

APPENDIX-B

FUNCTIONAL REQUIREMENTS

Functional Requirements

GF/EGF Regional Architecture RA (Region)

3/25/2005 3:28:56PM



Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element: Altru Ambulance Vehicles</i>	
<i>Entity: Emergency Vehicle Subsystem</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	Existing
5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	
<i>Element: CAT Operations Center</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Tracking and Dispatch</i>	
Monitoring transit vehicle locations via interactions with on-board systems and determining vehicle schedule adherence. Furnish users with real-time transit related information and maintain interface with digital map providers.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Planning and scheduling associated with fixed and flexible route transit services, automatically updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	Existing
5 The center shall collect transit operational data for use in the generation of routes and schedules.	
<i>Requirement:</i>	Existing
9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Functional Area: Transit Center Fare and Load Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	Existing
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	
<i>Element: EGF Dispatch Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:EGF Dispatch Center</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
11 The center shall update the incident information log once the emergency system operator has verified the incident.	
<i>Requirement:</i>	Existing
12 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
13 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units; includes requests for signal preemption.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies and provide suggested routing under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	
<i>Requirement:</i>	Existing
8 The center shall receive asset restriction information from maintenance centers to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Existing
9 The center shall receive traffic information, including closures, traffic conditions, etc. from traffic management centers.	
<i>Requirement:</i>	Existing
10 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
12 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	

Element:EGF FD Vehicles

Entity:Emergency Vehicle Subsystem

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:EGF FD Vehicles</i>	
<i>Entity:Emergency Vehicle Subsystem</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	Existing
5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	
<i>Element:EGF PW Field Devices</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Automated Treatment</i>	
Field elements that activate automated roadway treatment systems (to disperse anti-icing chemicals, etc.) based on environmental or atmospheric conditions, or under center control.	
<i>Requirement:</i>	Planned
1 The field element shall activate automated roadway treatment systems based on environmental or atmospheric conditions. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The field element shall activate automated roadway treatment systems under center control. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
3 The field element shall return automated roadway treatment system and associated environmental sensor operational status to the maintenance center.	
<i>Requirement:</i>	Planned
4 The field element shall return automated roadway treatment system and associated environmental sensor fault data to the maintenance center for repair.	
<i>Element:EGF PW Operations Center</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Automated Treatment System Control</i>	
Remotely controls automated roadway treatment systems (to disperse anti-icing chemicals, etc.) directly, or via control of the environmental sensors that activate the treatment systems automatically in the field.	
<i>Requirement:</i>	Planned
1 The center shall remotely control automated roadway treatment systems. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The center shall remotely control the environmental sensors that upon detecting changes in environmental or atmospheric conditions, automatically activate roadway treatment systems.	
<i>Requirement:</i>	Planned
3 The center shall collect automated roadway treatment system and associated environmental sensor operational status.	
<i>Requirement:</i>	Planned
4 The center shall collect automated roadway treatment system and associated environmental sensor fault data and request repair.	
<i>Requirement:</i>	Planned
5 The center shall accept requests for automated roadway treatment system activation from center personnel.	
<i>Functional Area: MCM Winter Maintenance Management</i>	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:EGF PW Operations Center</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
6 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	
<i>Requirement:</i>	Existing
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	
<i>Requirement:</i>	Existing
8 The center shall determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.	
<i>Requirement:</i>	Existing
9 The center shall provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.	

*Element:GF FD Vehicles**Entity:Emergency Vehicle Subsystem**Functional Area: On-board EV En Route Support*

On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.

<i>Requirement:</i>	Existing
5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	

*Element:GF PW Field Devices**Entity:Roadway Subsystem**Functional Area: Roadway Automated Treatment*

Field elements that activate automated roadway treatment systems (to disperse anti-icing chemicals, etc.) based on environmental or atmospheric conditions, or under center control.

