

2016 Arterial Management Survey

AGENCY CHARACTERISTICS

1. **Centerline arterial miles operated by your agency:**
2. **Signalized intersections operated by your agency:**

SURVEILLANCE

3. **Total number of arterial centerline miles with real-time traffic data collection technologies (does not include Closed Circuit TV or CCTV):**
 - 3a. Number of these miles where real-time traffic data are collected using roadside infrastructure such as loops, radar detectors, or video imaging detector systems:

 - 3b. Number of these miles where real-time traffic data are collected by vehicle probes, using technology such as toll tag readers, cell phones etc.:
4. **What type of vehicle probe readers are used to obtain traffic information? (Check all that apply)**
 - Toll tag readers
 - Blue tooth readers
 - Cellular phone readers
 - GPS readers
 - License plate recognition
 - Do not collect vehicle probe data
 - Other readers (please specify):
5. **Does your agency gather crowdsourced data concerning arterial conditions, including incidents?**
 - Yes
 - Cellular phone using a dedicated number
 - Waze
 - Google maps traffic
 - Contracted third-party commercial provider (e.g., Inrix, HERE)
 - Custom-built smartphone app
 - Other (please specify)
 - No

HARDWARE CHARACTERISTICS OF SIGNALIZED INTERSECTIONS

6. **Indicate the number of signalized intersections where the following detection technologies are deployed:**
 - Loop detectors:
 - Video imaging detection systems:
 - Radar:
 - Other (please specify):
7. **Number of signalized intersections equipped with Closed Circuit Television (CCTV) Cameras for the purpose of monitoring traffic flow:**

8. For each signal controller type in your system, please provide the number deployed: (Please indicate 0 if a specific type of controller is not deployed)

- ATC 5.2b
- Model 2070L
- NEMA Modern (Standard or Non-Standard OS)
- NEMA Legacy (Shelf)
- Type 170 Modern
- Type 170 Legacy (Rack)
- Electromechanical Controllers
- Other (please specify):

TRAFFIC SIGNAL CONTROL OPERATION STRATEGIES

9. Does your agency have a documented plan (e.g., agency memo, Concept of Operations, MOU, agreement) inclusive of objectives and performance measures, to guide the management, operation and maintenance of traffic signals?

Yes

Which of the following areas are included in the plan? (Check all that apply)

- Management and operations
- Maintenance

No

10. Does your agency use adaptive signal control technology (ASCT) as an operational strategy to improve coordinated signal timing?

No

Yes (Provide number of intersections below)

Number of signalized intersections under ASCT:

11. Does your agency participate in a regional program managed by the State DOT, MPO or other regional authority that actively coordinates traffic signals on arterials of regional significance across jurisdictional boundaries?

Yes

How often are the plans updated?

No

TRAFFIC SIGNAL PREEMPTION AND PRIORITY

12. Number of signalized intersections that allow for signal preemption for emergency vehicles:

13. Number of signalized intersections that allow for signal priority for transit vehicles:

14. Number of signalized intersections that allow for signal priority for trucks:

15. Number of signalized intersections near a highway-rail intersection that utilize traffic signal preemption to flush a vehicle queue spilled back across an active highway-rail grade crossing:

PARKING MANAGEMENT CAPABILITIES

16. Does your agency and/or a private entity monitor the availability of parking? (Select only one response)

- Yes, agency monitors
- Yes, private entity monitors
- Yes, both agency and private entity monitors
- No

17. Does your agency disseminate parking availability information to drivers?

- Yes
- No

18. Does your agency use a parking pricing strategy (e.g., peak period surcharges) to manage congestion?

- Yes
- No

19. Does your agency allow travelers to reserve a parking space at a destination facility on demand to ensure availability?

