.12	The IM subsystem shall automatically log detected incidents and notify the user for further verification and processing of the event to the alarm and event logger.	1			D
1,2,3,4,5,6	3.1.7.13	The IM subsystem shall allow incident records to be modified by only a single user at a time.	1			D
1,2,3,4,5,6	3.1.7.14	The IM system shall share data with the CARS/511 system and other subsystems, such that any incident or event entered or modified in either system shall automatically be updated in the other system.	1			D
1,2,3,4,5,6	3.1.7.15	The IM subsystem shall archive all incident records, including time/date stamps for every modification to the incident record throughout the life of the incident.	1			D
1,2,3,4,5,6	3.1.7.16	The IM subsystem shall recognize control sections, mile markers, and roadway interchanges, as a method for locating incidents.	1			D
1,2,3,4,5,6	3.1.7.17	The IM subsystem shall capture date/time stamp information associated with the various events which transpire through the duration of an incident.	1			D
	3.1.8	Incident Response Plans				
1,2,3,4,5,6	3.1.8.1	The IR subsystem shall provide an automated response mechanism to planned and unplanned incidents and/or events.	1			D
1,2,3,4,5,6	3.1.8.2	The IR subsystem shall generate a suggested plan in response to an unplanned or planned incident/event that can be implemented, in part or in whole, by a user with the appropriate permissions.	1			D
1,2,3,4,5,6	3.1.8.3	The IR subsystem shall generate automatic response actions, for review by the operator based on the IM input and a user-configurable set of distance constraints, including, but not limited to, the following:	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.8.3.1	Recommended DMS to use in response to an incident,	1			D
	3.1.8.3.2	Recommended messages for DMS,	1			D
	3.1.8.3.3	Recommended HAR to use in response to an incident,	1			D
	3.1.8.3.4	Recommended messages for HAR,	1			D
	3.1.8.3.5	Public messages for CARS/511 traveler information and Twitter distribution, and	1			D
	3.1.8.3.6	Recommendations for electronic notifications for staff via e-mail, text message, pager, phone, fax, or Twitter.	1			D
1,2,3,4,5,6	3.1.8.4	The IR subsystem shall provide a mechanism to create, store, modify, and implement response plans for special situation events.	1			D
1,2,3,4,5,6	3.1.8.5	The IR subsystem shall allow the user to select any one of the stored response plans or to generate a new one.	1			D
1,2,3,4,5,6	3.1.8.6	The IR subsystem shall provide for notification to outside agencies via an email distribution list (from ATMS) for each incident.	1			D
1,2,3,4,5,6	3.1.8.7	The IR subsystem shall provide for notification to the public via a Twitter distribution list (from ATMS) for each incident.	2			D
1,2,3,4,5,6	3.1.8.8	The IR subsystem shall allow the incident notification email and Twitter distribution lists to be configurable.	2			D
1,2,3,4,5,6	3.1.8.9	The IR subsystem shall log an event message to the alarm and event logger whenever an incident response plan is manipulated. The message shall contain the date, time, operator name, incident response plan, and action taken.	1			D
	3.1.9	Vehicle Detection System (VDS)				
1,2,3,4,5,6	3.1.9.1	The VDS shall provide the ability to view, collect, and archive real-time data from detectors such as, but not limited to, volume, speed, occupancy, and classification on a lane-by-lane basis, if available.	1			D
1,2,3,4,5,6	3.1.9.2	The VDS shall be able to utilize quick commands as per section 3.1.4.3.11	1			D
1,2,3,4,5,6	3.1.9.3	The VDS shall retrieve status information from sensors and log the information to the alarm and event logger, including, but limited to:	N/A			D
	3.1.9.3.1	Operational status (in or out of service),	1			D
	3.1.9.3.2	Internal malfunction,	2			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.9.3.3	Any configurable parameters,	2			D
	3.1.9.3.4	Date/time of last successful poll,	1			D
	3.1.9.3.5	Date/time of last failed poll,	1			D
	3.1.9.3.6	Device failures, and	1			D
	3.1.9.3.7	Communication failures.	1			D
1,2,3,4,5,6	3.1.9.4	The VDS shall be able to interface with a variety of VDS sensors, including:	N/A			D
	3.1.9.4.1	Inductive Loops	3			D
	3.1.9.4.2	Remote Traffic Microwave Sensors (X2/X3/G4)	1			D
