

Traffic Management



What is Traffic Management?

Traffic management of freeways and highways including infrastructure, daily and near/long-term operations, and agency coordination.

Existing Conditions

ADOT has in place a robust network of traffic management infrastructure throughout the state that is more advanced the more urbanized the area is. This includes signal systems, vehicle detection, visual monitoring systems, ramp metering, and feedback provided to the traveling public in the form of travel times for their day-to-day travel. There is some use within the state of third party data to supplement for where there is no visual or detection available, although not all parties that could use this data have access to or utilize it for their daily traffic management requirements.

as the area becomes rural. Traffic management operations rely heavily upon accurate, timely, and quality data feeds to the TOC that enable decision-making for traffic flow. ADOT should focus on getting to an integrated capability where urban and rural infrastructure alike are connected, updated on a regular basis to be optimized for day-to-day traffic mobility, and well maintained to support functional use. Funding should be commensurate and support operational needs for the various regions of the state.

Near-Term Priorities

PROCESS

Institute a GIS-Based Asset and Work Order Management System

Automation to Assess Detector Health

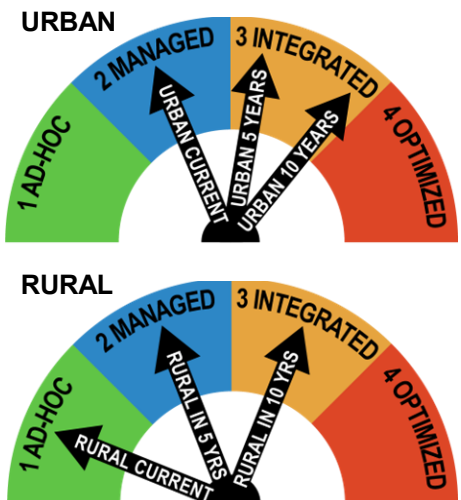
Evaluate Traffic Management Staffing & Workforce

Establish ITS Program Funding Pools

ADOT Traffic Management GOALS



A summary of ADOT's own self-assessment indicates that current capabilities are very different within the Phoenix metro area as compared to other parts of the state.



Challenges and Gaps

- Challenged with monitoring and proactively managing of day-to-day operations.
- Seeking real-time information on traffic conditions.
- Limited TOC/maintenance staffing.
- Need a better understanding of inventory, lifecycle and status of field devices to shorten maintenance timeframes.
- Funding sources are not readily available for lifecycle/replacement, capital new, maintenance, or piloting/innovation.

Future Vision

ADOT has in place a robust network of traffic management infrastructure throughout the state. Areas of the state that are considered urbanized have increased amounts of advanced infrastructure with the trend decreasing

Formalize ADOT ITS Committee Across TSMO Division

Develop ITS Upgrade / Maintenance Plan

INFRASTRUCTURE

Queue Management

Digital Infrastructure

Performance Measures

| Performance Measure | Measure Applicability |
|--|--|
| Increased device coverage statewide and across each Region | % of priority locations (based on incidents, congestion, weather, etc.) that are covered by each type of device |
| Increased ITS infrastructure health | Collecting data or not collecting data Uptime, downtime, data quality and/or functional quality of a device or system |
| Status of traffic conditions throughout year | Continue to monitor speed, travel time, user delay, bottleneck month over month and year over year |

Active Transportation Demand Management (ATDM)



What is ATDM?

ATDM is used to analyze, predict, and manage congestion issues. Active management optimizes the performance of TSMO/ITS strategies by monitoring the strategies, assessing their performance, generating and selecting ways to improve performance, and then implementing the performance.

Existing Conditions

ADOT has a robust network of ITS devices in the Phoenix urban area that allows for data collection, device connectivity, and monitoring. Similar capability is present in other urban and rural areas of the State, but at a lower density. These features provide the foundation for ATDM and serve as the basis for responding to and managing congestion and other operational issues.

Future Direction

The ADOT TSMO Division operates and maintains a wide range of ITS systems and devices related to a number of functions statewide. While these strategies are deployed for specific issues, they are often not consistently applied and used across the State and are often implemented standalone and may not be integrated with other strategies. ADOT should increase options for continuously monitoring systems to make them more effective. Performance measures need to be defined to support justification in staffing, processes, and infrastructure recommendations. The ADOT Traffic Operations center is currently only focused on traffic incident management and should move toward supporting ATDM from the Traffic Operations Center functions including the staff and resources to support proactive management of transportation operations.

