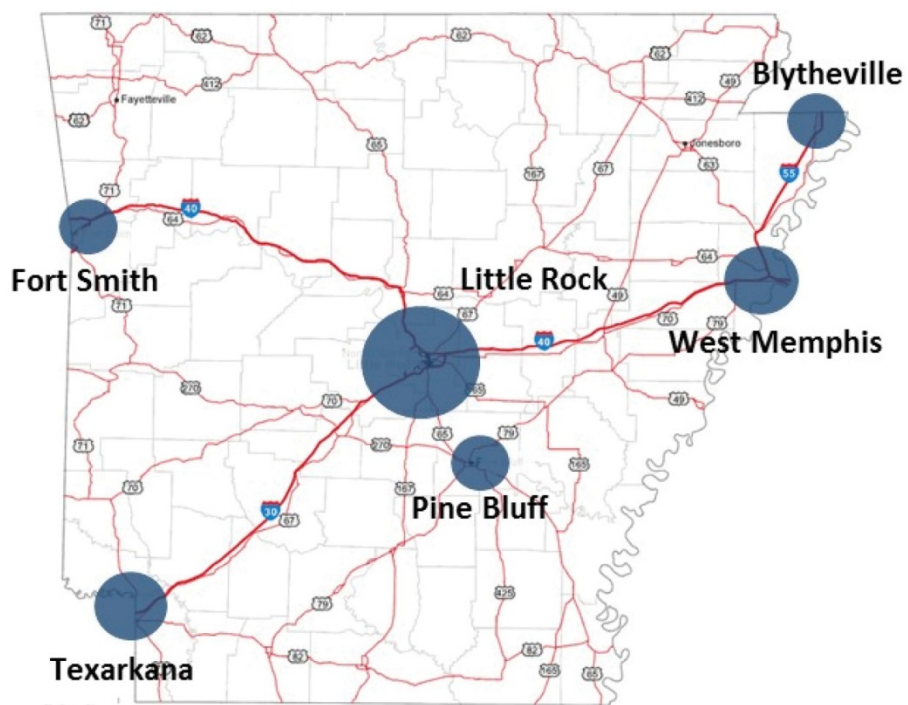




ADVANCED TRANSPORTATION AND CONGESTION MANAGEMENT TECHNOLOGIES DEPLOYMENT PROGRAM

Grant Application for Arkansas Statewide Traffic Management Center



Existing AHTD ITS Field Infrastructure

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

ARKANSAS STATEWIDE TRAFFIC MANAGEMENT CENTER	
Project Name	Arkansas Statewide Traffic Management Center
Previously Incurred Project Cost	\$0
Future Eligible Project Cost	\$947,951
Total Project Cost	\$1,895,902
ATCMTD Request	\$947,951
Total Federal Funding (including ATCMTD)	\$947,951
Are matching funds restricted to a specific project component? If so, which one?	No
State(s) in which project is located	Arkansas
Is the project currently programmed in the <ul style="list-style-type: none"> • TIP • STIP • MPO Long Range Transportation Plan • State Long Range Transportation Plan 	<u>TIP</u> – No <u>STIP</u> – No <u>MPO LRTP</u> – No <u>SLRTP</u> – No

TABLE OF CONTENTS

COVER PAGE.....	i
TABLE OF CONTENTS.....	ii
PROJECT NARRATIVE.....	1
Introduction	1
PROJECT DESCRIPTION.....	3
Description of the Arkansas State Highway and Transportation Department.....	3
Description of Geographic Area.....	4
Issues and Challenges	4
Transportation Systems and Services Included in the Project	4
Advanced Transportation and Congestion Management Technologies Plan	13
Obstacles to Deployment.....	13
Quantifiable System Performance Improvements	13
Plan for Partnering.....	15
Plan to Leverage Local Technology Investments.....	18
Schedule.....	18
STAFFING.....	19
Statewide TMC Staffing	19
Primary Contact	20

VOLUME I: PROJECT NARRATIVE

INTRODUCTION

State Transportation agencies across the country share similar challenges: Continual need to improve safety and reduce fatalities and injuries on the transportation system; increased demand on the system while resources to maintain or expand the system often decrease; and lack of reliability of the system, which leads to frustration for travelers. An increased focus on transportation systems' management and operations strategies have been shown to be a cost effective way to address some of the challenge transportation agencies face. These management and operations strategies have been proven to improve safety, reduce congestion, and increase reliability. Strategies such as monitoring freeways and providing real-time information on travel conditions, traffic incident management coordination between traffic and emergency response agencies, freeway service patrols, and ramp-metering are just a few example of transportation systems management and operation strategies that can be implemented.

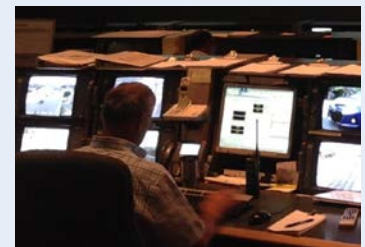
The Arkansas State Highway and Transportation Department (the Department) has begun deploying much of the infrastructure to support improved management and operations strategies. Closed circuit television (CCTV) cameras, dynamic message signs (DMS), highway advisory radio (HAR), and the [IDriveArkansas](#) website are just a few examples of the Intelligent Transportation System (ITS) that the Department has installed to improve operations. The Department is continually challenged to monitor these systems, while maintaining staff that is available to respond to incidents, road closures, severe weather, or other events that may disrupt normal traffic flow. The Department also lacks the staff and facilities to more closely coordinate with local partners, such as the State Police during incident response, or with other State DOTs to manage closures that

TRAFFIC MANAGEMENT FUNCTIONS

Traffic management functions relate to tracking and reporting information related to recurring congestion.

Camera monitoring of traffic patterns, reporting speeds and delays via applications, and coordination of information to appropriate agencies are typical traffic management functions that a Traffic Management Center (TMC) performs.

From the survey, traffic data monitoring (speeds, volume, congestion), CCTV monitoring, and information sharing with municipal traffic operations agencies were all rated "very important". Conversely, ramp meter operation and information sharing with transit centers were identified as "less important" to stakeholders. AHTD does not currently have ramp meters, so it is possible that this function rated lower because stakeholders did not see the need, however if ramp metering is implemented it may be considered a more important function by stakeholders.



impact traffic entering or exiting Arkansas.

