Highway Performance Monitoring System Catalog

New Technology and Techniques

Department of Transportation
Federal Highway Administration (FHWA)
Office of Highway Information Management
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with the assistance of the Standing Committee on Planning
American Association of State Highway and Transportation Officials
for the
Federal Highway Administration
September 1998

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INTRODUCTION

PURPOSE, USE, CONTENT, BACKGROUND AND FUTURE OF CATALOG

➢ Audience

The Catalog on HPMS new technologies and techniques is intended for use by:

1. State employees or contractors involved in the preparation of the HPMS submittal.
2. State employees or contractors involved in other data activities from which HPMS data are extracted.
3. FHWA field personnel involved in HPMS.

➢ Purpose

The purpose of the catalog is to create a network to share information on new technologies and techniques for collecting and reporting HPMS data.

➢ Definition

New technology or technique:

Any new technology or technique which the State has employed in the past five years or is currently considering which increases the efficiency, quality, consistency and/or safety of data collection by the State and is used or could be used in the preparation of the annual HPMS submittal to FHWA. Information on current research activities is also included.

➢ Scope

Since much of the data for HPMS comes from other sources and activities, the use of the term HPMS is in the broadest context and includes new technologies and techniques used in these other sources and activities as well as the direct collection and processing of HPMS. For example, if HPMS pavement condition information comes from the State pavement management system and States are using a new technology or technique for the collection of data, they were encouraged to include the activity in the catalog.

➢ Content

The catalog is organized into two parts.

Part One contains a description of recent literature, ongoing research programs, web sites and conferences where information on new technologies and techniques may exist. The programs, sites and conferences listed are not specifically focused on HPMS, but are on subjects directly related to data collection, processing and presentation.

Part Two contains individual forms which were prepared by the States. They are sorted by the following categories:

1. Field data collection technique
2. GIS/GPS application for data collection integration and presentation
3. Other data integration and presentation technique
4. Automated data collection equipment
   - ◇ pavement characteristics and condition
   - ◇ traffic/travel
   - ◇ congestion
   - ◇ other (specify)
5. Private data sources and privatization of data collection

Each form contains one new technology application or technique. The forms contain the following information:

- ➢ Contact person for the particular new technology application or technique, including organization, name, address, phone, fax, and e-mail
- ➢ Category
- ➢ Description of technology or technique application
- ➢ Description of use or possible use for HPMS. If the project is in the research phase, a description of the research project is included.
- ➢ Results of the use in terms of improved efficiency, quality, consistency, safety of data collection and other benefits.

Each form contains enough information to allow users to make decisions on which States to contact if they want to obtain additional information on a particular technology or technique or to share information on experiences. The purpose of the catalog is to create a network to share information.

➢ Background

This catalog is being prepared as part of the FHWA initiative to reassess the current HPMS. The reassessment of HPMS was initiated in early 1997 in conjunction with the HPMS Steering Committee with the support of AASHTO and AMPO. The reassessment process involved a number

of activities. One activity was to hire a consultant to conduct an independent review of an HPMS in conjunction with AASHTO, AMPO and other users of HPMS. The consultant prepared a preliminary reassessment report in the spring of 1997; the report was used for input to a HPMS workshop held in the summer of 1997 in Minneapolis, Minnesota. The workshop had over 95 participants representing 35 States as well as MPOs, contractors, TRB committee members, interest groups, academia and the Federal Government. The workshop was followed by a meeting of the HPMS Steering Committee. Copies of the consultant's Phase 1 Report and the Summary of the Workshop are available from FHWA.

At the workshop, one recommendation subsequently approved by the HPMS Steering Committee was that **"FHWA catalog new technology applications and develop methods of sharing experiences used for HPMS data collection."**

After researching existing information sharing programs on data, consultation with TRB data committees and discussions with HPMS data providers, the decision was made to create the catalog in this form. It is designed to be a simple catalog, with its primary purpose to create a network to share information.

The AASHTO Standing Committee on Planning requested that the States prepare inputs to the catalog. AASHTO sent a letter to each state SCOP representative with a request to fill out attached forms which were used to create the initial catalog. This initial catalog contains 73 entries which were submitted by 30 States.

➢ Future of Catalog

The catalog was designed so that it could be periodically updated and supplemented. The catalog content will also be added to the FHWA web site--www.fhwa.dot.gov/ohim. FHWA in cooperation with the HPMS Steering Committee and AASHTO will reevaluate the initial product and jointly recommend a future direction and update cycle. States are encouraged to update their submittals and add new entries; States that did not respond to the initial request are also encouraged to contribute.

New or modified forms should be sent to: James Getzewich, Office of Highway Information Management - HPM-20, Federal Highway Administration, 400 Seventh Street, SW, Washington, DC 20590, or jim.getzewich@fhwa.dot.gov.

PART ONE

LISTING OF RECENT LITERATURE AND PROGRAMS FOR INFORMATION/PRODUCT/TECHNOLOGY SHARING AND CONFERENCES RELATED TO NEW TECHNOLOGIES AND TECHNIQUES IN DATA COLLECTION AND PRESENTATION

➢ Recent Literature

1. NCHRP Project 15-15 -Project panel on Collection and Presentation of Roadway Inventory Data. Completion date March 1999.

2. NCHRP 8-32(5) - Multimodal Transportation Planning Data.

3. TRB Record 1477 - Statewide Travel Surveys, Traffic Data Collection and Urban Travel Patterns. Paper on traffic data collection systems using video-based systems.

4. TRB Record 1551 - Innovative Transportation Data Management, Survey Methods and GIS. Papers on computer-aided traveltime data collection, relational database structure for managing network information, vehicle classification using advanced technologies, advanced techniques for traveltime data collection and review of methods for estimating VMT.

5. TRB Record 1580 - Partnerships For Effective Technology Transfers.

6. TRB Record 1593 - Advances in Transportation Data. Papers on using voice recognition to collect license plate data for traveltime studies, temporal GIS and its application to transportation, location translation within a GIS, and opportunities for collecting highway inventory data with GPS.

7. TRB Circular 488 - Transportation Technology Transfer: A Primer on the State of the Practice.

8. Project TE-21 Strategic Highway Research Program - Pavement Condition Measurement.

9. Scan of Recent Data Research, September 1996, Travel Model Improvement Program - DOT-T-97-07.

➢ Information/Product/Technology Sharing

1. Traffic Research Laboratory - An advanced research laboratory to fulfill research, development, test and evaluation initiatives in support of the advanced traffic management systems (ATMS) research and development program plan.
   http://www.fhwa-tsis.com

2. U.S. Department of Transportation, Research and Special Programs, Technology Sharing Program.
   http://www.tsp.dot.gov

3. Federal Highway Administration, Office of Technology Applications - Information from demonstrations of latest highway technologies.
   http://www.ota.fhwa.dot.gov

4. National Transportation Product Evaluation Program, AASHTO - Enables State transportation departments to be "informed customers" of transportation products and provides industry with a "one-stop shop" for the evaluation of products. The program is not currently dealing with data collection products.
   http://www.aashto.org

5. Local Technical Assistance Program (LTAP) - Promotes an active, progressive and cost-effective transfer of highway technology and technical assistance to rural and local governments. There are LTAP Centers in each State. American Public Works Association.
   http://patroit.net/~ltap/ltap.htmc

6. Center for Microcomputers in Transportation (McTrans), University of Florida, Transportation Research Center.
   http://mctrans.ce.ufl.edu/

7. PCTRANS, Kansas University Transportation Center.
   http://kuhub.cc.ukans.edu/~pctrans

8. National Center for Advanced Transportation Technology, University of Idaho - Specializes in research for biodiesel fuels, hybrid and electric vehicles, transportation software, commercial vehicle size and weight design, and video detection of traffic.
   208-885-6002 or http://www.uidaho.edu/ncatt

9. Pool Funded Study - Vehicle Detection Clearinghouse, New Mexico State University.
   http://www.nmsu.edu/traffic/

10. U.S. Department of Transportation Home Page - Link to National Transportation Library and Bureau of Transportation Statistics.
    http://www.dot.gov

11. Turner-Fairbank Highway Research Center - Hosts almost 7,000 files of transportation-related information.

    http://www.tfhrc.gov

12. National Highway Institute - Transportation-related training and education programs that assist Federal, State and local transportation agencies as well as private transport providers and firms.

    http://www.nhi.dot.gov

➢ Conferences with Proceedings

1. North American Travel Monitoring Exhibition and Conference (NATMEC)
   Held every two years. This sixth conference was held in May 1998 in Charlotte, North Carolina. The conference provides an opportunity to examine and share state-of-the-art technology, knowledge and progress in the field of traffic monitoring and data analysis. FHWA contact:

   Ralph Gillmann
   202-366-5042
   http://itre.ncsu.edu/natmec/

2. Integrating the Transportation Business Using GIS
   Held in Salt Lake City in April 1998.

   http://gis.dot.state.mn.us

3. Local Technical Assistance Program Annual Conference
   Held in Salt Lake City in July 1998.

   joan@lab.cee.usu.edu

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES FORMS (listed by category)

FHWA Data Collection Techniques

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Alabama	Agency: Department of Transportation	
Contact: Ray Barron	Title: Assistant HPMS Coordinator	
Street Address: 1409 Coliseum Boulevard		
City: Montgomery	State: Alabama	Zip Code: 36139
E-Mail: barron@dot.state.ai.us	Phone: 334-242-6600	Fax: 334-269-0827

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Using a laptop computer with a Microsoft Access application with tables, queries, and forms to record field inspections and process updates to the master HPMS data table.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Using a Microsoft Access 97 process on a laptop computer to enter updates from field inspections. The Microsoft Access 97 database uses the HPMS Paradox database to provide the data (record) of each sample section. The update form is built with filters to retrieve records for rural, urban or both. Additional items such as map number and description have been added to assist in locating the sample section. The Access form creates a file that is used to hold all the updates for processing at the conclusion of all field inspections. The form also shows both what is current in HPMS and what it will be updated to. Thirty five (35) different tables are used to provide drop down boxes that are used to ensure only valid data is entered. Where possible, these drop down boxes are also used to provide a simple explanation of each value. The update table is processed against the Paradox HPMS table by an Access update query with "IF" statements that only update fields containing new data.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Use of this process will reduce training time, reduce errors, and provide consistency in data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: David Saia	Title: Sr. Transportation Engineer	
Street Address: 1120 N Street		
City: Sacramento	State: California	Zip Code: 95814
E-Mail: dsaia@trmx3.dot.ca.gov	Phone: 916-654-4238	Fax: 916-654-6583

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
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Description of Technology or Technique Application:
Thomas Bros. Electronic color maps and address finder (Geofinder) are loaded onto laptops and used instead of paper maps.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
For field establishing new samples or reviewing existing samples, electronic maps enable easy HPMS segment location without the need for bulky paper maps. Street name is entered or "point and click" is utilized to easily locate desired highway section. Unlike paper maps, views can be instantaneously zoomed from regional to close-up view.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Major benefits: efficient and easy to use, ability to instantaneously zoom in or out of regional or close-up view, slightly less time spent in the field. Disadvantage: must bring paper maps as backup in case of laptop or battery failure.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: David Saia	Title: Sr. Transportation Engineer	
Street Address: 1120 N Street		
City: Sacramento	State: California	Zip Code: 95814
E-Mail: dsaia@trmx3.dot.ca.gov	Phone: 916-654-4238	Fax: 916-654-6583

CATEGORY

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Description of Technology or Technique Application:
Special data input screens for HPMS segment field reviews have been developed using Microsoft Access that allow field data to be directly keyed into laptop computers and electronically uploaded into Caltrans corporate Oracle database. A program has also been developed (using Oracle) to populate the laptop screens with previous years's data prior to field activity.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Screens have been successfully developed and upload/download programs have been written and successfully tested. Still in testing phase: actual field entry to occur in April 1998. Also considering the use of electronic tablets and character recognition software.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Anticipated pros: data will only be written once, eliminating office entry, reducing potential errors, and saving time. Previous year's data will be easily viewable in the field as quality check. Anticipated cons: slightly more time spent in the field, valid code edits will be bypassed (although they will be captured in the final edit).

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Connecticut	Agency: Transportation	
Contact: Angelo Asaro	Title: Transportation Planner	
Street Address: 2800 Berlin Turnpike, PO Box 317546		
City: Newington	State: Connecticut	Zip Code: 06131-7546
E-Mail:	Phone: 860-594-2107	Fax: 860-594-2056

CATEGORY

X	Field Data Collection Technique	
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Description of Technology or Technique Application:
Connecticut Department of Transportation converted its paper based roadway inventory process to a new process that used a pen based computer technology. This new process is called the Mobile Roadway Inventory System and was developed in three phases, which consisted of the State roadway system, HPMS, and the town maintained roadway system.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
MRIS uses the HPMS ASCII data file for its input. The MRIS program displays the field data items needed for review using visual basic. A majority of these items have pull down pick lists to assist in correctly coding the items. Changes are verified by HPMS office personnel, then MRIS will electronically create an update file in the HPMS format.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The HPMS field inventory process is running 45 percent faster with the new MRIS procedure. The office processing of the data is approximately 30 percent faster. The accuracy of the data has also improved due to the decrease in manually coding the required field data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Georgia	Agency: Office of Information Services	
Contact: Elizabeth Stolz	Title: Data Collections Bureau Chief	
Street Address: 5025 New Peachtree Road		
City: Chamblee	State: Georgia	Zip Code: 30341
E-Mail: elizabeth.stolz@dot.state.ga.us	Phone: 770-986-1361	Fax: 770-986-1016

CATEGORY

x	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
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Description of Technology or Technique Application:
Data Collection Resources Bureau of the Office of Information Services is conducting a pilot project to improve the collection of road characteristics data. The pilot project will integrate the collection of Global Positioning Systems (GPS) data with the collection of physical characteristics. The configuration of the hard- and software will not be decided until the completion of the needs assessment phase of the project, but the basic concept has been established. The intent is to use an Oracle-compliant database with a user interface involving on-screen maps and menus, running on hand-held computers in conjunction with real-time, differentially corrected GPS (DGPS).

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The new system will enable the data collection technicians to collect HPMS physical characteristics data as well as the data required for State use. With maps and DGPS, the crews will identify HPMS sections quickly and accurately. The collection of data in electronic form at the source will eliminate the time consuming, error-prone data entry function. The software will include edit checks and pull-down pick lists to reduce the chance of inaccurate entries. In addition, there will be a complete on-line help manual, including digital images, to provide guidance in the event of uncertainty.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Data quality will be dramatically improved by the consistency and accuracy allowed by the on-line help, and by the pick lists and edits included in the software. Efficiency will increase due to the elimination of data entry and repeated editing of keypunched files. The enhancement of efficiency will pay dividends in the currency of the data, by allowing more frequent visits to higher priority sites. Mapping will be aided by the collection of accurate DGPS alignments for new roads concurrently with physical characteristic data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Hawaii	Agency: Department of Transportation	
Contact: Gary Toyama	Title: CE III	
Street Address: 600 Kapiolani Boulevard		
City: Honolulu	State: Hawaii	Zip Code: 96813
E-Mail:	Phone: 808-587-1839	Fax: 808-587-1787

CATEGORY

X	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
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Description of Technology or Technique Application:
Logging of digital images of the highway system. The system collects full-frame, high resolution, georeferenced images of the road. The images and reference data are stored in the standardized Joint Photographic Expert Group (JPEG) compression format.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Extracting HPMS data from the video logging system such as curves, grades, number of lanes, and possibly lane widths. The video logging system can also provide data for the linear referencing system required for the HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The system provides verification of the HPMS data currently recorded. It also provides data that are difficult to obtain, data currently only on project plans. The accuracy of the data will be greatly improved.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: Department of Transportation	
Contact: Rick J. Dubois	Title: Management Systems Engineer	
Street Address: Management Systems Div., 16 State House Station, Department of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: rick.dubois@state.me.us	Phone: 207-287-6817	Fax: 207-287-3292

CATEGORY

X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
The Department has ordered and will take delivery on a new ARAN vehicle in June 1998. ARAN is a multi-functional data collection vehicle which gathers highway information while traveling at highway speeds. Highway video is collected and maintained by the Pavement Management Section. In addition to the panoramic video, physical properties of the pavement surface are also collected such as rut depths and roughness.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Some data elements required by HPMS are fed directly from ARAN data.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The data gathered is analyzed to assign a Pavement Condition Rating (PCR), predict future deterioration, and make recommendations on where pavement expenditures should be made.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maryland	Agency: State Highway Administration	
Contact: Bill Walsek/Michael Baxter	Title: Division/Assistant Division Chief	
Street Address: 707 North Calvert Street, Mail Stop C-607		
City: Baltimore	State: Maryland	Zip Code: 21202
E-Mail: bwalsek@sha.state.md.us mbaxter@sha.state.md.us	Phone: 410-545-5529 (Walsek) 410-545-5511 (Baxter)	Fax: 410-209-5033

CATEGORY

X	Field Data Collection Technique	
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Description of Technology or Technique Application:
Maryland will begin exploring, developing or acquiring a system to further automate the collection road inventory data. Areas to be examined include collecting and storing road inventory data in electronic form and elimination of the need to carry paper inventory. The new system should contain the ability to electronically create and maintain a straight line inventory of Maryland roads. Data collected electronically will be directly portable to databases maintained at a central site.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
No direct impact on HPMS; it may speed up the collection of road inventory data, but this will not significantly speed up the submission of HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Improved data collection efficiencies and quality, speedier database updates at the central site, straight line inventory could be made available over the LAN/WAN

