APPENDIX B
ITS ARCHITECTURE UPDATE

1. Regional System Interconnect Diagram
2. Recommended Service Package Definitions
3. Interconnect Flow Diagrams
4. Applicable ITS Standards
5. Example ITS Architecture Maintenance Procedures
Regional System Interconnect Diagram
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<th>Service Package</th>
<th>Service Package Name</th>
<th>Service Package Description</th>
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<tr>
<td>AD1</td>
<td>ITS Data Mart</td>
<td>This service package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization. This focused archive typically includes data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides the basic data quality, data privacy, and metadata management common to all ITS archives and provides general query and report access to archive data users.</td>
<td>Existing</td>
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<tr>
<td>APTS01</td>
<td>Transit Vehicle Tracking</td>
<td>This service package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system’s schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Transit Management Subsystem is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Transit Management Subsystem processes this information, updates the transit schedule and makes real-time schedule information available to the information Service Provider.</td>
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<tr>
<td>APTS02</td>
<td>Transit Fixed-Route Operations</td>
<td>This service package performs automated dispatch and system monitoring for fixed-route and flexible-route transit services. This service performs scheduling activities including the creation of schedules, blocks and runs, as well as operator assignment. This service determines the transit vehicle trip performance against the schedule using AVL data and provides information displays at the Transit Management Subsystem. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g. rail, ferry, air) to provide the public with integrated and personalized dynamic schedules.</td>
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<td>APTS03</td>
<td>Demand Response Transit Operations</td>
<td>This service package performs automated dispatch and system monitoring for demand responsive transit services. This service performs scheduling activities as well as operator assignment. In addition, this service package performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem. The ISP may either be operated by a transit management center or be independently owned and operated by a separate service provider. In the first scenario, the traveler makes a direct request to a specific paratransit service. In the second scenario, a third party service provider determines that the paratransit service is a viable means of satisfying a traveler request and makes a reservation for the traveler.</td>
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<td>APTS05</td>
<td>Transit Security</td>
<td>This service package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this service package provides surveillance and sensor monitoring of non-public areas of transit facilities (e.g., transit yards) and transit infrastructure such as bridges, tunnels, and transit railways or bus rapid transit (BRT) guideways. The surveillance equipment includes video and/or audio systems. The sensor equipment includes threat sensors and object detection sensors as described above as well as, intrusion or motion detection sensors and infrastructure integrity monitoring (e.g., rail track continuity checking or bridge structural integrity monitoring). The surveillance and sensor information is transmitted to the Emergency Management Subsystem, as are transit user activated alarms in public secure areas. On-board alarms, activated by transit users or transit vehicle operators are transmitted to both the Emergency Management Subsystem and the Transit Management Subsystem, indicating two possible approaches to implementing this service package. In addition the service package supports remote transit vehicle disabling by the Transit Management Subsystem and transit vehicle operator authentication.</td>
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<td>APTS06</td>
<td>Transit Fleet Management</td>
<td>This service package supports automatic transit maintenance scheduling and monitoring. On-board condition sensors monitor system status and transmit critical status information to the Transit Management Subsystem. Hardware and software in the Transit Management Subsystem processes this data and schedules preventative and corrective maintenance. The service package also supports the day to day management of the transit fleet inventory, including the assignment of specific transit vehicles to blocks.</td>
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<td>APTS08</td>
<td>Transit Traveler Information</td>
<td>This service package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package.</td>
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<td>APTS09</td>
<td>Transit Signal Priority</td>
<td>This service package determines the need for transit priority on routes and at certain intersections and requests transit vehicle priority at these locations. The signal priority may result from limited local coordination between the transit vehicle and the individual intersection for signal priority or may result from coordination between transit management and traffic management centers. Coordination between traffic and transit management is intended to improve on-time performance of the transit system to the extent that this can be accommodated without degrading overall performance of the traffic network.</td>
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<td>APTS10</td>
<td>Transit Passenger Counting</td>
<td>This service package counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center. The collected data can be used to calculate reliable ridership figures and measure passenger load information at particular stops.</td>
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<td>ATIS01</td>
<td>Broadcast Traveler Information</td>
<td>This service package collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadcasts the information to travelers using technologies such as FM subcarrier, satellite radio, cellular data broadcasts, and Internet web casts. The information may be provided directly to travelers or provided to merchants and other traveler service providers so that they can better inform their customers of travel conditions. Different from the service package ATMS06 - Traffic Information Dissemination, which provides localized HAR and DMS information capabilities, ATIS01 provides a wide area digital broadcast service. Successful deployment of this service package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.</td>