The Department's Maintenance Division currently monitors and operates ITS equipment by remotely using on-call staff after hours. This process has been effective when a limited amount of ITS equipment has been deployed, but as the amount of infrastructure increases it will be more difficult to efficiently operate the ITS infrastructure through a remote on-call operator.

One of the proposed solutions to facilitate improved management and operations of Arkansas' transportation system is a Statewide Transportation Management Center (TMC). A Statewide TMC would provide a single point of contact for other agencies, act as hub for processing information from around the State, and serve as the central communications facility to provide information to the public, media, other states, local traffic, and emergency response partners. The Statewide TMC could be co-located with the Department's current Radio Room, which would provide an opportunity for the TMC operators and Radio Room dispatchers to act collaboratively. Co-location provides the Radio Room dispatchers with easy access to video and data feeds from the Statewide TMC. Initially, it is not anticipated that the Statewide TMC would be operated as a 24-hour facility, so co-location would also allow dispatchers, who staff the Radio Room on a 24-hour basis, to provide back-up of the TMC operations after normal TMC business hours.

In the short term, the Statewide TMC would rely upon existing ITS equipment to provide traffic information and work zone information, update the [IDriveArkansas](#) website and social media applications, and upgrade virtual access systems and software capabilities for the Department's needs. Incident management and monitoring of highway traffic conditions and rural signal operations would rely upon the existing infrastructure and become more effective over time as additional monitoring devices and/or equipment is deployed. Sources for traffic data would rely upon currently available data sources offered by third-party data providers (e.g., INRIX or HERE). Although the Department does not plan to deploy its own traffic detection systems, if a more cost effective system were developed in the future the TMC would be responsible for monitoring the detectors. Incident detection would rely upon existing field personnel. A pilot test zone could be defined whereby a concentrated effort is placed on deployment of additional field equipment to demonstrate the effectiveness of the program. This could form the basis for a future statewide focus as funding becomes available.

In the long term, with appropriate investment in software systems within the TMC and appropriate system coverage with CCTV, DMS, HAR, and other equipment (such as traffic detectors), it would be possible to have proactive, full-scale operations of traffic incident monitoring and management, as well as traffic information sourcing for public knowledge. The Statewide TMC would serve the purpose of incident management hub or command center, with public safety agencies reporting information into the TMC for dissemination to appropriate

personnel in other agencies and the traveling public. The scope of traveler information would include uploading messages to DMS as information becomes available, by monitoring, verifying, and reporting from other agencies and first responders, as well as utilization of live updating for the [IDriveArkansas](#) website and applications. In addition, surveillance equipment could be used to verify the nature and severity of incidents and signal malfunctions to dispatch appropriate maintenance crews and provide information to responders. Expanding the system's capacity would help the TMC realize its full potential.

PROJECT DESCRIPTION

DESCRIPTION OF ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

The Department is the transportation agency for the State of Arkansas. The statewide TMC will be managed by the the Department's Maintenance Division. The Maintenance Division is leading the effort to develop the plan for the Statewide TMC and will provide the staff for the operations and maintenance of the TMC. They currently monitor a majority of the ITS devices deployed in Arkansas, including CCTV cameras, DMS, HAR, and the proposed HAR, and they are responsible for posting messages on DMS. The Maintenance Division also provides oversight of the Radio Room, which provides 24-hour dispatching for the Arkansas Highway Police.

The Maintenance Division falls under the supervision of the Assistant Chief Engineer for Operations, who is also responsible for the Construction Division, Materials Divisions, and the ten Districts that cover the State of Arkansas. It is anticipated that the Maintenance Division will work in close coordination with the state highway districts in determining where and when to deploy ITS infrastructure that will be controlled by the TMC as well as to develop operational strategies for using the ITS infrastructure.

The Maintenance Division will also coordinate closely with the Public Information Office to provide the Public Information Office with real-time information on traffic and weather conditions around the State. TMC operators and the Radio Room Dispatchers will coordinate with the Arkansas Highway Police to share information regarding road closures and traffic conditions. The Maintenance Division will also coordinate with the Transportation Planning and Policy Division to share archived traffic data.

It is anticipated that the funding requested in this application would be managed by the Program Management Division, under the Direction of the Assistance Chief Engineer for Planning.

DESCRIPTION OF GEOGRAPHIC AREA

Once fully deployed, the TMC, although physically located at the Department's Central Office in Little Rock, would be utilized statewide. Figure 1, concerning existing ITS services, shows the current specific areas of operation that would benefit as a result of the deployment.

ISSUES AND CHALLENGES

The Statewide TMC will fulfill several distinct roles to serve the Radio Room operators, the Maintenance and Highway District staff, as well as serving future TMC operations functions as the capability of the ITS system in Arkansas grows.

The Radio Room has a need for additional space to accommodate the three operators that are on-duty at all times, as well as a supervisor. Additional space is needed for operator training and the potential addition of a fourth operator in the future.

The Maintenance staff and Highway Districts have the need to virtually access all monitoring capabilities of the Statewide TMC, including CCTV cameras and HAR stations. This monitoring capability may also be provided to other agencies such as other State DOTs that border Arkansas, state and local police and fire, local municipal traffic agencies, universities, and ADEM.

- The Maintenance staff have the need to virtually access all control capabilities of the Statewide TMC, such as CCTV camera control and the ability to post messages on DMS.
- The Maintenance staff have the need to have a facility to house TMC operators to monitor and control ITS infrastructure during TMC operating hours. Full-time staffing of the TMC is not anticipated in the short-term, but as the Department deploys additional ITS infrastructure around the state, the need to have a full time operators in the Statewide TMC will grow.

TRANSPORTATION SYSTEMS AND SERVICES INCLUDED IN THE PROJECT

The Department currently provides a variety of services and capabilities, including the ability to monitor freeways through CCTV cameras, the ability to provide traveler information through DMS, HAR, and [IDriveArkansas](#) website, and the ability to monitor work zones through portable cameras and DMS trailers. A complete list of the existing and planned ITS services provided by the Department was developed in the 2014 Arkansas Statewide ITS Architecture and is provided in Table 1.