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Michigan	Agency: Department of Transportation	
Contact: Don Howe	Title: HPMS Coordinator	
Street Address: 425 West Ottawa Street, PO Box 30050		
City: Lansing	State: Michigan	Zip Code: 48813
E-Mail: howed@mdot.state.mt.us	Phone: 517-335-2901	Fax: 517-373-9255

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
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Description of Technology or Technique Application:
Measurement of curve and grade for sample sections using a vehicle equipped with a GPS and inertial guidance system.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Data is required for HPMS samples.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Good consistent data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Montana	Agency: Department of Transportation	
Contact: Becky Duke	Title: Planner	
Street Address: 2701 Prospect Avenue, PO Box 201001		
City: Helena	State: Montana	Zip Code: 59620-1001
E-Mail: U3828@long.mdt.mt.gov	Phone: 406-444-7238	Fax: 406-444-7671

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
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Description of Technology or Technique Application:
The Montana Department of Transportation (MTDOT) contracted with Mandli Communications to digilog (logging of digital images) and collect road inventory data. Mandli collected images on all of Montana's interstate, non-interstate NHS, primary and secondary roads.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
MTDOT employees are able to "drive" Montana's roadways from their computer. We will be using the digital images to fulfill some of the HPMS inventory requirements.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Because of the size of Montana, data collection is a very time consuming and costly task. The digital images will save the MTDOT both time and money plus inventorying can be done in the winter months as well as the summer.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nebraska	Agency: Department of Roads	
Contact: David Winter	Title: Classification Needs & Pavement Management Engineer	
Street Address: 1400 Nebraska Highway 2		
City: Lincoln	State: Nebraska	Zip Code: 68509-94759
E-Mail: dor26004@vmhost.cdp.state.ne.us	Phone: 402-479-4783	Fax: 402-479-3884

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
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Description of Technology or Technique Application:
Laptop computers used for the collection of pavement management data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Pavement condition surveys are performed on laptop. This has greatly reduced the paperwork involved with pavement rating.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
By entering the data directly into the laptop, paperwork was greatly reduced. The data is entered into an Access database, which also contains the data from the previous year. This allows for the pavement rater to perform an on-site comparison of data, which has improved the quality and consistency of condition data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: North Dakota	Agency: North Dakota Department of Transportation	
Contact: Robert Olzwoski	Title: Project Manager	
Street Address: 608 East Boulevard Avenue		
City: Bismarck	State: North Dakota	Zip Code: 58505-0700
E-Mail: Rolzwosk@ranch.state.nd.us	Phone: 701-328-3479	Fax: 701-328-4545

CATEGORY

X	Field Data Collection Technique	
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Description of Technology or Technique Application:
Roadway Information Management System. RIMS File

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Our pavement AADTs, SN numbers, curve and grade data is stored in the file called (RIMS). The HPMS file is electronically updated from the RIMS file each year. Many hours of updating has been eliminated.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: Tony Manch	Title: Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: tmanch@odot.dot.ohio.gov	Phone: 617-466-3075	Fax: 617-752-8646

CATEGORY

X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
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Description of Technology or Technique Application:
Microwave radar (RTMS) side mounted radar that can be used to collect up to 8 lanes of volume traffic data. Can be used in a permanent (ac power) or portable application (battery power).

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
If used on an urban Interstate can collect volume data. Can be used to replace road sensors (loops) to make an existing ATR operational.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Increased safety because it is an off-road sensor. Used by ARTJMIS (Cincinnati ITS) for urban interstate data collection. Used by technical services in a portable mode to collect data on high volume routes in urban areas.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: Tony Manch	Title: Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: tmanch@odot.dot.ohio.gov	Phone: 617-466-3075	Fax: 617-752-8646

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Research project will be underway to classify vehicles from the side of the road. Goal is to be able to obtain Federal Highway Administration 13 vehicle class from the side of the road.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Vehicle class is required on each HPMS section.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Safety will increase because we will not have to get on the roadway to place axle sensors.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Steve Allen/Charles King	Title: Transportation Manager 1, Roadway Specialist III	
Street Address: Suite 1000, James K. Polk Building, 505 Deaderick Street		
City: Nashville	State: Tennessee	Zip Code: 37243-0344
E-Mail: sallen@mail.state.tn.us	Phone: 615-741-6741 (Allen) 615-741-0957 (King)	Fax : 615-532-0353

CATEGORY

X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
			Pavement Characteristics and Condition
		X	Traffic/Travel
			Congestion
			Other (specify)
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
The University of Tennessee is reviewing Tennessee's random sampling of local roads for statistical accuracy.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Provides local counts for developing local VMT.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The local sample data provides HPMS requirements and VMT for use in the Department.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Texas	Agency: Texas Department of Transportation	
Contact: Kim Hajek	Title: Director, Data Management, TPP Division	
Street Address: PO Box 149217		
City: Austin	State: Texas	Zip Code: 78714-9217
E-Mail: Khajek@mailgw.dot.state.tx.us	Phone: 512-486-5052	Fax: 512-486-5099

CATEGORY

X	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Texas Department of Transportation (TXDOT) will be incorporating the use of laptops for the field data collection and validation of HPMS data in the 25 TXDOT districts. This is in conjunction with the implementation of the PC software at the district level.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The use of laptops for field data collection and validation is approximately 2 years away, as the central division planning office is currently piloting the use of this technology.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
We expect to achieve improved quality and consistency for HPMS data through the use of the new PC software.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Washington	Agency: Washington State Department of Transportation	
Contact: Pat Whittaker	Title: HPMS Engineer	
Street Address: Transportation Building, 310 Maple Park Avenue, SE.		
City: Olympia	State: Washington	Zip Code: 98504-7380
E-Mail: Whittap@wsdot.wa.gov	Phone: 360-664-9681	Fax: 360-586-5855

CATEGORY

X	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A program named SR View was developed by Washington State Department of Transportation for the State highway system. The complete State system is "filmed" with digital images obtained each 1/100th of a mile. These images can be viewed on a desktop PC using SR View. The user selects a specific State route and milepost location from an on-screen list to display an image of the roadway looking ahead. The user can also select to automatically "drive" ahead or back using the software.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
State highway data placed in the HPMS database can be verified/checked as needed for physical data such as intersections, preventing a trip to the field for review.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Data with questionable accuracy can be quickly corrected, thereby increasing accuracy, as well as reducing field review time.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Wisconsin	Agency: Department of Transportation	
Contact: Ruben L. Anthony, Jr.	Title: Chief of the Data Management Section	
Street Address: 4802 Sheboygan Avenue, PO Box 7913		
City: Madison	State: Wisconsin	Zip Code: 53707-7913
E-Mail:	Phone: 608-266-2249	Fax: 608-267-0294

CATEGORY

X	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
We designing a field collection application on penbased computers to allow use to enter data on a computerized form and subsequently upload the data to our mainframe computer. This computer has handwriting recognition.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The project has been prototype and tested. The project will be used to collect State trunk highway data. This data is used as a part of the HPMS submittal.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This will reduce the effort of having to manually enter the data into the computer from inventory forms. The form will now be computerized and automatically uploaded to the mainframe computer. In the past, the field collector recorded the data on paper and also had to manually enter the data on the mainframe computer.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

GIS/GPS Application for Data Collection Integration and Presentation

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arizona	Agency: Department of Transportation	
Contact: Joe Breyer	Title: Consultant, Data Team	
Street Address: Lee Engineering-3240 E. Camelback Road #180		
City: Phoenix	State: Arizona	Zip Code: 85018
E-Mail: Jbreyer@lee-eng.com	Phone: 602-955-7206	Fax: 602-955-7349

CATEGORY

X	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Highly accurate GPS data collection of centerline information, together with customized ArcView software utilities allow for the determination of curve and grade calculations for HPMS Items 59 and 61.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Although technique has not been implemented (awaiting Reassessment results on whether curve/grade is long-term stable in the data set), we developed the appropriate techniques of reducing 3-D GPS to the formatting requirements of HPMS. Have since turned the technique into a useful tool for traffic engineers to assess as-built curves and grades.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
If curve/grade lives through the reassessment process, Arizona Department of Transportation (AZDOT) may implement the technique to populate the curve/grade columns for all State highway system HPMS records (level of control = '01'). Actually the HPMS format is quantitative and presumably helpful for the Federal Highway Administration analysts. The AZDOT traffic engineers prefer their curve/grade assessments in GIS spatial representations rather than tables of numbers.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arizona	Agency: Department of Transportation	
Contact: Joe Breyer	Title: Consultant, Data Team	
Street Address: Lee Engineering - 3240 East Camelback Road, #180		
City: Phoenix	State: Arizona	Zip Code: 85018
E-Mail: Jbreyer@lee-eng.com	Phone: 602-955-7206	Fax: 602-955-7349

CATEGORY

x	Field Data Collection Technique	
x	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Portable and Customized ArcView GIS software and Arizona Transportation Information System (ATIS) library CD-ROM allow all data suppliers to review last year's submittals in map form, make corrections spatially, supply new information (capital improvement, forecasts, signal installs, etc.), add new local streets/roads with pavement type & volume group from other sources.

