



# Archived Data User Service (ADUS)

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## ITS Standards Advisory

Welcome to the **ITS Standards Advisory**—a series of reports produced by the U.S. DOT's ITS Standards Program. **This Advisory focuses on ADUS Standards.** ITS Standards Advisories provide state and local transportation agencies with background and guidance on development issues and other key activities related to ITS standards. Approximately every two months, the Standards Program distributes a new or updated Advisory. Each Advisory focuses on a single ITS standard or a group of ITS standards used in a specific ITS application. In addition to standards development information, Advisories include information on testing, training, early deployments, and other important activities. The entire Advisory series is posted on the ITS Standards Program web site at [www.its-standards.net](http://www.its-standards.net). Please e-mail [flood@volpe.dot.gov](mailto:flood@volpe.dot.gov) if you would like to be notified by e-mail when a new ITS Standards Advisory is posted on the web.

If you are new to working with ITS standards, refer to the following introductory information.

- Frequently Asked Questions (FAQs) at the ITS Standards web site, [www.its-standards.net/FAQ.htm](http://www.its-standards.net/FAQ.htm)
- The ITS Specialist at your [FHWA Resource Center](#) or [Division Office](#).

## The New ADUS Standard

### What is ADUS?

The Archived Data User Service (ADUS) enables transportation agencies to retain ITS-generated data and make them available for analysis. ITS applications produce huge amounts of fine-grained data. When summarized and analyzed, these data are useful for many purposes beyond their immediate applications. Additionally, archived data from different transportation agencies can be shared, combined, or compared if they have compatible structures.

ADUS is one of 32 user services defined in the National ITS Architecture. Each user service addresses a particular user need and defines:

- Subsystems or locations applicable to satisfying the need
- Data flows between the subsystems
- Functions enabled by the data flows.

ADUS major functions include:

- Operational Data Control for data integrity
- Data Import and Verification
- Automatic Data Historical Archive to store the data permanently
- Data Warehouse Distribution to provide data to the planning, safety, operations, and research communities
- ITS Community Interface.

View the description of ADUS functions at <http://itsarch.iteris.com/itsarch/html/user/usr71.htm>.

### ADUS Standards Development

The American Society for Testing and Materials (ASTM) has published the first ADUS standard: ASTM E2259-03, *Standard Guide for Archiving and Retrieving ITS-Generated Data*. The guide promotes a structured process for developing Archived Data Management Systems (ADMSs), which host the ADUS functions described in the ITS National Architecture. The guide stresses:

- Sound practices for information systems development
- Maintenance of data quality through mechanisms such as retaining original source data, correcting data at the source, and constructing an audit trail.

ASTM E2259-03 is general in scope; it does not strictly specify formats and processes. The guide is expected to provide an element of consistency in ADMS development across the country. An overview of the standard is available under the Standards section on ASTM's homepage at [http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE\\_PAGE\\_S/E2259.htm?L+mystore+bola8912+1064613121](http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE_PAGE_S/E2259.htm?L+mystore+bola8912+1064613121).

ASTM Committee E17.54, responsible for developing the standard guide, is working on other ADMS standards, including:

- A metadata standard specification for archiving ITS-generated data: This standard will provide the exact structure for the metadata needed in addition to those attributes required for ITS data dictionaries. (Metadata is data about data. For example, a library's card catalog contains metadata describing each library book.)

- A standard specification for archiving ITS-generated traffic monitoring data: This will take the form of a data dictionary for archiving traffic data, a record structure for creating data tables, and a file transfer format.

In the future, ASTM Committee E17.54 plans to address standard specifications for additional types of ITS-generated data: (1) incident/safety, (2) transit, and (3) commercial vehicle operations/freight.

## Bridging the Data Gap with ADUS

### ADUS Standards in Use

Many state and local transportation agencies are incorporating archived data into their operations. The following agencies are using, or considering using, the ADUS standard, ASTM E2259-03:

**State of Alaska, Department of Transportation and Public Facilities (DOT&PF)** officials are using ASTM E2259-03 to develop protocols for collecting, managing, and disseminating data collected by their weigh-in-motion (WIM) stations. The ADUS standard is facilitating efforts to consolidate and standardize differently formatted historical data collected by these stations, resulting in easier access to more reliable transportation data. One benefit of the standard noted by the agency is its scalability: it applies as easily to small ITS deployments as it does to large. DOT&PF officials have been active participants in the working committee that developed ASTM E2259-03. Contact Maryann Dierckman at 907-465-6993 or [maryann\\_dierckman@dot.state.ak.us](mailto:maryann_dierckman@dot.state.ak.us) for more info.

**Maricopa County, Arizona** is currently developing and implementing the **Regional Archived Data Server (RADS)** using data archival standards outlined in ASTM E2259-03. When completed, RADS will provide and maintain valid, classified ITS-derived data for use in transportation system planning, modeling, and real-time operation applications. RADS will also be compatible with the National ITS Architecture and data registries, in addition to data archiving standards. More information will soon be available on the RADS project website at [www.itsradsaz.org](http://www.itsradsaz.org) or contact Dave Wolfson, Maricopa County Department of Transportation at 602-506-6950 or [davewolfson@mail.maricopa.gov](mailto:davewolfson@mail.maricopa.gov).

