

Thank you for participating in the **Transit Management survey**, administered on behalf of the US Department of Transportation (DOT), Intelligent Transportation Systems (ITS) Joint Program Office (JPO). Please review the survey questions and consult with colleagues, as needed, to gather the requested information before the completing the online survey.

TRANSIT AGENCY CHARACTERISTICS

1. What is the total number of vehicles used in revenue service for each of the following modes? If none for a mode, please enter '0.'

	Total number
a. Fixed Route Bus	_____
b. Heavy or Rapid Rail (including subway)	_____
c. Light Rail	_____
d. ADA Complementary Paratransit	_____
e. Demand Responsive	_____
f. Commuter Rail	_____
g. Streetcar	_____
h. Ferry Boat	_____
i. Other (please specify): _____	_____

[A RESPONSE TO Q. 1 IS REQUIRED TO PROCEED TO Q2.]

TRANSIT VEHICLE CHARACTERISTICS

If you reported multiple modes in Q. 1, you may see the next two questions on ITS technologies (Q. 2) and traveler information technologies (Q. 3) repeated for those modes. The Worksheets for Q. 2 (p. 3) and Q. 3 (p. 6) show the modes for which each question is asked.

2. For your agency's **[INSERT MODE]** service, what is the number of revenue vehicles equipped with each of the following technologies? . If none for a technology, please enter '0.'

[INSERT MODE] revenue vehicles equipped with:	Total number
<p>a. <u>Automated Vehicle Location (AVL)</u> DEFINITION: AVL systems are computer-based vehicle tracking systems which use real-time location technology and a wireless data communications system to transmit location data from vehicles to a transit operations center.</p>	_____
<p>b. <u>Computer Aided Dispatch and Scheduling (CADS)</u> DEFINITION: CADS is software incorporating routes, schedules, trip orders, and vehicle assignments to let dispatchers know where vehicles are.</p>	_____
<p>c. <u>Mobile Data Terminals (MDTs) or Mobile Data Computers (MDCs)</u> DEFINITION: MDTs, or MDCs, are computerized devices that communicate with a central dispatch office. They provide two-way text-based communications and the ability to upload collected data during a scheduled run.</p>	_____
<p>d. <u>Automatic Passenger Counters (APC) – Do not include registering fareboxes or mobile ticket readers.</u> DEFINITION: APC systems are electronic machines near vehicle doors that count passengers entering and exiting at each transit stop. Common types of APC systems are: electronic infrared beams, light beams, mechanical treadle mats, and camera-based detection.</p>	_____
<p>e. <u>Maintenance Management Systems (MMS) (i.e., remote monitoring of vehicle components)</u> DEFINITION: MMS can monitor vehicle components (e.g., fuel and fluid levels) and can alert operators of mechanical failures. Advanced systems capture conditions such as temperature and voltage to help predict when parts might fail.</p>	_____
<p>f. [IF BUS, LIGHT RAIL, OR STREETCAR IN Q. 1] <u>Transit Signal Priority (TSP)</u> DEFINITION: TSP refers to the use of sensors or signal timing to detect approaching transit vehicles and grant them priority at signalized intersections. TSP systems can extend green lights, provide an early green light, or use bypass (or queue jump) lanes for transit vehicles.</p>	_____

[THE NUMBER PROVIDED FOR EACH MODE IN Q. 2 CANNOT EXCEED THE TOTAL NUMBER OF VEHICLES FOR THAT MODE REPORTED IN Q. 1].

WORKSHEET FOR Q. 2:

For each mode reported in Q. 1, you will be asked to report the ITS technologies deployed on that mode (i.e., if your agency does not operate a particular mode, disregard that column; the online survey tool will **ONLY** show Q. 2 for the modes your agency operates).