- Yes
- No

MANAGED LANES

20. Screening question: Does your agency operate managed lanes on arterials?

- Yes
- No

20. a. Total number of arterial centerline miles featuring managed lanes:

20. b. Please provide the estimated number of arterial centerline miles for each type of managed lane strategy:

- Occupancy control (HOV):
- Reversible flow:
- Lane open/closed (traffic incidents, roadway maintenance, etc.):
- Truck only:
- High Occupancy Toll (HOT):
- Other congestion pricing strategies:
- Other managed lane strategy (please specify):

MODELING AND DECISION SUPPORT

21. Does your agency use any Analysis, Modeling and Simulation (AMS) tools to optimize/model the arterial system?

Yes

Please specify how your agency uses AMS tools:

No

22. Has your agency deployed a decision support system to assist in operations of the following? (Check all that apply)

Road weather management

Incident management

Roadside device maintenance

Emergency management

Evacuation

No decision support system deployed

Other (please specify):

AUTOMATED ENFORCEMENT

23. Screening question: Does your agency deploy automated enforcement technologies?

Yes

No

23. a. What types of automated enforcement does your agency use? (Check all that apply)

Speeding

Red light running (answer part c below)

School zone

Work zone

Bus-use only

Railroad crossing

Other (please specify):

23. b. What automated enforcement technologies are used? (Check all that apply)

License plate recognition

Cameras

Toll tag readers

Radar

Other (please specify):

23. c. Number of signalized intersections with automated red-light running enforcement:

SAFETY AND ROAD WEATHER MANAGEMENT

24. Has your agency deployed any of the following safety systems? (Check all that apply)

- Pedestrian warning system (please answer part b below)
- Bicyclist warning system
- Over-height warning system
- Speed harmonization
- Queue warning
- Dynamic curve warning system
- Variable speed limits
- None of the above
- Other (please specify):

24. b. Number of signalized intersections equipped with pedestrian crossing technology:

25. What are your agency's sources of weather and road weather information? (Check all that apply)

- National Weather Service products
- FAA (ASOS, AWOS, etc.)
- USGS earthquake alerts
- Agency field personnel
- Agency field sensors (RWIS/ESS, probes, etc.)
- National sensor data sources (Clarus/MADIS)
- Private providers
- Other (please specify):

26. Does your agency employ safety warning systems related to road weather events?

- Yes
 - What hazards are covered? (Check all that apply)
 - High wind
 - Icy roads
 - Fog
 - Dust
 - Other
- No

27. Has your agency deployed any Environmental Sensor Stations (ESS)?

- Yes
 - How many?
 - What data are collected by ESS and in-pavement sensors? (Check all that apply)
 - Pavement temperature
 - Pavement surface condition
 - Pavement precipitation
 - Temperature
 - Humidity
 - Wind speed
 - Precipitation (rain)
 - Precipitation (snow)
 - Visibility
 - Other (please specify):
- No

28. Is your agency using or planning to use a Maintenance Decision Support System (MDSS) for winter maintenance? (MDSS includes software systems that provide strategic and tactical weather forecasts, support treatment decision making and provide summary.)

Yes, agency uses an MDSS

Yes, considering (pilot project, used partially, used in one district)

No, agency needs an MDSS, but does not have a system

No, agency does not need an MDSS

29. Does your agency adjust traffic signal timing in response to inclement weather or road weather conditions?

Yes

No

INCIDENT MANAGEMENT/WORK ZONE MANAGEMENT

30. Number of arterial miles patrolled by service patrols:

31. Number of arterial miles covered by each of the following incident detection/verification methods:

Computer algorithms:

Closed Circuit Television (CCTV):

Other (please specify):

32. Does your agency deploy ITS technology at work zones?

Yes

What ITS technologies does your agency deploy at work zones? (Check all that apply)

Intrusion alarm

Dynamic lane merge system

Queue detection and alert system

Variable speed limit

Travel time system

Route guidance around work zones

Portable traffic monitoring devices

Portable CCTV

Temporary ramp metering

Other (please specify):

No

TRAVELER INFORMATION

33. Number of arterial centerline miles covered by Highway Advisory Radio (HAR):

34. Total number of permanent Dynamic Message Signs (DMS) deployed on arterials:

35. Does your agency have an agreement with a private vendor to push mobile alerts regarding incidents, roadway conditions, etc. to mobile media?