Transaction .dbf and .shp files are compiled by the system for DOT staff to process through the master files in Phoenix and prepare the submittal using the latest submittal software. All changes are easily reviewable by staff before introduced to the master file. After submittal is sent to DC, new master file CD is burned and sent back out to COG/MPO/LGAs for next year's submittal.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Designed and built secondarily for HPMS submittal. Primary purpose of design was to provide ADOT with a Transportation Information System. The difference between the two is that the ADOT's TIS satisfies more purposes and provides more information on roads (in general) than HPMS requires.

We are doing our best to enforce the ideology that ADOT collects this data for internal transportation planning purposes, and that HPMS is just a by-product of that system. We feel we will achieve long-term buy-in from supporting agencies with this in mind.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Rolled out on February 23, 1998. Two of eight COGs have submitted their QA reviews within 4 weeks with only 4 hours of training. Other COGs and locals have pledged to use the tools but not this year with such a short fuse on the submittal deadline. We are looking for funding to keep training and support in effect throughout the year and encourage a successful program and be an example for other States. Continued support will definitely improve transportation information greatly for both Arizona, and FHWA.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Colorado	Agency: Department of Transportation	
Contact: Tim Baker	Title: Unit Manager	
Street Address: 4201 E. Arkansas Avenue		
City: Denver	State: Colorado	Zip Code: 80222
E-Mail: Tim.J.Baker@dot.state.co.us	Phone: 303-757-9805	Fax: 303-757-9727

CATEGORY

X	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A systematic review of HPMS samples that includes the additional collection of G.P.S. information and a digital camera picture of various locations within the sample, with at least one picture taken in the general location where the traffic count is being conducted.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The project allows GIS mapping of the sample locations and some additional special querying capacity by linking files to the HPMS database. In addition, we are using this as a quality control component for HPMS by storing various pictures of the location in order to document changes in the sample, provide field staff with an approximate appearance of the sample and provide a pictorial record of the count area for future data collection integrity.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Improved data quality through systematic review of sample data by conducting a thorough review of existing data. Ability to spatially display HPMS data via GIS software and provide a pictorial record of samples that can be used to verify data without the need for immediate field review.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Connecticut	Agency: Department of Transportation	
Contact: Angelo Asaro	Title: Transportation Supervising Planner	
Street Address: 2800 Berlin Turnpike, PO. Box 317546		
City: Newington	State: Connecticut	Zip Code: 06131-7546
E-Mail:	Phone: 860-594-2107	Fax: 860-594-2056

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Connecticut Department of Transportation uses intergraphic GIS software (MGE,MGA) to analyze and develop various roadway system networks. These networks are developed using dynamic segmentation software which allows the users to pinpoint any location on the roadway network.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
One of the roadway networks that was developed is the linear reference system network for the HPMS submittal. This network references the HPMS data base by the section identification which is comprised of the route number and route milepoint.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Submitting the LRS network in a GIS format provides a precise representation of Connecticut's roadway system.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Peggi Knight	Title: Trans. Eng. Mgr.	
Street Address: 800 Lincoln Way		
City: Ames	State: Iowa	Zip Code: 50010
E-Mail:	Phone: 515-239-1380	Fax: 515-239-1828

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Integrating HPMS Data Source (Base Record) with CADD maps to create a GIS for maintenance of the data. This will allow the Department of Transportation (DOT) to better integrate HPMS data with other transportation data (accident locations, roadside feature inventories, etc.) maintained by the DOT.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The HPMS data will be maintained in the GIS system and exported to the PC HPMS program for preparation of submittal.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Still in development, will eliminate duplication of effort in maintaining data on maps separate from base record data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kansas	Agency: Kansas Department of Transportation	
Contact: Brian C. Logan	Title: Chief, Cartography Unit, Bureau of Trans Planning	
Street Address: Docking State Office Building		
City: Topeka	State: Kansas	Zip Code: 66612-1568
E-Mail: Brian@dtdsob4.wpo.state.ks.us.	Phone: 785-296-3841	Fax: 785-296-2526

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The use of GIS technology has recently been enhanced to improve the timeliness of updating the GIS Base Map. For seven years, the process of updating the base map was so involved and time consuming that it was only updated once per year. A new process was established using Intergraph MGE Segment Manager to update the digital base map on a daily basis. New versions of the base map are now placed into the production of decision maps on a quarterly basis.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The GIS decision maps (color-coded displays of pavement, geometric, and accident data) are used periodically to identify discrepancies and possible errors in the database.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Pavement management, geometric, and accident data can be mapped with greater accuracy.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: Department of Transportation	
Contact: Rick J. Dubois	Title: Management Systems Engineer	
Street Address: Management Systems Division, 16 State House Station, Dept. of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: rick.dubois@state.me.us	Phone: 207-287-6817	Fax: 207-287-3292

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Department is developing the first phase of a GIS-Linked Data warehouse entitled TIDE which stands for Transportation Information for Decision Enhancement. Phase 1 will contain Pavement Management, Inventory, Safety, Condition, Bridge, Geometric and Speed Zone data. Many specialized mapped and tabular queries are being developed from the data. TIDE will also have a powerful ad-hoc environment.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
At this time, the integration with the HPMS has not been determined.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
TIDE will enable a management approach featuring statewide analysis and reporting and help implement the Department's GIS. It will make necessary transportation information more readily available to users.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: Department of Transportation	
Contact: Rick J. Dubois	Title: Management Systems Engineer	
Street Address: Management Systems Division, 16 State House Station, Dept. of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: rick.dubois@state.me.us	Phone: 207-287-6817	Fax: 207-287-3292

CATEGORY

X	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Portable G.P.S. equipment used to gather centerline and attribute information.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Information is used to update mainframe inventory database and the Department's GIS base maps.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This method is both more efficient and more accurate. The Department is also participating in the State's E911 effort, which is also using G.P.S. technology.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maryland	Agency: State Highway Administration	
Contact: Michael Baxter/Rose Davis	Title: Assistant Division Chiefs	
Street Address: 707 North Calvert Street, Mail Stop C-607		
City: Baltimore	State: Maryland	Zip Code: 21202
E-Mail: mbaxter@sha.state.md.us rsdavos@sha.state.md.us	Phone: 410-545-5511 (Baxter) 410-545-5537	Fax: 410-209-5033

CATEGORY

X	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Maryland is currently using G.P.S. to update its digital maps by collecting road alignments during its field inventory process. The line work is collected electronically in the field and post processed at a central site. The resulting digital line work is integrated into our digital maps.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
No direct use for HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Speedier updates to the digital map base--we expect to shrink update cycle of line work from 2-3 years to less than a year. Will also improve the accuracy of the line work in the digital map base.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maryland	Agency: State Highway Administration	
Contact: Bill Walsek/Rose Davis	Title: Division/Assistant Division Chiefs	
Street Address: 707 North Calvert Street, Mail Stop C-607		
City: Baltimore	State: Maryland	Zip Code: 21202
E-Mail: bwalsek@sha.state.md.us rsdavis@sha.state.md.us	Phone: 410-545-5529 (Walsek) 410-545-5537 (Davis)	Fax: 410-209-5033

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Maryland is currently implementing an agency wide GIS which will be available to anyone having the GIS client software and connected to the agency LAN/WAN. The GIS will be developed in ArcView and ArcInfo and include a customized desktop client with frequently posed queries pre-programmed to better enable occasional users to easily use the system. The system will enable responses to analytical inquires to integrate data from HPMS, Bridge, Pavement, Accidents, and Traffic Signals with digital maps and other spatial data sets (legislative districts, watersheds, wetlands, engineering districts, etc.).

