PROCEEDINGS

National Traffic Data Acquisition Conference

Albuquerque
New Mexico
May 5-9, 1996

NOTE TO READER:

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PROCEEDINGS

National Traffic Data Acquisition Conference

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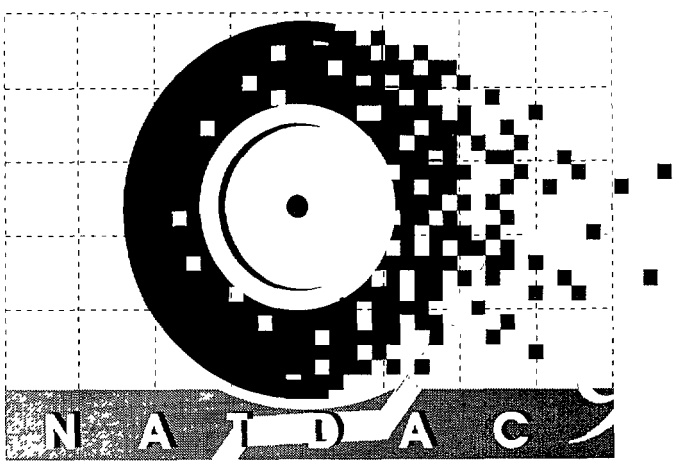

National Traffic Data Acquisition Conference

The New Mexico State Highway and Transportation *Department*

Alliance For Transportation Research

The Federal Highway Administration

NATIONAL TRAFFIC DATA ACQUISITION CONFERENCE (NATDAC '96)

PROCEEDINGS
Volume I

Albuquerque, New Mexico
May 5-9,1996

Hosted By:
Alliance For Transportation Research (ATR)
New Mexico State Highway and Transportation Department (NMSHTD)
Federal Highway Administration (FHWA)

Sponsored By:
American Association of State Highway and Transportation Officials (AASHTO)
Transportation Research Board (TRB)
Institute of Transportation Engineers (ITE)

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NM-NATDAC-96		NATDAC-96

4. Title and Subtitle	5. Report Date
National Traffic Data Acquisition Conference (NATDAC '96) Proceedings, Volume I, Albuquerque, New Mexico, May 5-9, 1996	6. Performing Organization Code CN9981
7. Author	8. Performing Organization Report
Geri Knoebel	NATDAC-96
9. Performing Organization Name and Address	10. Work Unit No.
Alliance for Transporation Research 1001 University Blvd, SE, Ste 103 Albuquerque, NM 87106	11. Contract No. SPR-PL-RD-0002(33)NM
12. Sponsoring Agency Name and Address	13. Report Type and Period Covered
New Mexico State Highway & Transportation Department PO Box 1149 Santa Fe, NM 87504	Final Report May 5-9, 1996 14. Sponsor Code CN9981

15. Supplementary Notes

This project was co-sponsored by the Alliance for Transportation Research, New Mexico State Highway and Transportation Department, and the Federal Highway Administration.

16. Abstract

The National Traffic Data Acquisition Conference 1996 (NATDAC '96) was held in Albuquerque, New Mexico on May 5-9 1996. A broad range of topics was covered during the conference, including: National Travel Trends, Travel Time Data Collection Using GPS, Congestion Management System Data Issues, Detector Technologies, and Metropolitan Travel Data. Concurrent sessions included Technology and Data Collection, Traffic Monitoring Systems, Weigh-In-Motion, and Enforcement Issues. There were 119 presenters, panelists, and moderators involved in the program. Conference participants were transported to three field sites for demonstrations of data collection equipment from 26 vendors. Thirty four vendors maintained displays and exhibits at the conference facility.

The 378 registered participants represented 48 states, the federal government, and industry. Twenty international participants attended.

The papers within this publication are a compilatation of those presented at NATDAC '96. It is presented in two volumes. Volume I contains all General Sessions papers as well as Track A Concurrent Sessions papers. Volume II contains Track B and Track C Concurrent Sessions papers.

17. Key Words	18. Distribution Statement
Global Positioning Systems Congestion Management System Traffic Detection Technologies Weigh-In-Motion	No restrictions. This document is available to the public through the National Technical Information Service. Springfield, VA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	600	

Form DOT F 1700.7

PREFACE

The National Traffic Data Acquisition Conference, 1996 (NATDAC '96) was held in Albuquerque, New Mexico on May 5-9, 1996. The Conference was co-sponsored by the Federal Highway Administration, the Alliance for Transportation Research, and the New Mexico State Highway and Transportation Department.

Presentations covered a broad range of topics related to traffic monitoring. General sessions included presentations covering policies, perspectives, and innovations of interest to a wide audience. Three concurrent session tracks were more specific in nature. Track "A" sessions focused on traffic monitoring in urban areas - congestion and other performance monitoring activities, including travel time and the unique challenges of data collection in and urban environment. Track "B" sessions were oriented toward traffic monitoring program management and data analysis with particular attention to vehicle classification data. Track "C" sessions focused on weigh-in-motion equipment and truck weight issues including Long-Term Pavement Performance (LTPP) project and data collection for weight enforcement.

There were 378 registered participants representing 48 states, the federal government, academia, and private industry. Twenty international participants attended. Thirty-four vendors maintained exhibition booths. One day was dedicated to field demonstrations where participation vendors demonstrated devices on the roadway for delegates to view. Altogether, NATDAC '96 had 119 presenters, panelists, and moderators involved in the program.

The papers within this publication are a compilation of those presented at NATDAC '96. It is presented in two volumes. Volume I has General Sessions I, II, III, and Track "A". Volume II contains Track "B" and Track "C".

Thank you to all the speakers, participants, and exhibitors who made the conference an outstanding success.

The contents of this report reflect the views of the authors of the papers and abstracts, who are responsible for the facts and accuracy of the data presented. The contents do not necessarily reflect the official views or policies of the New Mexico State Highway and Transportation Department or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

Neither the United States government, nor the State of New Mexico endorse products or manufacturers. Trade or manufacturer names appear herein only because they are considered essential to the objec of this document.