	Number of Fixed Route Buses with:	Number of Heavy or Rapid Rail (including subway) with:	Number of Light Rail with:	Number of ADA Complementary Paratransit with:	Number of Demand Responsive with:	Number of Commuter Rail with:	Number of Streetcar with:	Number of Ferry Boat with:	Number of Other with:
a. Automated Vehicle Location (AVL)									
b. Computer Aided Dispatch and Scheduling (CADS)									
c. Mobile Data Terminals (MDTs) or Mobile Data Computers (MDCs)									

	Number of Fixed Route Buses with:	Number of Heavy or Rapid Rail (including subway) with:	Number of Light Rail with:	Number of ADA Complementary Paratransit with:	Number of Demand Responsive with:	Number of Commuter Rail with:	Number of Streetcar with:	Number of Ferry Boat with:	Number of Other with:
d. Automatic Passenger Counters (APC) – Do not include registering fareboxes or mobile ticket readers.									
e. Maintenance Management Systems (MMS) (i.e., remote monitoring of vehicle components)									
f. Transit Signal Priority (TSP)		Not Applicable		Not Applicable	Not Applicable	Not Applicable		Not Applicable	Not Applicable

3. What is the total number of [INSERT MODE: BUS, HEAVY RAIL, LIGHT RAIL, COMMUTER RAIL, STREETCAR, OTHER] revenue vehicles equipped with the following traveler information technologies? If none for a traveler information technology, please enter '0.'

	Total number
<p>a. [INSERT MODE-] revenue vehicles equipped with Automatic Voice Announcement (AVA) systems (e.g., automatically triggered stop name display and announcement)</p> <p>DEFINITION: AVA systems provide audio (i.e., recorded announcements) and visual announcements that are schedule- or location-based, such as upcoming stops or major intersections. AVA may also include exterior display and announcement of route numbers & destinations.</p>	_____
<p>b. [INSERT MODE] revenue vehicles equipped with dynamically updating passenger information displays (e.g., visual displays of estimated arrival times for upcoming stops, transfer information, service alerts)</p> <p>DEFINITION: These are visual displays, or dynamic message signs, inside the vehicle that provide real-time information, such as estimated arrival times for upcoming stops, and may include transfer information or service alerts.</p>	_____
<p>c. [INSERT MODE] revenue vehicles equipped with dynamically triggered automated announcements (e.g., audio of delays on the current or other connecting routes)</p> <p>DEFINITION: These are audio announcements that are triggered based on real-time information. For example, an audio announcement might inform riders of the estimated time of arrival at a major transfer location, based on real-time traffic conditions.</p>	_____

[THE NUMBER PROVIDED FOR EACH MODE IN Q.3 CANNOT EXCEED THE TOTAL NUMBER OF VEHICLES FOR THAT MODE REPORTED IN Q. 1].

WORKSHEET FOR Q.3

Question 3 is only asked for Fixed Bus Route Bus, Heavy or Rapid Rail, Light Rail, Commuter Rail, and Streetcar (i.e., if you do not operate one of those modes, disregard the column; the online survey tool will ONLY show Q. 3 if your agency operates one of the qualifying modes).

	Number of Fixed Route Buses with:	Number of Heavy or Rapid Rail (including subway) with:	Number of Light Rail with:	Number of Commuter Rail with:	Number of Streetcar with:	Number of Other with:
a. Revenue vehicles equipped with Automatic Voice Announcement (AVA) systems (e.g., automatically triggered stop name display and announcement):						
b. Revenue vehicles equipped with dynamically updating passenger information displays (e.g., visual displays of estimated arrival times for upcoming stops, transfer information, service alerts)						
c. Revenue vehicles equipped with dynamically triggered automated announcements (e.g., audio of delays on the current or other connecting routes)						

4. What is the total number of the following facilities served by your agency? If none for a specific facility type, please enter '0.'

	Total Number
a. Bus Stops (including BRT stops/stations)	_____
b. Rail Stations (including stations serving heavy, light and commuter rail and/or streetcars)	_____
c. Multi-modal Stations or Transfer Stations	_____

5. What is the total number of your agency's facilities where dynamic traveler information (e.g., real-time schedule and system information) is provided to the public using the following methods? If none for a specific type of traveler information display or delivery, please enter '0.'