Table 1 provides a list of the ITS Service Packages from the National ITS Architecture that are existing or planned for Arkansas. ITS Service Packages represent slices of the Physical Architecture that addresses specific services like network surveillance, road weather data collection, or traffic information dissemination. These ITS Service Packages describe the various services that an agency will provide with ITS. ITS Service Packages labeled as “Existing” are functions currently provided by the Department. Although an ITS Service Package may currently be listed as existing, it may need additional deployment to be considered complete. For example, the Department currently has CCTV cameras deployed and therefore the Network Surveillance ITS Service Package is listed as existing, but the Department would like to deploy additional CCTV cameras to provide surveillance on major routes that do not currently have cameras. ITS Service Packages listed as “Planned” indicate that no infrastructure has been deployed, but the Department would like to deploy related infrastructure and provide this service in the future.

TABLE 1: ITS SERVICES

ITS Service Package	Service Package Name	Service Package Status	Included Elements
ATIS01	Broadcast Traveler Information	Planned	the Department Maintenance Division the Department Traffic Operations Center User Personal Computing Devices
ATIS05	ISP Based Trip Planning and Route Guidance	Existing	the Department Traffic Operations Center User Personal Computing Devices
ATMS01	Network Surveillance	Existing	the Department Traffic Operations Center the Department Traffic Operations Center Roadside Equipment
ATMS04	Freeway Control	Existing	the Department Traffic Operations Center the Department Traffic Operations Center Roadside Equipment
ATMS06	Traffic Information Dissemination	Existing	the Department Traffic Operations Center the Department Traffic Operations Center Roadside Equipment
ATMS07	Regional Traffic Management	Planned	the Department Traffic Operations Center
ATMS08	Traffic Incident Management System	Planned	the Department Traffic Operations Center Roadside Equipment Emergency Vehicles
ATMS19	Speed Monitoring	Existing	the Department Maintenance Division the Department Traffic Operations Center Maintenance and Construction (MC) Field Devices
CVO03	Electronic Clearance	Existing	Arkansas Highway Police Arkansas Highway Police Inspection Facility Commercial Vehicles
CVO04	CV Administrative Processes	Existing	Arkansas Highway Police
CVO06	Weigh-In-Motion	Planned	Arkansas Highway Police Inspection Facility Commercial Vehicles

ITS Service Package	Service Package Name	Service Package Status	Included Elements
VO07	Roadside CVO Safety	Existing	Arkansas Highway Police Arkansas Highway Police Inspection Facility Commercial Vehicles
CVO10	HAZMAT Management	Existing	Arkansas Department of Emergency Management
CVO11	Roadside HAZMAT Security Detection and Mitigation	Existing	Arkansas Highway Police Arkansas Highway Police Inspection Facility Commercial Vehicles
EM01	Emergency Call-Taking and Dispatch	Existing	the Department Traffic Operations Center Arkansas Department of Emergency Management Emergency Vehicles
EM02	Emergency Routing	Planned	the Department Maintenance Division the Department Traffic Operations Center Arkansas Department of Emergency Management Emergency Vehicles
EM05	Transportation Infrastructure Protection	Existing	the Department Maintenance Division the Department Traffic Operations Center Security Monitoring Field Equipment
EM06	Wide-Area Alert	Existing	the Department Maintenance Division the Department Traffic Operations Center User Personal Computing Devices
EM07	Early Warning System	Existing	the Department Traffic Operations Center Arkansas Department of Emergency Management Security Monitoring Field Equipment
EM08	Disaster Response and Recovery	Existing	the Department Traffic Operations Center Arkansas Department of Emergency Management
EM09	Evacuation and Reentry Management	Existing	the Department Traffic Operations Center Arkansas Department of Emergency Management
EM10	Disaster Traveler Information	Existing	the Department Traffic Operations Center Arkansas Department of Emergency Management
MC03	Road Weather Data Collection	Existing	the Department Maintenance Division the Department Traffic Operations Center MC Field Devices
MC04	Weather Information Processing and Distribution	Planned	the Department Maintenance Division the Department Traffic Operations Center Weather Services
MC05	Roadway Automated Treatment	Planned	the Department Maintenance Division MC Field Devices
MC06	Winter Maintenance	Existing	the Department Maintenance Division MC Vehicles
MC07	Roadway Maintenance and Construction	Existing	the Department Maintenance Division the Department Traffic Operations Center MCO Vehicles

ITS Service Package	Service Package Name	Service Package Status	Included Elements
MC08	Work Zone Management	Existing	the Department Maintenance Division the Department Traffic Operations Center MC Field Devices MC Vehicles
MC10	Maintenance and Construction Activity Coordination	Planned	the Department Maintenance Division the Department Traffic Operations Center

Source: Arkansas Statewide ITS Architecture

The ITS devices operated and maintained by the Department are primarily focused on urban centers and are geographically dispersed around the state. The map below, Figure 1, represents the relative quantities of 50 permanent DMS units, 24 CCTV permanent cameras, and 10 permanent HAR stations as they are located geographically in the state. In addition to this infrastructure, the Department has 6 portable CCTV trailers (acquired through work zone contracts), 4 portable HAR systems, 4 fixed RWIS with additional planned and 11 Mobile RWIS units. The map is intended to reflect the locations of ITS equipment will be concentrated in the state.