Yes

No

36. What methods are used to disseminate traveler information on arterials? (Check all that apply)

- 511
- Other (non-511) telephone system
- Twitter
- Facebook
- LinkedIn
- YouTube
- Podcasts
- Pinterest
- Other social media websites (please specify in part b below)
- Email or alert
- Custom-built smartphone app
- Other app for mobile device
- Dynamic Message Signs
- Website
- Highway Advisory Radio
- Other (please specify):

36. b. If applicable, please describe other social media sites:

37. Does your agency have an open data policy with a feed available for app developers, information service providers or the public?

- Yes
- No, but agency is working on this
- No current plans for an open data policy

38. Does your agency report real-time arterial travel time data to travelers?

- Yes
 - What arterial travel time data are reported? (Check all that apply)
 - Travel time by segment
 - Travel time over selected route
 - Other (please specify):
- No

SYSTEM PERFORMANCE MANAGEMENT

39. Does your agency have documented operational objectives and performance measures for the arterial network?

- Yes
 - Has your agency established targets for the performance measures?
 - Yes
 - No
- No

40. Does your agency use archived operations data to track arterial system performance?

Yes

What are the archived operations data used for? (Check all that apply)

Real-time Operations (e.g., used in real-time to adjust system operations)

Capital planning/analysis

Operations planning/analysis

Dissemination to the public

Planning/analysis of work zone design

Other (please specify):

No

41. Which of the following measures are used to report on the performance of the arterial system? (Check all that apply)

Average speed

Average delay per vehicle

Delay per incident

Frequency of severe congestion

Travel time

Travel time reliability

Vehicles per lane per mile

Vehicles per hour

Person throughput per lane per hour

Person throughput per hour

Average auto occupancy

Average queue length

Performance measures are not used

Other (please specify):

INTEGRATED CORRIDOR MANAGEMENT

This section focuses on corridor operations and seeks to understand **whether and how your agency coordinates with other agencies to actively manage operations within a corridor, such that performance is optimized for the corridor as a whole** (rather than optimizing performance on individual facilities). Please refer these questions to appropriate person(s) in your agency.

For the purposes of these questions, a corridor is defined as: a largely linear geographic band that serves a particular travel market (or markets) affected by similar transportation needs and mobility issues. The corridor includes multiple facilities (e.g., freeway, arterial and public transit) with cross-facility connections.

42. Have you identified corridor(s) for the purpose of integrating operations across multiple transportation facilities (including freeways, major arterials, and public transit networks) in order to actively manage travel demand and capacity in the corridor as a whole?

Yes

How many corridors have been identified for integrated transportation operations?

1 corridor identified

2 corridors identified

3 or more corridors identified

No (go to Next Section)

43. The next set of questions all pertain specifically to the corridor you identified above. If you identified more than one corridor, please tell us about the corridor where the greatest level of coordination is taking place. In your responses, please do NOT include coordination efforts that are occurring outside the specific corridor you have identified

Please name the key facilities that comprise the corridor (please be as specific as possible):

- a. Freeway(s) (e.g., US-75):
- b. Key Arterial(s) (e.g., Greenville Avenue, US-75 Frontage Roads):
- c. Public Transit Services (e.g., DART Red/Orange Light Rail Line, MTS Express Bus):
- d. Other (e.g., freight, rail, bicycle, pedestrian):

44. Approximately how long is the corridor?

- Less than 10 miles
- 11-20 miles
- 21-30 miles
- 31-50 miles
- More than 50 miles

45. For each agency type listed below, please indicate whether you are currently coordinating or plan to coordinate integrated transportation operations in the corridor specified above. If yes, please provide the name of the agencies in the corridor with which your agency is coordinating (referred to as the "coordinating agencies" in this survey). Please do NOT include coordination efforts that are occurring outside the corridor. For each agency type, a-d, select only one response.

