



Kimley-Horn
and Associates, Inc.



APPENDIX B – CUSTOMIZED MARKET PACKAGES

APPENDIX B – TABLE OF CONTENTS

Nebraska Department of Roads Statewide ITS Architecture

LIST OF FIGURES

Figure B1 – ATMS01 Network Surveillance Customized Market Package.....	1
Figure B2 – ATMS03 Surface Street Control Customized Market Package.....	2
Figure B3 – ATMS04 Freeway Control Customized Market Package.....	3
Figure B4 – ATMS06 Traffic Information Dissemination Customized Market Package.....	4
Figure B5 – ATMS07 Regional Traffic Control Customized Market Package.....	5
Figure B6 – ATMS08 Incident Management System Customized Market Package.....	6
Figure B7 – ATMS13 Standard Railroad Grade Crossing Customized Market Package.....	7
Figure B8 – ATMS15 Railroad Operations Coordination Customized Market Package.....	8
Figure B9 – MC01 Maintenance and Construction Vehicle Tracking Customized Market Package.....	9
Figure B10 – MC03 Road Weather Data Collection Customized Market Package.....	10
Figure B11 – MC04 Weather Information Processing and Distribution Customized Market Package.....	11
Figure B12 – MC05 Roadway Automated Treatment Customized Market Package.....	12
Figure B13 – MC06 Winter Maintenance Customized Market Package.....	13
Figure B14 – MC07 Roadway Maintenance and Construction Customized Market Package.....	14
Figure B15 – MC08 Workzone Management Customized Market Package.....	15
Figure B16 – MC10 Maintenance and Construction Activity Coordination Customized Market Package.....	16
Figure B17 – ATIS1 Broadcast Traveler Information Customized Market Package.....	17
Figure B18 – EM1 Emergency Response Customized Market Package.....	18
Figure B19 – EM4 Roadway Service Patrols Market Package.....	19
Figure B20 – AD2 ITS Data Warehouse Customized Market Packages.....	20
Figure B21 – HAZMAT/Over-Dimensional Permitting Data Collection (Extension) Market Package.....	21

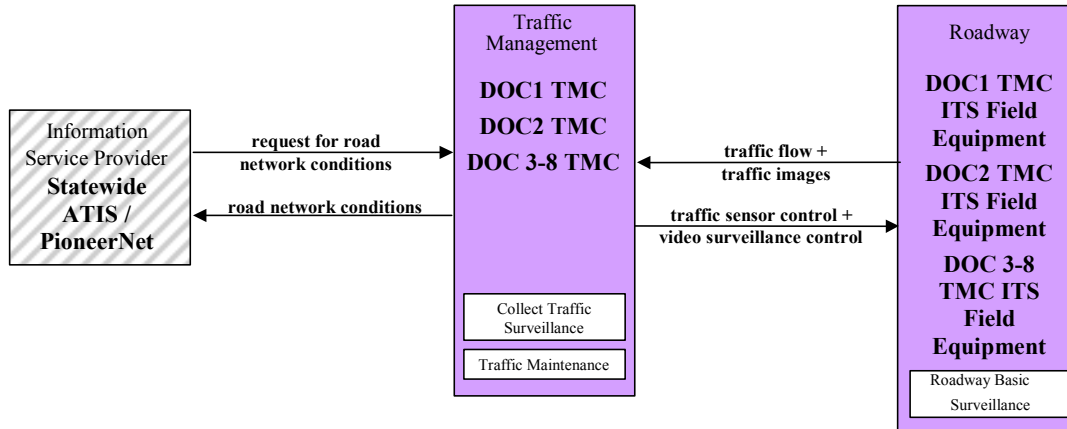


Figure B1 – ATMS01 Network Surveillance Customized Market Package

ATMS01 Market Package Description: This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and wireline communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Subsystem). The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.

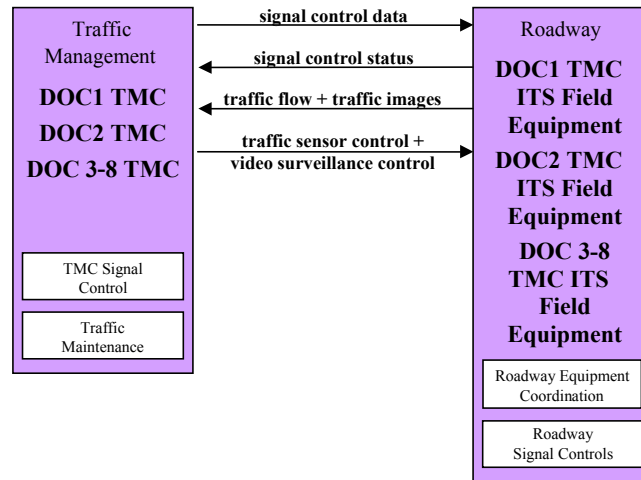


Figure B2 – ATMS03 Surface Street Control Customized Market Package

ATMS03 Market Package Description: This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from static pre-timed control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. Additionally, general advisory and traffic control information can be provided to the driver while en route. This market package is generally an intra-jurisdictional package that does not rely on real-time communications between separate control systems to achieve area-wide traffic signal coordination. Systems that achieve coordination across jurisdictions by using a common time base or other strategies that do not require real time coordination would be represented by this package. This market package is consistent with typical urban traffic signal control systems.

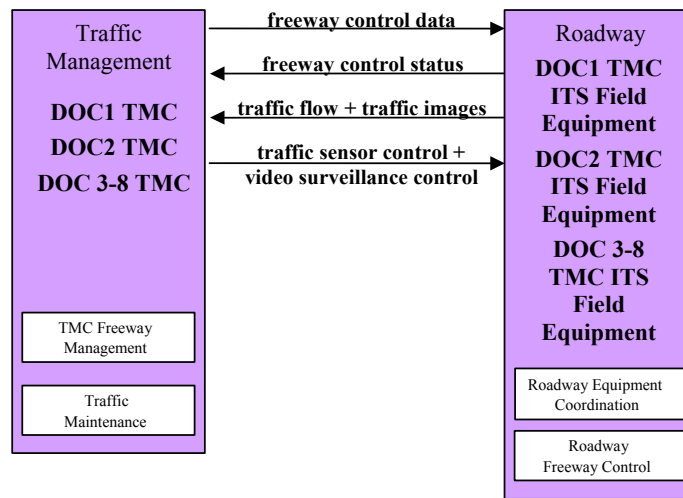


Figure B3 – ATMS04 Freeway Control Customized Market Package

ATMS04 Market Package Description: This market package provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for freeways. Coordination and integration of ramp meters are included as part of this market package. This package is consistent with typical urban traffic freeway control systems. This package incorporates the instrumentation included in the Network Surveillance Market Package to support freeway monitoring and adaptive strategies as an option. This market package also includes the capability to utilize surveillance information for detection of incidents. Typically, the processing would be performed at a traffic management center; however, developments might allow for point detection with roadway equipment. For example, a CCTV might include the capability to detect an incident based upon image changes. Additionally, this market package allows general advisory and traffic control information to be provided to the driver while en route.