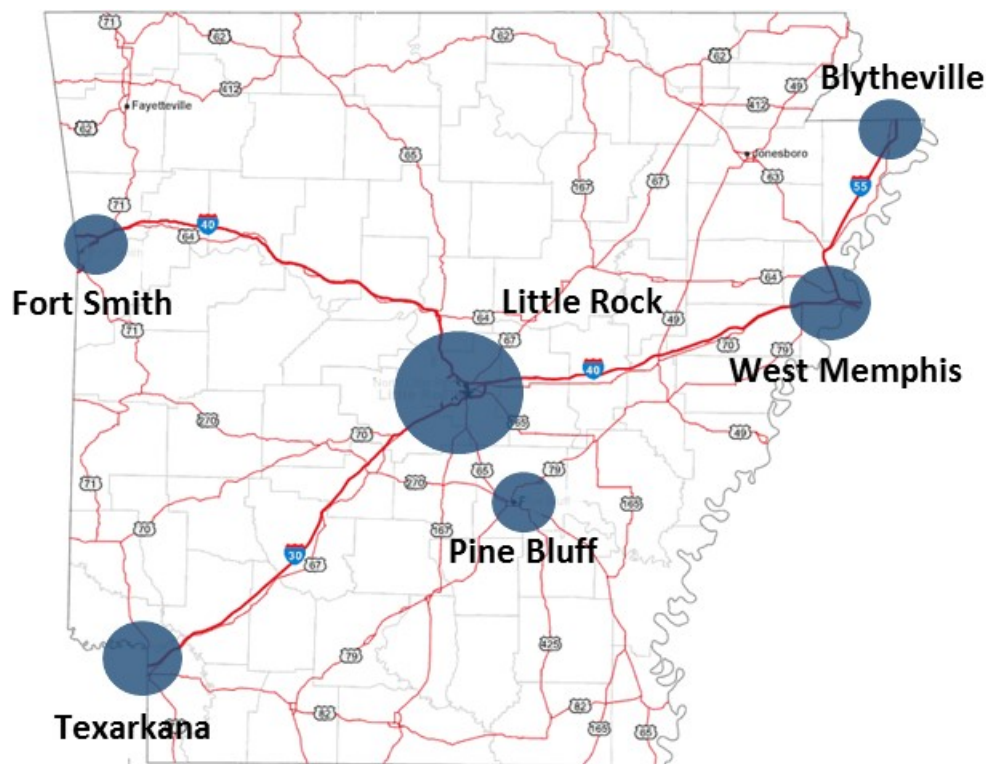


FIGURE 1: EXISTING DEPARTMENT ITS FIELD INFRASTRUCTURE

The infrastructure that has been deployed in urban areas is summarized below. Some additional infrastructure is also located in rural areas around the state. The Department has also identified a need for deploying RWIS throughout the state to assist management of severe winter weather and identify potential flooding conditions. Blytheville

- 2 DMS
- 1 HAR

Bi-State (Fort Smith)

- 2 permanent DMS
- 1 permanent HAR site

Northwest Arkansas

- The Department's Maintenance Division has not deployed ITS, but there is existing infrastructure at the Bobby Hopper tunnel (DMS and CCTV cameras) controlled by non-state level agencies

Pine Bluff

- 1 permanent DMS
- 1 CCTV camera

West Memphis

- 5 permanent DMS
- 2 permanent HAR sites

Central Arkansas

- 26 permanent DMS
- 21 CCTV cameras
- 4 permanent HAR sites
- 4 RWIS

Texarkana

- 11-permanent DMS
- 2 CCTV cameras
- 2 permanent HAR sites

ITS operations are managed by the Maintenance Division in Little Rock. The Department monitors, controls, and maintains a majority of the ITS devices deployed in Arkansas including CCTV cameras, DMS, HAR, and the planned RWIS units. Traffic detection devices, such as Bluetooth detectors for travel times, and ramp meters would also fall under the Maintenance Division if they are deployed in the future.

The Department staff monitor the ITS devices primarily through remote access using a laptop or workstation. CCTV cameras are not continually monitored and generally accessed only when Maintenance staff are alerted to an incident, severe weather, special event, or other issue that may disrupt normal traffic operations. The Department's staff is generally reactive to traffic conditions and will post information about incidents, unexpected delays, weather, or construction as needed. Information regarding incidents or other events is usually reported to the Radio Room first and then relayed to the Maintenance Division staff who is currently on-call for monitoring the ITS devices. The "rule of thumb" is that if an incident lasts more than 4 hours, a message will be created and displayed on DMS and HAR. On average, the Department posts 30 messages per year due to incidents.

The Department does not monitor any of their devices on a 24-hour basis; however a staff person is continually on-call to post messages on DMS or HARs if a long-term incident happens. The Department does have a workstation with multiple-monitors located in the Maintenance Division facilities in Little Rock. The workstation is used during major winter weather events so the Maintenance Division can assist Districts with managing snow and ice storms. Generally, the workstation and monitors are only used during winter weather events.

The Department operates a website called [IDriveArkansas](#) that provides real-time information on road closures and conditions, shown in Figure 2. The website is updated by the Public Information Office but after hours it can also be updated by the Radio Room dispatchers. Twitter accounts are also used to update subscribers on road conditions throughout the state. Twitter can be also be updated by the Public Information Office or the Radio Room dispatchers.

The Department Radio Room's primary function is to act as dispatch for the Department Highway Police. The Highway Police enforce commercial vehicle regulations around the state, but can provide incident management and other types of law enforcement if needed. The Radio Room falls under the jurisdiction of the Maintenance Division and supports other activities within the Department. The Radio Room operates on a 24-hour basis and will take calls from throughout the entire state related to road and bridge closures and conditions. A summary of the Radio Room dispatcher's functions that are related to roadway operations is included below:

- Log information on road conditions and closures
- Email the District and Division personnel regarding road conditions and closures
- Post information on the website regarding road condition and closures
- Update Twitter with road condition and closure information
- Complete the Department flood map with updates regarding flooding
- Update the Road Conditions Hotline phone number