**The Virginia Department of Transportation** is conducting an operational test of applications of archived data for transportation management

centers. The objective of the test is to discern whether the use of archived data can improve the effectiveness and efficiency of Transportation Management Center (TMC) operations and, ultimately, traffic conditions. The test will also examine other uses of the archived data by non-traditional users including transportation planners, DOT Environmental Divisions, and emergency/evacuation planners. VDOT plans to follow all ADUS standards in developing its archive. For further information, contact Cathy McGhee at 434-293-1973 or [Cathy.McGhee@VirginiaDOT.org](mailto:Cathy.McGhee@VirginiaDOT.org).

**CHART (State of Maryland)** is a statewide traffic management system that utilizes ITS-based traffic monitoring, traveler information, and incident management services to improve real-time operations of the state's highway system. CHART currently collects and archives ITS data for system recovery and base systems statistics but is considering plans to improve access to its archived ITS data—allowing CHART and other safety and engineering personnel to use historical data to enhance safety and operations activities. Part of this effort will include an assessment of the archiving guidelines contained in ASTM E2259-03. Contact Rick Dye, CHART Systems Administrator, for more info at [rdye@sha.state.md.us](mailto:rdye@sha.state.md.us) or 410-582-5619.

### Contacts and References

Tools and resources are available to those considering the development of an ADMS to implement ADUS.

- Key contacts for ADUS within the USDOT:
  - James Pol, ITS Joint Program Office, 202-366-4374 [james.pol@fhwa.dot.gov](mailto:james.pol@fhwa.dot.gov)
  - Ralph Gillmann, FHWA Office of Highway Policy Information, 202-366-5042, [ralph.gillmann@fhwa.dot.gov](mailto:ralph.gillmann@fhwa.dot.gov)
  - Larry J. Brown, FHWA Office of Safety, 202-366-2214, [larry.j.brown@fhwa.dot.gov](mailto:larry.j.brown@fhwa.dot.gov)
- The Texas Transportation Institute's *Guidelines for the Development of ITS Data Archiving Systems* provides the principles and technical issues surrounding ADMS implementation. See <http://tti.tamu.edu/product/catalog/reports/2127-3.pdf>.
- The ADUS Data Model can be viewed at [http://www.trevilon.com/adms\\_web\\_model/adms.html](http://www.trevilon.com/adms_web_model/adms.html).
- The U.S. Department of Transportation provides information on ADUS, including its strategic plan for producing ADUS standards, at <http://www.its.dot.gov/TravelManagement/adus.htm>

- The ADUS Survey of Emerging Sensor and Information Technologies is available at <http://www.mitretrek.org/publications/its/2002-36.pdf>
- The “Getting Involved” subsection on page 4 of this document lists ASTM committee contacts.
- Oak Ridge National Laboratory (ORNL) prepared for the USDOT a comprehensive report, *Cross-Cutting Studies and State-of-the-Practice Reviews: Archive and Use of ITS-Generated Data*. This report, which is discussed further in the following subsection, can be found at [http://www.itsdocs.fhwa.dot.gov/jpodocs/repts\\_t/13697.pdf](http://www.itsdocs.fhwa.dot.gov/jpodocs/repts_t/13697.pdf).

## Researchers Summarize ADUS Benefits

The above-referenced ORNL report, *Cross-Cutting Studies and State-of-the-Practice Reviews: Archive and Use of ITS-Generated Data*, discusses general benefits of using ITS-generated data. By polling early ADUS users as part of freeway management surveys conducted in 1999 and 2000, the authors determined that the data most often archived by transportation agencies are traffic volume and vehicle classification. The following is taken from the study conclusions:

- Archived ITS-generated data are distinct from traditional data sources in three aspects: (1) ITS-generated data are temporally intensive (e.g., collected in very short intervals), (2) ITS-generated data meet some major data gaps that could not be met in the past due to resource limitations, and (3) all ITS-generated data are on electronic media, thereby expediting data analysis and information dissemination.
- These attributes of archived ITS-generated data provide unprecedented opportunities that traditional ways of compiling information cannot offer. Making information accessible almost on a real-time basis allows transportation planners and operators to anticipate emerging issues, thereby allowing them to progress from a reactive mode to a proactive mode. Furthermore, more detailed and insightful understanding of the problems (safety, planning, operations, or maintenance) is now possible because of the expanded scope and increased frequency of data collection.
- The specific benefits of using ITS-generated data vary from one application to the next, and are difficult to enumerate. However, the general benefits of using archived ITS-generated data can be gauged in at least three ways. First, can ITS data replace traditional data? If so, this

benefit can be measured in monetary terms. Second, can ITS-generated data supplement traditional data so that more reliable estimates can be developed? Third, can ITS-generated data meet data gaps that are expensive or impossible to meet with traditional data sources? Results from our previous research confirm that ITS-generated data can both replace and supplement data collected through traditional ways.