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
May help gather to sample data for HPMS if the proper data is included in the EGIS in a timely manner. Should greatly increase the use of HPMS data by making it directly accessible to the users over the network.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Allow more extensive analysis of data in a given length of time and, hopefully, lead to better decision making. Provide easy-to-use analytical tools in the hands of staff who might not otherwise use these tools.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nebraska	Agency: Department of Roads	
Contact: David Winter	Title: Classification, Needs & Pavement Management Engr	
Street Address: 1400 Nebraska Highway 2		
City: Lincoln	State: Nebraska	Zip Code: 68509-94759
E-Mail: dor26004@vmhost.cdp.state.ne.us	Phone: 402-479-4783	Fax: 402-479-3884

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The GIS.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Create maps showing sample section locations. Maps are used by office staff and distributed to local governmental officials. This replaced coloring maps by hand.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Maps are accurately and efficiently reproduced from relational database containing sample section locations.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nevada	Agency: Nevada Dept. of Transportation	
Contact: Eileen Letizia	Title: Transportation Analyst II, Safety Engineering	
Street Address: 1263 South Stewart Street		
City: Carson City	State: Nevada	Zip Code: 89712
E-Mail:	Phone: 702-888-7469	Fax: 702-888-7403

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
	X	Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Crash data is currently maintained on a mainframe flat file. A new system is being developed using a Fox Pro front end and GIS application. Upon completion, we will have statewide graphical querying capabilities based on roadway system, functional classification, county, or any boundary or element specified.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Easier access and increased accuracy of crash data in the HPMS format.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
N/A

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: North Dakota	Agency: ND Department of Transportation	
Contact: Robert Olzweski	Title: Project Manager	
Street Address: 608 East Boulevard Avenue		
City: Bismarck	State: North Dakota	Zip Code: 58505-0700
E-Mail: ccmail.rolzwesk@ranch.state.nd.us	Phone: 701-328-3479	Fax: 701-328-4545

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
We plan to use G.P.S. to locate our HPMS samples in the field.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
With the use of G.P.S., we can go back to the same location to check the HPMS sample data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: David L. Blackstone	Title: GIS Manager	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: dblackst@odot.dot.ohio.gov	Phone: 614-466-2594	Fax: 614-752-8646

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Existing LRS. Dynamic segmentation utilized to display roadway attributes; including HPMS.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Display and mapping of HPMS sections.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Can be used to verify location and accuracy at HPMS sections.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Oklahoma	Agency: Department of Transportation	
Contact: Jay B. Adams	Title: Transportation Spec. III	
Street Address: 200 NE. 21st Street, Room 3A-5		
City: Oklahoma City	State: Oklahoma	Zip Code: 73105
E-Mail: jadams@fd9ns01.okladot.st.ok.us	Phone: 405-521-2526	Fax: 405-521-6917

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The technology and technique application is the utilization of a GIS-T based on a relational database model for data management, G.P.S. coordinate data combined with satellite imagery for graphic feature placement, extensive use of dynamic segmentation process for linking HPMS universe and sample data to the HPMS linear referencing system and object-based GIS tools for HPMS data analysis.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The GIS/G.P.S. technology is being used to integrate data that is collected and maintained in different areas throughout the Oklahoma Department of Transportation. The GIS is being used to join entities of data that would not otherwise have required join data items. The GIS is being used to identify and correct errors in data. The GIS/G.P.S. is being used to maintain centerline graphics and attributes which comprise the HPMS submittal.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The results of using GIS and G.P.S. include the elimination of redundancy in the map production process, improved quality and consistency of HPMS data, greatly enhanced transportation analysis capabilities, reduction in time required to prepare the HPMS submittal and the maintenance of the HPMS linear referencing system is simplified.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Pennsylvania	Agency: Department of Transportation	
Contact: Gaye F. Liddick	Title: HPMS Coordinator	
Street Address: 555 Walnut Street, 6th Floor Forum Place		
City: Harrisburg	State: Pennsylvania	Zip Code: 17101-1900
E-Mail:	Phone: 717-787-5983	Fax: 717-783-9152

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The HPMS/GIS system is a windows based HPMS/GIS application consisting of the Federal Highway Administration HPMS PC Software, relational HPMS data tables built from the mainframe database, historical HPMS data tables and GIS software products. The user will use point and click navigation to perform a variety of tasks including data importing, editing and validation, queries of current and historical data, preparation and submittal of the HPMS data and GIS mapping.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
This system is in the design stage and will be developed in 3 phases: (1) develop database objects to store the required HPMS data (2) develop systematic interfaces between three different computing platforms and (3) develop programmed interfaces and map generating facilities that are intelligent enough for a novice user.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The expected benefits from this system include more efficient management of the HPMS data, improvement in data quality and the ability to present the HPMS data graphically using GIS applications.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Texas	Agency: Texas Department of Transportation	
Contact: Kim Hajek	Title: Director, Data Management, TPP Division	
Street Address: PO Box 149217		
City: Austin	State: Texas	Zip Code: 78714-9217
E-Mail: Khajek@mailgw.dot.state.tx.us	Phone: 512-486-5052	Fax: 512-486-5099

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Texas currently has a project underway to collect a specific set of data for all county roads in the State (approximately 140,000 miles). This data collection effort uses GPS technology and the data set will eventually be incorporated with our base map database, in support of GIS development.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The GPS technology can be used to locate the off-system data samples, once the initial county road database is developed.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Expected results include the improved accuracy of data locations and quality of the data collected.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Virginia	Agency: Department of Transportation	
Contact: David Wyant	Title: GIS Director	
Street Address: P.O. Box 4546		
City: Charlottesville	State: Virginia	Zip Code: 22905
E-Mail:	Phone: 804-293-1964	Fax: 804-293-5412

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Virginia Department of Transportation (VADOT) is in the process of developing its Geographic Information System (GIS) to facilitate Linear Referencing System (LRS) development. The GIS Integrator will access data in various relational databases and will provide a graphical user interface for GIS users; will enable the integration of applications into GIS; and will enable the translating of different means of describing locations in VADOT's attribute database.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Overlay of HPMS data onto base State map.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The following three methods of describing location supported by the Integration will improve data quality and consistency: (1) HTRIS route-id, node, and offset (in miles to the nearest hundredth); (2) HTRIS route-id, milepoint; and (3) Latitude, longitude, and route-id. The roads vector data set will be copied into the Integrator tier to keep in synchronization with attribute data updates in other data sets.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Virginia	Agency: Department of Transportation	
Contact: David Wyant	Title: GIS Director	
Street Address: P.O. Box 4546		
City: Charlottesville	State: Virginia	Zip Code: 22905
E-Mail:	Phone: 804-293-1964	Fax: 804-293-5412

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Virginia Department of Transportation (VADOTs) Highway Traffic Records Inventory System (HTRIS) is proposed to include a Linear Referencing System (LRS) utilizing links and nodes. The revised process flow will have the Road Inventory staff that changes links/nodes to also change links/nodes in the road vector data set.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Will enhance accuracy of HPMS data which is housed within HTRIS records.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Having the same individual make changes to both data sets is expected to help keep changes in the two data sets synchronized. This is extremely important because if changes to location information are not kept synchronized with updates to the base map, attribute data may not be properly displayed on the road vector data set.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Virginia	Agency: Department of Transportation	
Contact: David Wyant	Title: GIS Director	
Street Address: P.O. Box 4546		
City: Charlottesville	State: Virginia	Zip Code: 22905
E-Mail:	Phone: 804-293-1964	Fax: 804-293-5412

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Add to the roads vector data set, VADOT's Linear Referencing System (LRS) using route-ids and nodes. The resulting digital maps will be in Arc/Info coverages.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Integration of HPMS data onto digital maps will provide the means of describing locations used in attribute data sets.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
AMLs that will be written to facilitate the digitizing and conflating of vectors to SPOT satellite imagery will be available as a result of our county map project.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Wisconsin	Agency: Department of Transportation	
Contact: Ruben L. Anthony, Jr.	Title: Chief of the Data Management Section	
Street Address: 4802 Sheboygan Avenue, PO. Box 7913		
City: Madison	State: Wisconsin	Zip Code: 53707-7913
E-Mail:	Phone: 608-266-2249	Fax: 608-267-0294

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Currently, we are redesigning our local roads database to incorporate GIS. We are also developing it as a confederate or enterprise database that local government can share in the development and management.