	Electronic signage or displays	SMS/text	Mobile application
a. Total number of bus stops:	_____	_____	_____

[RESPONSES TO Q. 5a CANNOT EXCEED THE TOTAL NUMBER OF BUS STOPS REPORTED IN Q. 4a].

b. Total number of rail stations:	_____	_____	_____
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[RESPONSES TO Q. 5b CANNOT EXCEED THE TOTAL NUMBER OF RAIL STATIONS REPORTED IN Q. 4b].

c. Total number of Multi-modal Stations or Transfer Stations:	_____	_____	_____
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[RESPONSES TO Q. 5c CANNOT EXCEED THE TOTAL NUMBER OF MULTIMODAL OR TRANSFER STATIONS REPORTED IN Q. 4c].

TRAVELER INFORMATION

6. What methods does your agency use to disseminate real-time traveler information to the public, including transit schedule adherence or arrival and departure times? *Please select all that apply.*

- 511
- Social media (e.g., Twitter, Facebook)
- Email or text/SMS alert
- Agency-branded mobile application (e.g., white-label commercial app, custom built)
- Third-party mobile app (e.g., Google Maps, Moovit, Transit)
- Website
- Dynamic message signs in station
- Dynamic message signs in-vehicle
- Dynamic message signs at stop
- Kiosks
- Other (please specify): _____
- Agency does not provide real time data about the transit system

7. Has your agency deployed or does your agency maintain a trip planner (web-based and/or mobile application) to assist travelers in planning trips? Please select one.

- Yes
- No [SKIP TO Q. 8]

7a. Which, if any, of the following applies to your agency's trip planner tool(s)? Please select all that apply.

- Incorporates more than one mode within your agency (e.g., demand responsive to bus connections)
- Incorporates multiple transit systems in your area
- Incorporates modes other than transit (e.g., walking, biking, or driving routes to stops/stations)
- Incorporates real-time traffic condition information
- Incorporates private mobility service providers (e.g., bikesharing, scooter-sharing, taxis, ride-hailing)
- Incorporates payment of fares for agency services
- Incorporates payment of fares to other mobility providers
- None of the above

DEFINITION:

Ride-hailing: also known as Transportation Network Companies (TNCs) or ridesourcing services, provide on-demand or pre-arranged transportation services where drivers of personal vehicles are compensated by riders, connected through an application

ELECTRONIC FARE PAYMENT

8. What types of fare media are currently accepted by your agency? Please select all that apply.

- Cash
- Magnetic stripe cards
- Agency or regional branded “smart cards”
- Contactless credit/debit cards
- Mobile Wallet (e.g., Apple Pay, Google Pay)
- Mobile App Payment (payment within agency-approved or sponsored application)
- Other (please specify): _____

8a. Does your agency use electronic fare payment? *Please select one.*

- Yes
- No **[SKIP TO Q. 10]**

9. This question asks about different characteristics of your agency's electronic fare payment (EFP) system.

9a. Which of the following best describes the system scope of your agency's EFP system? *Please select one.*

- Single agency
- Multiagency
- Don't know

9b. Which of the following best describes the design and technology of your agency's EFP system? *Please select one.*

- Proprietary
- Standards-based
- Don't know

9c. Which of the following best describes the system architecture of your agency's EFP? *Please select one.*

- Stored value/Card-based
- Account-based
- Don't know

9d. Which of the following best describes the payment architecture of your agency's EFP? *Please select one.*

- Closed payments
- Open payments
- Don't know

10. Is your agency planning to upgrade its fare payment system to accept additional or different types of fare media in the next 5 years? Please select one.

- Yes, in the next year
- Yes, within the next 1 to 3 years
- Yes, within the next 3 to 5 years
- No
- Don't know

AGENCY PARTNERSHIPS

11. Does your agency partner with any private transportation services (e.g., ride-hailing, bikesharing, microtransit)? Please select one.

- Yes
- No [SKIP TO Q. 14]

DEFINITION:

Microtransit: Service featuring privately or publicly operated technology-enabled transit service, typically using multi-passenger shuttles or vans to provide services with either dynamic or fixed routing.

