

APPENDIX-B
FUNCTIONAL REQUIREMENTS

Functional Requirements

Bismarck-Mandan RA (Region)



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Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bis-Man Transit Center	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Tracking and Dispatch	
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:</i> Transit Center Fixed-Route Operations	
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>	Planned
3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	
<i>Requirement:</i>	Existing
5 The center shall collect transit operational data for use in the generation of routes and schedules.	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Planning and scheduling of demand responsive transit (i.e. paratransit) services, includes automatic operator assignment and monitoring.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Planned
2 The center shall track the location and availability of transit vehicles for use in demand responsive transit (paratransit) operations.	
<i>Functional Area:</i> Transit Center Fare and Load Management	
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>	Planned
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	Planned
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bis-Man Transit Center	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Data Collection Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	
<i>Element:</i> Bis-Man Transit Vehicles	
<i>Entity:</i> Transit Vehicle Subsystem	
<i>Functional Area:</i> On-board Transit Trip Monitoring 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:</i> On-board Paratransit Operations On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Inputs based on the transit vehicle's type and passenger capacity.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Functional Area:</i> On-board Transit Security 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>	Planned
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>Element:</i> Bismarck FD Vehicles	
<i>Entity:</i> Emergency Vehicle Subsystem	
<i>Functional Area:</i> 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.	
<i>Element:</i> Bismarck PW Field Devices	
<i>Entity:</i> Roadway Subsystem	
<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.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bismarck PW Field Devices	
<i>Entity:</i> Roadway Subsystem	
<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>Element:</i> Bismarck PW Operations Center	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Vehicle Tracking	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	
<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.	
<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:</i> MCM Winter Maintenance Management	
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.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bismarck PW Operations Center	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Winter Maintenance Management 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
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
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:</i> Bismarck PW Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall compute the location of the vehicle based on inputs from a vehicle location determination function.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall send the timestamped vehicle location to the controlling center.	
<i>Element:</i> Bismarck TOC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Signal Control 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>Element:</i> Bismarck TOC Field Devices	
<i>Entity:</i> Roadway Subsystem	
<i>Functional Area:</i> Roadway Basic Surveillance Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bismarck TOC Field Devices	
<i>Entity:</i> Roadway Subsystem	
<i>Functional Area:</i> Roadway Basic Surveillance	
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:</i> Roadway Signal Controls	
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:</i> Roadway Signal Priority	
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>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>Requirement:</i>	Planned
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Planned
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<i>Functional Area:</i> Roadway Data Collection	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bismarck TOC Field Devices	
<i>Entity:</i> Roadway Subsystem	
<i>Functional Area:</i> Roadway Data Collection	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Existing
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Element:</i> Bismarck/Burleigh Combined Communications Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
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
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>	Planned
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:</i> Emergency Dispatch	
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
5 The center shall track the location and status of emergency vehicles responding to an emergency and update the incident status based on information from the emergency vehicle.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> Bismarck/Burleigh Combined Communications Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch 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
7 The center shall store and maintain the emergency service responses in an action log.	
<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
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:</i> Mandan Engineering Field Devices	
<i>Entity:</i> Roadway Subsystem	
<i>Functional Area:</i> Roadway Signal Controls 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:</i> Roadway Signal Priority 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>Element:</i> Mandan FD Vehicles	
<i>Entity:</i> Emergency Vehicle Subsystem	
<i>Functional Area:</i> 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.	
<i>Element:</i> Mandan PD Dispatch Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element: Mandan PD 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.	
<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
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
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
5 The center shall track the location and status of emergency vehicles responding to an emergency and update the incident status based on information from the emergency vehicle.	
<i>Requirement:</i>	Existing
7 The center shall store and maintain the emergency service responses in an action log.	
<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
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: Mandan PW Operations Center

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element: Mandan 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
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: Mandan Traffic Engineering</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.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element: Mandan Traffic Engineering</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
4 The center shall collect traffic signal controller fault data from the field.	
<i>Element: Metro Area 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: Morton County Communications</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
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
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
Bismarck-Mandan RA (Region)	(Region)
<i>Element: Morton County Communications</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
5 The center shall track the location and status of emergency vehicles responding to an emergency and update the incident status based on information from the emergency vehicle.	
<i>Requirement:</i>	Existing
7 The center shall store and maintain the emergency service responses in an action log.	
<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>	
<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>Requirement:</i>	Planned
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Planned
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<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.	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:</i> NDDOT District Field Devices	
<i>Entity:</i> Roadway Subsystem	
<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
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>Element:</i> NDDOT District Office	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Vehicle Tracking Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	
<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.	
<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:</i> MCM Winter Maintenance Management 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).	

Architecture	Status
Bismarck-Mandan RA (Region)	(Region)
<i>Element:NDDOT District Office</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:NDDOT District Vehicles</i>	
<i>Entity:Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Location Tracking</i> On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall compute the location of the vehicle based on inputs from a vehicle location determination function.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall send the timestamped vehicle location to the controlling center.	
<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
7 The center shall store and maintain the emergency service responses in an action log.	
<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.	