The project expects to give all local governments access to Maps and turn key applications that will allow them to do a variety of local highway system analysis. It will also allow them to directly update the local roads inventory

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
This data is the local roads data that is used for HPMS reporting. A prototype of this project is expected to be ready by the end of the summer (1998). The ultimate "GOAL" by the year 2000.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This will provide us with more up-to-date and accurate local roads inventory and mileage information. It will provide the locals with tools to improve their highway planning efforts.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Other Data Integration and Presentation Technique

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
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City: Sacramento	State: California	Zip Code: 95814
E-Mail: dsaia@trmx3.dot.ca.gov	Phone: 916-654-4238	Fax: 916-654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The distribution, updating and retrieval of non-state HPMS data has been expedited and automated. Electronic update files are now distributed through MPOs to local agencies in Microsoft Access forms or Excel spreadsheet format. The forms and spreadsheets are populated from Caltrans' corporate database, distributed via e-mail or by diskette, and finally uploaded back into the corporate database.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Requests are now handled electronically rather than tediously bulk mailed and hand entered. Jurisdictional HPMS update requests are now downloaded onto forms and electronic spreadsheet files are distributed via e-mail or floppy diskette. Some hard copy update requests are still sent to and received from those local agencies without electronic means of updating.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Major benefits: Data quality has improved, resource requirements reduced, and credibility with local agencies improved. Disadvantages: initial edits are bypassed increasing final edit effort, some hand entry must be done for local agencies without electronic means.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: David Saia	Title: Senior Transportation Engineer	
Street Address: 1120 N Street		
City: Sacramento	State: California	Zip Code: 95814
E-Mail: dsaia@trmx3.dot.ca.gov	Phone: 916-654-4238	Fax: 916-654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
HPMS data has been recently integrated into Caltran's relational corporate (Oracle) database allowing may state highway data items (AADT, D factor, K factor, percent trucks, shoulder type/width, median type/width, length, landmark, etc.) to be obtained electronically and effortlessly. Non-state data items obtained from local agencies are electronically uploaded as received or hand entered as necessary.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
User friendly input screens were developed to allow swift entry or editing of HPMS data (including valid codes and cross edits). Current state highway data from pavement management system, traffic census, and highway inventory are loaded into HPMS sections at the push of a button. Data is then downloaded into Federal software for final edits and submittal. Ad hoc reports for data requests are easily extracted using SQL.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Major benefits: quick entry and uploading of HPMS data, easy ad hoc report extracting, calculates/reports travel on non-functionally classified roads not obtainable from Federal software. Disadvantages: minor bugs still being worked out.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Florida	Agency: Department of Transportation	
Contact: Gordon Morgan	Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street, Mail Stop 27		
City: Tallahassee	State: Florida	Zip Code: 32399-0450
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CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Research on off-system traffic data. We are sponsoring research by Florida International University into reasonable default values for Annual Average Daily Traffic data on roads not on the State Highway System. These defaults will be related to functional classification, geographic location, and other categories determined by the researchers.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
We need accurate traffic volumes for all roads functionally classified as rural major collectors and above. About half of this road mileage is not on the State Highway System, and we ask local governments to provide it. Some of these agencies are unable or unwilling to provide the data, and our Department does not have the resources to collect it all ourselves. This research when finished next year, will allow us to provide reasonable data when we do not have current actual counts available.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
When the research is completed, it should provide increased quality of traffic data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Florida	Agency: Department of Transportation	
Contact: Robert Hanson	Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street, Mail Stop 27		
City: Tallahassee	State: Florida	Zip Code: 32399-0450
E-Mail: robert.hanson@dot.state.fl.us	Phone: 850-488-4111	Fax: 850-488-4752

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Digital Videolog: We collect video images (at 100-foot intervals) of the roadway and nearby right of way. These images are immediately saved in digital format and stored on CD-ROMs in jukeboxes on a network server. Using software developed in-house, we enable Department users to pick road locations from an on-screen map and see the corresponding videolog.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Many questions about the accuracy of HPMS field data can be answered easily and accurately by viewing the videolog of the road in question. This reduces the need for additional field work.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Since follow-up field work is reduced, data quality is maintained more efficiently. Reducing the amount of field work may also improve safety.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Georgia	Agency: Office of Information Services	
Contact: Thaddeus S. Kowal	Title: Database Administrator	
Street Address: 5025 New Peachtree Road		
City: Chamblee	State: Georgia	Zip Code: 30341
E-Mail: kowal_t@dot.state.ga.us	Phone: 770-986-1361	Fax: 770-986-1016

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Georgia Department of Transportation (GADOT) intends to develop a comprehensive Transportation Information System (TIS) for use throughout the Department. This GADOT TIS investment is to create greater opportunities for better analysis and to facilitate strategic decision making. The GADOT intends to integrate databases that communicate easily with users and provide an enhanced opportunity for the exchange of information through the Department and with agencies outside. Currently under development is the Systems and Facilities Subsystem (SFS).

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The SFS will include information for all modes of transportation. Information on physical description system, classification, current conditions, projected or scheduled maintenance, history, traffic, inventory, performance, special report data (including HPMS and other federally required reports) and related information will be part of the subsystem. Data in the SFS will be used for information technology applications, including GIS mapping. The SFS applications are expected to inform, analyze, document and facilitate reporting on the condition, use and operations of the State's transportation system. The SFS will support the current and developing business practices of the Department and the data information needs of the Department's customers and partners.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The TIS will facilitate access to information related to the administration and operations of the transportation system. These data files are not currently integrated and therefore cannot be used effectively for analysis and decision making. In addition, there is other information available from other sources that we would like to access as a means of enhancing the scope and depth of data resources available to carry out our work. This data and application integration will greatly improve quality and consistency of data collected. Data will be shared across offices so data duplication and resulting inherent errors will be eliminated. Data standards will apply not only Departmentwide, but extend across partnering agencies.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kansas	Agency: Kansas DOT.--Bureau of Transportation Planning	
Contact: Ron Balsters	Title: Chief, Geometric and Accident Data Unit	
Street Address: Docking State Office Building, 8th floor		
City: Topeka	State: Kansas	Zip Code: 66612-1568
E-Mail: RonnieB@dtdsob4.wpo.state.ks.us	Phone: 785-296-7406	Fax: 785-296-8168

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
On-going conversion from a mainframe, flat file, batch environment to a client/server environment and relational database for transportation data entry and processing. Kansas has contracted to use Oracle Transportation Manager (OTM) product as a basic platform for its geometric data processing and is customizing the product for Kansas-specific needs. One module of the product is the creation of the HPMS submittal information.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The OTM stores data that is specifically targeted for HPMS reporting. The developing HPMS module (not fully tested) is purported to be able to process the needed highway data, using tables, codes, calculations, (formulas, etc., into a FHWA-ready HPMS submittal data format. Other modules within OTM will maintain roadway and bridge data, automatically updating tables as a result of construction realignments, new construction, and error corrections.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
(In terms of improved efficiency, quality, consistency, safety of data collection and other benefits).
Anticipated improvement in data integrity and efficiency of employees due to the online system environment (versus previous batch environment) and increased edits within the database that will prevent data entry errors.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kentucky	Agency: Kentucky Transportation Cabinet (KYTC)	
Contact: Greg Witt	Title: Engineering Technologist III	
Street Address: 125 Holmes Street		
City: Frankfort	State: Kentucky	Zip Code: 40622
E-Mail: gwitt@mail.kytc.state.ky.us	Phone: 502-564-7183	Fax: 502-564-2865

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Development and implementation of an Oracle database and GIS. We extract the HPMS samples and associated data from this larger, more comprehensive relational database. This database is linked to the Cabinet's GIS basemap. Using a fairly complex series of structured query language (SQL) routines we perform periodic data validity checks and extract the information into the HPMS format for annual submittal to Federal Highway Administration.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Eliminating redundant data files reduced data collection and maintenance efforts, and improved data consistency among the districts statewide. Incorporating into a relational database enabled us to provide more in depth analysis of highway information more quickly and efficiently. Linkage to the GIS basemap provides a mechanism to display information for analytical purposes and assists in improving data integrity.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nebraska	Agency: Department of Roads	
Contact: David Winter	Title: Classification, Needs & Pavement Management Engr	
Street Address: 1400 Nebraska Highway 2		
City: Lincoln	State: Nebraska	Zip Code: 68509-94759
E-Mail: dor26004@vmhost.cdp.state.ne.us	Phone: 402-479-4783	Fax: 402-479-3884

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Relational Database--In house developed Integrated Highway Inventory (IHI) is a statewide database containing location, classification, and geometric information.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The majority of all data reported in the HPMS comes from the IHI. This has replaced the old paper filing system.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
We are more efficient, since project data only has to be reviewed and entered into the IHI once. Provided that the data is entered correctly, our quality is much better. Inconsistency has been reduced or eliminated since everyone is using the same data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Tom Eldridge/Connie Gilliam	Title: Information Systems Supervisor/HPMS Coordinator	
Street Address: Suite 900, James K. Polk Building, 505 Deaderick Street		
City: Nashville	State: Tennessee	Zip Code: 37243-0334
E-Mail: teldridge@mail.state.tn.us cgilliam@mail.state.tn.us	Phone: 615-741-3429 (Eldridge) 615-741-1590 (Gilliam)	Fax: 615-532-8451

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
	X	Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A digital photolog is linked to the highway database. Tennessee Department of Transportation has indexed its highway inventory with the location along the roadway. This links the photolog data with all of the other data and the GIS.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Photos are used to aid in inventory of signing, speed zones, sight distance, intersection inventory, and other inventory items.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
There is less field inventory needed which makes data collection safer and more efficient.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: West Virginia	Agency: Department of Transportation	
Contact: Jerry Cooper	Title: Head, Mapping and Graphics	
Street Address: 1900 Kanawha Boulevard East		
City: Charleston	State: West Virginia	Zip Code: 25305-0430
E-Mail: Jcooper@mail.dot.state.wv.us	Phone: 304-558-0366	Fax: 304-558-3783

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
All county and municipal maps are now being digitized.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Not directly applicable.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Increased ease of updating plus distribution to users via CD.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Automated Data Collection Equipment

a. Pavement Characteristics and Condition

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: Arkansas State Highway & Transportation Dept.	
Contact: Mark A. Evans	Title: Civil Engineer II	
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City: Little Rock	State: Arkansas	Zip Code: 72203
E-Mail: maep033@ahtd.state.ar.us	Phone: 501-569-2265	Fax: 501-569-2476

CATEGORY

	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
The Automatic Roadway Analyzer (ARAN) data collection vehicle that collects IRI, curve and grade data for use in the HPMS. (Other data is also collected that is not currently requested by HPMS (i.e. cracking and rutting)).