- Monitor the Department building fire and security alarms

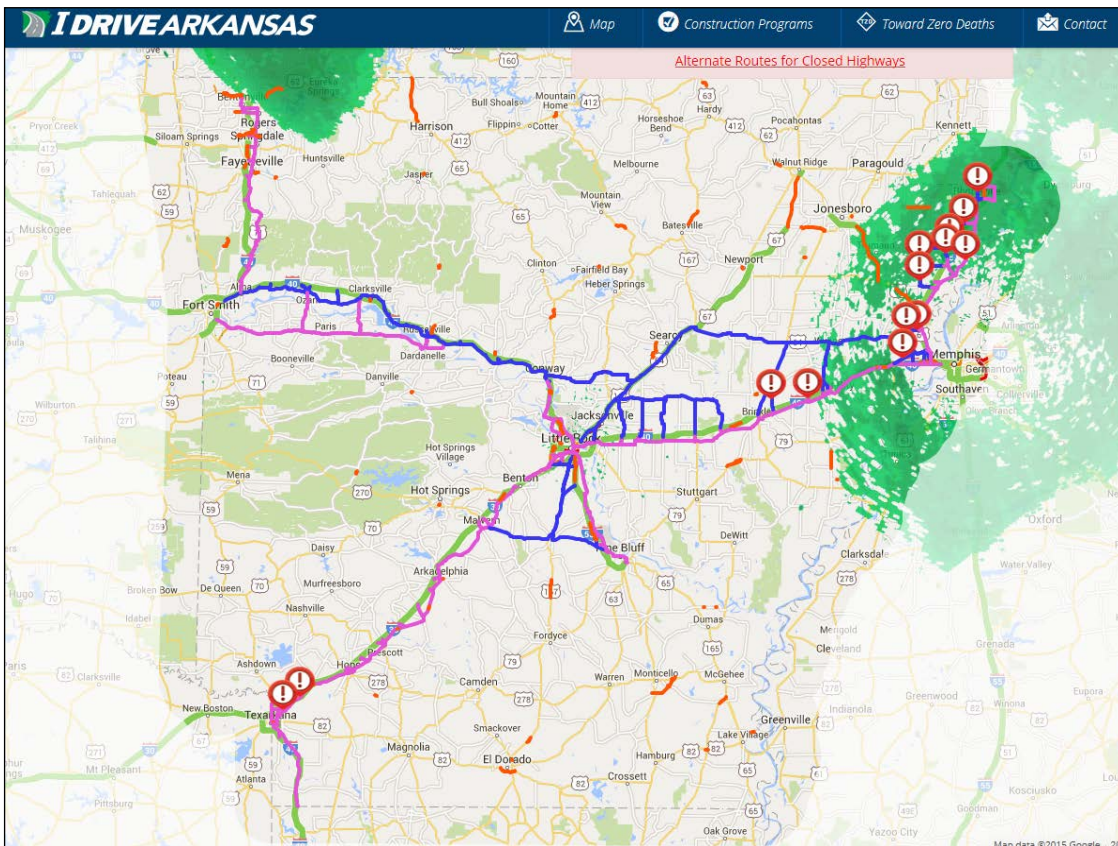


FIGURE 2: IDRIVEARKANSAS WEBSITE SCREEN CAPTURE

PROPOSED STATEWIDE TMC

The Statewide TMC for Arkansas is being proposed as a hybrid TMC that will be deployed in two phases. Additional information on physical, virtual, and hybrid TMCs is provided in Section 6.1 with a description of the reasoning behind this recommendation for the Department. Phase I will focus on building the system network that will provide the Department with virtual TMC capabilities. Space will be developed for the TMC to house at a minimum the TMC Manager and the co-located the Radio Room operations. In Phase II, the focus will be on providing for expanded TMC operations including space for additional TMC operators as well as other TMC users that may operate in the TMC on a limited basis.

STATEWIDE TMC PHASE I

Phase I of the Statewide TMC is envisioned to include a system network that will provide a virtual TMC as well as the physical build out of a space that will house the TMC Manager and one TMC operator at two workstations, along with the Radio Room Supervisor and up to five Radio Room dispatcher workstations.

VIRTUAL TMC COMPONENTS

The virtual components of the TMC will support remote access to all of the TMC capabilities, including data monitoring, control of devices, and configuration changes. Remote users will be able to access the system via a direct connection or through a Virtual Private Network (VPN) connection through the internet. Users will access the system with full or restricted rights. With full rights, the user can monitor, control and configure the system ITS devices. With limited or restricted rights, the user may control selected ITS devices or may be limited to monitoring data only. In addition to the Department, remote users could include ADEM, State Police, other State DOTs, and local traffic agencies. A separate media server could be set up outside the firewall and be used specifically for publishing public data. This media server could be accessed by the media and web users for access to data that is provided publicly, but may be restricted at times. For example, video from CCTV cameras that is sent to the media server may be restricted during incidents when a TMC operator is viewing the incident scene to assess injuries or damage. A diagram of the proposed Statewide TMC system configuration is included in Figure 3.

PHYSICAL TMC COMPONENTS

The Department has noted a need to expand the physical office space where the Radio Room is located. The combined Statewide TMC and Radio Room will include the three Radio Room dispatch workstations currently in use, the addition of at least one workstation for a potential fourth Radio Room dispatcher in the future, as well as a workstation to use for training new dispatchers. Ideally, the expanded Radio Room will also allow for the Radio Room Supervisor to be located in close proximity to the dispatchers.

During Phase I deployment, as well as Phase II, the Radio Room dispatchers will be trained on how to monitor and control the ITS devices supported by the Statewide TMC. For example, Radio Room dispatchers will be able to control CCTV cameras, post messages on DMS and HAR, and monitor mobile RWIS stations for information during severe weather events. This capability will be particularly important during non-business hours when the TMC Manager or TMC operator may not be available in the TMC.

The proposed Statewide TMC configuration that is shown in Figure 3 would be the same for both Phase I and Phase II. The primary difference between Phase I and II would be in the number of workstations and the level of staffing of the physical TMC. The functionality would not change, however it is anticipated that in Phase II there would be more ITS field infrastructure deployed by the Department, and the capability of the Statewide TMC to monitor the transportation network would be increased.