Challenges and Gaps

- Big data sets are not currently connected, processed, and readily accessible for real-time decision making to manage congestion/incidents.
- Existing agency-wide data governance process is not well known.
- Need ability to evaluate performance metrics in an automated fashion for day to day operation on a weekly/monthly basis.

Near-Term Priorities

Recommendations developed as part of the System Layer Plans were evaluated to identify initial near-term recommendations.

PROCESS

Enhance Real-Time Data Repository

Develop TSMO Data Governance and Management Plan

Develop and Utilize TSMO Performance Measures Platform

Develop ATSPM Dashboard

INFRASTRUCTURE

Fix Detection Locations

Connected Vehicle Data Use Evaluation Pilot

ADOT ATDM GOALS



Current capabilities are at the ad-hoc Level 1 state within the Capability Maturity Model (CMM) framework and in the future can be moved toward the Level 2 managed state.



Performance Measures

| Performance Measure | Measure Applicability |
|--|--|
| Increased detection of congestion issues | Number of CCTV cameras accessible to the TOC Number of TOC dispatches to operations staff (IRU, RTEs) Frequency and location of targeted |
| Improved signal timing | Number of intersections with CCTV & ATMS |

Safety Applications



What are Safety Applications?

Safety applications include projects, initiatives, and infrastructure directly related to preventing incidents

Existing Conditions

ADOT currently has a number of ITS features and systems that support increased safety. In addition, the TSMO Division has a robust safety group/program that is well managed relative to crash data processing and analysis, traditional safety studies, and HSIP funding. This group supports activities across most aspects of ADOT including support of projects within MPD (planning), IDO (design), and Administration's coordination with GOHS and DPS. In addition, the group manages the funding and programming of HSIP dollars across the State, coordinating with many local agencies.

Challenges and Gaps

- Need to evaluate crash modification factor (CMF) for ITS elements to support federal fund use.
- Need to track TSMO safety improvements against Statewide Safety Goals.
- No predictive analysis is available based on historical data to identify potential safety issues.
- Need more coverage to detect wrong-way drivers.
- Limited real time information to alert road users, TOC operators to achieve Strategic Safety Goal: Vision Zero (Zero Crashes, Injuries, and Fatalities).

Near-Term Priorities

Recommendations developed as part of the System Layer Plans were evaluated to identify initial near-term recommendations.

PROCESS

- Improve Crash Data Platform
- Setup Predictive Crash Data Analysis Tool
- Develop CMF for ITS Funding Support
- Generate Quarterly Safety Metrics
- Track TSMO Safety Goals to Align with Statewide Traffic Safety Plans

INFRASTRUCTURE

- Expand Installation of Wrong Way Counter Measure / WWD Detection
- Address Pedestrian Safety

Future Vision

ADOT currently has a robust safety group/program that is well managed relative to crash data processing and analysis, traditional safety studies, and HSIP funding. However, the safety staff/processes are not fully integrated with the other TSMO groups, ITS efforts specifically. ADOT should increase the coordination between the Traffic Safety

ADOT Safety Applications GOALS

A summary of ADOT's own self-assessment indicates that current capabilities in this functional area are at Level 2 (Managed). In the next 5-10 years, staff would like to move toward Level 3 (Integrated).



Group and other ITS staff in the future and increase the capability/readiness through establishing new internal processes and increasing education relative to the benefits among other efforts.



Performance Measures

| Measure | Measure Applicability |
|--|--|
| Reduce speed variation | Number, frequency, and locations of rear end crashes |
| Improved safety at intersections | Left turn and angle crashes including number of pedestrian and bicycle crashes using |
| Increased programming of safety improvements | Average benefit-cost analysis for HSIP awarded projects and before and after crash performance |

Work Zone Management



What is Work Zone Management?

Work zone management includes planned activities occurring on the state network and how those activities impact the traveling public.