## Standards Resources

### Technical Assistance

Technical assistance for those using, or considering using, ITS standards is available in a number of formats.

- **The ITS JPO Standards Program Web Site** is the first stop for information on standards. Visit <http://www.its-standards.net/>.
- **An ITS Specialist** is available at the FHWA Resource Center to provide guidance on issues related to ITS standards. For contact info, visit <http://www.fhwa.dot.gov/field.html>.
- **The ITS Field Support Team** is a new technical assistance program sponsored by the Standards Program. (Visit <http://www.its-standards.net/Documents/FSTflyer.pdf> for more details.) The ITS Field Support Team offers intensive consultation and support on a broad range of standards-related issues, including:
  - Assessment of current system
  - Development of project specifications
  - Review of existing contracts and specifications
  - Identification of appropriate contracting and procurement mechanisms
  - Development of test plans.
- **The ITS Standards Contacts Database** contains contact information for state-level deployers who have used, are using, or are planning to use Data Archival standards. Individuals in the database are available for informal discussions about using Data Archival standards. Find the database at <http://www.its-standards.net/deploy.htm>.
- **The Standards Forum** is a moderated, online community of individuals interested in learning about ITS standards and sharing experiences with colleagues. Questions posted to the Forum are answered quickly. Visit the Forum at [www.nawgits.com/stdsforum](http://www.nawgits.com/stdsforum).

### Training

ADUS-specific training is currently unavailable. However, training is available for other ITS standards

through the Institute of Transportation Engineers (ITE) and the Transit Standards Consortium. Training is held at locations throughout the country. The following web sites provide more detail.

- <http://www.ite.org/>
- <http://www.tsconsortium.org/>
- <http://www.pcb.its.dot.gov/>

### Standards for Sale

*The Standard Guide for Archiving and Retrieving ITS-Generated Data* is available from ASTM for \$35 and can be downloaded from: <http://www.astm.org/>.

### Getting Involved

#### ASTM Committee E17.54

For information on participating in the standards development process, contact Dan Smith, staff

manager of ASTM Committee E17.54 Archived Data User Service, at [dsmith@astm.org](mailto:dsmith@astm.org) or 610-832-9727. Contact the committee chair, Rich Margiotta, at [rmargiotta@camsys.com](mailto:rmargiotta@camsys.com).

#### National Transportation Communications for ITS Protocol (NTCIP) Data Collection Monitoring Working Group

NTCIP 1206, Data Collection and Monitoring, is related to ADUS and deals with the data stored in roadside count stations. The committee will issue a new standard shortly; the chair, Rick Stalowski, can be reached at [rstalowski@peektraffinc.com](mailto:rstalowski@peektraffinc.com).

## ADUS Standards Development Organization (SDO):

The following section lists ADUS standards. Note: "SDO Status" denotes the standard's current development status as determined by the committee that oversees the development of the standard. "Comment" refers to any additional information related to the status of the standard. For further information on the ADUS standards, see <http://www.astm.org/COMMIT/E17.htm>. For information on the standards development process and its terminology, see <http://www.astm.org/MEMBERSHIP/standardsdevelop.html>.

Standard	Document Title	Description	SDO Status	Comment
ASTM E2259-03	Standard Guide for Archiving and Retrieving ITS-Generated Data	Provides guiding principles for ADMS development	Published June 2003	
ASTM Task Group E17.54.02.1	Standard Specification for Metadata Content for ITS-Generated Data	Specifies how to annotate data for subsequent uses	In development	Draft expected early 2004
ASTM Task Group E17.54.02.2	Standard Specification for Archiving ITS-Related Traffic Monitoring Data	Specifies a data dictionary for archiving traffic data	In development	Draft expected late 2004

## Acronyms and Abbreviations

ADMS	Archived Data Management System	ITS	Intelligent Transportation Systems
ADUS	Archived Data User Service	JPO	Joint Program Office
ASTM	American Society of Testing and Materials (now ASTM International)	NTCIP	National Transportation Communications for ITS Protocol
FAQs	Frequently Asked Questions	ORNL	Oak Ridge National Laboratory
FHWA	Federal Highway Administration	SDO	Standards Developing Organization
ITE	Institute of Transportation Engineers	TMC	Transportation [Traffic] Management Center

## The ITS Standards Advisory Series

Number	Name	Date	Web Address
1	Dynamic Messaging Systems (DMS)	January 2003	<a href="http://www.its-standards.net/Documents/dms_advisory.pdf">http://www.its-standards.net/Documents/dms_advisory.pdf</a>
2	Environmental Sensor Stations (ESS)	March 2003	<a href="http://www.its-standards.net/Documents/ess_advisory.pdf">http://www.its-standards.net/Documents/ess_advisory.pdf</a>
3	Dedicated Short Range Communications (DSRC)	April 2003	<a href="http://grouper.ieee.org/groups/1616/136_dsrc_advisory.pdf">http://grouper.ieee.org/groups/1616/136_dsrc_advisory.pdf</a>