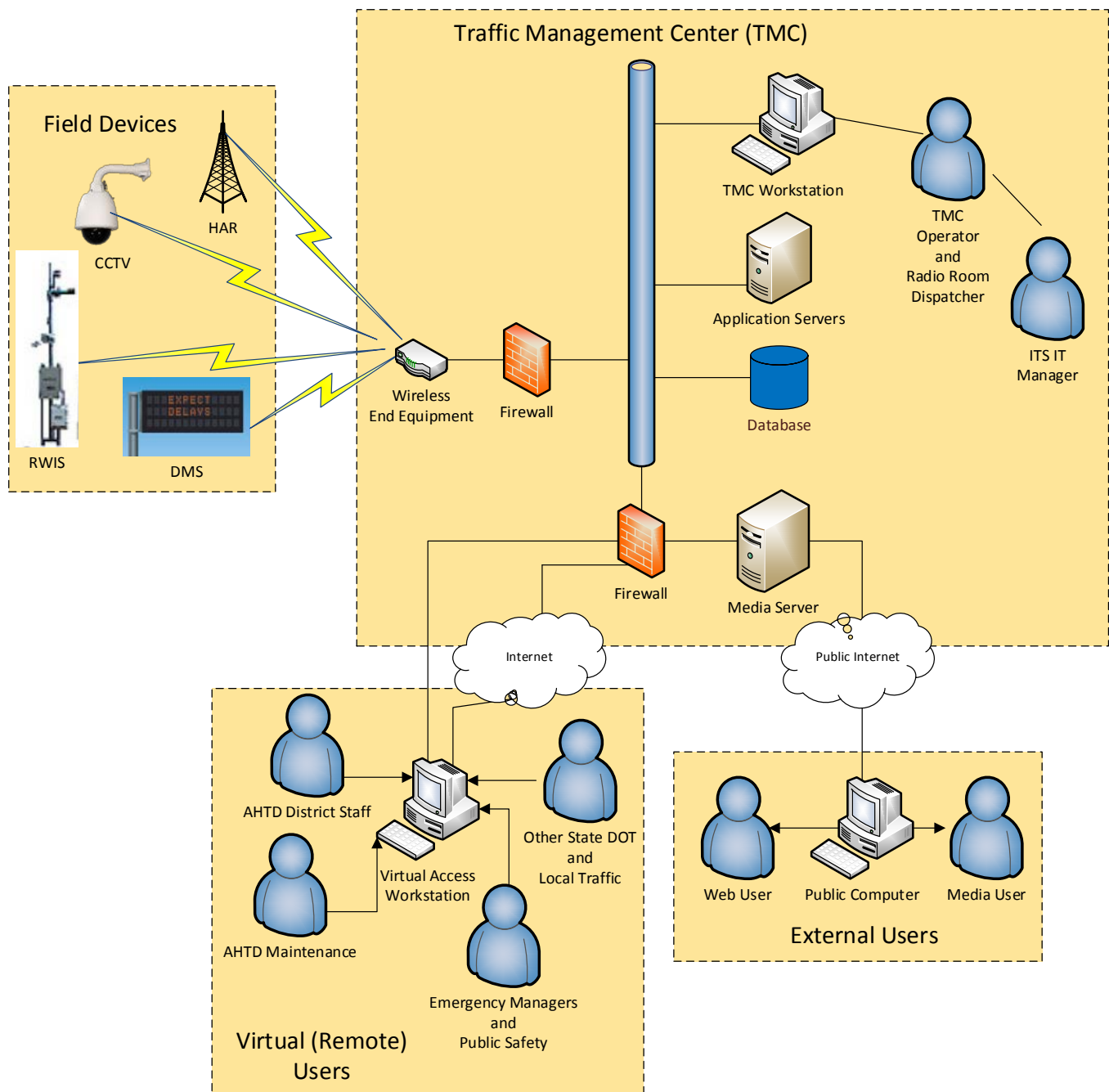


FIGURE 3: PROPOSED STATEWIDE TMC SYSTEM CONFIGURATION

ADVANCED TRANSPORTATION AND CONGESTION MANAGEMENT TECHNOLOGIES PLAN

In the long term, with appropriate investment in software systems within the TMC and appropriate system coverage with CCTV, DMS, HAR, and other equipment (such as traffic detectors), it would be possible to have proactive, full-scale operations of traffic incident monitoring and management, as well as traffic information sourcing for public knowledge. The Statewide TMC would serve the purpose of incident management hub or command center, with public safety agencies reporting information into the TMC for dissemination to appropriate personnel in other agencies and the traveling public. The scope of traveler information would include uploading messages to DMS as information becomes available (both by monitoring, verifying, and reporting from other agencies and first responders) and utilization of live updating for the [IDriveArkansas](#) website and applications. In addition, surveillance equipment could be used to verify the nature and severity of incidents and for verification of signal malfunctions to dispatch appropriate maintenance crews and provide information to responders. This ultimate expanded capacity would help the TMC realize its full potential.

OBSTACLES TO DEPLOYMENT

There are no known regulatory, legislative, or institutional hurdles to deployment, beyond the funding sought in this application.

QUANTIFIABLE SYSTEM PERFORMANCE IMPROVEMENTS

Benefits of a TMC are numerous. It is expected that a Statewide TMC could ultimately improve safety on roadways, reduce non-recurring congestion, and improve travel time reliability. Some examples of benefits observed in other states with Statewide TMCs are summarized below:

- A TMC facilitates enhanced communication in all aspects of transportation management (e.g., planning, design, implementation, operation, maintenance) when the involved parties are co-located in the center. A TMC facilitates both daily communication, and communication for special circumstances such as special events or an unusually severe incident.
- Agencies working closely together in a TMC typically produce a more consistent, unified response to a situation, increasing the overall effectiveness of the transportation resources. 9 Miami-Dade County Transportation Management Center Functionality Study
- The Toronto COMPASS system is reported to have resulted in a reduction in average duration of incidents from 86 minutes to 30 minutes, prevent about 200 accidents per year, and increase average speed 7 to 19 percent.