Existing Conditions

ADOT has been implementing Smart Work Zones (SWZ) in construction zones in the last five to seven years. The SWZ system is a broad range of portable communications-based information and electronic technologies placed in and around work zones to enhance transportation and improve safety and mobility. ADOT has utilized Traffic Data Collection Systems, Queue Warning, Dynamic Lane Merge, Travel Times, Variable Speed Limits, Traffic Monitoring Cameras, and Truck Entry/Exit systems. SWZ systems are being tested and deployed more and more on construction sites and the benefits of technology deployed are proving valuable to safety and mobility.

Challenges and Gaps

- Lack of real time metrics to evaluate work zone performance.
- Need to update smart work zone standards as technology changes to improve work zone situational awareness efficiently and effectively.
- Need ability to know real time work zone conditions by TOC to manage and adjust upstream traffic flows.
- Lack of integration of SWZ technologies in current development process.

Performance Measures

** Metrics specifically cited in ADOT's ENG 07-3 Work Zone Safety and Mobility Policy*

Near-Term Priorities

Recommendations developed as part of the System Layer Plans were evaluated to identify initial near-term recommendations that provide the highest benefit, that can be accomplished with available resources, or that may already be underway but require additional attention to complete.

PROCESS

Update Work Zone Standards

Complete WZ Performance Measures Dashboard

INFRASTRUCTURE

Establish Smart Work Zone Data Connection to TOC/ATMS

Retrofit Equipment

Future Vision

To enhance coordination between Districts, IDO, Contract & Specs, TSMO groups, and the construction Contractor, ADOT should acquire additional staff either in-house or through contracting mechanisms and utilize those staff as liaisons between the above-mentioned groups. This staff would be responsible for collecting and disseminating current and accurate work zone information to necessary stakeholders in a timely manner. ADOT should also focus its

ADOT Work Zone Management GOALS



A summary of ADOT's own self-assessment indicates that current capabilities in this functional area are at Level 1 (Ad-hoc). In the next 5-10 years, staff would like to move toward Level 2 (Managed).



resources on developing standard, scalable formats and management practices for the vast amount of work zone data that can be generated with current and future technology. In particular, ADOT should formalize a process to ingest WZDx data from deployed devices, manipulate that data as necessary to then be fed into other systems, and push that data to those systems. This process should be as automated as possible in order to minimize additional work for current ADOT staff. ADOT should look toward a future where there are clearly designated activities that occur in every work zone in the state and there is automation in work zone data collection and sharing that information with users that require that knowledge to make resource and routing decisions.

| Performance Measure | Measure Applicability |
|--|---|
| Improved traveler information | Work zone related travel times/delay * |
| Improved speed compliance in work zone | Measure speed variation and speed compliance when workers are present |
| Safer for traveling public and workers | Continue to track number of work zone related crashes * |

Road Weather Management



What is Road Weather Management?

Road weather management includes the operation and management of the transportation network through flooding, fires, snow, ice, dust, and rain conditions.



ADOT Road Weather Management GOALS

A summary of ADOT’s own self-assessment indicates that current capabilities in this functional area are at Level 2 (Managed). In the next 5-10 years, staff would like to move toward Level 3 (Integrated).



Existing Conditions

ADOT experiences a variety of weather-related events including snow/ice, dust (visibility), flooding, and fires. Data related to these events is primarily gathered through road weather information systems (RWIS), National Weather Service, and first-hand observation. The conditions then trigger responses ranging from traveler information (posting to DMS in the area) to dispatching services (snowplows or other). All RWIS feeds back to a centralized data management system to support TOC operations, safety, and winter operations.

Challenges and Gaps

- Need to address weather data gaps in coverage throughout the state via RWIS or other sensors where weather conditions are likely to cause issues for drivers.
- Installing RWIS in rural areas requires a significant amount of resources.
- Need process and resources to apply CV technology or crowdsourced data to augment physical infrastructure or where physical infrastructure is not feasible.

Near-Term Priorities

Recommendations were evaluated to identify initial near-term activities that provide the highest benefit.