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<td>ATIS02</td>
<td>Interactive Traveler Information</td>
<td>This service package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that “push” a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. Although the Internet is the predominate network used for traveler information dissemination, a range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and Information Service Provider. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via a 511-like portal and web pages via kiosk, personal digital assistant, personal computer, and a variety of in-vehicle devices. This service package also allows value-added resellers to collect transportation information that can be aggregated and be available to their personal devices or remote traveler systems to better inform their customers of transportation conditions. Successful deployment of this service package relies on availability of real-time transportation data from roadway instrumentation, transit, probe vehicles or other means. A traveler may also input personal preferences and identification information via a “traveler card” that can convey information to the system about the traveler as well as receive updates from the system so the card can be updated over time.</td>
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<td>ATIS06</td>
<td>Transportation Operations Data Sharing</td>
<td>This service package makes real-time transportation operations data available to transportation system operators. The Information Service Provider collects, processes, and stores current information on traffic and travel conditions and other information about the current state of the transportation network and makes this information available to transportation system operators, facilitating the exchange of qualified, real-time information between agencies. Using the provided information, transportation system operators can manage their individual systems based on an overall view of the regional transportation system. The regional transportation operations data resource represented by the Information Service Provider may be implemented as a web application that provides a web-based access to system operators, an enterprise database that provides a network interface to remote center applications, or any implementation that supports regional sharing of real-time transportation operations data.</td>
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<td>ATMS01</td>
<td>Network Surveillance</td>
<td>This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point 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 service 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.</td>
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<td>ATMS02</td>
<td>Traffic Probe Surveillance</td>
<td>This service package provides an alternative approach for surveillance of the roadway network. Two general implementation paths are supported by this service package: 1) wide-area wireless communications between the vehicle and center is used to communicate vehicle operational information and status directly to the center, and 2) dedicated short range communications between passing vehicles and the roadside is used to provide equivalent information to the center. The first approach leverages wide area communications equipment that may already be in the vehicle to support personal safety and advanced traveler information services. The second approach utilizes vehicle equipment that supports toll collection, in-vehicle signing, and other short range communications applications identified within the architecture. The service package enables transportation operators and traveler information providers to monitor road conditions, identify incidents, analyze and reduce the collected data, and make it available to users and private information providers. It requires one of the communications options identified above, on-board equipment, data reduction software, and fixed-point to fixed-point links between centers to share the collected information. Both “Opt out” and “Opt in” strategies are available to ensure the user has the ability to turn off the probe functions to ensure individual privacy. Due to the large volume of data collected by probes, data reduction techniques are required, such as the ability to identify and filter out-of-bounds or extreme data reports.</td>
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<td>ATMS03</td>
<td>Traffic Signal Control</td>
<td>This service package provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. A range of traffic signal control systems are represented by this service package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This service package is generally an intra-jurisdictional package. Systems that achieve coordination across jurisdictions by using a common time base or other strategies that do not require real time coordination would also be represented by this package. Coordination of traffic signal systems using real-time communications is covered in the ATMS07 Regional Traffic Management service package. This service package is consistent with typical traffic signal control systems.</td>
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<tr>
<td>ATMS06</td>
<td>Traffic Information Dissemination</td>
<td>This service package provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, travel restrictions, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. 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 and restrictions due to maintenance and construction activities to be disseminated. The sharing of transportation operations data described in this service package also supports other services like ATMS09- Traffic Decision Support and Demand Management.</td>
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<td>ATMS08</td>
<td>Traffic Incident Management System</td>
<td>This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service 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 rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service 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 service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service 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.</td>