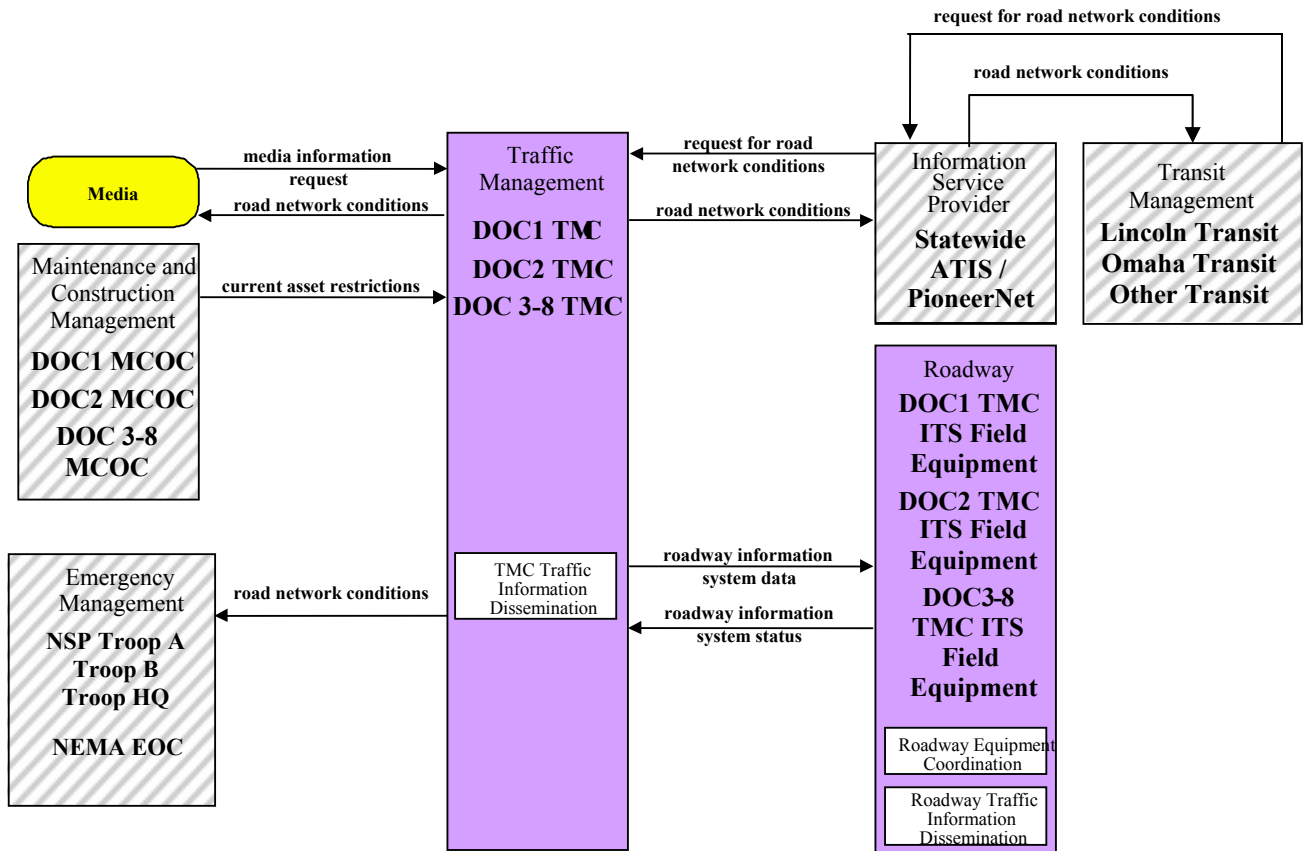


Figure B4 – ATMS06 Traffic Information Dissemination Customized Market Package

ATMS06 Market Package Description This market package allows traffic information to be disseminated to drivers and vehicles using roadway equipment such as dynamic message signs or highway advisory radio. This package provides a tool that can be used to notify drivers of incidents; careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Information Service Providers. A link to the Maintenance and Construction Management subsystem allows real time information on road/bridge closures due to maintenance and construction activities to be disseminated.

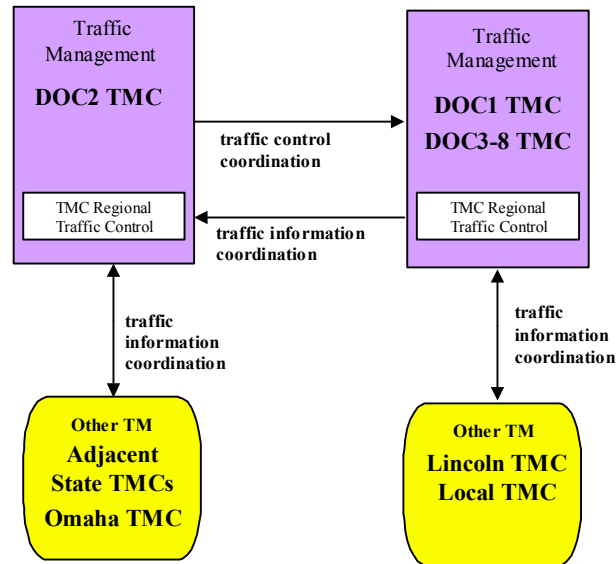


Figure B5 – ATMS07 Regional Traffic Control Customized Market Package

ATMS07 Market Package: This market package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy. This market package advances the Surface Street Control and Freeway Control Market Packages by adding the communications links and integrated control strategies that enable integrated interjurisdictional traffic control. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. This package relies principally on roadside instrumentation supported by the Surface Street Control and Freeway Control Market Packages and adds hardware, software, and wireline communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. Several levels of coordination are supported from sharing of information through sharing of control between traffic management centers.