PROCESS

Develop Statewide RWIS Management Plan

Evaluate RWIS Inventory for Modernization

Create RWIS Dashboard and Reporting

Generate Quarterly RWIS Metrics

Monitor and Evaluate VSL Operations

INFRASTRUCTURE

RWIS Modernization

Expand RWIS Locations

Future Vision

Knowing weather conditions around the state and knowing how that weather is going to impact travel on the roads is an ongoing challenge. ADOT has 21 RWIS locations providing robust real-time weather conditions data around the state. There are areas of the state without RWIS coverage and in some cases existing RWIS technologies have communications challenges with transmitting data centrally accessible to be utilized for better operations and management of the roadways. ADOT should move toward a future where weather information is integrated into ADOT processes at the TOC and weather data collection is consistent, reliable, and is used to support decision

making and traveler information throughout the state. Future efforts should include management of a centralized data management system, forecasting being used to inform maintenance activities, and enhanced information dissemination for travelers in terms of rerouting during inclement weather.

Performance Measures

| Measure | Measure Applicability |
|--|--|
| Reduction in weather-related maintenance and incident response | Cost of agency activities related to weather response to incidents and infrastructure damage |
| Increased coverage of RWIS data in snowplow | Number of mobile and fixed RWIS assets located in snowplow regions |
| Improved safety and operations during weather | Number and severity of crashes attributed to adverse weather |

Traffic Incident Management (TIM)



What is TIM?

Traffic incident management includes any unplanned activity occurring on the transportation network that causes safety risk, capacity restriction, rerouting, and coordination between transportation and public safety agencies.

ADOT TIM GOALS



A summary of ADOT's own self-assessment indicates that current capabilities in this functional area are very different between Phoenix area and the rest of the state.

PHOENIX



STATE



- Improve and Automate TOC TIM Performance Tracking
- Develop and Conduct ITS Training Program for TIM Staff (Table Top Exercise)
- Complete IRU Expansion Feasibility Study and Implement Recommendation

INFRASTRUCTURE

- Expand Availability of Additional Portable ITS Equipment
- Enhance CCTV Coverage for Monitoring

Performance Measures

- The level of expertise of each staff member is not equivalent such as: experience, self-confidence and time in operational deployment.

Future Vision

Traffic incident management strategies are focused activities to provide real-time coordination between public safety and transportation departments, as well as providing accurate information to the traveling public as to the impacts an unexpected event will have on their route to aid in their decision-making. ADOT and AZDPS are pursuing opportunities to share real-time data between public safety and transportation management as an essential component of TIM, and work through any technical or institutional issues to facilitate real-time data sharing. ADOT should also invest in TIM strategies already implemented in the Central District in other urbanized areas of the state. The goal is to cohesively coordinate strategies so that all urban areas have similar TIM operations and outcomes while providing an elevated level of support throughout the state.

Near-Term Priorities

PROCESS

- Enhance Data Sharing Between AZDPS and ADOT TOC
- Develop TIM Data Dashboard

Existing Conditions

ADOT puts a high priority on functions and operations to support incident management on the state's road network. The ADOT TOC and urban management system were designed to help ADOT better detect, monitor and support response processes. ADOT has built response teams to provide emergency responders with valuable traffic control support to help with incident clearance and traffic management. ADOT TOC staff roles have been re-aligned to reflect their role as 'dispatchers' to track incident details and coordinate with ADOT Incident Response Units. In the Phoenix urban area, ADOT is active with the TIM Coalition, which brings together responders and transportation representatives from state, county and city agencies. ADOT's urban area Incident Response Units routinely support freeway incident needs in partnership with AZDPS. On a statewide level, many of the traffic management response support comes from ADOT maintenance staff in the Districts.

Challenges and Gaps

- Real-time incident data is not currently shared between AZDPS and ADOT TOC (on-site officer will alert TOC of an incident).
- ADOT's TIM response program in the urban areas is well established; there are limited formal TIM response programs and resources in the rural districts.
- Need to add CCTV coverage to improve TIM response when there is an incident or inclement weather in the rural area/blind spots in the urban area.

| Performance Measure | Measure Applicability |
|--|--|
| Reduce secondary crashes | Measure reduction in secondary crashes on corridors with active incidents |
| Improve incident response and clearance times for IRU areas | Continue measuring incident clearance time for IRU response areas |
| Notify ADOT staff of incidents and impacts faster through CAD data feed from AZDPS | Reduce incident notification and mobilization time through AZDPS CAD data alerts |

Traveler Information System



What is Traveler Information?