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<td>ATMS13</td>
<td>Standard Railroad Grade Crossing</td>
<td>This service 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.</td>
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<td>ATMS19</td>
<td>Speed Warning and Enforcement</td>
<td>This service package monitors vehicle speeds and supports warning drivers when their speed is excessive. Also the service includes notifications to an enforcement agency to enforce the speed limit of the roadway. Speed monitoring can be made via spot speed or average speed measurements. Roadside equipment can display the speed of passing vehicles and/or suggest a safe driving speed. Environmental conditions and vehicle characteristics may be monitored and factored into the safe speed advisories that are provided to the motorist. For example, warnings can be generated recognizing the limitations of a given vehicle for the geometry of the roadway such as rollover risk for tall vehicles. This service focuses on monitoring of vehicle speeds and enforcement of the speed limit while the variable speed limits service (covered in ATMS22-Variable Speed Limits service package) focuses on varying the posted speed limits to create more uniform speeds along a roadway, to promote safer driving during adverse conditions (such as fog) and/or to reduce air pollution.</td>
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<td>ATMS26</td>
<td>Mixed Use Warning Systems</td>
<td>This service package supports the sensing and warning systems used to interact with pedestrians, bicyclists, and other vehicles that operate on the main vehicle roadways, or on pathways which intersect the main vehicle roadways. These systems could allow automated warning or active protection for this class of users.</td>
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<td>AVSS05</td>
<td>Intersection Safety Warning</td>
<td>This service package monitors vehicles approaching an intersection and warns drivers when hazardous conditions are detected. The service package detects impending violations (e.g., red-light violations) and potential conflicts between vehicles occupying or approaching the intersection (e.g., situations where a left turn would be unsafe because of approaching traffic). When a potentially hazardous condition is detected, a warning is communicated to the involved vehicles using short range communications and/or signs/signals in the intersection.</td>
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<td>CVO10</td>
<td>HAZMAT Management</td>
<td>This service package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. HAZMAT tracking is performed by the Fleet and Freight Management Subsystem. The Emergency Management subsystem is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by the Fleet and Freight Management Subsystem. The latter information can be provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.</td>
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<tr>
<td>EM01</td>
<td>Emergency Call-Taking and Dispatch</td>
<td>This service package provides basic public safety call-taking and dispatch services. It 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 between agencies. Wide area wireless communications between the Emergency Management Subsystem and an Emergency Vehicle supports dispatch and provision of information to responding personnel.</td>
<td>Existing</td>
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<tr>
<td>EM02</td>
<td>Emergency Routing</td>
<td>This service package supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Emergency Management Subsystem provides the routing for the emergency fleet based on real-time conditions and has the option of requesting a route from the Traffic Management subsystem. The Emergency Vehicle may also be equipped with dedicated short range communications for local signal preemption and the transmission of alerts to surrounding vehicles. The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.</td>
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<td>EM04</td>
<td>Roadway Service Patrols</td>
<td>This service package supports roadway service patrol vehicles that monitor roads that aid motorists, 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). The service package monitors service patrol vehicle locations and supports vehicle dispatch to identified incident locations. Incident information collected by the service patrol is shared with traffic, maintenance and construction, and traveler information systems.</td>
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<td>EM06</td>
<td>Wide-Area Alert</td>
<td>This service package uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public’s help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS). When an emergency situation is reported and verified and the terms and conditions for system activation are satisfied, a designated agency broadcasts emergency information to traffic agencies, transit agencies, information service providers, toll operators, and others that operate ITS systems. The ITS systems, in turn, provide the alert information to transportation system operators and the traveling public using ITS technologies such as dynamic message signs, highway advisory radios, in-vehicle displays, transit displays, 511 traveler information systems, and traveler information web sites.</td>
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<td>EM07</td>
<td>Early Warning System</td>
<td>This service package monitors and detects potential, looming, and actual disasters including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks). The service package monitors alerting and advisory systems, ITS sensors and surveillance systems, field reports, and emergency call-taking systems to identify emergencies and notifies all responding agencies of detected emergencies.</td>
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<td>EM08</td>
<td>Disaster Response and Recovery</td>