	Currently Coordinate in Corridor	Plan to Coordinate in Corridor	No Plans to Coordinate in Corridor	Not Applicable	Agency Names
Freeway agencies:					
Arterial agencies:					
Transit agencies:					
Other agencies (e.g., MPOs, Toll Authorities, Port Operators):					

46. Has your agency signed any formal multi-jurisdictional or multi-agency Agreements, Memorandums of Understanding (MOUs), or other instruments with these coordinating agencies regarding the integrated operations of the corridor?

- Yes, already signed
 - One instrument signed
 - Multiple instruments signed
- No, but agreements, MOUs, or instruments are being developed (plan to sign)
- No, there is no plan to develop or sign Agreements, MOUs, or other instruments
- Do not know

IF SIGNED OR PLAN TO SIGN: Please describe what is covered by the Agreements, MOUs, or instruments:

47. How are data about conditions in the corridor shared among the coordinating agencies? (Check all that apply)

Manual data sharing: Corridor stakeholders call, radio, fax or email relevant corridor data to one another
Automated sharing of real-time video data (video servers/switcher communicate directly to one another in real time to share video images through video protocols)

Automated sharing of real-time data (computers, database servers communicate directly to one another to transmit data automatically (in real time) via center-to-center protocols)

Information Clearing House/Information Exchange Network (IEN) between corridor networks/agencies (a software system that collects, aggregates, warehouses and distributes traffic flow/transit performance data and incident/construction data for the corridor. All corridor agencies can access the agency/network information)

Other (please specify):

48. How would you describe the institutional coordination among the corridor stakeholders? Please select one response from the following scale, which ranges from less formal institutional coordination (1) to more formal institutional coordination (5).

1 (Less Formal) - Ad hoc coordination; no regular meetings; corridor stakeholders address near-term issues only

2 - Informal working groups; regular meetings among corridor stakeholders

3 - Formally established working groups; assigned responsibilities for Integrated Corridor Management

4 - Funded staff person(s) and well defined responsibilities for Integrated Corridor Management

5 - (More Formal) - Legal entity with dedicated resources and a governing board

49. a. Have the coordinating agencies in the corridor developed an Integrated Corridor Management (ICM) Concept of Operations (ConOps) or some other planning document that includes shared operating objectives for the corridor? (Check all that apply)

Yes, ICM ConOps has been developed

ICM ConOps is currently being developed

Plan to develop ICM ConOps

No plans to develop ConOps

Other planning document on corridor operations has been developed (please describe in part b below)

Other planning document on corridor operations is currently being developed or plan to develop (please describe in part c below)

Do not know

49. b. If applicable, please specify other planning document on corridor operations that has been developed:

49. c. If applicable, specify the other planning document on corridor operations that is currently being developed or planned to develop:

50. Have the coordinating agencies in the corridor developed a documented set of response plans or strategies, in any level of detail, that are based on shared operational objectives and that are designed to optimize performance in the corridor as a whole (e.g., across transportation facilities/modes) during conditions of both recurring and non-recurring congestion? In your response, please do not include response plans developed for emergency situations, such as evacuations.

Response plans or strategies have been developed for day-to-day operations during congested conditions

Response plans have been developed for emergency situations only (e.g., detours, evacuations)

Response plans or strategies are currently being developed

There are plans to develop response plans or strategies

There are no plans to develop response plans or strategies (skip to last question for additional comments)

Do not know

51. Has your agency deployed or does it plan to deploy a Decision Support System (DSS) to assist in the integrated operations of the Corridor?

- Yes, deployed
- Plan to deploy
- No (no plans to deploy)
- Do not know

52. Have the coordinating agencies identified corridor-level/multimodal performance measures (e.g., person throughput, average travel time, average travel speed, etc.) that will be used to measure the effectiveness of the strategies and response plans that are implemented in the corridor?