Traveler information systems include the utilization and management of a dynamic network consisting of software and hardware to alert the traveling public in a real-time manner to affect driver routing decisions.

Existing Conditions

Since the inception of ITS capabilities at ADOT in the early 1990's, ADOT has integrated capabilities for traveler alerts and information dissemination as a cornerstone of the DOT's ITS and operations programs. Dynamic Message Signs (DMS) were among the early technologies installed as part of the ADOT Freeway Management System in Phoenix, and these have now expanded to corridors statewide. ADOT was an early adopter of both AZ511 and social media for information alerts to travelers and key stakeholders. Many of ADOT's other ITS and operations initiatives intersect with this System Layer. ADOT has also been testing innovations such as pushing notifications to cell phones. ADOT co-located several members of the communications team into the TOC to provide increased coordination between operators coordinating incidents and closures and the teams that could quickly get information out to the public. Multiple workgroups maintain AZ511 including ADOT's technical, data, communications and TOC staff.

- Multiple stakeholders involved in weather alerts which lead to delayed messaging.

Future Vision

Public tools such as AZ511 and social media are robust and well executed. ADOT is in a position to move toward an optimized state by providing more opportunities to give information to the traveling public. Current internal and external agency notifications is at the managed state and can be improved to the integrated state in the future. Setting up automated systems to provide traveler information as well as utilizing different sets of data to provide insights for traveler information dissemination. Integration can be accomplished with focused attention on utilizing private sector data feeds to provide more robust information for various traveler information systems that ADOT manages.

Challenges & Gaps

- Limited third party data use; Limited information delivered in small, discrete offerings, non-real-time.
- Limited alternate routing in rural areas.
- Drivers rely on third party traveler app; lack of using the AZ511 app which contains accurate information/warning.

Performance Measures

| Performance Measure |
|--|
| Use established DMS messages for planned events / incidents / unplanned closures |
| Expand partnerships with counties and cities to increase data in AZ511 statewide (get to 100% of counties getting closure info to AZ511 systems) |
| Increase # of partnerships with data aggregators and data providers |
| Increase usage of ADOT's AZ511.gov website by unique visitors and frequent visitors |
| Expand technologies to provide en-route information on key corridors |

ADOT Traveler Information GOALS



A summary of ADOT's self-assessment shows that capabilities are very different between the agency notification processes and public tools.

INTERNAL/EXTERNAL AGENCY NOTIFICATIONS



PUBLIC TOOLS (511, SOCIAL MEDIA)



Near-Term Priorities

PROCESS

Administer AZ511 Public Awareness Campaign

Establish DMS Message Automation

INFRASTRUCTURE

Real-Time Roadway Condition Enhancements (DMS and CCTV)

Broaden Implementation of Third Party Data in AZ511

Real-Time Truck Parking Availability

Connected/Autonomous Vehicles and Smart Cities



What is C/AV and Smart Cities?

C/AV and Smart Cities are emerging fields within the transportation realm that utilize technology and communication platforms to communicate and interact with public infrastructure. Connected vehicles exchange data and information to increase efficiency and safety while autonomous vehicles utilize sensors and other means to automate driving tasks.

Existing Conditions

ADOT, as an infrastructure owner and operator (IOO), is largely focused on building and maintaining roadways with the TSMO Division responsible for optimizing traffic operations. Through TSMO and interactions with the C/AV community, ADOT has prioritized specific features that will support the operation of Advanced Driver Assistance Systems (ADAS) and Automated Driving Systems (ADS) vehicles as well as partnering with other stakeholders in the Maricopa County area to conduct pilot studies related to traveler information and basic safety messages (BSM). ADOT has also explored connected vehicles options for their specialized fleets such as Incident Reasons Units (IRU) and snowplows which can provide some level of probe data. Within the realm of Smart Cities, ADOT has begun providing broadband access Statewide to support increased data solutions.

ADOT is in the early stages of C/AV and Smart Cities and there are many opportunities to increase ADOT involvement in the area that drive the recommendations outlined in this System Layer Plan.

