

EXECUTIVE SUMMARY

Introduction

Much of the data generated by Intelligent Transportation Systems (ITS) can be of great value beyond their immediate use in real-time control strategies. However, unless ITS operators have made special provisions, data from system surveillance equipment are typically not stored for future use. Because the amount of data is so enormous, it is doubtful that simply saving the raw data would be of use to other stakeholders; some level of aggregation or sampling is required to make the data more meaningful to stakeholders. Further, the National ITS Architecture currently has no specification for a data archival process.

Data needs of many stakeholder groups have been identified in several past studies. In particular, the *ITS As A Data Resource Workshop* held in January, 1998 substantiated stakeholder needs and began the process of matching ITS-generated data with those needs.

Because of the wide range of support among stakeholders represented at the *ITS As a Data Resource Workshop*, it has been determined that there is a need for a new User Service to be included in the National ITS Architecture: the Archived Data User Service. The recommendations herein are the starting point for this process. Specifically, this document has four objectives:

- (1) definition of the Archived Data User Service;
- (2) development of preliminary requirements for revising the National ITS Architecture;
- (3) identification of steps for implementation beyond inclusion in the Architecture; and
- (4) fostering communication between stakeholder groups.

Stakeholder Groups

The number of stakeholder groups with an interest in the Archived Data User Service is much larger than for any other of the 30 currently specified User Services. Stakeholders include:

- ! MPO and state transportation planners;
- ! ITS operators and transportation engineers;
- ! Transit operators;
- ! Air quality analysts;
- ! MPO/state freight and intermodal planners;
- ! Safety planners and administrators;
- ! Maintenance personnel;
- ! Commercial vehicle enforcement personnel;
- ! Emergency management services (local police, fire, and emergency medical);
- ! Transportation researchers; and
- ! Private sector users.

It is noteworthy that a significant beneficiary of archived data is the ITS operator community, whose systems collect the data in the first place.

Uses and Benefits of Archived Data Generated By ITS

For the most part, data generated by ITS is similar to data collected by traditional means (e.g., traffic counts) but ITS-related data are collected continuously and at a very detailed level. Accordingly, a wide range of stakeholder functions can be supported with data from ITS. For example, roadway surveillance data can be used in many stakeholder applications, including development and calibration of travel demand forecasting and simulation models; congestion monitoring; transit route and schedule planning; intermodal facilities planning; and air quality modeling. In addition to identifying specific applications, several general observations on the uses and benefits of ITS-generated data can be made.

- ! The continuous nature of most data generated by ITS removes sampling bias from estimates and allows the study of variability.
- ! The detailed data needed to meet emerging requirements and for input to new modeling procedures can be provided by ITS.
- ! Use of data generated by ITS for multiple purposes is a way to stimulate the support of other stakeholders for ITS initiatives.
- ! Promoting the use of archived data for multiple purposes complements the initiative for integrating ITS in general.
- ! Because the data are already being collected for ITS control, other uses provide a value-added component to ITS.
- ! ITS is a rich data source for multiple uses, but not a panacea; traditional sources of data will continue to be important.
- ! As the focus of transportation policy shifts away from large-scale, long-range capital improvements and toward better management of existing facilities, ITS-generated data can support the creation and use of the system performance measures that are required to meet this new paradigm.

Basic Requirements of the Archived Data User Service

Based on the data needs of stakeholders and the nature of data in ITS, three types of recommendations are made. The recommendations are not exhaustive, merely a point of departure for future discussions with stakeholders.

First, general requirements for systems to support the User Service are specified. These relate to:

- ! support for both centralized and decentralized systems;
- ! data processing, storage, and retrieval;
- ! data aggregation and sampling;
- ! metadata specifications;
- ! data ownership;
- ! coordination with all relevant standards and data dictionary efforts; and
- ! data privacy.

The second type of recommendation is the specification of the types of ITS-generated data that should be considered, the data's attributes, internal storage structure, data reduction cycles, and level of accuracy. A detailed table of data elements is given in the report which includes, for example, traffic volume, vehicle speed, classification, as well as transit vehicle boardings, incident data, and environmental data. As with the general requirements, these data elements are the starting point for stakeholder discussions. They also can form the basis of a data dictionary and for the development of formal Architecture requirements, if required.

The third type of recommendation is aimed at the next steps in the process. These are offered for consideration in promoting development and use of the Archived Data User Service in the field.

- ! "Best Practice" procedures for performing quality control and editing on Archived Data User Service data should be developed.
- ! "Best Practice" procedures for analysis of archived data generated by ITS would provide guidance to stakeholders and would promote the use of Archived Data User Service.
- ! Coordination with ongoing data dictionary efforts is crucial to the future development of the Archived Data User Service.
- ! The needs of stakeholder groups should be represented in the development of standards that may have an impact on the relevant data.
- ! The Archived Data User Service should be integrated into other Federal, state, and local data collection programs.
- ! Training the various stakeholders in each others' needs is seen as an ongoing requirement.
- ! A concentrated field effort, similar to the ITS Field Operational Tests, to demonstrate the implementation and use of the Archived Data User Service should be undertaken.
- ! Funding for the Archived Data User Service should be implicit in future ITS grant programs and national legislation.

Successful implementation will require resolution of many difficult institutional and technical issues. A total of sixteen such issues are identified, including: development, operation, and maintenance costs; system access; ownership; data quality; data management; data and communications standards; privacy concerns; data analysis; coordination with other data collection efforts; liability; confidentiality of privately collected data; incremental and uncoordinated ITS deployments; retrofitting vs. new development of systems; data flows not defined by the National ITS Architecture; conformance with metric conversion standards; and training and outreach.