	3.1.9.4.3	Wavetronix Microwave Sensors	1			D
	3.1.9.4.4	Speedinfo Sensors	3			D
	3.1.9.4.5	3M Microloops	3			D
	3.1.9.4.6	Autoscope Solo/Solo Terras	1			D
	3.1.9.4.7	Sensys Networks magneto resistive sensors	2			D
	3.1.9.4.8	BlueToad Sensors	1			D
	3.1.9.4.9	Traficon Video	2			D
2,3	3.1.9.5	The VDS shall have the capability to automatically poll one or more VDS sensors in order to test device communications.	1			D
2,3	3.1.9.6	The VDS shall have a configurable polling rate.	1			D
2,2	3.1.9.7	The VDS subsystem shall allow the user to initiate a poll at any time.	1			D
1,2,3,4,5,6	3.1.9.8	The VDS shall provide a map layer that allows operators to manage and view a summary of information from roadway sensors to easily see and understand the congestion status of the entire roadway network.	2			D
	3.1.9.9	The VDS shall allow for the operator to utilize “VCR Controls” to rewind, pause, and play the congestion / flow map to understand when congestion started and the impacts over a period of time.	3			
1,2,3,4,5,6	3.1.9.10	The VDS shall allow users to select one or more sensors from the VDS list or GUI map.	1			D

Need	Requirement Number	Requirement	DOTD Priority	Contractors Response	Contractor Compliance Comment/Clarification	Verification Method (D, T, A, I)
Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.9.11	The VDS shall allow users with the required privileges to view and set multiple threshold values on one or more sensors in one operation.	1			D
	3.1.9.12	The VDS shall allow users with the required privileges access to modify the VDS color thresholds for the purposes of display on the GUI system map.	1			D
	3.1.9.13	The VDS shall allow users with the required privileges to define the data interval to be used in threshold calculation. For example, 20-second data interval, 60-second data interval, or a rolled-up data interval.	1			D
1,2,3,4,5,6	3.1.9.14	The VDS subsystem shall be capable of detecting and reporting to the IM subsystem any roadway congestion, incidents and anomalies through the use of an incident detection algorithm.				D
1,2,3,4,5,6	3.1.9.15	The VDS shall have the capability to interface with sensors conforming to the NTCIP 1209 protocol.	1			D
1,2,3,4,5,6	3.1.9.16	The VDS shall be capable of obtaining traffic data from GPS or cell probe data systems/brokers (e.g. Inrix).	1			D
1,2,3,4,5,6	3.1.9.17	The VDS shall be capable of obtaining data from external data feeds such as TrafficCast, Navteq, etc.	1			D
	3.1.9.18	The VDS subsystem shall provide a sortable, filterable list of configurable sensors with the system displaying the current volume, speed, occupancy, and classification data.	1			A
	3.1.9.19	The VDS shall aggregate lane-by-lane data into station data.	1			A
1,2,3,4,5,6	3.1.9.20	The VDS shall publish station data to other subsystems, such as, but not limited to, the travel time subsystem.	1			D
	3.1.9.21	The VDS shall allow the user to define a link, which consists of a start and end point on the roadway and contains a station.	1			D
	3.1.9.22	The VDS shall have the capability to place a sensor offline from system access.	1			D
	3.1.9.23	The VDS shall have the capability to place a sensor online for system access or change the current status of its operational state.	1			D
	3.1.9.24	The VDS shall allow configuration of all sensor parameters.	3			D
	3.1.9.25	The VDS shall log an event message to the alarm and event logger whenever a sensor is manipulated. The message shall contain the date, time, operator name, sensor, and action taken.	1			D
	3.1.9.26	The VDS shall log an alarm message to the alarm and event logger with an error message when an action cannot be performed on a sensor. The message shall contain a suggested course of action to bypass or correct the problem.	1			D
	3.1.10	Travel Times				

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
4	3.1.10.1	The travel time subsystem shall be capable of obtaining internal VDS data and external data feeds such as TrafficCast, Navteq, Inrix, etc., for use in calculating travel times for display on DMS and other dissemination methods (website, CARS/511, Twitter).	1			D
4	3.1.10.2	The travel time subsystem shall not interfere with the timely display of any other operator-generated message on the DMS when displaying travel time messages.	1			D