<i>Requirement:</i>	Planned
1 The field element shall activate automated roadway treatment systems based on environmental or atmospheric conditions. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:GF PW Field Devices</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Automated Treatment</i>	
Field elements that activate automated roadway treatment systems (to disperse anti-icing chemicals, etc.) based on environmental or atmospheric conditions, or under center control.	
<i>Requirement:</i>	Planned
2 The field element shall activate automated roadway treatment systems under center control. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
3 The field element shall return automated roadway treatment system and associated environmental sensor operational status to the maintenance center.	
<i>Requirement:</i>	Planned
4 The field element shall return automated roadway treatment system and associated environmental sensor fault data to the maintenance center for repair.	
<i>Element:GF PW Operations Center</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Automated Treatment System Control</i>	
Remotely controls automated roadway treatment systems (to disperse anti-icing chemicals, etc.) directly, or via control of the environmental sensors that activate the treatment systems automatically in the field.	
<i>Requirement:</i>	Planned
1 The center shall remotely control automated roadway treatment systems. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The center shall remotely control the environmental sensors that upon detecting changes in environmental or atmospheric conditions, automatically activate roadway treatment systems.	
<i>Requirement:</i>	Planned
3 The center shall collect automated roadway treatment system and associated environmental sensor operational status.	
<i>Requirement:</i>	Planned
4 The center shall collect automated roadway treatment system and associated environmental sensor fault data and request repair.	
<i>Requirement:</i>	Planned
5 The center shall accept requests for automated roadway treatment system activation from center personnel.	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
6 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	
<i>Requirement:</i>	Existing
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:GF PW Operations Center</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
8 The center shall determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.	
<i>Requirement:</i>	Existing
9 The center shall provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.	
<i>Element:GF TOC</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Existing
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	
<i>Requirement:</i>	Planned
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at major intersections and on main highways for urban areas, based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	Existing
1 The center shall remotely control traffic signal controllers.	
<i>Requirement:</i>	Existing
4 The center shall collect traffic signal controller fault data from the field.	
<i>Requirement:</i>	Existing
5 The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	Planned
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Functional Area: TMC Regional Traffic Control</i>	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:GF TOC</i>	
<i>Entity:Traffic Management</i>	
<i>Functional Area: TMC Regional Traffic Control</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Planned
1 The center shall exchange traffic information with other traffic management centers, includes incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Planned
2 The center shall exchange traffic control information with other traffic management centers, includes remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Element:GF TOC Field Devices</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	Planned
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	
<i>Requirement:</i>	Planned
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Planned
6 The field element shall return sensor and CCTV system operational status to the controlling center.	
<i>Requirement:</i>	Planned
7 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at major intersections and on main highways for urban areas; also supports pedestrian crossings.	
<i>Requirement:</i>	Existing
1 The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.	
<i>Requirement:</i>	Existing
6 The field element shall return traffic signal controller operational status to the controlling center.	
<i>Requirement:</i>	Existing
7 The field element shall return traffic signal controller fault data to the maintenance center for repair.	
<i>Functional Area: Roadway Signal Priority</i>	
Field elements that provide the capability to receive vehicle signal priority requests and control traffic signals accordingly.	
<i>Requirement:</i>	Existing
1 The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.	
<i>Requirement:</i>	Existing
2 The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:GF TOC Field Devices</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Traffic Information Dissemination</i> Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Planned
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Element:MnDOT D2 Field Devices</i>	
<i>Entity:Roadway Subsystem</i>	
<i>Functional Area: Roadway Signal Controls</i> Field elements including traffic signal controllers for use at major intersections and on main highways for urban areas; also supports pedestrian crossings.	
<i>Requirement:</i>	Existing
1 The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.	
<i>Requirement:</i>	Existing
6 The field element shall return traffic signal controller operational status to the controlling center.	
<i>Requirement:</i>	Existing
7 The field element shall return traffic signal controller fault data to the maintenance center for repair.	
<i>Functional Area: Roadway Signal Priority</i> Field elements that provide the capability to receive vehicle signal priority requests and control traffic signals accordingly.	
<i>Requirement:</i>	Existing
1 The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.	
<i>Requirement:</i>	Existing
2 The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.	
<i>Functional Area: Roadway Automated Treatment</i> Field elements that activate automated roadway treatment systems (to disperse anti-icing chemicals, etc.) based on environmental or atmospheric conditions, or under center control.	
<i>Requirement:</i>	Planned
1 The field element shall activate automated roadway treatment systems based on environmental or atmospheric conditions. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The field element shall activate automated roadway treatment systems under center control. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
3 The field element shall return automated roadway treatment system and associated environmental sensor operational status to the maintenance center.	
<i>Requirement:</i>	Planned
4 The field element shall return automated roadway treatment system and associated environmental sensor fault data to the maintenance center for repair.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element: MnDOT D2 TOC</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Automated Treatment System Control</i>	
Remotely controls automated roadway treatment systems (to disperse anti-icing chemicals, etc.) directly, or via control of the environmental sensors that activate the treatment systems automatically in the field.	
<i>Requirement:</i>	Planned
1 The center shall remotely control automated roadway treatment systems. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The center shall remotely control the environmental sensors that upon detecting changes in environmental or atmospheric conditions, automatically activate roadway treatment systems.	
<i>Requirement:</i>	Planned
3 The center shall collect automated roadway treatment system and associated environmental sensor operational status.	
<i>Requirement:</i>	Planned
4 The center shall collect automated roadway treatment system and associated environmental sensor fault data and request repair.	
<i>Requirement:</i>	Planned
5 The center shall accept requests for automated roadway treatment system activation from center personnel.	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
6 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	
<i>Requirement:</i>	Existing
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	
<i>Requirement:</i>	Existing
8 The center shall determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.	
<i>Requirement:</i>	Existing
9 The center shall provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.	