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TRACK "A"

Concurrent Session 1A: ITS Related Activities

Concurrent Session 2A: Travel Time Data Collection Usina GPS

Concurrent Session 3A: CMS Data **Issues**

CONFERENCE OPENING REMARKS

Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9,1996

PETE V. DOMENICI
NEW MEXICO

United States Senate

WASHINGTON, DC. 20510

MESSAGE FROM U.S. SENATOR PETE V. DOMENICI

National Traffic Data Acquisition Conference

Holiday Inn Pyramid
Albuquerque, New Mexico

May 6,1996

Welcome to everyone gathered for the National Traffic Data Acquisition Conference. I regret that pressing business in Washington keeps me from greeting you personally this morning.

In New Mexico, I am a strong proponent of the work of David Albright and the Alliance for Transportation Research. This group's initiatives and teamwork with the New Mexico State Highway and Transportation Department create a joint venture that's dedicated to making transportation safer and more efficient. I hope those of you from outside New Mexico might have an opportunity to visit with our representatives, and we can share the technology we have developed to advance traffic monitoring research and products.

I hope you have a very productive conference, and I look forward to hearing of progress from all of you, based on what you learn this week. I also hope each of you from outside New Mexico can take time to enjoy this area's unique food, culture and friendship.

Warm regards,

Pete V. Domenici
United States Senator

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
NEW MEXICO DIVISION
604 West San Matw Road
Santa Fe, New Mexico 87505
REGION SIX

May 6, 1996

In Reply Refer To:
HDA-NM
784

Dear Participants:

Welcome to the National Traffic Data Acquisition Conference in Albuquerque, New Mexico. You have a very exciting agenda and having worked with your host, the Alliance for Transportation Research, for many years, I know that you are in good hands.

I once heard a college professor who taught pavement design say that we measure with a micrometer, mark with a grease pencil, and cut with an axe, sometimes a very dull axe. Each part of the development process of a transportation project can adversely affect the performance of the infrastructure, whether it is data acquisition, planning, design or construction. You can have the best pavement design in the world, but if your estimated traffic loading data are inaccurate or the asphalt mix is bad, you will have a premature pavement failure. It is essential that we pay the same attention to quality in all steps of the process and not just construction.

Our customers, the traveling public, don't see or most likely don't recognize all the effort that goes into the development of a project. They judge us by two criteria, time and rideability. They want to reach their destination quickly and on a smooth roadway. As providers of traffic data, you have an important role in satisfying our customers by ensuring accurate and high quality data.

With tight fiscal resources at both the State and Federal levels, we can not afford failures or poor performance. We, the stewards of the public trust, must do it right the first time. Given the existing financial constraints, we need to determine the most effective use of the Iimited funds. Which roadways need repair, where will the greatest benefit/cost ratio be recognized? Thus, another essential role for traffic data.

Finally, we have now started the process for the reauthorization of the Intermodal Surface Transportation Efficiency Act (ISTEA) You have an important responsibility in this also. Carefully evaluate the existing regulations and determine where improvements, especially in traffic data acquisition, can be made. You have a great opportunity to shape the future of transportation, don't let it slip by.

Good luck in your future endeavors. Remember, strive for excellence and truth in data.

Sincerely yours,

Reuben S. Thomas

Reuben S. Thomas
Division Administrator

GENERAL SESSION I - SELECTED TOPICS

Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9, 1996

NATIONAL TRAVEL TRENDS AND IMPLICATIONS

Gary E. Maring
Federal Highway Administration

Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9, 1996

NATIONAL TRAVEL TRENDS AND IMPLICATIONS

by
Gary E. Maring
Director, Office of Highway Information Management

I'm very happy to be here representing the FHWA Headquarters Policy Office. Gloria Jeff, our Associate Administrator for Policy also planned to be here, but must send her apologies because of an unexpected trip she is making for our Administrator.

Slide 1

We at FHWA are extremely pleased to be co-hosts of this important national conference, along with the Alliance of Transportation Research and the New Mexico Highway and Transportation Department. The National Traffic Data Acquisition Conference has a history of 20 or more years of predecessor conferences which started with early weigh-in-motion conferences in the 70's, and has become a major biennial conference in the last 10 years. Credit to Dave Albright and staff at the Alliance, and Frank Jarema, Ralph Gillmann of my staff. As the new Director for Office of Highway Information Management, I am very pleased to be here for this most important conference.

Travel monitoring data are essential to our understanding of the demand for highway services, the physical need for highway improvements, and the justifications for financing those improvements. I want to talk about some of the recent policy trends that impact on data needs.

This is an important time to be considering national data monitoring issues. Several factors dictate reconsideration of data needs and processes for providing that data.

Slide 2

- NHS passage -- I'll talk more about in a few minutes.
- Reauthorization -- Our Executive Director, Tony Kane, will talk more about potential changes with the upcoming reauthorization in 1997 on Wednesday.
- Quality initiatives dictate that we better measure system performance -- Tony Kane will talk about how FHWA and many States are pursuing quality initiatives. Improvement with all such initiatives assumes good performance data.
- The Government Performance and Results Act (GPRA) requires all Federal agencies to measure performance of their programs.
- Tony Kane will be talking to you more about these driving forces on Wednesday and the implications for data monitoring programs.

Maring, Gary E.

Slide 3

The most recent **national** highway legislation--the National Highway System Bill (NHS)--signed into law on November 28, 1995, is a milestone piece of legislation taking us beyond the Interstate era, setting in place a national system which will be a primary focus of our attention over the next few decades. A Policy Group in FHWA headed by my boss, Gloria Jeff, Associate Administrator for Policy, is looking at a broad set of performance indicators for the NHS which will place challenges on our current Highway Performance Monitoring System and other data sources.

Slide 4

This system constitutes only 4 percent of mileage, but carries 43 percent of travel and 70 percent of heavy truck travel, so it is incumbent on us at Federal/State level to be concerned about continued performance of that system.

Slide 5

The NHS is a very important link to our intermodal system. We'll be reporting to Congress very soon on the identification of intermodal connectors to NHS. Our monitoring systems will have to be expanded to cover the condition and performance of these important intermodal links on the NHS. The management systems, although made optional under NHS, will be an important planning tool in most States and will require improved travel monitoring data.