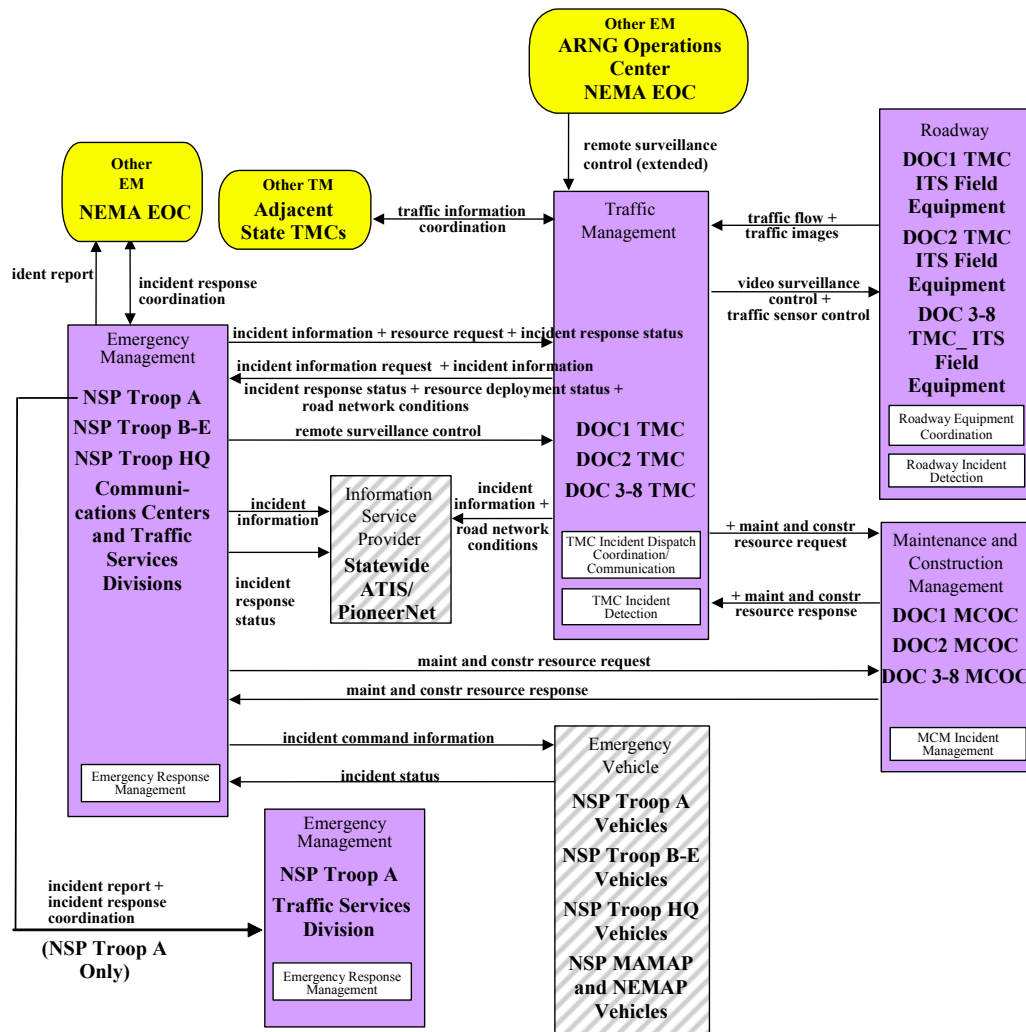


Figure B6 – ATMS08 Incident Management System Customized Market Package

ATMS08 Market Package Description: This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as weather service entities and event promoters. Information from these diverse sources are collected and correlated by this market package to detect and verify incidents and implement an appropriate response. This market package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between center subsystems. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination market package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler

Information market packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.

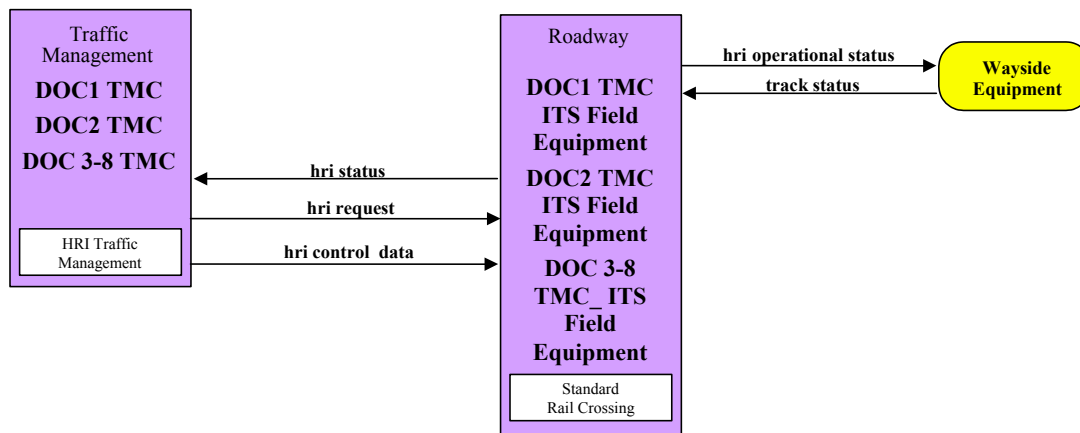
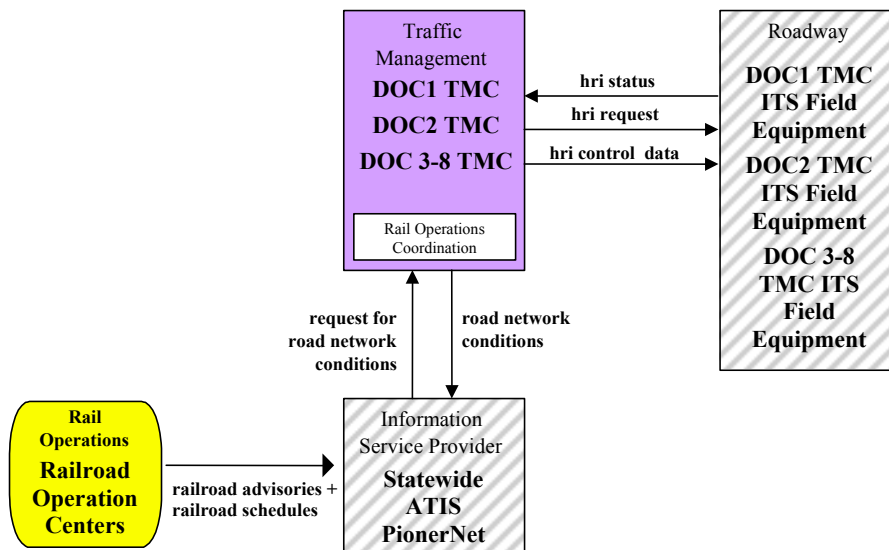


Figure B7 – ATMS13 Standard Railroad Grade Crossing Customized Market Package

ATMS13 Market Package Description: This market package manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. (Note that passive systems exercise only the single interface between the roadway subsystem and the driver in the architecture definition.) These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the traffic management subsystem.



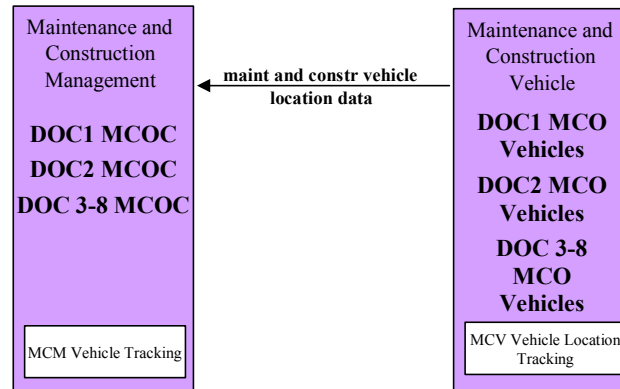


Figure B9 – MC01 Maintenance and Construction Vehicle Tracking Customized Market Package

MC01 Market Package Description: This market package will track the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.