*Entity: Traffic Management**Functional Area: TMC Signal Control*

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element: MnDOT D2 TOC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at major intersections and on main highways for urban areas, based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	Existing
1 The center shall remotely control traffic signal controllers.	
<i>Requirement:</i>	Existing
4 The center shall collect traffic signal controller fault data from the field.	
<i>Requirement:</i>	Existing
5 The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.	
<i>Functional Area: TMC Regional Traffic Control</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Planned
1 The center shall exchange traffic information with other traffic management centers, includes incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Planned
2 The center shall exchange traffic control information with other traffic management centers, includes remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Element: MSP Dispatch Center Crookston</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units; includes requests for signal preemption.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies and provide suggested routing under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	
<i>Requirement:</i>	Existing
8 The center shall receive asset restriction information from maintenance centers to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Existing
12 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	
<i>Element: NDDOT District Field Devices</i>	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:</i> NDDOT District Field Devices	
<i>Entity:</i> Roadway Subsystem	
<i>Functional Area:</i> Roadway Traffic Information Dissemination Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Planned
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Functional Area:</i> Roadway Automated Treatment Field elements that activate automated roadway treatment systems (to disperse anti-icing chemicals, etc.) based on environmental or atmospheric conditions, or under center control.	
<i>Requirement:</i>	Planned
1 The field element shall activate automated roadway treatment systems based on environmental or atmospheric conditions. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The field element shall activate automated roadway treatment systems under center control. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
3 The field element shall return automated roadway treatment system and associated environmental sensor operational status to the maintenance center.	
<i>Requirement:</i>	Planned
4 The field element shall return automated roadway treatment system and associated environmental sensor fault data to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Speed Monitoring Vehicle speed sensors that detect excessive vehicle speeds, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Planned
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	
<i>Requirement:</i>	Planned
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, etc.).	
<i>Element:</i> NDDOT District Office	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Automated Treatment System Control Remotely controls automated roadway treatment systems (to disperse anti-icing chemicals, etc.) directly, or via control of the environmental sensors that activate the treatment systems automatically in the field.	
<i>Requirement:</i>	Planned
1 The center shall remotely control automated roadway treatment systems. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	
<i>Requirement:</i>	Planned
2 The center shall remotely control the environmental sensors that upon detecting changes in environmental or atmospheric conditions, automatically activate roadway treatment systems.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:NDDOT District Office</i>	
<i>Entity:Maintenance and Construction Management</i>	
<i>Functional Area: MCM Automated Treatment System Control</i>	
Remotely controls automated roadway treatment systems (to disperse anti-icing chemicals, etc.) directly, or via control of the environmental sensors that activate the treatment systems automatically in the field.	
<i>Requirement:</i>	Planned
3 The center shall collect automated roadway treatment system and associated environmental sensor operational status.	
<i>Requirement:</i>	Planned
4 The center shall collect automated roadway treatment system and associated environmental sensor fault data and request repair.	
<i>Requirement:</i>	Planned
5 The center shall accept requests for automated roadway treatment system activation from center personnel.	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
6 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	
<i>Requirement:</i>	Existing
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	
<i>Requirement:</i>	Existing
8 The center shall determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.	
<i>Requirement:</i>	Existing
9 The center shall provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.	
<i>Element:PIC</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: Basic Information Broadcast</i>	
Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect, process, store, and disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:PIC</i>	
<i>Entity:Information Service Provider</i>	
<i>Functional Area: Basic Information Broadcast</i>	
Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i>	Existing
2 The center shall collect, process, store, and disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	
<i>Element:PSAP</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
11 The center shall update the incident information log once the emergency system operator has verified the incident.	
<i>Requirement:</i>	Existing
12 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
13 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units; includes requests for signal preemption.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies and provide suggested routing under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element:PSAP</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units; includes requests for signal preemption.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	
<i>Requirement:</i>	Existing
8 The center shall receive asset restriction information from maintenance centers to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Existing
9 The center shall receive traffic information, including closures, traffic conditions, etc. from traffic management centers.	
<i>Requirement:</i>	Existing
10 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
12 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	
<i>Element:State Radio</i>	
<i>Entity:Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units; includes requests for signal preemption.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies and provide suggested routing under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	
<i>Requirement:</i>	Existing
8 The center shall receive asset restriction information from maintenance centers to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Existing
12 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	
<i>Element:Transit Vehicles</i>	
<i>Entity:Transit Vehicle Subsystem</i>	
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.	
<i>Functional Area: On-board Transit Fare and Load Management</i>	

Architecture	Status
GF/EGF Regional Architecture RA (Region)	(Region)
<i>Element: Transit Vehicles</i>	
<i>Entity: Transit Vehicle Subsystem</i>	
<i>Functional Area: On-board Transit Fare and Load Management</i>	
On-board systems provide variable and flexible fare collection using a travelers fare medium (stored value cards or other payment instrument). Collect data required to determine accurate ridership levels and fare statistics.	
<i>Requirement:</i>	Existing
10 The transit vehicle shall provide passenger loading and fare statistics data to the center.	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	Existing
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	
<i>Functional Area: On-board Transit Signal Priority</i>	
On-board systems to provides request signal priority through short range communication directly with traffic control equipment at the roadside (intersections, crossings, ramp meters, etc.).	
<i>Requirement:</i>	Existing
2 The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected.	