I want to now talk about some of the **important travel trends** showing up in our data systems and their implications for the future:

Slide 6

The National Transportation Statistics Report by the Bureau of Transportation Statistics shows transportation is a large and growing part of our economy.

Slide 7 & 8

Highways and the motor vehicles using them constitute the predominant transportation mode serving our economy both in freight travel and personal travel.

Slide 9

The 1990 Nationwide Personal Transportation Survey (NPTS) (Note: 1995 NPTS soon to be completed) **provides** rich data on some of the important forces affecting growth in personal travel demand on our highway systems. Population growth is a diminishing factor in travel

growth, but trips per capita have grown significantly, particularly among women, and trip lengths have grown. Modal alternatives and auto occupancy are also major factors in determining how much vehicle travel will occur.

Slide 10

Personal travel grew almost 40 percent between the 1983 and 1990 NPTS surveys. This slide shows factors contributing to this increase. Population growth is a small part at 13 percent. Bigger factors were shift towards more SOV travel at the expense of transit and HOV despite all of our efforts to promote HOV modes. Also person trips per capita increased. Vehicle trip length increase was the largest factor and I believe metropolitan development patterns are a big contributing factor here.

Slide 11

The edge city development pattern shown here, common to most major metropolitan areas contributes to a predominant suburb or edge city to edge city travel pattern which tends to generate longer trips.

Slide 12

One positive note in future demand factors is that long range personal VMT growth rates will likely be diminishing somewhat due to lower population growth, approaching saturation in driver licensing, and aging of the population. The historic 3.5 percent annual VMT growth is likely to fall to 2.5 percent and below. We've been seeing somewhat lower growth rates in the 1990's.

Slide 13

Other factors affecting demand on freight side are trends toward heavier truck demand and increased international trade including intermodal containers. Larger container ships calling at our domestic ports are putting greater demands on our connecting highway systems.

Slide 14

This chart shows the growth over the last 20 years in many of the factors contributing to highway demand. VMT increased most rapidly, at the same time fuel efficiency improvements eroded fuel tax revenues used to pay for needed highway improvements.

Slide 15

This is our latest 1995 estimate of the Highway and transit needs over the next 20 years. One of the very important uses of our travel monitoring and other highway performance monitoring data is the biennial Condition and Performance report to Congress. Capital expenditures of $57 billion are needed annually just to maintain today's condition and performance . We're currently only spending $40 billion at all levels of government. Of course States need similar data to develop their program needs.

Slide 16

And these investment numbers assume aggressive efforts to more effectively manage supply and demand through use of ITS, HOV modes, telecommuting, pricing, etc. Those programs will dictate need for improved data on travel time, occupancies, and other key operational performance indicators. Christine Johnson will talk about travel monitoring implications of ITS at lunch.

Slide 17

Environmental and energy requirements impose other constraints on travel and on data needs to monitor travel and mobile emissions on the highway system.

Slide 18

Also place demand on data systems as our HPMS generated VMT data used to track conformity progress in nonattainment areas to see if emission reductions are being achieved.

Slide 19

Many different forms of alternative fuels emerging including move to nonfossil fuel with electrical vehicles. These have potential big impacts on highway user revenue sources.

Slide 20

Monitoring of travel and fuel consumption is very important to revenue estimation. This slide shows the relatively flat revenue picture over the next 5 years at Federal level.

Slide 21

Further demands for good data were prompted by two current Federal policy studies. One, the Federal Highway Cost Allocations Study data on highway usage and loadings for 19 vehicle classes on 12 highway systems, pavement condition, and detailed expenditures data in order to fairly allocate costs for maintaining systems to various classes of users. States have their own needs for such studies.

Slide 22

The ultimate use of the cost allocation study is to determine if different vehicles are paying their fair share of revenues based on costs imposed. This slide shows the current and projected Federal revenues from fuel taxes and the heavy vehicle taxes.

Slide 23

FHWA is also conducting a Comprehensive Truck Size and Weight Study.

Slide 24

Rationale for the study: Its been 30 years since a comprehensive TS&W study has been conducted by FHWA; the economy has changed dramatically; international trade and containerization have changed freight flows; NAFTA dictated a review of TS&W compatibility among the three countries and it will provide appropriate input for reauthorization. The data demands for this study include detailed truck usage and weight data, intermodal freight flows, pavement and bridge inventories, safety data, etc.

In Summary

The basic effect from all these initiatives will be a growing demand for reliable data which dictates continued research in data collection technology and its deployment in the field. We have seen significant gains over the last 10 to 15 years, but we need to advance further. The nature of the transportation issues we face today at the local, State, and national levels has ushered a role change. We've gone beyond "highway builders" and become highway and inter-modal transportation system planners, operators, and managers. We have increasing demands to measure the performance of the system. The need for more finely stratified traffic data and information continues to grow. I have highlighted some broad national issue areas in transportation, which coupled with the requirements at State/local level for planning, management systems, air quality analysis, and investment analysis, show the important role that traffic data plays. The traffic monitoring systems in each State will be expected to provide the data necessary to develop State and national strategies to guide these programs. Likewise, environmental requirements, and the growing importance of freight transportation will continue to challenge our programs. The needs for traffic data will continue to challenge the program developers and also the equipment developers, who will have to meet the demands of a rapidly changing environment. Policy decisions, more than ever, depend on accurate and timely data and information.