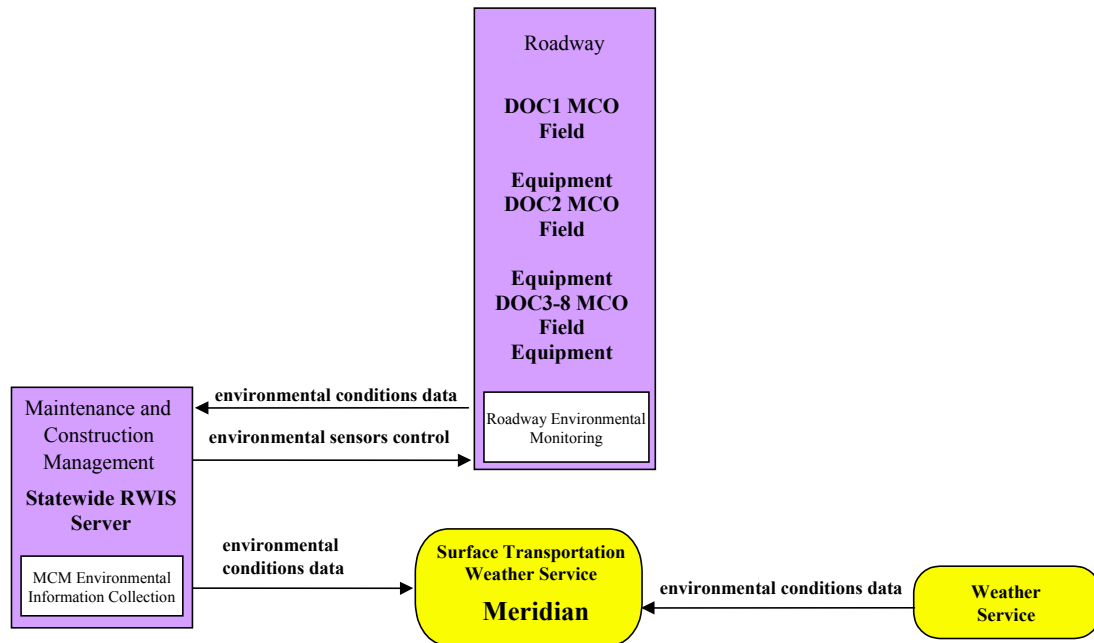


Figure B10 – MC03 Road Weather Data Collection Customized Market Package

MC03 Market Package Description: This market package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. The collected environmental data is used by the Weather Information Processing and Distribution Market Package to process the information and make decisions on operations.

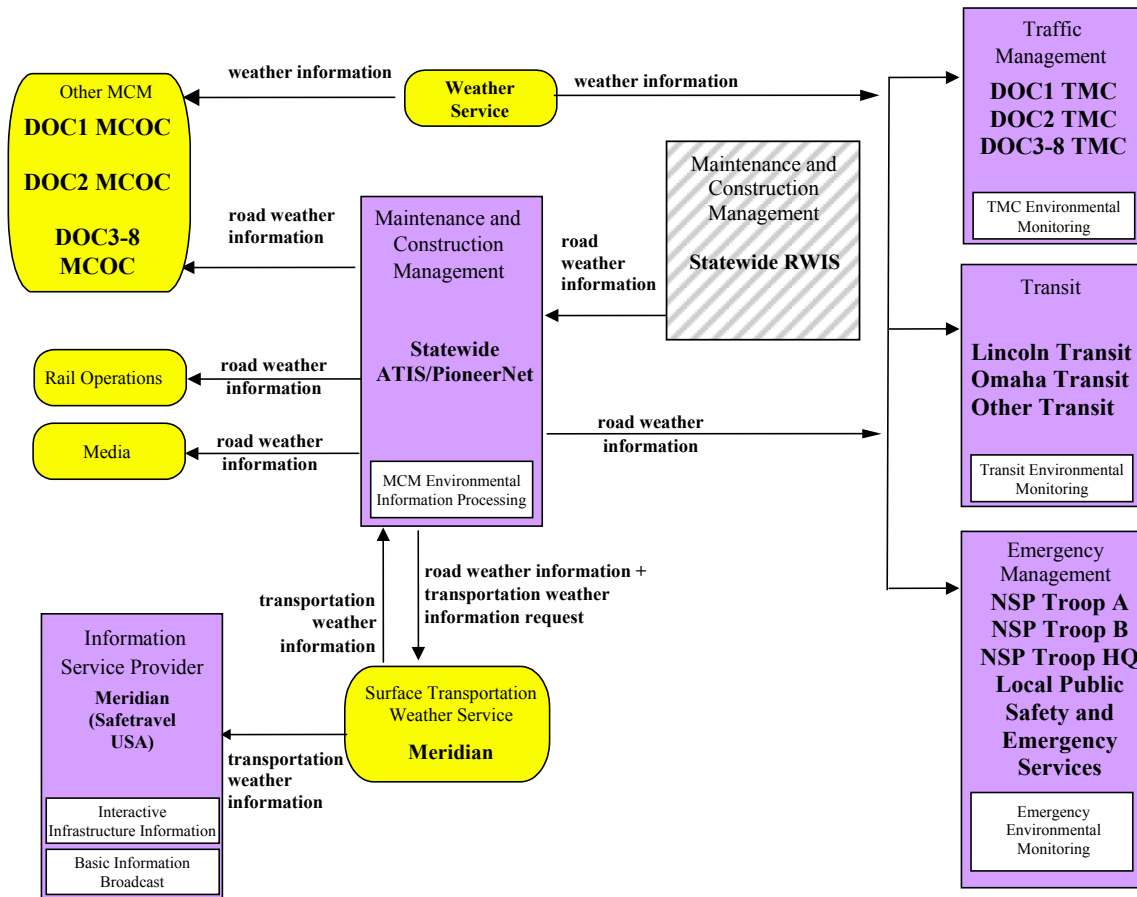


Figure B11 – MC04 Weather Information Processing and Distribution Customized Market Package

MC04 Market Package Description: This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so system operators and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination market package, and aid operators in scheduling work activity.

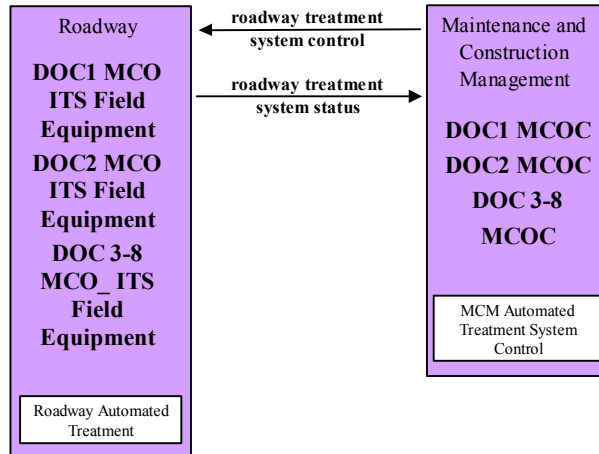


Figure B12 – MC05 Roadway Automated Treatment Customized Market Package

MC05 Market Package Description: This market package automatically treats a roadway section based on environmental or atmospheric conditions. Treatments include fog dispersion, anti-icing chemicals, etc. The market package includes the environmental sensors that detect adverse conditions, and the automated treatment system itself, and driver information systems (e.g., dynamic message signs) that warn drivers when the treatment system is activated.