<td>This service package enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as nuclear, chemical, biological, and radiological weapons attacks). The service package supports coordination of emergency response plans, including general plans developed before a disaster as well as specific tactical plans with short time horizon that are developed as part of a disaster response. The service package provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and maintains situation awareness regarding the disaster itself. In addition, this service package tracks and coordinates the transportation resources - the transportation professionals, equipment, and materials - that constitute a portion of the disaster response. The service package identifies the key points of integration between transportation systems and the public safety, emergency management, public health, and other allied organizations that form the overall disaster response. In this service package, the Emergency Management subsystem represents the federal, regional, state, and local Emergency Operations Centers and the Incident Commands that are established to respond to the disaster. The interface between the Emergency Management Subsystem and the other center subsystems provides situation awareness and resource coordination among transportation and other allied response agencies. In its role, traffic management implements special traffic control strategies and detours and restrictions to effectively manage traffic in and around the disaster. Maintenance and construction provides damage assessment of road network facilities and manages service restoration. Transit management provides a similar assessment of status for transit facilities and modifies transit operations to meet the special demands of the disaster. As immediate public safety concerns are addressed and disaster response transitions into recovery, this service package supports transition back to normal transportation system operation, recovering resources, managing on-going transportation facility repair, supporting data collection and revised plan coordination, and other recovery activities. This service package builds on the basic traffic incident response service that is provided by ATMS08, the Traffic Incident Management service package. This service package addresses the additional complexities and coordination requirements that are associated with the most severe incidents that warrant an extraordinary response from outside the local jurisdictions and require special measures such as the activation of one or more emergency operations centers. Many users of the National ITS Architecture will want to consider both ATMS08 and this service package since every region is concerned with both day-to-day management of traffic-related incidents and occasional management of disasters that require extraordinary response. Disaster Response and Recovery is also supported by EM10, the &quot;Disaster Traveler Information&quot; service package that keeps the public informed during a disaster response. See that service package for more information.</td>
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<td>EM09</td>
<td>Evacuation and Reentry Management</td>
<td>This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning. This service package supports coordination of evacuation plans among the federal, state, and local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. Information is shared with traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes. Reversible lanes, shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes. Transit resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. Evacuations are also supported by EM10, the &quot;Disaster Traveler Information&quot; service package, which keeps the public informed during evacuations. See that service package for more information.</td>
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<td>EM10</td>
<td>Disaster Traveler Information</td>
<td>This service package uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster. This service package collects information from multiple sources including traffic, transit, public safety, emergency management, shelter provider, and travel service provider organizations. The collected information is processed and the public is provided with real-time disaster and evacuation information using ITS traveler information systems. A disaster will stress the surface transportation system since it may damage transportation facilities at the same time that it places unique demands on these facilities to support public evacuation and provide access for emergency responders. Similarly, a disaster may interrupt or degrade the operation of many traveler information systems at the same time that safety-critical information must be provided to the traveling public. This service package keeps the public informed in these scenarios, using all available means to provide information about the disaster area including damage to the transportation system, detours and closures in effect, special traffic restrictions and allowances, special transit schedules, and real-time information on traffic conditions and transit system performance in and around the disaster. This service package also provides emergency information to assist the public with evacuations when necessary. Information on mandatory and voluntary evacuation zones, evacuation times, and instructions are provided. Available evacuation routes and destinations and current and anticipated travel conditions along those routes are provided so evacuees are prepared and know their destination and preferred evacuation route. Information on available transit services and traveler services (shelters, medical services, hotels, restaurants, gas stations, etc.) is also provided. In addition to general evacuation information, this service package provides specific evacuation trip planning information that is tailored for the evacuee based on origin, selected destination, and evacuee-specified evacuation requirements and route parameters. This service package augments the ATIS service packages that provide traveler information on a day-to-day basis for the surface transportation system. This service package provides focus on the special requirements for traveler information dissemination in disaster situations.</td>
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<td>MC08</td>
<td>Work Zone Management</td>
<td>This service package manages work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work activities are underway. Traffic conditions are monitored using CCTV cameras and controlled using dynamic message signs (DMS), Highway Advisory Radio (HAR), gates and barriers. Work zone information is coordinated with other groups (e.g., ISP, traffic management, other maintenance and construction centers). Work zone speeds and delays are provided to the motorist prior to the work zones. This service package provides control of field equipment in all maintenance and construction areas, including fixed, portable, and truck-mounted devices supporting both stationary and mobile work zones.</td>
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AD1-ITS Data Mart