12. With which private transportation services does your agency partner? Please select all that apply.

- Ride-hailing/Ridesourcing/Transportation Network Company (TNC)
- Bikesharing
- Scooter-sharing
- Microtransit
- Taxis
- Parking (municipal or privately-owned)
- Carpool matching service
- Other (please specify): _____

DEFINITIONS:

Bikesharing: Service in which travelers access bicycles on an as-needed basis for one-way or roundtrip travel.

Scooter-sharing: Service in which users have short-term access to scooters on an as-needed basis.

Carpool matching service: Service allowing passengers to connect with drivers of personal vehicles who have similar origins and destinations.

13. In what ways do these private transportation services partner with your agency?

Please select all that apply.

- Provide subsidized or unsubsidized service to agency customers
- Integrate real-time, schedule, or availability data in trip planning tools
- Integrate dispatching
- Share payment platforms
- Share traveler information through an app
- Other (please specify): _____

14. Does your agency operate a Travel Management Coordination Center (TMCC) or similar service coordination platform that works with other entities to coordinate mobility services for the transportation disadvantaged? These other entities may include social service agencies, Health and Human Services, non-emergency medical transportation services (NEMTs), or private transportation providers, among others. *Please select one.*

- Yes, agency operates a TMCC or similar service coordination platform
- No, agency does not operate a TMCC or similar service coordination platform
- Other (please specify): _____

INTEGRATED CORRIDOR MANAGEMENT

This next question focuses on Integrated Corridor Management (ICM). ICM is an approach that manages a transportation corridor as a multimodal system (**freeway, arterial, and public transit**), integrating operations such as traffic incident management, work zone management, traffic signal timing, managed lanes, real-time traveler information, and active traffic management to maximize the capacity of all facilities and modes across the corridor .

For the purposes of this survey, a corridor is defined as: a largely linear geographic band and a bounded travel shed of (mostly) commute and daily trips. The corridor must include **freeway, arterial and public transit facilities**, with cross-facility connections.

You can find more information about ICM at: <https://rosap.ntl.bts.gov/view/dot/38816>

15. Has your agency deployed Integrated Corridor Management (ICM) in one or more corridors (i.e., integrating operations across networks (freeways, major arterials, and public transit) to actively manage travel demand and capacity in the corridor as a whole)? Please select one.

- Yes, my agency has deployed ICM
- No, but my agency plans to deploy ICM
- No, my agency has no plans to deploy ICM

ITS DATA USE AND COLLECTION/ARCHIVING

16. Does your agency provide an open data feed (e.g., to app developers, information service providers or the public)?

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

17. What information does your agency collect and/or archive in real-time, if any? Please select all that apply.

- Vehicle time and location
- Vehicle monitoring status (i.e., vehicle diagnostics and health)
- Passenger count
- Trip itinerary planning records
- Passenger information (e.g., fare transactions, trip origin/destination location)
- Road surface conditions (e.g., wet, icy)
- Emergency vehicle signal preemption events
- Transit vehicle signal priority events
- Weather conditions (e.g., snow, fog, rain)
- Incidents
- Impact of work zones on transit operations
- Other (please specify): _____
- My agency does not collect and/or archive data in real time.

18. Does your agency currently use ITS data for route and service planning? Examples of ITS data include: fare transaction data, on-time performance and delays captured by automatic vehicle location (AVL), and/or crowding and stop utilization captured by automatic passenger counters (APCs). *Please select one.*

- Yes, for all modes
- Yes, but only for some modes
- No
- Don't know

TRANSPORTATION DEMAND MANAGEMENT

19. Does your agency employ automated vehicle location, combined with dispatching and reservation technologies to provide flexible routing and scheduling? *Please select one.*

- Yes
- No
- Not applicable

20. Does your agency employ vehicle monitoring and communication technologies to hold vehicles to facilitate the coordination of passenger transfers between vehicles or between transit systems (e.g., connection protection)? *Please select one.*

- Yes
- No
- Not applicable

21. Does your agency dynamically adjust the assignments of assets (e.g., buses) based on real-time demand to cover the most overcrowded sections of the network? *Please select one.*

- Yes
- No
- Not applicable

TELECOMMUNICATIONS

22. What type of telecommunications technologies does your agency use to communicate between any ITS devices, and/or between ITS roadside devices and a central processing location? Please select all that apply.