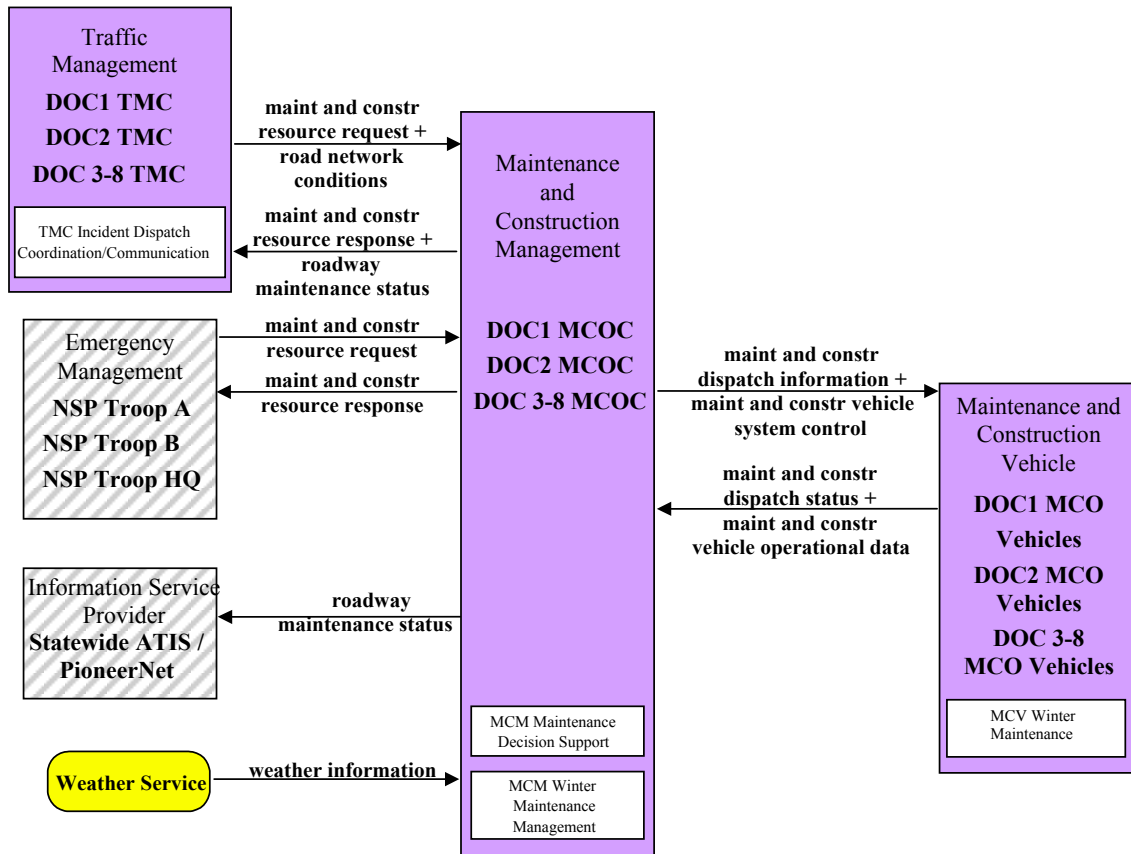


Figure B13 – MC06 Winter Maintenance Customized Market Package

MC06 Market Package Description: This market package supports winter road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and other snow and ice control activities.

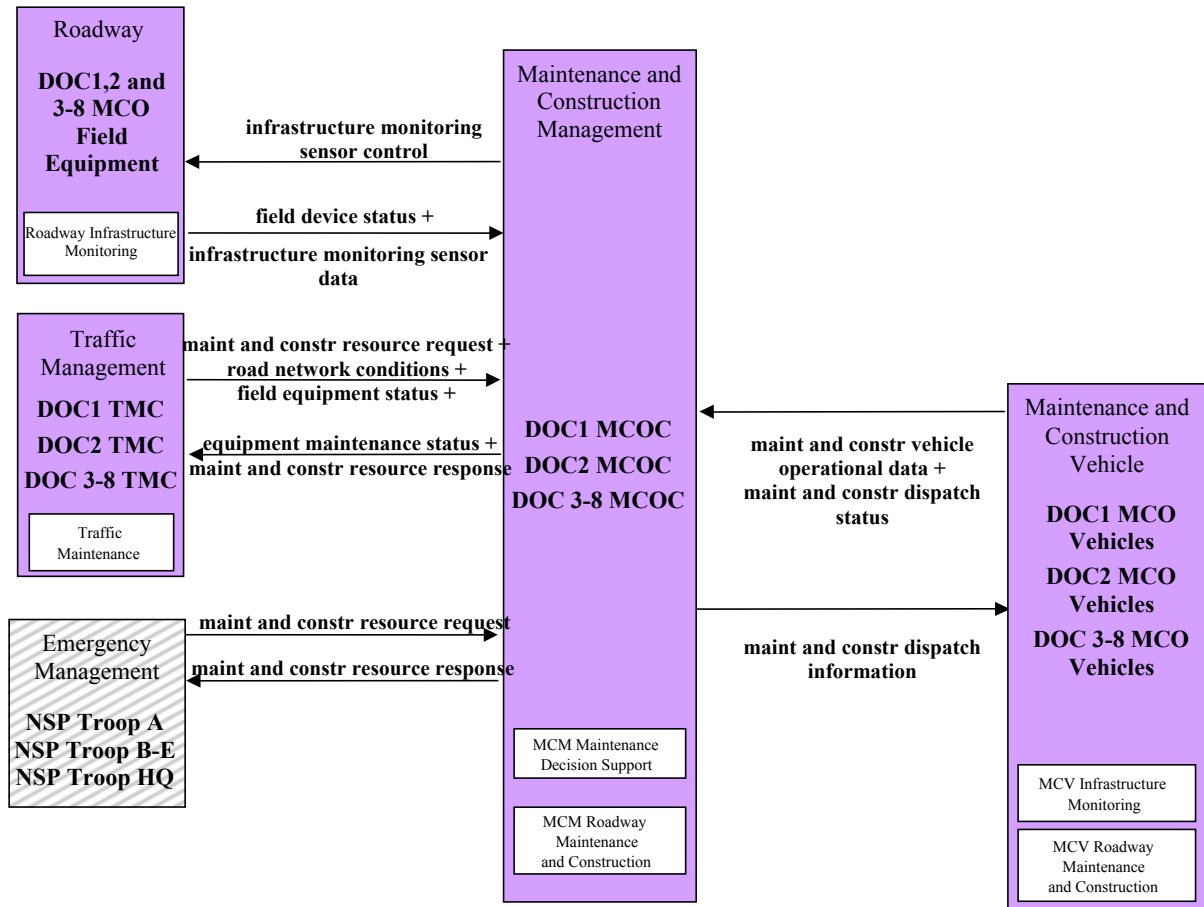


Figure B14 – MC07 Roadway Maintenance and Construction Customized Market Package

MC07 Market Package Description: This market package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.).