- Long Island's (New York) INFORM system is reported to have resulted in increased freeway speeds by 13 percent, despite an increase of 5 percent in vehicle miles traveled for the afternoon peak. The number of locations with speeds of less than 30 mph (miles per hour) decreased by 50 percent for the morning peak. INFORM's ramp metering systems is reported to have resulted in a 15 percent accident reduction and a 9 percent increase in speed.
- A study of ramp meters in Detroit measured a 50 percent accident reduction, an 8 percent increase in speed and a 12.5 percent increase in demand. The current expansion of the freeway management system is expected to reduce delays from incidents by about 40 percent. This would lead to an annual reduction of 41.3 million gallons of fuel used, a reduction of 122,000 tons of carbon monoxide, 1,400 tons of hydrocarbon and 1,200 tons of nitrogen oxides.
- The Milwaukee MONITOR system has resulted in the increase of AM peak period average speed by 3 percent while volume has increased 22 percent. Net savings of 1,454 driver hours per peak hour have been calculated as a result of ramp metering alone.
- The Atlanta NaviGator TMC also hosts the area motorist assistance patrol program and the state's commercial vehicle operations enforcement program. The delay between the report of a crash and dispatch of emergency services has been cut in half, and accidents are cleared from the roadway 38 percent faster.
- Arizona DOT found that the rapid incident detection and response from Trailmaster resulted in diversion of 21 percent of the vehicles traveling on the affected roadway, resulting in a savings of 1,452 vehicle hours for a major incident.
- A conservative estimate of average freeway incident time savings as a result of the Houston TranStar system is 5 minutes per vehicle. Analysis has shown that a savings of 30 minutes per vehicle is possible for major freeway incidents. Total annual delay savings is estimated at 573,095 vehicle-hours, resulting in about \$8.4 million in savings per year.
- The Arizona Statewide TMC focus on incident management has resulted in a dramatic decrease in freeway incident duration, with average incident duration times dropping by 33% or almost 20 minutes.
- The Arizona Statewide TMC has also found that 35% of drivers will change routes based on the travel times that the TMC posts on DMS according to a 2009 survey of commuters. These drivers have found the information to be reliable enough that they will seek alternate routes when unexpected delay occurs which aids in making their travel times more reliable.
- The Wisconsin State Traffic Operations Center (TOC) operates as a 24/7 call center for reporting issues and incident for all public safety agencies in the state. By serving as a single

call center as well as a Statewide TMC, Wisconsin is able to quickly post information regarding incidents and other road closures, improving safety for the traveling public and emergency responders as well as providing real-time information to allow motorists to change routes and avoid potential delays.

- The Mississippi Statewide TMC provides traveler information to the public on road conditions through roadside infrastructure, website, and a mobile application. The mobile app is only in its fourth year of existence, but over 64,000 people in Mississippi currently use the mobile application for traffic incident and work zone information which provides the Mississippi DOT with an efficient and inexpensive method for providing traffic information to the public.

With Departmental implementation of MAP-21's upcoming Performance Measures requirements, the Department plans on evaluating benefits provided in accord with the FHWA's "Methodologies to Measure and Quantify Transportation Management Center Benefits: Final Synthesis Report".

PLAN FOR PARTNERING

A primary role of any TMC is to provide for coordination with stakeholders to improve traffic operations. Stakeholders can include internal, such as other Divisions, as well as external agencies such as ADEM or the State Police. This section identifies and describes the stakeholders that the Statewide TMC will interface with on a regular basis. The information included in this section was obtained through both the stakeholder outreach effort that was conducted as part of the Statewide TMC planning effort, as well as information provided in the Arkansas Statewide ITS Architecture, dated April 2014. Interfaces are categorized into two groups: the Department Stakeholders and External Stakeholders.

DEPARTMENTAL STAKEHOLDERS

The Department Maintenance Division – The Maintenance Division will provide the staffing for the TMC including the TMC Manager, TMC operators, and support needed for TMC maintenance. The Maintenance Division also provides the staffing for the Radio Room including the Radio Room Supervisor and dispatchers. The Maintenance Division staff will have full access to the TMC including rights for control and monitoring of all ITS devices operated out of the TMC. In addition to overseeing operations of the TMC from a management level, the Maintenance Division will interact with the TMC for various maintenance activities. Specific operations that will interface with the Department include traffic operations information reporting, maintenance resources for incident response, dispatching of the Department maintenance personnel, coordination with regional maintenance and construction agencies,

performing maintenance on ITS field equipment, and providing permits to private fleet systems. These activities will largely be in support of the personnel operating within the TMC and will be limited to coordinating and the actual performance of maintenance on equipment the TMC utilizes.

The Department Districts – The Districts will work closely with the TMC in support of construction, maintenance, traffic management, and weather management activities within the District. It is anticipated that the Districts will have access to the CCTV camera feeds and any information from traffic detectors that the TMC gathers. The Districts will not have the capability to control CCTV cameras or post messages on DMS or HAR, but will be able to request that the TMC move cameras or post messages as needed. During severe winter weather or major incidents that require long-term closures, it is anticipated that the Districts and TMC will coordinate closely on operational strategies and determine the most appropriate messages to posts on DMS and HAR. The TMC will also collect and archive traffic information which will be made available to the Districts for use in planning and operating their roadway system.

The Department Public Information Office – The Public information Office will work closely with the TMC to determine real-time traffic conditions and post information to the [IDriveArkansas](#) website, the Twitter feed and other social media feeds, and alert the media when necessary. Although it is not anticipated that the Public Information Office will have staff located in the TMC during the first phase of deployment, the TMC operators should continually communicate with the Public Information Office during all events that might warrant broadcasting road condition information.

The Department Transportation Planning and Policy Division – The Transportation Planning and Policy Division will collect real-time and archived traveler information data to use for planning purposes. This information may be available through traffic detection devices such as possible future deployments of vehicle detection systems including microwave radar detection, video detection, or Bluetooth reader detection. Although ITS devices have generally not been proven to have a level of accuracy that is high enough for long-range planning purposes, continued improvements in technology may allow future ITS deployments to be used by the Transportation Planning and Policy Division in the future.

The Department Highway Police – The Arkansas Highway Police will coordinate with the TMC through the presence of the Radio Room dispatchers co-located in the Statewide TMC. The Radio Room dispatchers are in continual contract with Highway Police throughout the State. The dispatchers can relay information on road conditions, incidents, traffic, and weather to or from the Highway Police officers in the field. The dispatchers are planned to be located in the

Statewide TMC which will foster close coordination between the dispatchers and the Statewide TMC operators.

The Department Computer Services – The Computer Services Division may take the lead on much of the network and system structure of the TMC. They will act as the primary network administrator and provide access to the system to both the Department and external stakeholders.