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The data from the ARAN can be processed using macros built in Excel Visual Basic for Applications. The macros can classify the curve and grade data in the format that is required by HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The ARAN allows data collection at near normal highway speed (50 mph) allowing for safer collection of data. No AHTD personnel are required to be outside of the vehicle when collecting data. Because data collection can be done at highway speed, HPMS data can be collected on the highway network every two years. The Excel macros can then be used to process the ARAN data in a matter of days.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Kevin Jones	Title: Special Investigation Engineer	
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City: Ames	State: Iowa	Zip Code: 50010
E-Mail: kjones@max.state.ia.us	Phone: 515-239-1232	Fax: 515-239-1092

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Roadware ARAN 490DC

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Used to obtain IRI on non-NHS federal aid eligible roads in Iowa.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Unable to increase staff to collect distress data on a newly implemented non-NHS, federal-aid eligible pavement management system.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kansas	Agency: Depart of Trans, Bureau of Materials & Research	
Contact: Stan Young	Title: Pavement Management Section (PMS) Engineer	
Street Address: 2300 Van Buren		
City: Topeka	State: Kansas	Zip Code: 66611
E-Mail: Young@dtmrc.wpo.state.ks.us	Phone: 785-296-3008	Fax: 785-296-2526

CATEGORY

	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
		X	Pavement Characteristics and Condition
			Traffic/Travel
			Congestion
			Other (specify)
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Laser-based automatic fault detection (the vertical movement of two adjacent slabs) using readings from laser profilometer.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Previously, faulting was a manual, visual survey. Faulting data is an integral part of the Pavement Management System data that Kansas Department of Transportation maintains.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Laser-based automatic fault detection provides greater speed of data collection and more objective, consistent, and accurate faulting data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Louisiana	Agency: Department of Transportation & Development	
Contact: Donald Carey	Title: Management Systems Administrator	
Street Address: LADOTD Capitol Station--Section 34, Box 94245		
City: Baton Rouge	State: Louisiana	Zip Code: 70804
E-Mail:	Phone: 504-379-1830	Fax: 504-358-9160

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Automatic Road Analyzer (ARAN) vehicle to collect information about the highway infrastructure while increasing the cost effectiveness of this effort. The electronic equipment of high resolution video, ultrasonic sensors, accelerometers gyroscopes, and distance measuring devices are utilized to collect data at highway speeds. This information is used to determine pavement condition, rutting, roughness, roadside inventory, rehabilitation, and maintenance priorities.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
At present, the primary use for HPMS is the international roughness index (IRI) providing an upgrade class II profile measurement.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Cost effectiveness has improved by more efficient collection method, quality of data has increased to class II measurements for IRI, and collection at highway speeds has provided safety benefits.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nebraska	Agency: Department of Roads	
Contact: David Winter	Title: Classification, Needs & Pavement Management Engr	
Street Address: 1400 Nebraska Highway 2		
City: Lincoln	State: Nebraska	Zip Code: 68509-94759
E-Mail: Dor26004@vmhost.cdp.state.ne.us	Phone: 402-479-4783	Fax: 402-479-3884

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Automated pavement distress data collection.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Video rating system for the collection of distress data at highway speeds in urban areas. This is an evaluation project being performed by a contractor. If we are pleased with the results, we may consider purchasing this or similar equipment. Presently there are some urban areas where our pavement raters have not been able to rate for several years, due to traffic. We hope that this new system will allow for safe and accurate pavement rating in these areas.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The system allows for the safe collection of data in congested urban areas. We hope that this system will provide increased accuracy through the near continuous collection of pavement condition data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nebraska	Agency: Department of Transportation	
Contact: David Winter	Title: Classification, Needs & Pavement Management Engineer	
Street Address: 1400 Nebraska Highway 2		
City: Lincoln	State: Nebraska	Zip Code: 68509-94759
E-Mail: Dor26004@vmhost.cdp.state.ne.us	Phone: 402-479-4783	Fax: 402-479-3884

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Laser Profilometer

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Presently using for the collection of rutting, faulting and IRI data.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
More accurate than our old South Dakota type sonar profilometer. The laser profilometer can measure faulting where the old profilometer could not. Presently we are using three sensors, but will be up-grading to five in the near future.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Ohio Department of Transportation	
Contact: Kenneth Coran	Title: Pavement Management Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: kcoran@odot.dot.ohio.gov	Phone: 614-466-2852	Fax: 614-742-8646

CATEGORY

	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Roughness Pavement Condition Rating Program: raters in the field use laptop computers and pen-based software to eliminate the necessity for paper forms. Data is input directly into the computer, processed and uploaded to the department's mainframe computer.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Software has been developed, tested in the field and is currently being upgraded. Similar software could be developed for HPMS data collection.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
System has speeded up data collection process and improved accuracy of collected data due to the elimination of transcription errors.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Pennsylvania	Agency: Department of Transportation	
Contact: James S. Moretz, P.E.	Title: Roadway Management Division Chief	
Street Address: 555 Walnut Street, 7th Floor Forum Place		
City: Harrisburg	State: Pennsylvania	Zip Code: 17101-1900
E-Mail:	Phone: 717-787-1199	Fax: 717-787-7004

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
	X	Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A video logging vehicle is used to survey the State owned highway system providing roadway and shoulder video, roughness data and pavement condition data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Several HPMS data items can be collected using this vehicle including IRI, route signing, roadway function, roadway geometry and signal and intersection data.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This project is in the early stages of development. Data has been collected and is in the process of being reviewed and formatted for loading to the Roadway Management System.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Tom Eldridge/Connie Gilliam	Title: Information Systems Supervisor/HPMS Coordinator	
Street Address: Suite 900, James K. Polk Building, 505 Deaderick Street		
City: Nashville	State: Tennessee	Zip Code: 37243-0334
E-Mail: teldridge@mail.state.tn.us cgilliam@mail.state.tn.us	Phone: 615-741-3429 (Eldridge) 615-741-1590 (Gilliam)	Fax: 615-532-8451

CATEGORY

	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Tennessee is in the process of getting a contract for collecting automated pavement distress, IRI, rutting, and crack survey for all of HPMS required systems.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The IRI will be collected in conjunction with the distress for use in the required HPMS systems.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This data will reside in Tennessee Department of Transportation's PMS, which is the source for all the HPMS required items.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Texas	Agency: Texas Department of Transportation	
Contact: Jerry Johnson	Title: State/Federal Reporting Manager	
Street Address: PO Box 149217		
City: Austin	State: Texas	Zip Code: 78714-9217
E-Mail:	Phone: 512-486-5074	Fax: 512-486-5099

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Texas is using inertial profilometry to collect the longitudinal pavement profile in both wheel paths.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The right wheel path profile can be used for HPMS. If required at the State level for projects, the left wheel path data can be utilized. If an HRI value, the average of both wheel paths are required, this profile can be supplied.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Texas Department of Transportation's Pavement Design Section is now measuring profile elevations. Data can be utilized if collected on new constructions for pavement. Profilers are maintained by a ride and level survey to .1000 inch on test sections established with Texas Transportation Institute.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: West Virginia	Agency: Department of Transportation	
Contact: Robert K. Anthony	Title: Head, Roadway, Records and Statistics	
Street Address: 1900 Kanawha Boulevard East		
City: Charleston	State: West Virginia	Zip Code: 25305-0430
E-Mail:banthony@mail.dot.state.wv.us	Phone: 304-558-2884	Fax: 304-558-3783

CATEGORY

	Field Data Collection Technique		
X	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Pavement roughness, distress, video and GIS/G.P.S. data now being collected through the use of contracted automatic data collection.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
All pavement information will be input to the PMS and HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Will replace subjective data collection of PSR data and film based photo log.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Wyoming	Agency: Wyoming Department of Transportation	
Contact: Andrew Freeman	Title: Pavement Management Engineer	
Street Address: 5300 Bishop		
City: Cheyenne	State: Wyoming	Zip Code: 82009
E-Mail: afreem@missc.state.wy.us	Phone: 307-777-4722	Fax: 307-777-4481