4	3.1.10.3	The travel time subsystem shall generate a single view of all calculated travel times throughout the system for internal and external stakeholders.	1			D
4	3.1.10.4	Travel times shall be available for definable routes that include links consisting of a start, multiple middle, and end points.	1			D
4	3.1.10.5	The travel time subsystem shall calculate travel times based on information obtained from the vehicle detectors, historical data, external data, or any predictive algorithm data for each link between the selected start and end points of a route. The calculated travel time for a route shall be the sum of the travel times for each link within that route.	1			A
4	3.1.10.6	The travel time subsystem shall allow the user to configure the frequency at which an automated travel time message is posted to a sign.				D
4	3.1.10.7	The travel time subsystem shall allow the operator to disable one or more travel time messages from displaying on a DMS.	1			D
4	3.1.10.8	The travel time subsystem shall provide the capability to schedule travel time messages to be displayed on one or more DMSs.	1			D
4	3.1.10.9	Where a route contains failed links, the travel time for the distance of all non-failed links shall be interpolated to cover the distance of all links in that route. If the number of working links for a route drops below a configurable threshold, then no travel time shall be available for that route.	1			A
4	3.1.10.10	The travel time subsystem shall assign zero or more routes to DMS. A DMS may have zero or more routes bound to it, and will only be able to display travel times for those routes.	1			D
4	3.1.10.11	The travel time subsystem shall only display travel times greater than 1 minute and less than 99 minutes as a range +/- 1 minute.	1			D
4	3.1.10.12	The travel time subsystem shall blank a sign if a travel time that is currently being displayed drops or raises outside the allowable range. This range shall be configurable for each route.	1			D
4	3.1.10.13	The travel time subsystem shall default to display no travel time when there is no data being collected on a route.	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
4	3.1.10.14	The travel time subsystem shall account for the number of characters on the DMS displaying the travel time, in order to display a clear message.	1			D
4	3.1.10.15	The travel time subsystem shall store the calculated route travel times in the database, along with the parameters used to perform that calculation.	1			D
4	3.1.10.16	The travel time subsystem shall be capable of exporting the raw travel time data via an XML feed.	1			D
4	3.1.10.17	The travel time subsystem shall log an alarm message to the alarm and event logger with an error message when there is no data being collected on a route. The message shall contain a suggested course of action to bypass or correct the problem.	1			D
	3.1.11	Alarm and Event Logger (AEL)				
	3.1.11.1	The AEL user interface shall display configurable subsystem alarms.	1			D
	3.1.11.2	The AEL shall display alarms and events received from any subsystem or interface to the ATMS that generated alarms.	1			D
	3.1.11.3	The AEL display shall allow the user to configure, sort and filter the alarm and event list based on different parameters, such as, but not limited to, alarm type, severity, date/time, action, region, etc.	1			D
	3.1.11.4	The AEL shall allow an alarm to be confirmed by a user.	1			D
	3.1.11.5	The AEL shall allow a custom action to be executed when an alarm is triggered.	1			D
	3.1.11.6	The AEL shall maintain a copy of each alarm, error condition, or operation reported.	1			D
	3.1.11.7	The AEL shall provide a historical record of ATMS module activity.	1			D
	3.1.11.8	The AEL shall provide a means to display alarms and events on a user workstation.	1			D
	3.1.11.9	The AEL shall provide a means to respond to alarms and events.	1			D
	3.1.11.10	The AEL shall provide a means to generate reports.	1			D
	3.1.11.11	When an alarm is displayed, it is an active alarm and the AEL shall provide multiple acknowledgement options.	1			D
	3.1.11.12	The AEL shall permit a user to select an alarm from the scrollable active alarm list and add a comment which includes the time and the user.	1			D