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  - GDOT Traffic Management Center
  - GDOT Roadway Devices
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  - traffic archive data
  - archive requests
  - archive status
  - archived data products
  - data collection and monitoring control
  - probe archive data
  - roadside archive data

- South Carolina DOT
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  - SCDOT Roadway Devices
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  - traffic archive data
  - archive requests
  - archive status
  - archived data products
  - data collection and monitoring control
  - probe archive data
  - roadside archive data

Existing
APTS01-Transit Vehicle Tracking

Best Friend Express
Best Friend Express Vehicles

Best Friend Express Dispatch Center

City of Augusta Public Transit
City of Augusta Bus Operations Center

City of Augusta Public Transit
City of Augusta Public Transit Vehicles

transit vehicle location data
transit vehicle schedule performance

Existing
Planned
APT02-Transit Fixed-Route Operations

Best Friend Express
- Best Friend Express Vehicles
- Best Friend Express Dispatch Center

City of Augusta Public Transit
- City of Augusta Bus Operations Center
- City of Augusta Public Transit Vehicles

Transit vehicle schedule performance
Transit schedule information
Transit vehicle operator information

Existing
Planned
APTS03-Demand Response Transit Operations

- Columbia County Transit
  - Columbia County Transit Operations Center
  - Columbia County Transit Vehicles
  - Demand response passenger and use data
  - Transit vehicle operator information
- Best Friend Express
  - Best Friend Express Vehicles
  - Best Friend Express Dispatch Center
  - Demand response passenger and use data
  - Transit vehicle operator information
- City of Augusta Public Transit
  - City of Augusta Public Transit Vehicles
  - City of Augusta Bus Operations Center
  - Demand response passenger and use data
  - Transit vehicle operator information
APTS08-Transit Traveler Information

- Travelers
  - User Personal and Portable Communications Devices
  - City of Augusta Public Transit
    - Real-Time Information Signs
  - City of Augusta Public Transit
    - City of Augusta Bus Operations Center

- Traveler
- Planned

- Traveler interface updates

- Personal transit information
  - Transit information user request
  - Transit traveler information
APTS09-Transit Signal Priority

- City of Augusta Public Transit
  - City of Augusta Public Transit Vehicles
    - local signal priority request

- City of Augusta Traffic Engineering
  - Augusta-Richmond County Roadway Devices

- Columbia County Engineering Department
  - Columbia County Roadway Devices
    - local signal priority request

- Columbia County Transit
  - Columbia County Transit Vehicles

Planned
APTS10-Transit Passenger Counting

Traveler

- boarding and alighting

City of Augusta Public Transit
City of Augusta Bus Operations Center

- transit vehicle loading data

Planned

City of Augusta Public Transit
City of Augusta Public Transit Vehicles
ATIS01-Broadcast Traveler Information