Wired:

- Coaxial
- Fiber optic cable
- Twisted copper pair/Twisted wire pair
- Digital subscriber line (DSL)
- Data cable over modem

Wireless:

- 5G New Radio and Small cell infrastructure
- Cellular (LTE-4G)
- Cellular (GPRS – 2G or 3G)
- LTE-Cellular V2X (LTE-CV2X)
- Wi-Fi
- Dedicated short range communications (DSRC)
- Mobile or Fixed service satellite (FSS)
- Ultra-wideband (UWB)
- Microwave
- Other telecommunications (wired and/or wireless) (please specify): _____

CYBERSECURITY

23. Does your agency have a documented cybersecurity policy specific to ITS equipment? Please select one.

- Yes, my agency has a policy
- No, but my agency is developing a policy
- No, my agency does not have/is not developing a policy
- Don't know

24a. Has your agency had any cybersecurity events (e.g., ransomware, data breach) affecting IT systems in the last three years? Please select one.

- Yes
- No
- Don't know

24b. Has your agency had any cybersecurity events (e.g., ransomware, data breach, tampering of field devices) affecting transportation operations in the last three years? Please select one.

- Yes
- No
- Don't know

[IF: (Q.23=HAS OR IS DEVELOPING POLICY) AND (Q. 24a AND/OR Q. 24b=YES), ASK Q. 25]:

25. Has your agency's policy on cybersecurity (specific to ITS equipment) changed since these cybersecurity event(s) took place? Please select all that apply.

- Yes, policy was developed or is being developed as a result of the event(s)
- Yes, policy has been updated as a result of the event(s)
- No, event(s) did not have an impact on policy
- Don't know

MAINTENANCE OF TRANSIT ITS TECHNOLOGY

26. Does your agency utilize an asset management system to track ITS inventory and/or related maintenance and operations activity? Please select one.

- Yes, system tracks only ITS inventory
- Yes, system tracks only ITS maintenance and operations activity
- Yes, system tracks both
- No, my agency does not have an ITS asset management system

27. Who installs, inspects, maintains, and repairs your agency's ITS equipment in the field? *Please select all that apply.*

- Agency staff [ASK Q. 28a]
- Contractor(s) [ASK Q. 28b]
- Other (please describe) _____

28a. Which job titles best describe the agency staff that perform this work (i.e., install, inspect, maintain, and repair your agency's ITS equipment in the field)? *Please select all that apply.*

- Engineer
- Electrician
- IT Specialist
- Software Engineer
- Traffic Signals Technician
- Maintenance Technician
- GIS Specialist
- Field Technician
- Planner
- Other (please specify): _____
- Don't know

28b. Approximately what percentage of all ITS field equipment work (i.e., installation, inspection, maintenance, and repair) is contracted out? *Please select one.*

- 0% to 25%
- 26% to 50%
- 51% to 75%
- 76% to 100%
- Don't know

INDEPENDENT TRAVEL FOR PEOPLE WITH DISABILITIES

29. Has your agency implemented or piloted any technologies or services to support independent travel for people with disabilities? *Please select all that apply.*

- Automated announcement and display of bus routes and rail lines and stops/stations
- Audio- and braille-equipped fare/ticket vending machines
- Accessible agency-owned websites and/or mobile applications (e.g. adjustable text sizes, screen reader capable, image descriptions, and other features outlined in Web Content Accessibility Guidelines V2.0 or higher. Click [here to view guidelines.](#))
- Trip reservation systems with ways to reserve trips in addition to a phone call with customer service representative and TTY/TDD [telecommunications device for the deaf] line [ASK Q. 30]
- Indoor navigation support [ASK Q. 31]
- Flexible/on-demand mobility services, including microtransit, operated by your agency or through formal partnerships with taxis or ride-hailing companies (must include wheelchair-accessible vehicle options)
- Travel training and independent travel support applications
- Augmentative and alternative communication (AAC) aids provided to operators and managers to support communication with customers
- Other (please specify): _____
- No technologies **or services** are currently implemented or being piloted