	3.1.11.13	Each subsystem shall generate a configurable alarm, which is sent to the alarm and event logger when the software cannot communicate with the ITS devices for a configurable number of successive poll cycles.	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.11.14	Each subsystem shall log the user ID, device descriptor, current action, and date/time when an operator is accessing any device.	1			D
	3.1.12	Highway Advisory Radio				
1,2,3,4,5,6	3.1.12.1	The HAR subsystem shall have the ability to record and transmit messages to roadside HAR devices.	3			D
1,2,3,4,5,6	3.1.12.2	The HAR subsystem shall have an interface with the Highway Information Systems (HIS) Platinum software currently utilized by the DOTD.	3			D
1,2,3,4,5,6	3.1.12.3	The HAR subsystem shall be able to utilize quick commands as per section 3.1.4.3.11	3			D
1,2,3,4,5,6	3.1.12.4	The HAR subsystem shall retrieve status information from HAR devices and log the information to the alarm and event logger, including, but not limited to:	3			D
	3.1.12.4.1	Operational status (in or out of service),	3			D
	3.1.12.4.2	Activation times,	3			D
	3.1.12.4.3	Internal malfunction,	3			D
	3.1.12.4.4	Any configurable parameters,	3			D
	3.1.12.4.5	Date/time of last successful poll,	3			D
	3.1.12.4.6	Date/time of last failed poll,	3			D
	3.1.12.4.7	Device failures, and	3			D
	3.1.12.4.8	Communication failures.	3			D
2,3,4	3.1.12.5	The HAR subsystem shall have the capability to poll one or more HAR devices in order to test communications.	3			D
2,3,4	3.1.12.6	The HAR subsystem shall have a configurable polling rate.	3			D
2,3,4	3.1.12.7	The HAR subsystem shall allow the user to initiate a poll at any time.	3			D
	3.1.12.8	The HAR subsystem shall allow users to select, view, and control one or more HAR devices from the HAR list or GUI map.	3			D
1,2,3,4,5,6	3.1.12.9	The HAR subsystem shall have the capability to add, modify, and delete messages in a central HAR library accessible by all statewide, regional, and local TMCs.	3			D
1,2,3,4,5,6	3.1.12.10	The HAR subsystem shall have the ability to initiate and terminate the transmission of messages to the roadside	3			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
		HAR devices.				
1,2,3,4,5,6	3.1.12.11	The HAR subsystem shall be able to play a prerecorded voice message.	3			D
1,2,3,4,5,6	3.1.12.12	The HAR subsystem shall be able to record a HAR message.	3			D
1,2,3,4,5,6	3.1.12.13	The HAR subsystem shall be able to create a HAR message via text-to speech.	3			D
1,2,3,4,5,6	3.1.12.14	The HAR subsystem shall be capable of sending one message to a grouping of HAR devices with one command.	3			D
1,2,3,4,5,6	3.1.12.15	The HAR subsystem shall have the capability to do an audible preview of the composed HAR message before sending the message to the HAR device.	3			D
1,2,3,4,5,6	3.1.12.16	The HAR subsystem shall have the capability to activate HAR beacon signs.	3			D
1,2,3,4,5,6	3.1.12.17	The HAR subsystem shall have the capability to deactivate HAR beacon signs.	3			D
	3.1.12.18	The HAR subsystem shall allow users with a higher priority level to lock HAR control for a specific length of time. During this period of time other users shall not be allowed to control the locked HAR.	3			D
	3.1.12.19	The HAR subsystem shall allow the existing operator to lock the HAR, but a user with a higher priority may operate/release the HAR.	3			D
	3.1.12.20	The HAR subsystem shall indicate the owner of a locked HAR.	3			D
	3.1.12.21	The HAR subsystem shall have the capability to place a HAR offline from system access.	3			D
	3.1.12.22	The HAR subsystem shall have the capability to place a HAR online for system access or change the current status of its operational state.	3			D
	3.1.12.23	The HAR subsystem shall allow configuration of all HAR parameters.	3			D
	3.1.12.24	The HAR subsystem shall log an event message to the alarm and event logger whenever a HAR is manipulated. The message shall contain the date, time, operator name, HAR, and message information.	3			D
	3.1.12.25	The HAR subsystem shall alert the user with an error message when an action cannot be performed on a HAR. The message shall contain a suggested course of action to bypass or correct the problem.	3			D