South Carolina DOT
SCDOT Traffic Management Center

South Carolina DOT
SCDOT Website

Media Outlets

Georgia DOT
GDOT 511 System

City of Augusta Traffic Engineering
Augusta-Richmond County Website and Social Media

Private Information Service Providers
Private Information Service Providers

Columbia County
Columbia County Website and Social Media

Traveler Information
Broadcast traveler information
Incident information
Road network conditions
Traffic images
Traveler information for media

Existing
Planned
ATIS02-Interactive Traveler Information

Georgia DOT
GDOT 511 System

- traveler profile
- traveler request
- interactive traveler information
- traveler alerts

Travelers
User Personal and Portable Communications Devices

Existing
ATIS06-Transportation Operations Data Sharing

- City of Aiken Engineering and Utilities
  - City of Aiken Engineering and Utilities

- South Carolina DOT
  - SCDOT Traffic Management Center

- Georgia DOT
  - GDOT Traffic Management Center

- Augusta Richmond County Planning ...
  - Augusta Regional Travel Time System

- City of Augusta Traffic Engineering
  - Augusta-Richmond County TCC

- Columbia County Engineering Depart...
  - Columbia County Traffic Management Center

Transportation information for operations
road network conditions

Planned
City of Aiken Engineering and Utilities

road network conditions

Private Information Service Providers

Planned
ATMS08-Traffic Incident Management System
ATMS19-Speed Warning and Enforcement

Driver

Vehicle

City of Aiken Engineering and Utilities
City of Aiken Roadway Devices

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Planned

driver information

vehicle characteristics
CVO10-HAZMAT Management

Private Trucking Companies
Commercial Vehicles

South Carolina Emergency Management

Georgia Emergency Management Agency

Private Trucking Companies

Aiken County Emergency Services
Aiken County Emergency Operations Center

Columbia County EMA
Columbia County Emergency Management

City of Augusta Emergency Management
Augusta-Richmond County Emergency Management

Existing

- Freight equipment information
- Hazmat information
- Hazmat information request
- Hazmat spill notification
Columbia County Engineering Department
Columbia County Traffic Management Center

- roadway information system status
- traffic images
- roadway information system data
- video surveillance control

Columbia County Engineering Department
Columbia County Roadway Devices

Existing
# Turbo Architecture Table - Augusta Regional Transportation Study (ARTS) Regional ITS Architecture

## Standards

<table>
<thead>
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<th>SDO</th>
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<th>Standard Title</th>
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<td>Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)</td>
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<td>APTA TCIP-S-001 3.0.4</td>
<td>Standard for Transit Communications Interface Profiles</td>
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<td>ASTM E2468-05</td>
<td>Standard Practice for Metadata to Support Archived Data Management Systems</td>
<td>Other</td>
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<td>ASTM E2665-08</td>
<td>Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data</td>
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<td>Advanced Traveler Information Systems (ATIS) General Use Standards Group</td>
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<td>Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group</td>
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ARTS ITS Architecture and Systems Engineering Checklist for ITS Projects
FHWA Final Rule 940 and FTA National ITS Architecture Policy

For all ITS projects, an Architecture Compliance Checklist must be completed and submitted with the Federal-Aid Authorization Form. For questions regarding the completion of this checklist contact Paul DeCamp – ARTS at 706-821-1801 or e-mail at pdecamp@augustaga.gov.