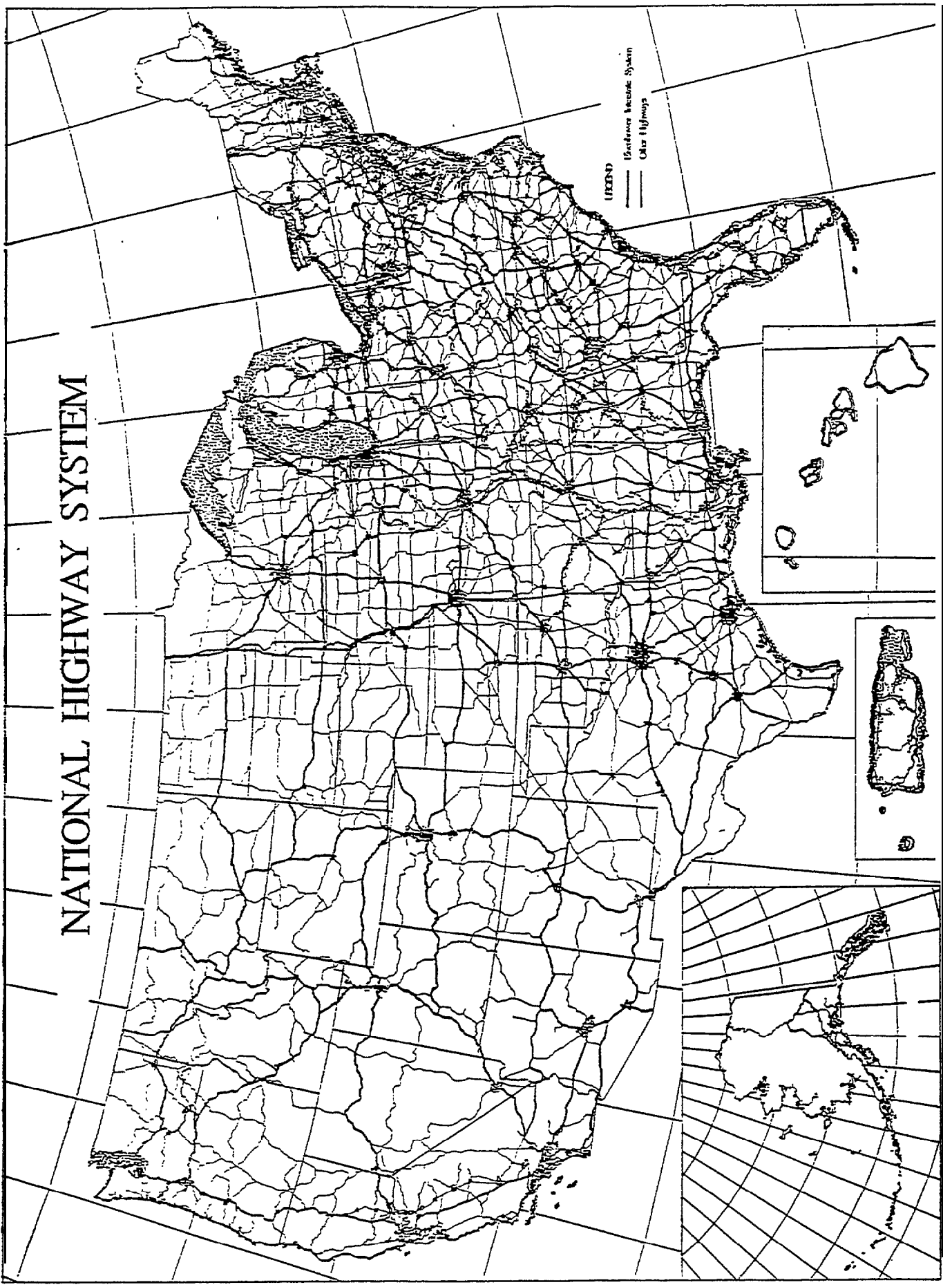
Thank you.

NATDAC 96

NATIONAL TRAVEL TRENDS AND IMPLICATIONS

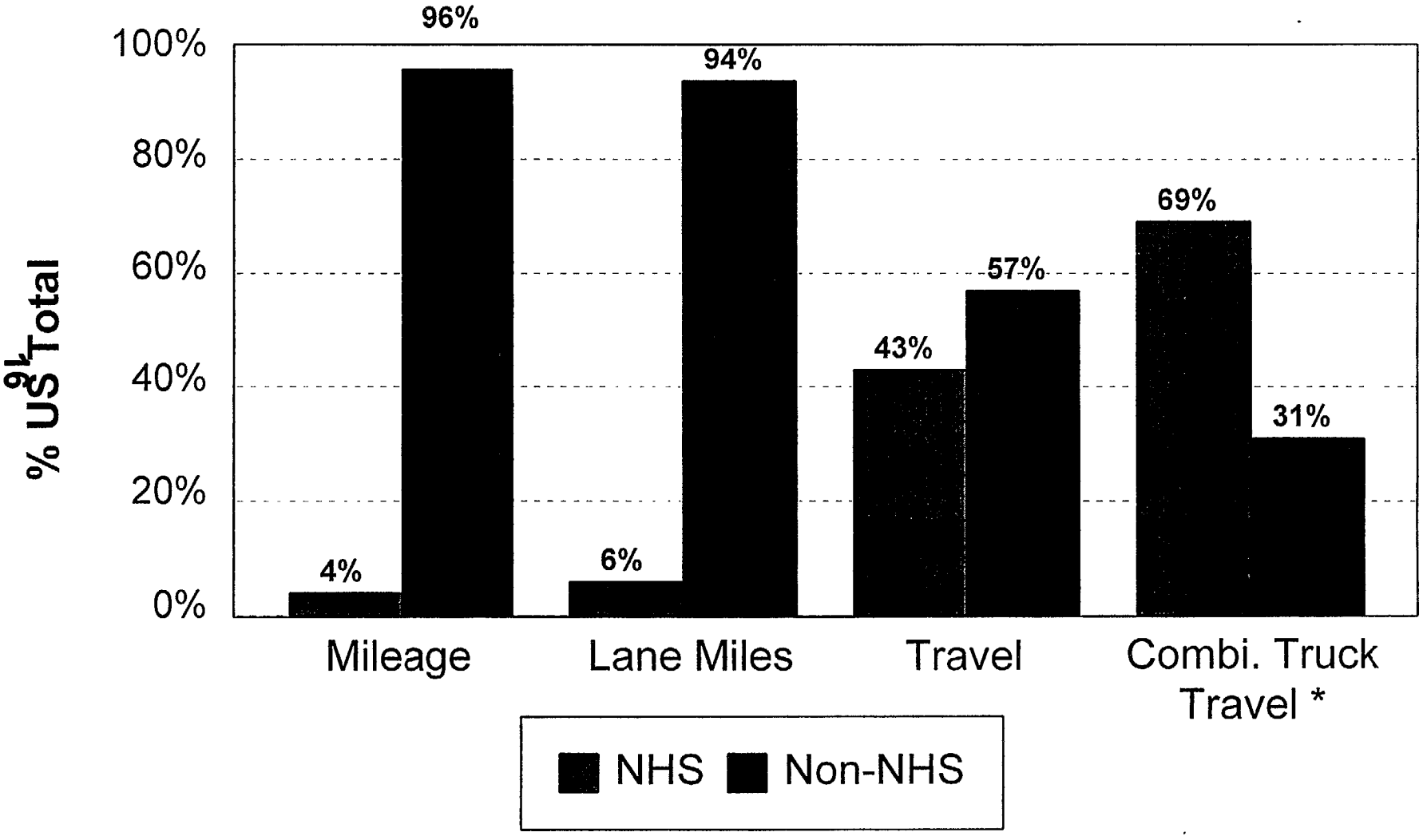
Issues On The Horizon Affecting Information Needs