	3.1.13	Ramp Metering				
1,2,3,4,5,6	3.1.13.1	The ramp metering subsystem shall have the capability of interfacing with the StreetWise software.	1			D
1,2,3,4,5,6	3.1.13.2	The ramp metering subsystem shall be able to utilize quick commands as per section 3.1.4.3.11.4.	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
1,2,3,4,5,6	3.1.13.3	The ramp metering subsystem shall retrieve status information from ramp meters and log the information to the alarm and event logger, including, but not limited to:	N/A			D
	3.1.13.3.1	Operational status (in or out of service),	1			D
	3.1.13.3.2	When the ramp meter is turned on or off automatically through the controller,	1			D
	3.1.13.3.3	Timing plans,	1			D
	3.1.13.3.4	Signal illumination (error message on bulbs),	1			D
	3.1.13.3.5	Any configurable parameters,	2			D
	3.1.13.3.6	Device failures, and	1			D
	3.1.13.3.7	Communication failures.	1			D
	3.1.13.4	The ramp metering subsystem shall have the capability to poll one or more ramp meter controllers in order to test communications.	1			D
2,3	3.1.13.5	The ramp metering subsystem shall have a configurable polling rate.	1			D
2,3	3.1.13.6	The ramp metering subsystem shall allow the user to initiate a poll at any time.	1			D
	3.1.13.7	The ramp metering subsystem shall allow users to select one or more ramp meter controllers from the ramp metering list or GUI map.	1			D
1,2,3,5,6	3.1.13.8	The ramp metering subsystem shall display a summary overview of all ramp metering controllers, viewable from one window that contains the current ramp meter status.	1			D
1,2,3,5,6	3.1.13.9	The ramp metering subsystem summary overview shall include streaming camera video, if available.	2			D
1,2,3,5,6	3.1.13.10	The ramp metering subsystem summary overview shall include the ability to turn off or on one or more ramp meter controllers.	1			D
1,2,3,5,6	3.1.13.11	The ramp metering subsystem shall have the ability to turn on one or more ramp meter controllers in a single operation.	1			D
1,2,3,5,6	3.1.13.12	The ramp metering subsystem shall have the ability to change ramp meter timing plans for one or more ramp meter controllers in a single operation.	1			D
1,2,3,5,6	3.1.13.13	The ramp metering subsystem shall have to ability to turn off one or more ramp meter controllers in a single operation.	1			D

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Contractor Compliance Response – (F)ully Comply; Comply with (M)odifications; Do (N)ot Comply						
Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.13.14	The ramp metering subsystem shall allow users with a higher priority level to lock ramp metering control for a specific length of time. During this period of time other users shall not be allowed to control the locked ramp meter controller.	3			D
	3.1.13.15	The ramp metering subsystem shall allow the existing operator to lock the ramp meter controller, but a user with a higher priority may operate/release the ramp meter controller.	3			D
	3.1.13.16	The ramp metering subsystem shall indicate the owner of a locked ramp meter controller.	3			D
1,2,3,5,6	3.1.13.17	The ramp metering subsystem shall have the capability to place a ramp meter controller offline from system access.	1			D
1,2,3,5,6	3.1.13.18	The ramp metering subsystem shall have the capability to place a ramp meter controller online for system access or change the current status of its operational state.	1			D
	3.1.13.19	The ramp metering subsystem shall allow configuration of all ramp meter controller parameters.	2			D
	3.1.13.20	The ramp metering subsystem shall log an event message to the alarm and event logger whenever a ramp meter controller is manipulated. The message shall contain the date, time, operator name, ramp meter controller, and action taken.	1			D
	3.1.13.21	The ramp metering subsystem shall log an alarm message with the alarm and event logger with an error message when an action cannot be performed on a ramp meter controller. The message shall contain a suggested course of action to bypass or correct the problem.	1			D
	3.1.14	Traffic Signal Subsystem (TSS)				
1,2,3,5,6	3.1.14.1	The TSS shall have the capability to interface with the Streetwise software.	1			D