- Yes, corridor-level/multimodal performance measures identified
- Agency plans to identify corridor-level/multimodal performance measures
- No plans to identify corridor-level/multimodal performance measures
- Do not know

53. Please use the space below to provide any additional comments about the integration and coordination of operations in the corridor:

INTERAGENCY COORDINATION

The purpose of this section is to assess the coordination of your agency with other agencies outside of corridors.

54. For each agency type listed below, please indicate whether you are currently coordinating or planning to coordinate integrated transportation operations. Please provide the agency names. For each agency type, a-d, select only one response.

	Currently Coordinate	Plan to Coordinate	No Plans to Coordinate	Not Applicable	Agency Names
Freeway agencies:					
Arterial agencies:					
Transit agencies:					
Other agencies (e.g., MPOs, Toll Authorities, Port Operators):					

55. How are data about conditions shared among the coordinating agencies? (Check all that apply)

- Manual data sharing:** Stakeholders call, radio, fax or email relevant data to one another
- Automated sharing of real-time video data** (video servers/switcher communicate directly to one another in real time to share video images through video protocols)
- Automated sharing of real-time data** (computers, database servers communicate directly to one another to transmit data automatically (in real time) via center-to-center protocols)
- Information Clearing House/Information Exchange Network (IEN) between networks/agencies** (a software system that collects, aggregates, warehouses and distributes traffic flow/transit performance data and incident/construction data. All agencies can access the agency/network information)
- Other (please specify):**

PLANNING FOR OPERATIONS

56. Select all that apply concerning your agency's participation in regional coordination activities with agencies outside your jurisdiction:

- No regular interagency meetings
- Regular meetings with other agencies to coordinate planning
- Regular meetings to coordinate operations
- Formal agreement on coordination and data sharing with other agencies
- Formal agreement to integrate operations with other agencies

57. Is your agency part of the Regional ITS Architecture used to support regional transportation planning?

- Yes
- No

58. Is your agency included in a Regional Concept for Transportation Operations?

- Yes
- No

59. Does your agency receive, in real-time, incident information (e.g., clearance activities, type, severity, etc.) from any public safety agency?

- Incident clearance
 - Yes
 - No
- Incident severity and type
 - Yes
 - No

60. Does your agency provide arterial travel time, speed and condition information in real-time (as these events occur) to the following types of agencies? (Check all that apply)

- Agencies involved in incident management
 - Yes
 - No
- Freeway Management agencies
 - Yes
 - No
- Arterial Management agencies
 - Yes
 - No
- Public Transit agencies
 - Yes
 - No

CONNECTED VEHICLES

Need more information about connected vehicle applications? See http://www.its.dot.gov/pilots/cv_pilot_apps.htm

61. Does your agency have plans to deploy connected vehicle applications?

Yes

When do you expect to deploy?

Within the next 3 years

In 3 to 6 years

In 7 or more years

No plans to deploy (skip next question)

62. Which of the following connected vehicle applications is your agency planning to deploy? (Check all that apply)

VEHICLE TO INFRASTRUCTURE (V2I) SAFETY APPLICATIONS:

Reduced Speed/Work Zone Warning (RSWZ)

Curve Speed Warning (CWS)

Other speed management applications

Pedestrian and bicycle

Transit safety

MOBILITY APPLICATIONS:

Intelligent traffic signal systems

Advanced traveler information systems

Incident and emergency management

Integrated dynamic transit operations (IDTO)

ENVIRONMENT-FOCUSED APPLICATIONS:

Eco-signal operations

Eco-traveler information

Low emission zones

Eco-lanes

Eco-ICM

OTHER APPLICATIONS:

Road Weather

Fee Payments

Commercial Vehicle applications

Agency data applications (performance measures, probe data applications, etc.)