- NHS Passage
- Reauthorization
- Quality Initiative
- Gov't Performance & Results Act (GPRA)


NATIONAL HIGHWAY SYSTEM
LEGEND
Interstate Highway System
Other Highways

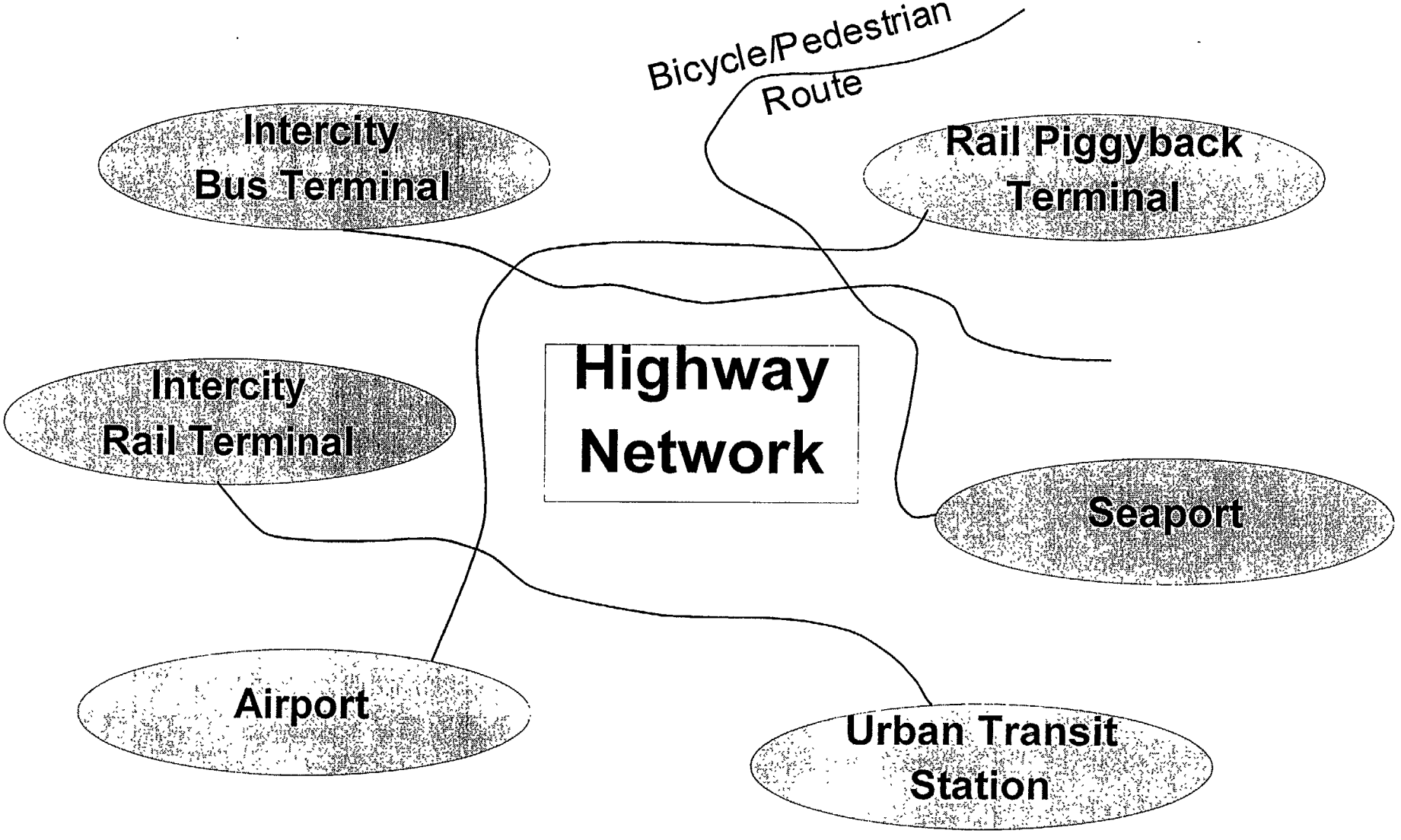
Maring, Gary E.