CATEGORY

	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
		X	Pavement Characteristics and Condition
			Traffic/Travel
			Congestion
			Other (specify)
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Beginning in 1996 our pavement analysis contractor began using laser-based roughness equipment. This has drastically reduced IRI numbers. What many States have discovered is that the old ultrasonic numbers were too high. These new laser numbers are more accurate and repeatable.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Automated Data Collection Equipment

b. Traffic/Travel

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Florida	Agency: Department of Transportation	
Contact: Harshad Desai	Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street, Mail Stop 27		
City: Tallahassee	State: Florida	Zip Code: 32399-0450
E-Mail: Mulder.Brown@dot.state.fl.us	Phone: 850-488-4111	Fax: 850-488-4752

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Fiber optic sensors for traffic data collection. The amount of light transmitted by an optical fiber varies with the pressure exerted on the fiber. Laboratory testing has shown this to be a feasible basis for an imbedded traffic sensor. Field testing is now underway, and should be completed by the end of 1998

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Traffic counts are used to develop annual average daily traffic (AADT) data for the State Highway System.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Fiber optic traffic sensors will not be subject to failure caused by lightning strikes, and will also eliminate related equipment failure due to electrical surges transmitted by the sensor.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Gordon Peterson	Title: Transportation Planner 3	
Street Address: 800 Lincoln Way		
City: Ames	State: Iowa	Zip Code: 50010
E-Mail:	Phone: 515-239-1548	Fax: 515-239-1828

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Traffic volume and vehicle classification data is collected as a part of our coverage count system through the use of automatic electronic portable traffic recorders. These recorders are set in the field to collect and store traffic data which can later be downloaded and processed in the office.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Information collected with the automatic portable traffic recorders is used to develop Annual Average Daily Traffic for highway planning and design activities as well as for HPMS submittals.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Quality traffic data is collected accurately and safely through the use of these portable traffic recorders.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Gordon Peterson	Title: Transportation Planner 3	
Street Address: 800 Lincoln Way		
City: Ames	State: Iowa	Zip Code: 50010
E-Mail:	Phone: 515-239-1548	Fax: 515-239-1828

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Intersection turning movement data is collected as a part of our coverage count system through the use of electronic laptop intersection monitors. Intersection turning movements and vehicle classification data can be recorded and stored within the units for downloading later on an office PC.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Information from the turning movement data is used extensively in engineering studies, planning activities, highway improvement projects and to develop AADTs for HPMS submittals.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Detailed intersection turning movement data is collected accurately and efficiently through the use of the lap-top intersection monitors.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Gordon Peterson	Title: Transportation Planner 3	
Street Address: 800 Lincoln Way		
City: Ames	State: Iowa	Zip Code: 50010
E-Mail:	Phone: 515-239-1548	Fax: 515-239-1828

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Iowa's Automatic Traffic Recorder System consists of 126 installations statewide with coverage on all highway systems. Sensors are installed in the roadways at each location and control units are solar powered and telemetric. Continuous traffic volume, vehicle classification and speed data are available through this system.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
This system is currently operational and is used to develop factors necessary to adjust short traffic counts to AADT. This traffic information is used for the HPMS submittal as well as the various planning and design activities conducted by the Department of Transportation and local government agencies.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This system provides quality traffic information on a continuous basis. The system can be programmed, monitored, and polled from the central office. Problems can be diagnosed from the office and maintenance trips to field units are necessary only when problems with sensors or control units are detected.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Gordon Peterson	Title: Transportation Planner 3	
Street Address: 800 Lincoln Way		
City: Ames	State: Iowa	Zip Code: 50010
E-Mail:	Phone: 515-239-1548	Fax: 515-239-1828

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Weigh-in-motion information is collected at 21 permanent piezo installation. All installations are solar powered and telemetric.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
This system is currently operational and is used to provide vehicle weight and classification data for the SHRP study as well as the Federal Highway Administration truck weight study.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Vehicle weight and classification information is collected effectively and safely through the use of this system.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nebraska	Agency: Department of Roads	
Contact: David Winter	Title: Classification, Needs & Pavement Management Engr	
Street Address: 1400 Nebraska Highway 2		
City: Lincoln	State: Nebraska	Zip Code: 68509-94759
E-Mail: Dor26004@vmhost.cdp.state.ne.us	Phone: 402-479-4783	Fax: 402-479-3884

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Automatic Traffic Classifiers.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Used at select locations throughout the State for the collection of vehicle classification data. The automatic classifiers have helped ease the workload of the employees who do classification counts.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The exposure of staff to traffic is minimized. The classification is not limited by availability of personnel.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Nevada	Agency: Nevada Department of Transportation	
Contact: Cecil Crandall	Title: Transportation Analyst	
Street Address: 1263 South Stewart Street		
City: Carson City	State: Nevada	Zip Code: 89712
E-Mail:	Phone: 702-888-7155	Fax: 702-888-7203

CATEGORY

X	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Installation of piezo sensors and automatic vehicle classifiers on new construction projects for urban Interstate/freeway and expressway facilities.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Primary use is for HPMS submittal template #6 (travel activity by vehicle type) and for Items 65A and 65B.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Monitoring has been unattainable since 1993 because of heavy traffic and the number of lanes.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: Tony Manch	Title: Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: tmanch@odot.dot.ohio.gov	Phone: 614-466-3075	Fax: 614-752-8646

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Data is available through "ITS" in the major cities. Mark Hallenbeck is the best person to talk to about using ITS data for planning. Washington State Department of Transportation has its ITS data on two CD-ROMS with software to extract traffic data that is useful for ADTs. Mark Morse is the contact for Washington State data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Collect data on urban Interstate highways for use in HPMS and other planning applications.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Multiple use of data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Pennsylvania	Agency: Department of Transportation	
Contact: Dennis Starr	Title: Transportation Planning Specialist	
Street Address: 555 Walnut Street, 6th Floor Forum Place		
City: Harrisburg	State: Pennsylvania	Zip Code: 17101-1900
E-Mail:	Phone: 717-787-4574	Fax: 717-783-9152

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Use of in-pavement loop detectors and portable or permanent traffic recording devices to collect traffic control and class counts used to develop growth factors for updating of the traffic database and assignment of traffic to vehicle class.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The traffic data is reported in HPMS items #28 (AADT), #29 (AADT Derivation), #65A (percent Single Unit Trucks), #65B (percent Combination Trucks), #66 (K Factor), and #67 (Directional Factor).

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Use of in-pavement loop detectors reduces the need for manual data collection providing more efficient and consistent data collection.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: West Virginia	Agency: Department of Transportation	
Contact: Jerry Legg	Title: Head, Traffic Analysis Section	
Street Address: 1900 Kanawha Boulevard East		
City: Charleston	State: West Virginia	Zip Code: 25305-0430
E-Mail: Jlegg@mail.dot.state.wv.us	Phone: 304-558-2864	Fax: 304-558-3783

CATEGORY

	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
			Pavement Characteristics and Condition
		X	Traffic/Travel
			Congestion
			Other (specify)
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
All traffic data are now collected by a consultant. In addition weight data are now collected via permanent piezo and bending plate technology.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Traffic data are reported for all HPMS sections. Less than 10 percent of mileage is grouped.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Improved efficiency and consistency of data collection.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Wyoming	Agency: Department of Transportation	
Contact: David Birge	Title: Supervisor	
?Street Address: 5300 Bishop Boulevard		
City: Cheyenne	State: Wyoming	Zip Code: 82003
E-Mail: dbirge@missc.state.wy.us	Phone: 307-777-4190	Fax: 307-777-3857

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Import all automatic traffic recorder (ATR) traffic data into Oracle data base. We are in the planning stage of this project.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Will give quick access to ATR data.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Improve efficiency for providing traffic data for use in HPMS reporting.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Private Data Sources and Privatization of Data Collection

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: David Saia	Title: Senior Transportation Engineer	
Street Address: 1120 N Street		
City: Sacramento	State: California	Zip Code: 95814
E-Mail: dsaia@trmx3.dot.ca.gov	Phone: 916-654-4238	Fax: 916-654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
X	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Since local agencies in California do not have the specialized equipment necessary for collecting IRI data, Caltrans has established service contracts for statewide IRI collection on a 3-year cycle by geographical region. Also, to reduce the burden on local agency traffic count collection, about one third of the non-state AADT data is contracted out annually to provide a 3-year update cycle. Count sight locations are selected based on prioritized local need.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The IRI data collected by privatization is reported for the rightmost wheel rut in the rightmost lane in the rightmost direction and electronically imported into Caltrans corporate database. Traffic counts are collected, adjusted (by daily, seasonal, and axial factors) and reported by electronic media for uploading into corporate database. Consultant also calculates and provides directional factor and peak hour volume. The data is also shared with local agencies.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Major benefits: improved State/local partnerships, improved peak and average traffic and travel data on non-state highways, improved pavement roughness data on non-state highways, improved D & K factors on non-state highways, reduces pavement and traffic data collection burden on local agencies. Disadvantage: Annual cost $250,000.

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