SECTION 1 – Project Information

1.1 CONTACT PERSON (e.g. PROJECT MANAGER)

Name: __________________ Title: ____________ Agency: ______________

Signature: _______________ Date: ______________

Telephone: _______________ Email: ______________

1.2 PROJECT TITLE

1.3 PROJECT NUMBER

1.3A Federal Project Number: ____________

1.3B State/Local Project Number: ____________

1.4 PROJECT LOCATION AND DESCRIPTION OF PROPOSED WORK

1.5 NEEDS ASSESSMENT

*Please describe the problem statement, goals and objectives of the project.*

*How were these needs identified? (Check appropriate box(es))*

☐ Internal Assessment ☐ Stakeholder Involvement ☐ Regional ITS Architecture

☐ Other ITS Planning or Technical Documents ☐ Technical Reviews or other studies

*If other documentation was used as a reference, please identify it here:*

1.6 NATURE OF WORK (Check appropriate box(es))

☐ Scoping ☐ Design ☐ Software/Integration ☐ Construction ☐ Operations & Management

☐ Evaluations ☐ Planning ☐ Equipment Replacement ☐ Research & Development

☐ Others (Please Specify)

1.7 RELATIONSHIP TO OTHER PROJECTS AND PHASES
Please list any construction and tied projects.

<table>
<thead>
<tr>
<th>Project Title</th>
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**SECTION 2 – Regional Architecture Assessment**

**2.1 PORTIONS OF REGIONAL ARCHITECTURE BEING IMPLEMENTED**

- [ ] Archived Data Management (AD)
- [ ] Public Transportation (APTS – Advanced Public Transportation Systems)
- [ ] Traveler Information (ATIS – Advanced Traveler Information Systems)
- [ ] Traffic Management (ATMS – Advanced Traffic Management Systems)
- [ ] Vehicle Safety (AVSS – Advanced Vehicle Safety Systems)
- [ ] Commercial Vehicle Operations (CVO)
- [ ] Emergency Management (EM)
- [ ] Maintenance & Construction Management (MCM)

**2.2 INVENTORY ELEMENTS IN ARTS ITS ARCHITECTURE INCLUDED BY THIS PROJECT** *(Refer to Sections 4.3 and 4.4 of Volume 9 document for a list of projects included in the architecture)*

<table>
<thead>
<tr>
<th>Project is included in the ARTS ITS Architecture:</th>
<th>Yes</th>
<th>No</th>
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</thead>
</table>

If “No”, please list ITS elements included in this project.

**2.3 INTERFACE IMPACTS (I.E. DATA EXCHANGES) DUE TO PROJECT**


**2.4 DOES THE DESIGN INCORPORATE NATIONAL ITS STANDARDS?**

- [ ] No
- [ ] Yes
If “Yes”, please specify what ITS Standards are being used:

Turbo Architecture – “Standards Report”  □ Attached
Information on ITS Standards can be found at http://www.standards.its.dot.gov/default.asp.

### 2.5 CHANGES RECOMMENDED TO MINNESOTA STATEWIDE REGIONAL ARCHITECTURE

□ No  □ Yes
If “Yes”, please specify and provide detail:

### SECTION 3 - Project Matrix

#### 3.1 Project Matrix - Documentation

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<th>Existing To Be Modified</th>
<th>To Be Developed</th>
<th>Not Applicable</th>
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### SECTION 4 - Procurement

#### 4.1 Procurement Methods

(Check all that apply)

□ Construction Contract
□ Professional Technical Services Contract/Agreement
□ Joint Powers Contract/Agreement
□ Interagency Contract/Agreement
□ Work Order Contract/Agreement
□ Commodities Contract
□ Purchase Order
□ Other

Comments:

### SECTION 5 - Operations and Management
5.1 STAFFING AND RESOURCES NEEDED FOR OPERATIONS AND MANAGEMENT

5.2 ESTIMATED ANNUAL OPERATIONS AND MANAGEMENT COSTS

SECTION 6 - Schedule

6.1 EXPECTED PROJECT COMPLETION DATE

SECTION 7 - Agreements

7.1 IS AN INTERAGENCY AGREEMENT NEEDED FOR THIS PROJECT?

☐ Existing    ☐ To be Developed    ☐ No

Please describe: (Agency name, agreement number, and nature of contract)

SECTION 8 - Approval

APPROVAL

Name: _______________  Title: ____________  Agency: ___________

Signature: _______________  Date: ____________

Telephone: _______________  Email: ____________