NATIONAL HIGHWAY SYSTEM (NHS)



* Derived from the entire Principal Arterial System

Intermodal System



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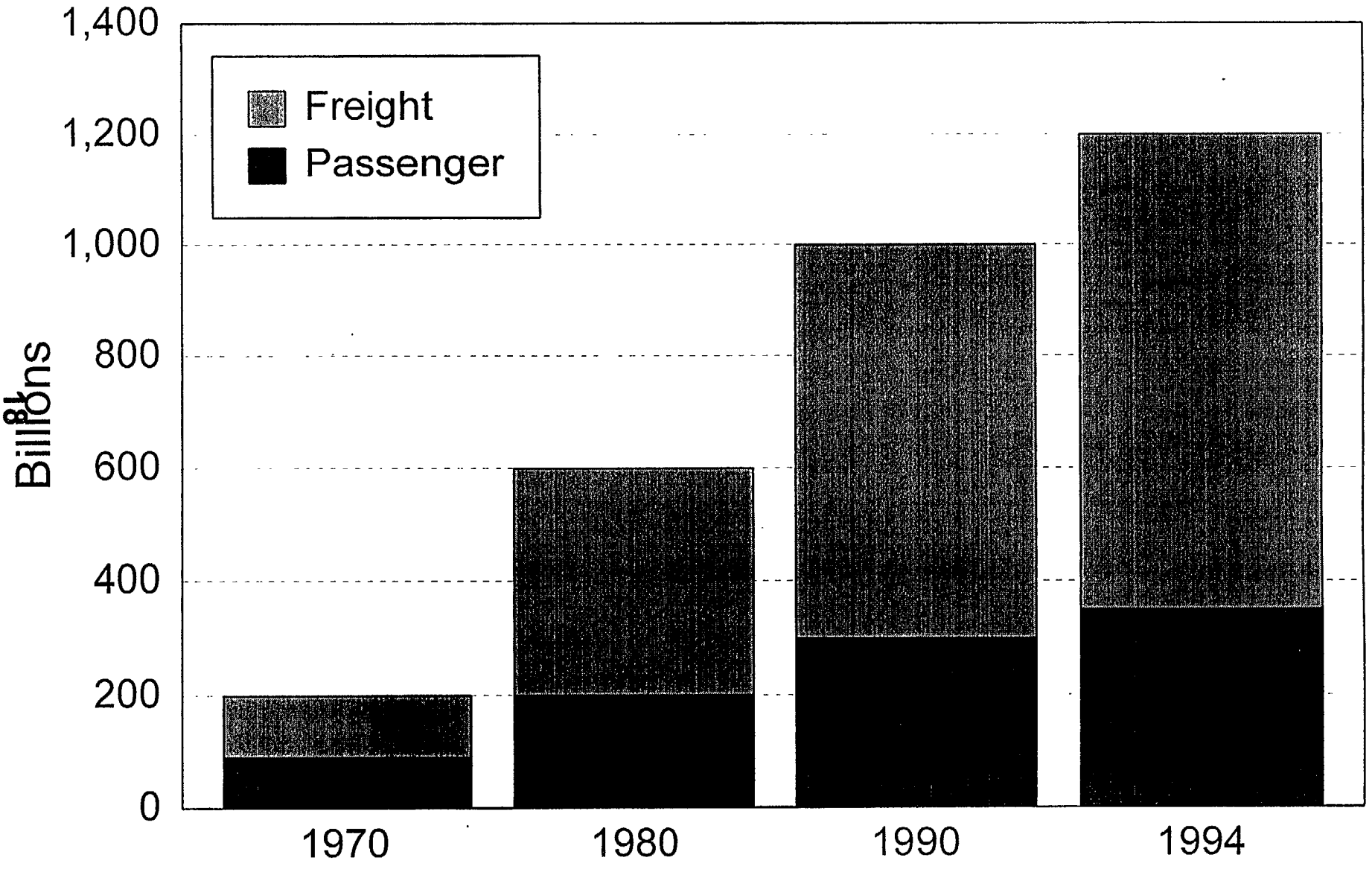
Total National Transportation Expenditures



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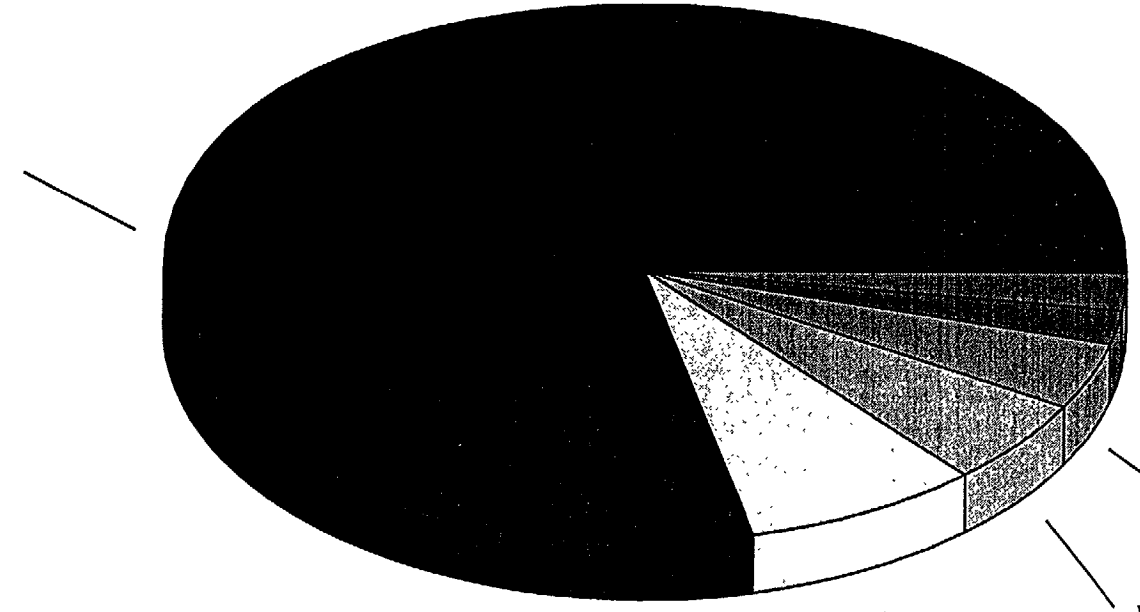
The Nation's Freight Bill