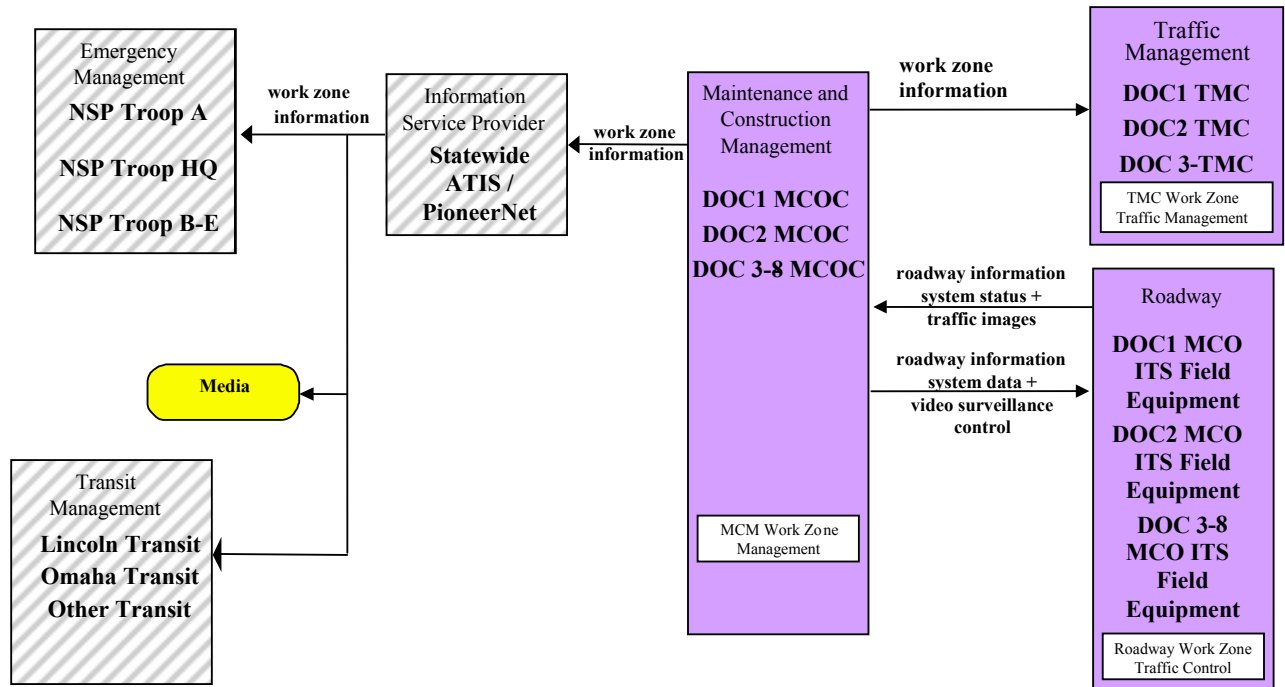


Figure B15 – MC08 Workzone Management Customized Market Package

MC08 Market Package Description: This market package directs activity in work zones, controlling traffic through portable dynamic message signs (DMS) and informing other groups of activity (e.g., ISP, TM, other maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones.

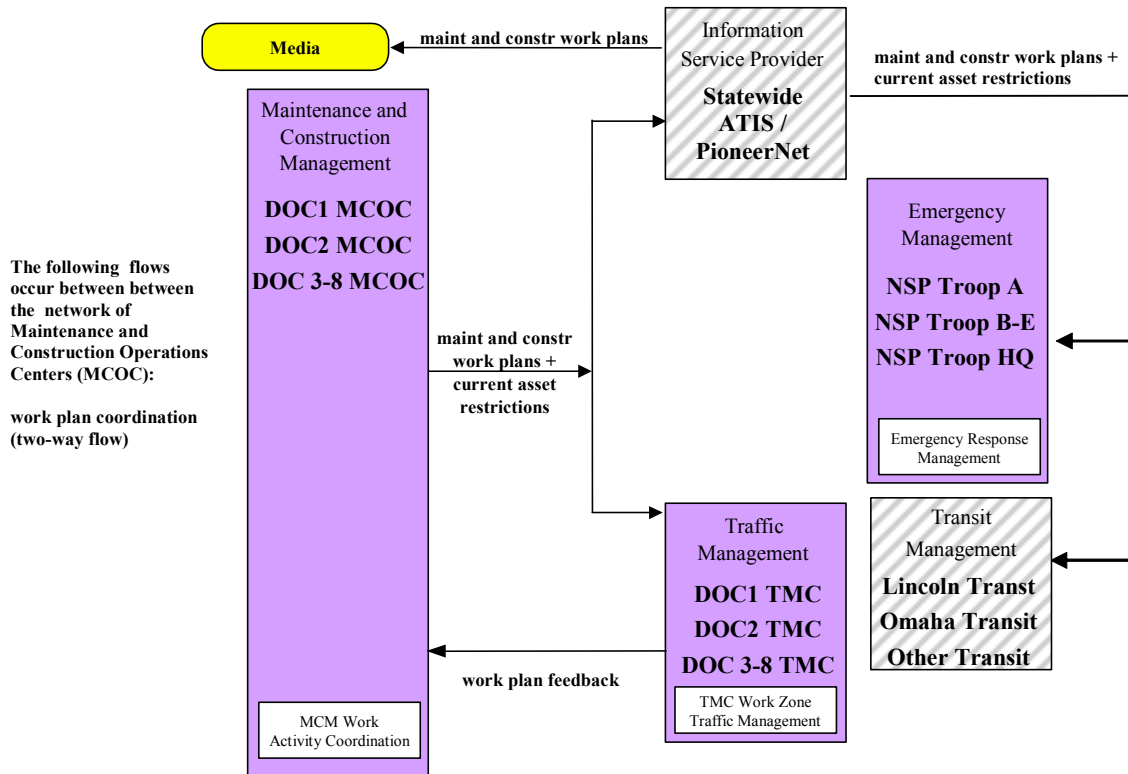


Figure B16 – MC10 Maintenance and Construction Activity Coordination Customized Market Package

MC10 Market Package Description: This market package supports the dissemination of maintenance and construction activity to centers which can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers.