Challenges and Gaps

- Major advances in CAV have been driven by private sector. The public sector role in CAV remains uncertain.
- Uncertainty of communication, data standards and industry direction, how to prepare IOO.

- Lacking testing protocols to thoroughly evaluate the new technology and also comply with business practices.
- Technology is evolving rapidly; Challenged with keeping current on emerging technology and assessing opportunity for application.

Performance Measures

Due to the nature of the CAV industry and the level which ADOT currently operates (Level 1), there are no specific performance measures within this SLP to actively track. Once ADOT has completed the recommended steps and developed a roadmap for CAV implementation and involvement, it is anticipated that relevant performance measures will be identified.

Future Vision

A small segment of ADOT staff is aware and/or engaged in existing research such as the Connected Vehicle Pooled Fund Study or relevant National Cooperative Highway Research Program (NCHRP) projects related to CAV as well as participation in national organizations such as AASHTO and ITS. There have also been several pilot projects to better understand CAV operational maturity and establish some relationships with other stakeholders particularly in the realm of traveler information and basic safety messages (BSM). Beyond those activities, there were some ADOT participants who felt

ADOT C/AV and Smart Cities GOALS



A summary of ADOT's own self-assessment indicates that current capabilities in this functional area are at Level 1 (Ad-hoc). In the next 5-10 years, staff would like to move toward 2 (Managed).



their engagement with Institute of Automated Mobility (IAM) and ADOT's current use of 6-inch road striping are a positive move toward their goal of Level 2 on the CMM scale. Overall, the future direction for ADOT relative to CAV/Smart Cities is largely one of education and exploration – to determine the functional need, scope, and involvement within the State DOT.

Near-Term Priorities

PROCESS

- Continue Evaluating Third Party Data Use
- Create an Internal CAV Committee (Statewide / Regional)
- Develop a CAV Strategic Vision / Plan
- Develop a CAV Integration Plan

INFRASTRUCTURE

- Upgrade / Improve Connected Infrastructure Networks
- Continue to Participate in CV Pilot Projects

Data and Performance Management



What is Data and Performance Management?

Systems to support data feeds from various systems to allow evaluation and assessment of program and operational performance.

Existing Conditions

ADOT uses a number of systems to collect and distribute data from its various ITS systems, as most ITS devices are capable of generating some kind of data. Some, like RADS and Flux, collect data on ADOT servers with varying levels of automatic input. Others, like INRIX, are third party data providers to which ADOT has access. Different data sources have different tools for access including SQL queries, APIs, or Web UIs. ADOT already has in place robust Phoenix Freeway Management System data, cloud services for TSMO functions, data quality initiatives to support ITS assets statewide, utilizing analytical tools such as Tableau, ESRI, PowerBI, Python, etc., and while data is not fully accurate, there are processes in place to make this happen. The data is also connected to various tools and dashboards for performance measures and monitoring. ADOT is working to acquire the Regional Integrated Transportation Information System (RITIS), which would provide additional performance management capabilities and tie some of the existing data and systems together.

Challenges and Gaps

- Generated data continuous to increase significantly; lack of connected data platform to enhance its data collection, aggregation, and usage capabilities.
- Data are not always available/timely because of different formats.

- Existing agency-wide data governance process is not well known.
- Standards and guidance are needed for items such as edge compute vs centralized computing, network bandwidth limitations and scalability.

Near-Term Priorities

PROCESS

Develop TSMO Data Governance and Management Plan

Develop Standards for ADOT Data Sharing

Continue Evaluating Third Party Data Use

Maintain and Enhance AZ511 Public Data Feed to External Users

Further Integration of Existing Data Platform

Customize Visualization Tools for Day-to-Day Operation

Develop and Utilize TSMO Performance Measure Platform

INFRASTRUCTURE

Focusing on the process recommendations is the near-term priority for ADOT

Future Vision

ADOT has an abundance of data coming in from various types of ITS devices such as loop detectors and CCTV cameras, inter-departmental data including DPS crash data, and

ADOT Data and Performance Management GOALS

A summary of ADOT's own self-assessment indicates that current capabilities in this functional area are at Level 1 (Ad-hoc). In the next 5-10 years, staff would like to move toward Level 2 (Managed).



even third-party data from INRIX and others. However, data is not always easily accessible or readily analyzed by the various groups. ADOT needs to re-emphasize the performance management program. ADOT needs to decide what answers are needed, what targets exist, determine the available data, the quality of the data and then sort out the approach. Also, ADOT needs to focus on measuring outcomes rather than outputs.