1994



Highway 78.6%

Misc. 2.2%

Oil Pipeline 2.0%

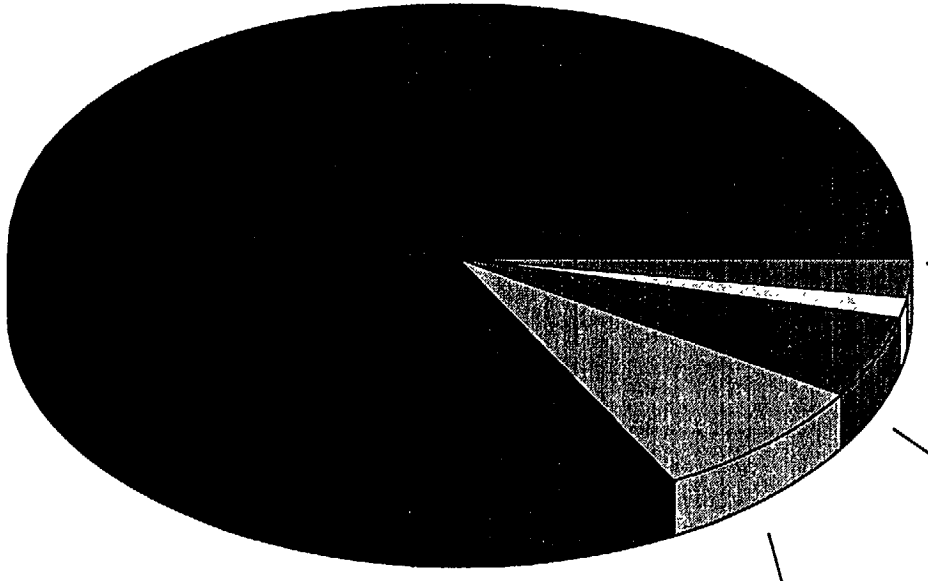
Air 4.0%

Water 5.2%

Railroad 7.9%

The Nation's Passenger Bill

1994



Auto
82.8%

Private Air
2.4%

International *
1.4%