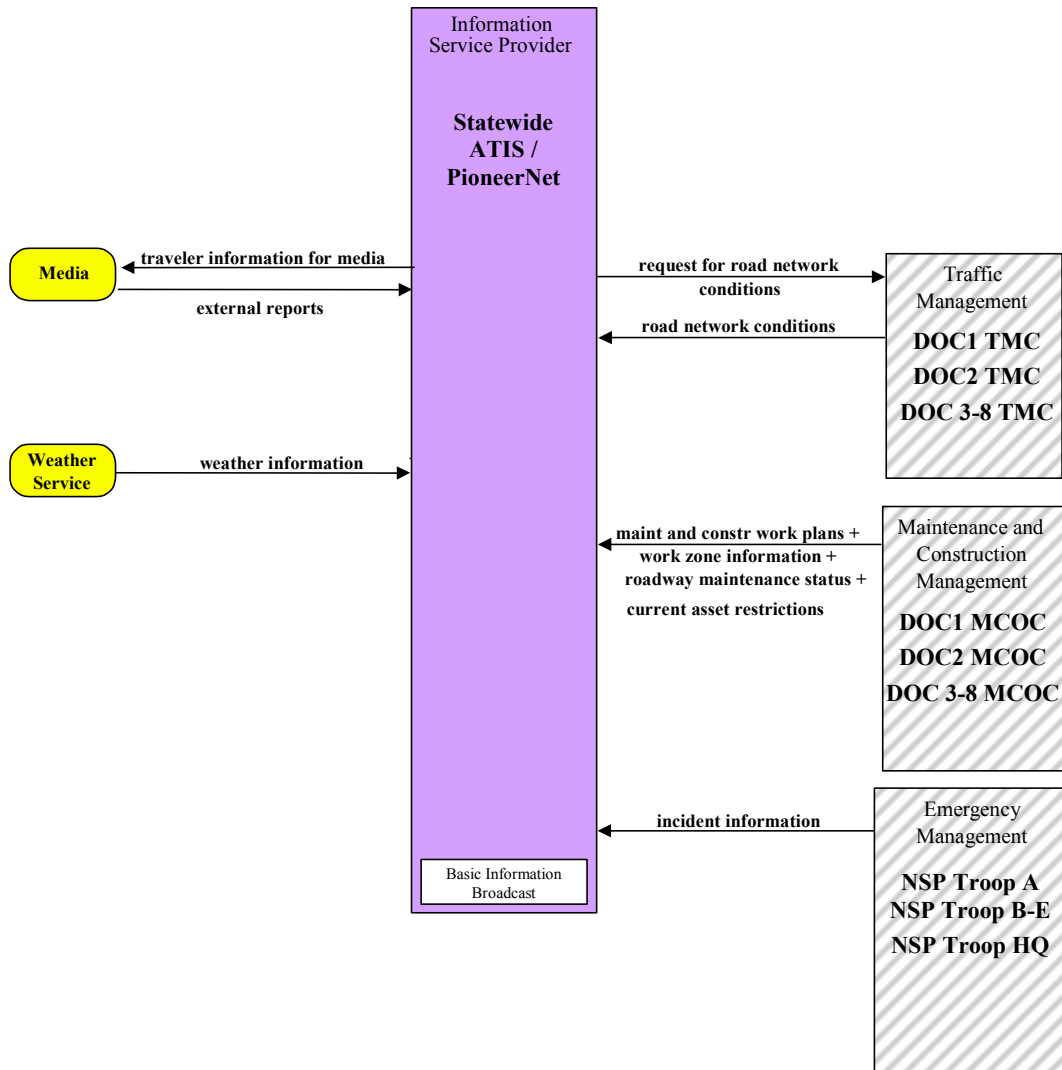


Figure B17 – ATIS1 Broadcast Traveler Information Customized Market Package

ATIS1 Market Package Description: This market package collects traffic conditions, advisories, incident information, air quality and weather information, and disseminates this information through existing infrastructures and low cost user equipment (e.g., FM subcarrier, cellular data broadcast).

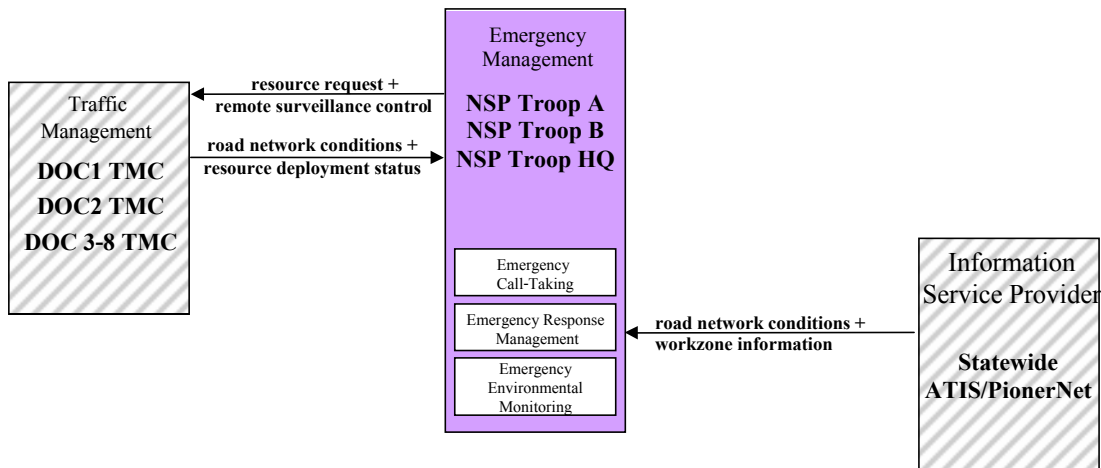


Figure B18 – EM1 Emergency Response Customized Market Package

EM1 Market Package Description: This market package includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Emergency Management Subsystems supports emergency notification and coordinated response between agencies. Existing wide area wireless communications would be utilized between the Emergency Management Subsystem and an Emergency Vehicle to enable an incident command system to be established and supported at the emergency location. Public safety, traffic management, and many other allied agencies may each participate in the coordinated response managed by this package.

EM4 - Roadway Service Patrols

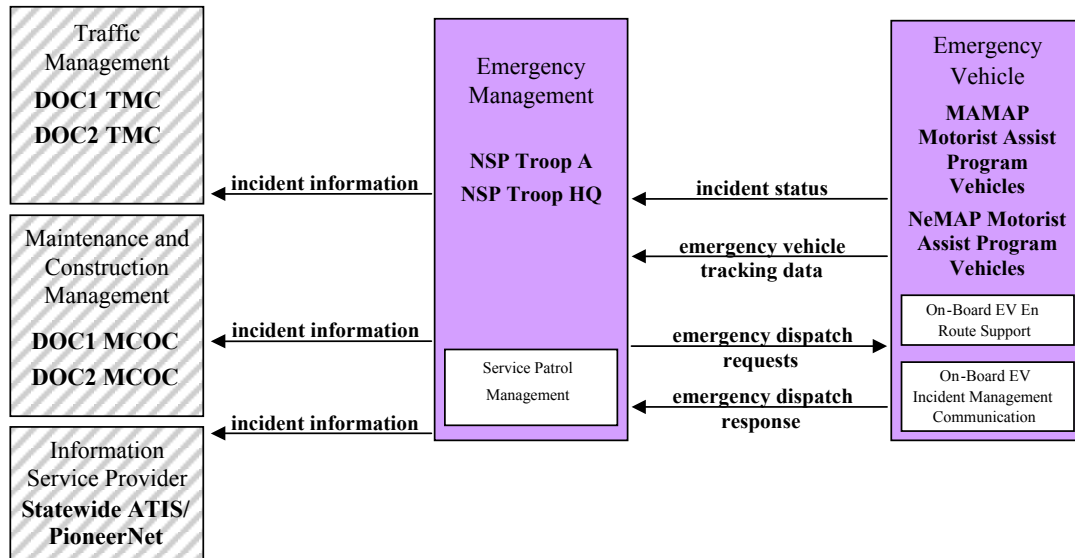


Figure B19 – EM4 Roadway Service Patrols Market Package

EM4 Market Package Description: This market package supports roadway service patrol vehicles that monitor roads that typically have incidents, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream. If problems are detected, the roadway service patrol vehicles will provide assistance to the motorist (e.g., push a vehicle to the shoulder or median).