[IF "TRIP RESERVATION SYSTEMS WITH..." RESPONSE SELECTED IN Q. 29, ASK Q. 30]:

30. Which of the following features are included with your trip reservation system?

Please select all that apply.

- Interactive Voice Response system [IVR]
- Live agent or artificial intelligence-enabled chat pod
- Mobile or website application
- Other (please specify): _____

[IF "INDOOR NAVIGATION SUPPORT" SELECTED IN Q. 29, ASK Q. 31]:

31. Which of the following types of indoor navigation support does your agency provide?

Please select all that apply.

- Wayfinding beacons
- GPS-enabled mobile application
- Digital mapping of accessible pathways (e.g., providing accessible routing information through General Transit Feed Specification (GTFS) Pathways, Indoor Geographic Markup Language (GML), or Building Information Models [BIM])
- Audio-tactile mapping applications
- Assistive robots
- Other (please specify): _____

[IF "TRAVEL TRAINING AND INDEPENDENT TRAVEL SUPPORT APPLICATIONS" SELECTED IN Q. 29, ASK Q. 32]:

32. Which of the following travel training and independent travel support applications does your agency provide? Please select all that apply.

- Pre-trip planning applications (provides reminders to users for pre-departure steps, including notices of times to leave)
- En-route navigation applications (provides dynamic step-by-step instructions to the user)
- Virtualization applications such as Mixed, Augmented, or Virtual Reality (allows users to practice independent travel through virtual environments, including virtual reality and web interfaces)
- Subscriptions for third-party navigation applications with accessibility features
- Other (please specify): _____

STANDARDS

33. Please select any of the following transit-related ITS standards implemented by your agency. Please select all that apply.

- Transit Communication Interface Profiles (TCIP)
- National Transportation Communications for ITS (Intelligent Transportation Systems) Protocol (NTCIP) Advanced Traveler Information System (ATIS)
- Contactless Fare Media System Standard (CFMS) / Universal Transit Fare Systems (UTFS)
- General Transit Feed Specification (GTFS) (*de facto* standard)
- GTFS Real-Time (GTFS-RT)
- GTFS-flex (proposed/prototype extension of GTFS to model demand-responsive transportation services)
- Service Interface for Real Time Information (SIRI)
- Network Timetable Exchange (NeTEx)
- Other (please specify): _____
- Don't know
- No ITS standards used

FUTURE DEPLOYMENT PLANNING

34. Does your agency plan to expand or upgrade current ITS during the next three years (2021 through 2023)? Please select one.

- Yes
- No
- Don't know

35. Does your agency plan to invest in new or emerging ITS during the next three years (2021 through 2023)? Please select one.

- Yes
- No [SKIP TO Q. 36]
- Don't know [SKIP TO Q. 36]

35a. Please describe new or emerging ITS technologies.

ADDITIONAL COMMENTS

36. 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.

37a. Can we contact you if we have any follow-up questions about your agency's experience deploying ITS?

- Yes
- No **[SKIP TO Q. 38]**

Thank you. How can we best reach you if we have follow-up questions about your agency's experience deploying ITS?

37b. Your preferred phone number. If this is not your preferred email, please type in your preferred email address:

37c. Your preferred email address. If this is not your preferred email, please type in your preferred email address:

38. Please confirm if you are ready to submit your responses. *Please select one.*

- Yes, I have completed the survey and I would like to submit my final responses (Note: if you click this button, you will not be able to return to the survey).
- No, I am still working on the survey and will complete it later.

Thank you for your time and effort in completing this survey! The ITS JPO and the U.S. DOT Volpe Center greatly appreciate your participation.