1,2,3,5,6	3.1.14.2	The TSS subsystem shall be able to utilize quick commands as per section 3.1.4.3.11	1			D
1,2,3,5,6	3.1.14.3	The TSS shall retrieve status information from traffic signal controllers and log the information to the alarm and event logger, including, but not limited to:	1			D
	3.1.14.3.1	Operational status (in or out of service),	1			D
	3.1.14.3.5	Timing plan activation,	1			D
	3.1.14.3.3	Device failures, and	1			D
	3.1.14.3.4	Communication failures.	1			D
2,3	3.1.14.4	The TSS shall have the capability to poll one or more traffic signal controllers in order to test communications.	1			D

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Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
2,3	3.1.14.5	The TSS shall have a configurable polling rate.	1			D
2,2	3.1.14.6	The TSS subsystem shall allow the user to initiate a poll at any time.	1			D
1,2,3,5,6	3.1.14.7	The TSS shall have the capability to access one or more traffic signal controllers to engage pre-engineered timing plans.	1			D
1,2,3,5,6	3.1.14.8	The TSS subsystem shall have the ability to change the signal timing plans for one or more traffic signal controllers in a single operation.	1			D
	3.1.14.9	The TSS shall allow users to select one or more traffic signal controllers from the TSS list or GUI map.	1			D
	3.1.14.10	The TSS shall allow users with a higher priority level to lock traffic signal control for a specific length of time. During this period of time other users shall not be allowed to control the locked traffic signal controller.	2			D
	3.1.14.11	The TSS shall allow the existing operator to lock the traffic signal controller, but a user with a higher priority may operate/release the traffic signal controller.	2			D
	3.1.14.12	The TSS shall indicate the owner of a locked traffic signal controller.	2			D
1,2,3,5,6	3.1.14.13	The TSS shall have the capability to place a traffic signal controller offline from system access.	1			D
1,2,3,5,6	3.1.14.14	The TSS shall have the capability to place a traffic signal controller online for system access or change the current status of its operational state.	1			D
	3.1.14.15	The TSS shall log an event message to the alarm and event logger whenever a traffic signal controller is manipulated. The message shall contain the date, time, operator name, traffic signal controller, and action taken.	1			D
	3.1.14.16	The TSS shall log an alarm message with the alarm and event logger with an error message when an action cannot be performed on a traffic signal controller. The message shall contain a suggested course of action to bypass or correct the problem.	1			D
	3.1.15	GPS Asset Tracking (GAT)				
1,2,3,5,6	3.1.15.1	The GAT subsystem shall have the capability to track vehicles and portable ITS devices in real-time, using GAT/GPS data and displaying the locations of these devices on the GUI map.	1			D
1,2,3,5,6	3.1.15.2	The GAT shall have the ability to interface with LocateIM software.	1			D
1,2,3,5,6	3.1.15.2.1	Hovering over a vehicle shall result in the display of status information made available through LocateIM, including, but not limited to, unit ID, status, and driver.	1			D

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Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
1,2,3,5,6	3.1.15.3	The GAT subsystem shall allow users to select a vehicle or portable device from the GAT list or GUI map.	1			D
	3.1.15.4	GAT/GPS data shall be time stamped with the date/time the GAT/GPS data was received.	1			D
	3.1.15.5	The GAT subsystem shall display devices with a unique ID and the current GPS/GAT location.	1			D
	3.1.16	Data Archiving and Reporting (DAR)				
3,5,6	3.1.16.1	The DAR subsystem shall archive all data retrieved from all ITS field device types, as well as all subsystem-generated data, such as, but not limited to, events, alarms, and travel times.	1			D
3,5,6	3.1.16.2	The DAR subsystem shall include the date and timestamp when the data was collected and archived.	1			D
3,5,6	3.1.16.3	The DAR subsystem shall limit access to the archiving and reporting module by user- and group-level security to ensure trusted access.	1			D
3,5,6	3.1.16.4	The DAR subsystem shall include, but not be limited to, the following reports:	N/A			D