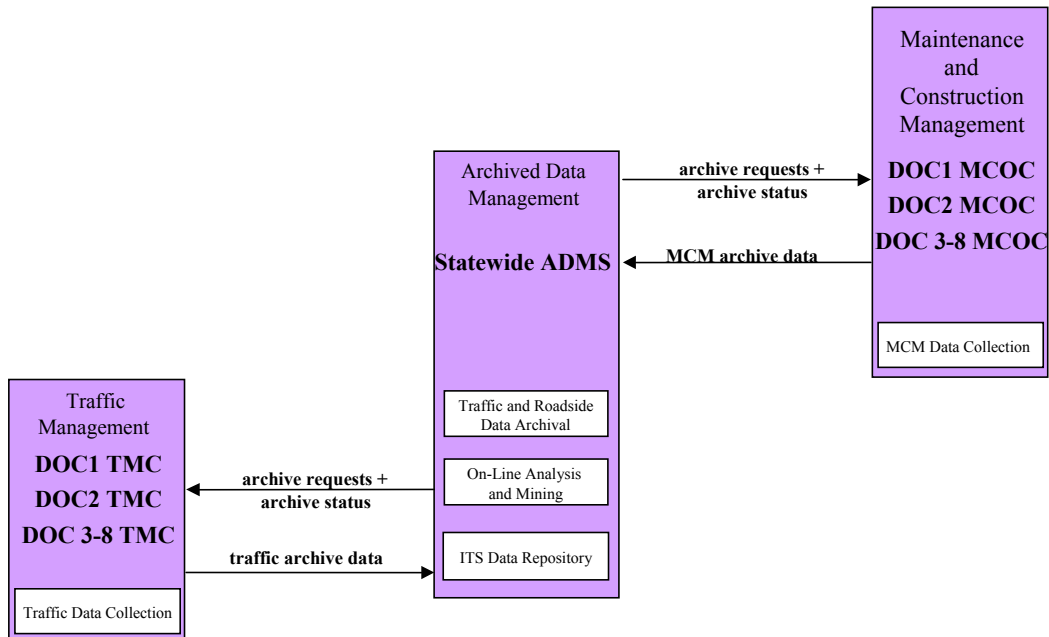


Figure B20 – AD2 ITS Data Warehouse Customized Market Packages

AD2 Market Package Description: This market package provides the functionality and interface definitions that allow collection of data from multiple agencies and data sources spanning across modal and jurisdictional boundaries. It performs the transformations and provides the additional meta data management features that are necessary so that all this data can be managed in a single repository with consistent formats.

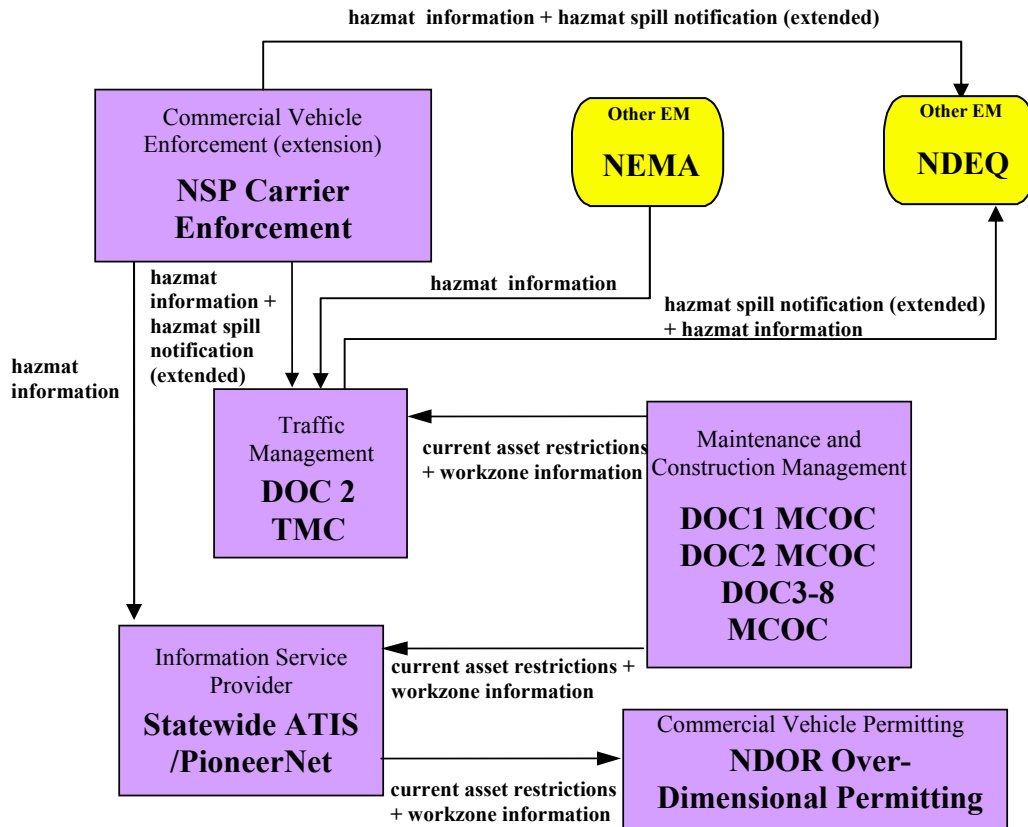


Figure B21 – HAZMAT/Over-Dimensional Permitting Data Collection (Extension) Market Package

Hazmat/Over-Dimensional Data Collection (extension) Description: This market package integrates traffic management capabilities with commercial vehicle enforcement, incident management, maintenance and construction management, and the commercial vehicle permitting subsystems to be able to quickly identify any hazardous materials within state boundaries, inform appropriate agencies when hazmat incidents occur, and prevent hazardous materials from traveling on roadways with temporary restrictions by providing a central data repository of HAZMAT information. HAZMAT identification is performed by the Commercial Vehicle Enforcement Subsystem (extension).

Upon notification of a hazardous material incident, the response is tailored based on information that is provided as part of the hazmat data collection information. This information is gathered from the commercial vehicle upon entering state boundaries by the Commercial Vehicle Enforcement Subsystem.

The market package also allows the sharing of information to support the issuing of over-dimensional permits based on current asset restrictions that have been previously entered into the traveler information system.