Other (please specify):

63. If your agency is not planning to deploy connected vehicle (CV) applications, why not? (Check all that apply)

Too costly for now

Too much technical risk; want to wait until technology and standards mature

Want to see benefits proven by pilot/early deployments

Not ready from an institutional or organizational point of view

Do not have enough staff with the right qualifications to plan and deploy CV applications

Concerned about security issues

Concerned about privacy issues

Not a high priority right now

We are more focused on:

Other (please specify):

64. When your agency starts planning the deployment of Connected Vehicle applications, which type of application will be the priority? (Select one)

- Safety applications
- Mobility applications
- Environment-focused applications
- Other
 - Please specify:
 - Do not know

65. What types of assistance or resources would your agency need in order to begin planning to deploy Connected Vehicle applications or to accelerate an existing deployment schedule? (Check all that apply)

- Funding
- Technology Procurement Information
- Training
 - Please indicate in what areas:
 - Technical assistance (e.g., CV technology information, deployment guidance, etc.)
 - Please indicate in what areas:
 - Information on institutional arrangements and agreements
 - Information on the benefits/return on investment
 - Information/data on costs of CV technologies
 - Other (please specify):

66. How familiar is your agency with the following:

	Very familiar	Moderately familiar	Slightly familiar	Not at all familiar
Connected Vehicle Reference Implementation Architecture (CVRIA)				
Systems Engineering Tool Intelligent Transportation (SET-IT)				

67. Has your agency:

	Yes	No, but plan to	No plans to
Hired a Chief Technology Officer or Chief Information Officer			
Obtained an FCC License to use 5.9GHz frequency spectrum (Dedicated Short-Range Communication)			
Included CV technologies and/or applications in agency planning documents (e.g., long range transportation plan, Strategic Highway Safety Plan, Transportation Improvement Program, etc.)			
Included CV applications and communications interfaces within your metropolitan area			

68. Has your agency been in discussions with public and/or private sector partners about forming partnerships for Connected Vehicle deployment and operations? (Select one answer)

- Yes, both public and private sector partners
- Yes, public sector partners only
- Yes, private sector partners only
- No

COMMUNICATIONS

69. What type of communications technologies does your agency use to communicate between any of its ITS devices, or between ITS roadside devices and a central processing location? (Check all that apply)

- Fiber
- Digital Subscriber Line (DSL)
- Cable TV
- Powerline carrier communications (PLCC)
- Cellular (LTE)
- Cellular (GPRS)
- WiMAX
- Fixed service satellite (FSS)
- Satellite digital audio radio service (SDARS)
- Ultra wideband (UAB)
- Wi-Fi
- Dedicated Short Range Communications (DSRC)
- ZigBee
- Microwave
- Other (please specify):

70. Do you have devices at intersections that have backhaul communications, where data is being sent from the field device to a central office or Traffic Management Center?

Yes

Are these communications systems owned by the operating agency or are they provided by a private operator?

All are owned by operating agency

All are provided by private operator

Some are owned by operating agency and some are provided by private operator

No

71. Does your agency have a security policy and procedures whose scope includes field devices and communications?

Yes

Does this policy cover cyber security?

Yes

No

No

MAINTENANCE OF ARTERIAL ITS TECHNOLOGY

72. Does your agency utilize an asset management system to track infrastructure inventory and related maintenance and operations activity?

Yes

No

73. Does your agency have a preventive maintenance program for ITS devices?

Yes

No

74. Does your agency collect data on the overall health and maintenance of ITS devices and equipment?

Yes

What sources of data are used?

Inspections

Complaint calls

Real-time monitoring

Other (please specify):

No

FUTURE DEPLOYMENT PLANNING

75. Has your agency deployed any vehicle charging stations?

Yes

No

Do you plan to deploy charging stations in the next three years?

Yes

No

76. a. Does your agency have any plans to invest in new ITS technology or to expand current ITS coverage in 2016 through 2019?

Yes

Check all that apply:

Invest in new ITS

Expand current ITS coverage

No

76. b. Please describe new ITS (if applicable):

ADDITIONAL COMMENTS

77. Please use the space below to provide any additional comments regarding your agency's deployment, operations or maintenance of ITS. (Please be as specific as possible when commenting on particular ITS technologies.)