EXTERNAL STAKEHOLDERS

Arkansas Department of Emergency Management (ADEM) – The ADEM will operate independently of the TMC in most scenarios, but will interact with TMC for efforts in coordinating emergency response. ADEM will monitor critical infrastructure for security threats, provide the TMC with disaster information to disseminate to the traveling public, and coordinate with entities and the TMC for providing emergency, evacuation, and reentry plans. ADEM will utilize the TMC surveillance capabilities through the CCTV cameras and RWIS and should have virtual access to the TMC for monitoring, but not control capabilities.

Arkansas State Police – The Arkansas State Police will also provide incident management field response, including coordination of incident response, detection, and verification. The State Police will coordinate maintenance resources in response to incidents with regional maintenance providers and relay that information back to the TMC. The State Police will generate AMBER alerts to send to the Statewide TMC for posting. Coordination between the Statewide TMC and the State Police will be required in order for the TMC to post messages in advance of incidents and provide updated traffic information on the [IDriveArkansas](#) website and social media.

Other State DOT and Local Traffic Agencies – Other State DOT TMCs and municipal traffic agencies will exchange information with the TMC on an as-needed basis when incidents on freeways in adjoining states, or incidents on local roads impact state roads under the Department jurisdiction. For example, a major incident on an arterial may cause delays and congestion on a state facility due to downstream blockage of a ramp or unusually heavy use of a state facility as an alternate route. Other State DOTs and municipal traffic agencies will provide information regarding traffic management and incident related information to coordinate across jurisdictional boundaries as needed. This will take place in the form of e-mail or phone calls for some agencies, and may occur as a direct link for some other operations, such as adjacent State DOT owned camera equipment within the State of Arkansas. Full details of each state's preferred communication procedures are detailed in Section 5.1.7.

Media – The media will interact with the TMC through access to video and traffic information. Many TMCs provide the media with direct feeds of CCTV cameras that can be broadcast during

traffic updates. The TMC should maintain rights to block feeds during incidents if a camera needs to zoom into the incident scene to assess potential injuries and the type of equipment that might be needed by emergency response agencies to respond to the incident. Once emergency managers are on-scene, most TMCs will then focus their cameras on the traffic delay and allow media to again access the camera feeds. The media will also have access to the [IDriveArkansas](#) website and any other information that is provided to the public.

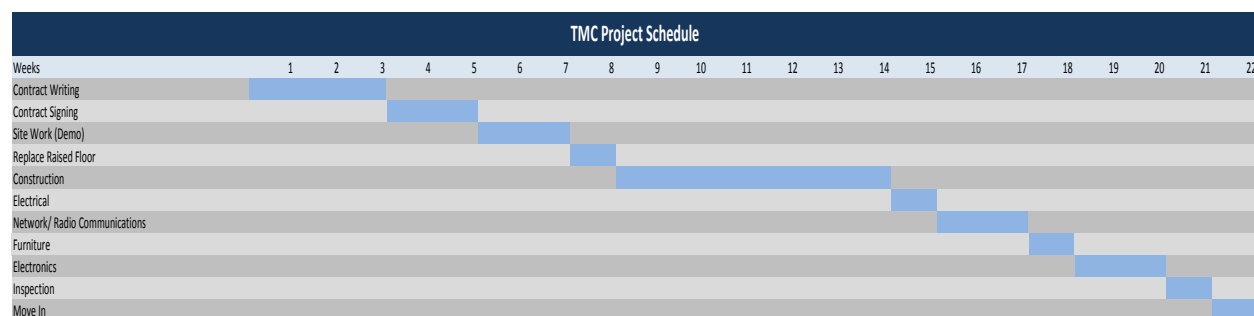
Web Users – Information provided by the Statewide TMC will primarily be published via the [IDriveArkansas](#) website as well as through social media. Third party Internet Service Providers (ISPs) may also utilize information provided by the Statewide TMC and display onto other websites or applications.

PLAN TO LEVERAGE LOCAL TECHNOLOGY INVESTMENTS

The Department’s plan for establishment and continued utilization of the TMC relies almost exclusively on existing local technology investments. For a detailed explanation of those resources, see the Section titled “**TRANSPORTATION SYSTEMS AND SERVICES INCLUDED IN THE PROJECT**” on page 4.

SCHEDULE

TABLE 2: SCHEDULE



STAFFING

STATEWIDE TMC STAFFING

TMC Staffing from both a personnel and hours of operation standpoint were considered based on the operational functions deemed necessary for the Statewide TMC. A series of case studies is presented with staffing schedules for several TMCs, followed by the recommended staffing levels and hours of operation for the Statewide TMC.

RECOMMENDED STAFFING FOR THE STATEWIDE TMC

Staffing of the statewide TMC will evolve as the level of ITS equipment monitored and controlled by the TMC grows. **Table 3** shows the maximum staffing for any one time at the TMC, but does not describe what day to day operations will look like.

Phase I Operations	
Staffing Requirements (Maximum staff at any one time)	<ul style="list-style-type: none">• 1 Radio Room Supervisor• 4 Radio Room Operators• 1 Radio Room Operator Trainee<ul style="list-style-type: none">• 1 TMC Manager• 1 TMC Operator or PIO
Space Elements	<ul style="list-style-type: none">• 1 Radio Room Supervisor Office• 5 Radio Operator Workstations• 2 TMC Workstations• Conference Room<ul style="list-style-type: none">• Server Room• Video Wall
Space Needed	1,900 Sq. Feet

Table 3: Arkansas Statewide TMC Phase I Operations

Initially, in Phase I, the Statewide TMC is envisioned to be deployed as a hybrid TMC with limited staffing. In Phase I the TMC should include space to accommodate two TMC workstations. One workstation will accommodate the TMC Manager and a second workstation will accommodate a TMC operator. It is envisioned that the TMC Manager will only be available during regular business hours and may not necessarily be located in the TMC full-time. The workstation for the TMC operator may be occupied during peak times, such as the morning and afternoon rush hour, during incidents, during major weather events, or during special events. As the ITS equipment in the field that is monitored by the TMC grows, an operator may be added to the Statewide TMC to provide an added level of coverage during business hours.

PRIMARY CONTACT

Kevin Thornton, Assistant Chief Engineer Planning, Arkansas State Highway and Transportation Department; 10324 Interstate 30 Little Rock, AR 72209; 501-569-2241;

Kevin.Thornton@ahtd.ar.gov