	3.1.16.4.1	VDS Traffic Data Report,	1			D
	3.1.16.4.2	5-minute Traffic Data Report per device,	1			D
	3.1.16.4.3	15-minute Traffic Data Report per device,	1			D
	3.1.16.4.4	Hourly Traffic Data Report per device,	1			D
	3.1.16.4.5	Daily Traffic Data Report per device,	1			D
	3.1.16.4.6	DMS Message History,	1			D
	3.1.16.4.7	DMS Status,	1			D
	3.1.16.4.8	CCTV Activity,	1			D
	3.1.16.4.9	Incident Summary,	1			D
	3.1.16.4.10	HAR Message History,	1			D
	3.1.16.4.11	HAR Status,	1			D
	3.1.16.4.12	User Activity,	1			D
	3.1.16.4.13	Ramp Metering Activity,	1			D

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Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
	3.1.16.4.14	Travel Time Segment Report,	1			D
	3.1.16.4.15	ITS Device Downtime Reports,	1			D
	3.1.16.4.16	ITS Device Failure Reports,	1			D
	3.1.16.4.17	Daily chronological report of all roadway incidences, and	1			D
	3.1.16.4.18	ATMS Module Failure Report.	1			D
3,5,6	3.1.16.5	The DAR subsystem shall provide the capability for generating and exporting file format data, such as, but not limited to, Excel, Word, CSV, PDF, and XML for custom reports.	1			D
3,5,6	3.1.16.6	The DAR subsystem shall provide the capability for generating Ad-Hoc reports.	1			D
3,5,6	3.1.16.7	The DAR subsystem shall provide the capability for generating automated reports.	1			D
3,5,6	3.1.16.8	The DAR subsystem shall provide the capability for Ad-Hoc database queries.	1			D
3,5,6	3.1.16.9	The DAR subsystem shall be able to save a custom or Ad-Hoc report.	1			D
3,5,6	3.1.16.10	The DAR subsystem shall be able to save all Ad-Hoc database queries.	1			D
3,5,6	3.1.16.11	The DAR subsystem shall support printing for all reports types.	1			D
3,5,6	3.1.16.12	The DAR subsystem shall accommodate retrieval and report generation for archived data covering a period of up to 18 months without impact to existing online data storage.	1			I
3,5,6	3.1.16.13	The DAR subsystem shall be able to automatically push daily traffic and operations data to an external data warehouse.	1			D
	3.1.17	External System Integration/Data Sharing				
3,5,6	3.1.17.1	The external system integration shall provide, at a minimum, the ability to generate an XML formatted file for exporting to other external stakeholders.	1			D
3,5,6	3.1.17.2	The external system integration shall be able to interface and share data to/from CARS/511.	1			D
3,5,6	3.1.17.3	The external system integration shall be able to receive XML formatted files from other external systems for integration into the system.	1			D
3,5,6	3.1.17.4	The external system integration shall log an event message to the alarm and event logger whenever a file is imported or exported. The message shall contain the date, time, operator name, file information, and action	1			D

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Needs: 1. Improves transportation network safety; 2. Improves traffic management; 3.Reduces non-recurring congestion; 4. Effectively disseminates traffic information; 5. Improves emergency management; 6. Improves administrative efficiency, operational safety, and productivity for commercial vehicles.						
		taken.				
	3.1.18	Center-to-Center (C2C) Interface				
1,2,3,4,5,6	3.1.18.1	The C2C interface shall be national ITS standards based.	1			I
1,2,3,4,5,6	3.1.18.2	The C2C interface shall support C2C standard data types and transmission protocols.	1			D
1,2,3,4,5,6	3.1.18.3	The C2C interface shall support input and output of data based on the Traffic Management Data Dictionary (TMDD).	1			D
1,2,3,4,5,6	3.1.18.4	The C2C interface shall support all subsystem interfaces.	1			D
1,2,3,4,5,6	3.1.18.5	The C2C interface shall support legacy systems' proprietary communication interfaces.	1			D
1,2,3,4,5,6	3.1.18.6	The C2C shall provide security for data exchange of all data types, so that data may be selectively included or excluded from transfer to an external agency.	1			D
1,2,3,4,5,6	3.1.18.7	The C2C shall provide a mechanism for automatically publishing data and video images from multiple sources to various traveler information web sites at specific intervals.	1			D
1,2,3,4,5,6	3.1.18.8	The C2C interface shall provide a mechanism to immediately restrict access to all ATMS data to external agencies.	1			D