Performance Measures

Specific metrics should be defined as part of the Data Governance and Management Plan developed for TSMO data and establishing the TSMO Performance Measure Platform.

EXECUTIVE SUMMARY OF SYSTEM LAYER PLAN

ITS Communications Structure



What is ITS Communications Structure?

A structure for communications statewide that is needed to support any device/system installed throughout the state.

Existing Conditions

ADOT has developed a fairly broad network of fiber communications throughout the Phoenix metropolitan region, along most of the freeway corridors. Fiber throughout the rest of the state is fairly sporadic. In Tucson, it is located along I-10. Fiber is also being added along the I-17 and I-19. There are also a few locations where ADOT leases fiber from third parties. ADOT has established a Broadband office, which is coordinating with the Arizona Commerce Authority's Arizona Broadband Office to develop a strategy for providing broadband communication throughout the state. There are a number of projects currently that are being designed that are following several broadband efforts – I-40, I-19, I-17, and I-10. ADOT also utilizes wireless and cellular communications throughout the state to connect to ITS devices and traffic signals that are not able to connect directly to existing fiber.

Future Vision

ADOT is partnering with the Broadband Office to invest in a broadband backbone along all interstates with the goal of providing communications to all communities and corners of the state. ADOT will continue to leverage this backbone of broadband communications to connect to ITS devices, traffic signals, and node facilities statewide through a variety of communications media to increase communications redundancy and resilience for each device. In urbanized areas of Phoenix and Tucson, ADOT

should have ownership over the operations and maintenance of all communications. In rural areas, ADOT should leverage private sector partnerships for operations and maintenance of communications. Proper funding based on needs for both the human and resources side as well as the capital investment side should be allocated to support District operations and maintenance. Providing a reliable backbone throughout the state as well as responsible operations and maintenance funding and resource support will propel the state into the next generation of being able to accept innovations in communicating with the traveling public and the communities that ADOT serves.

Challenges and Gaps

- Operational inefficiency in areas where communication is not available with ITS devices.
- Needs to update communication standard periodically.
- Communication gaps in rural areas.

Near-Term Priorities

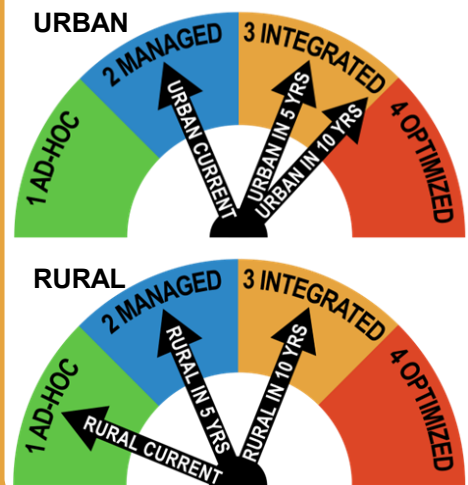
PROCESS

Update Communication Standards

| Performance Measure | Measure Applicability |
|--|---|
| Increased ITS infrastructure health – fiber IP, wireless radios, nodes | % of devices / systems from which a signal is received |
| Increased communications availability of the state | % of state-owned roadway mileage with ADOT broadband coverage |
| Increased communications connectivity to ITS infrastructure | % of devices with fiber versus other types of communications connectivity |

ADOT ITS Communications Structure GOALS

A summary of ADOT's own self-assessment indicates that current capabilities in this functional area are very different between the urban areas and the rural areas.



Establish Funding Pool for Middle Mile / Last Mile Connections

INFRASTRUCTURE

Establish Fiber Tracking Inventory

Establish Connection to All ADOT ITS Devices and Traffic Signals

Construct Middle Mile / Last Mile Connections

Performance Measures