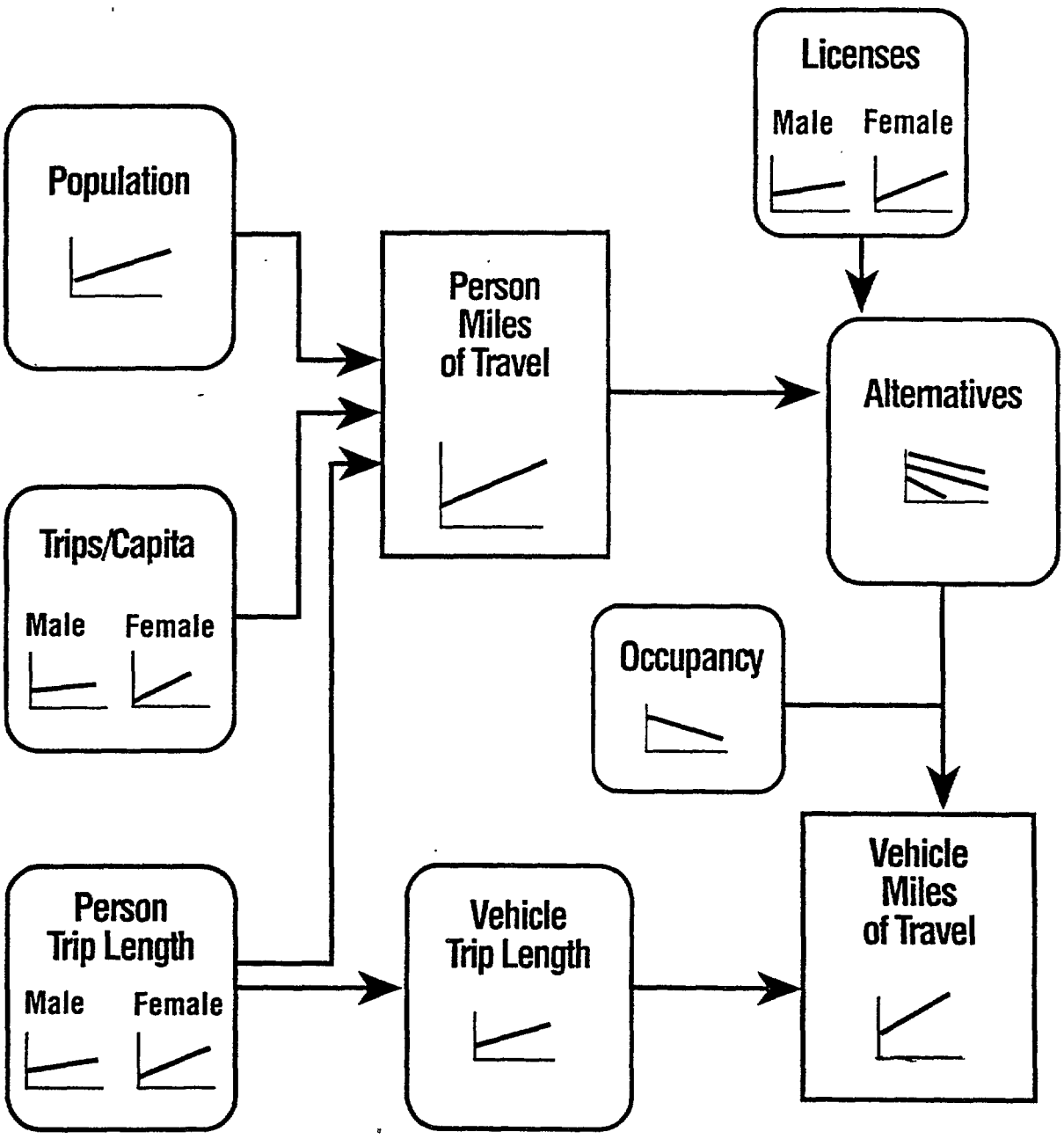
Local 5.2%

Intercity *
8.1%

* Includes Commercial Aviation

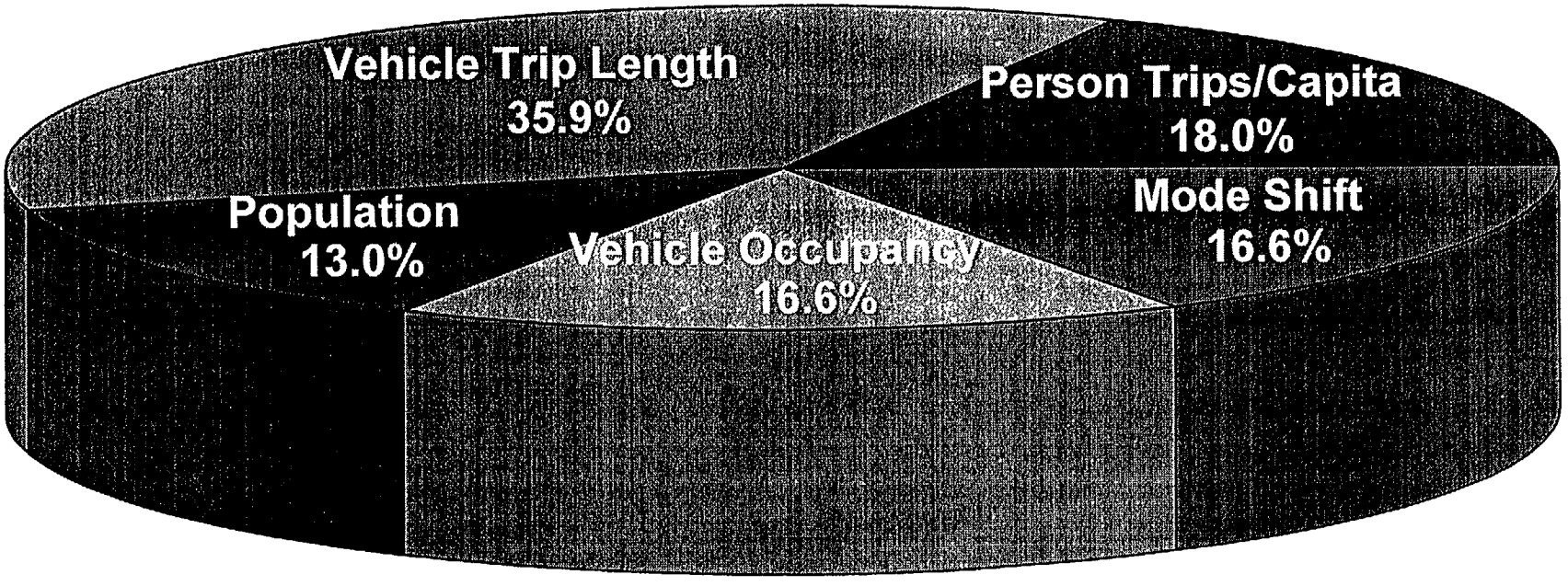
Maring, Gary E.

Factors in Growth of Personal Travel

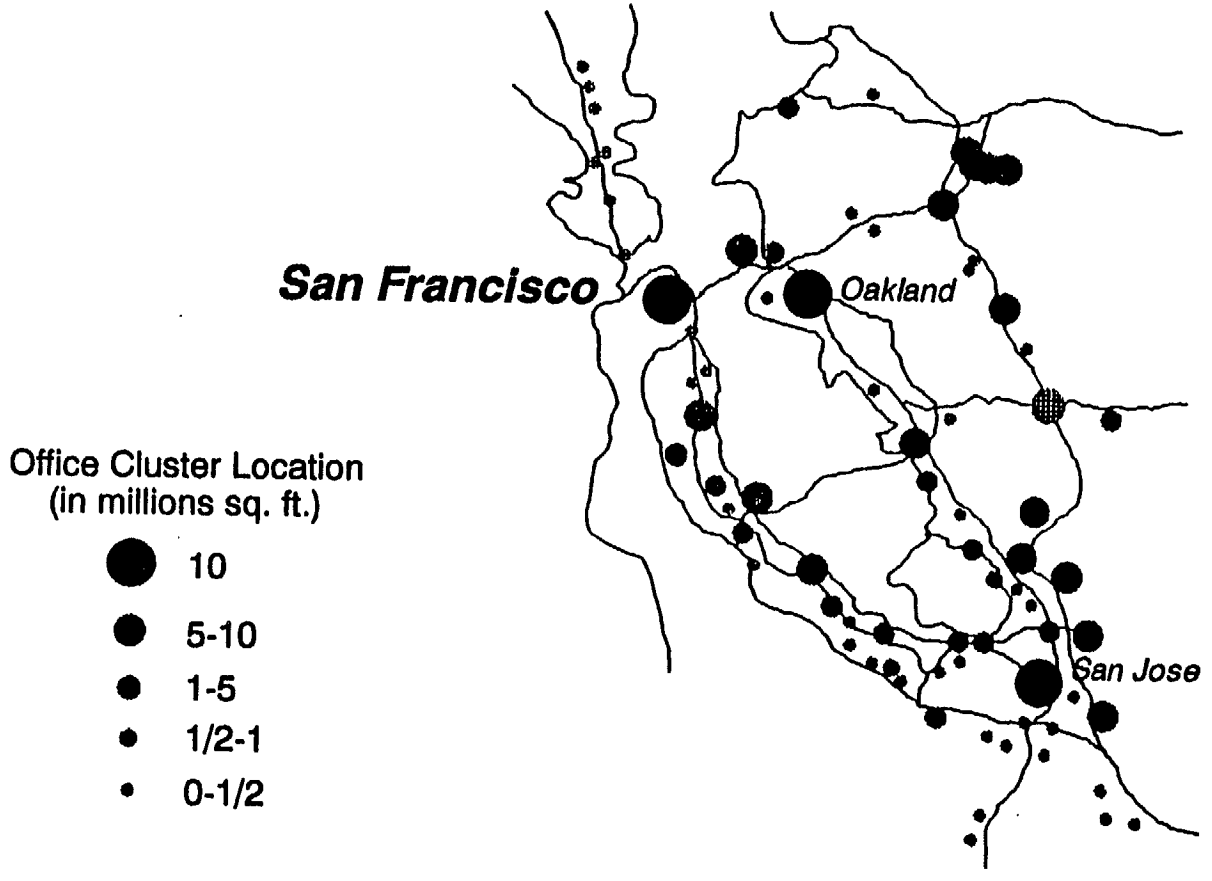


Maring, Gary E.

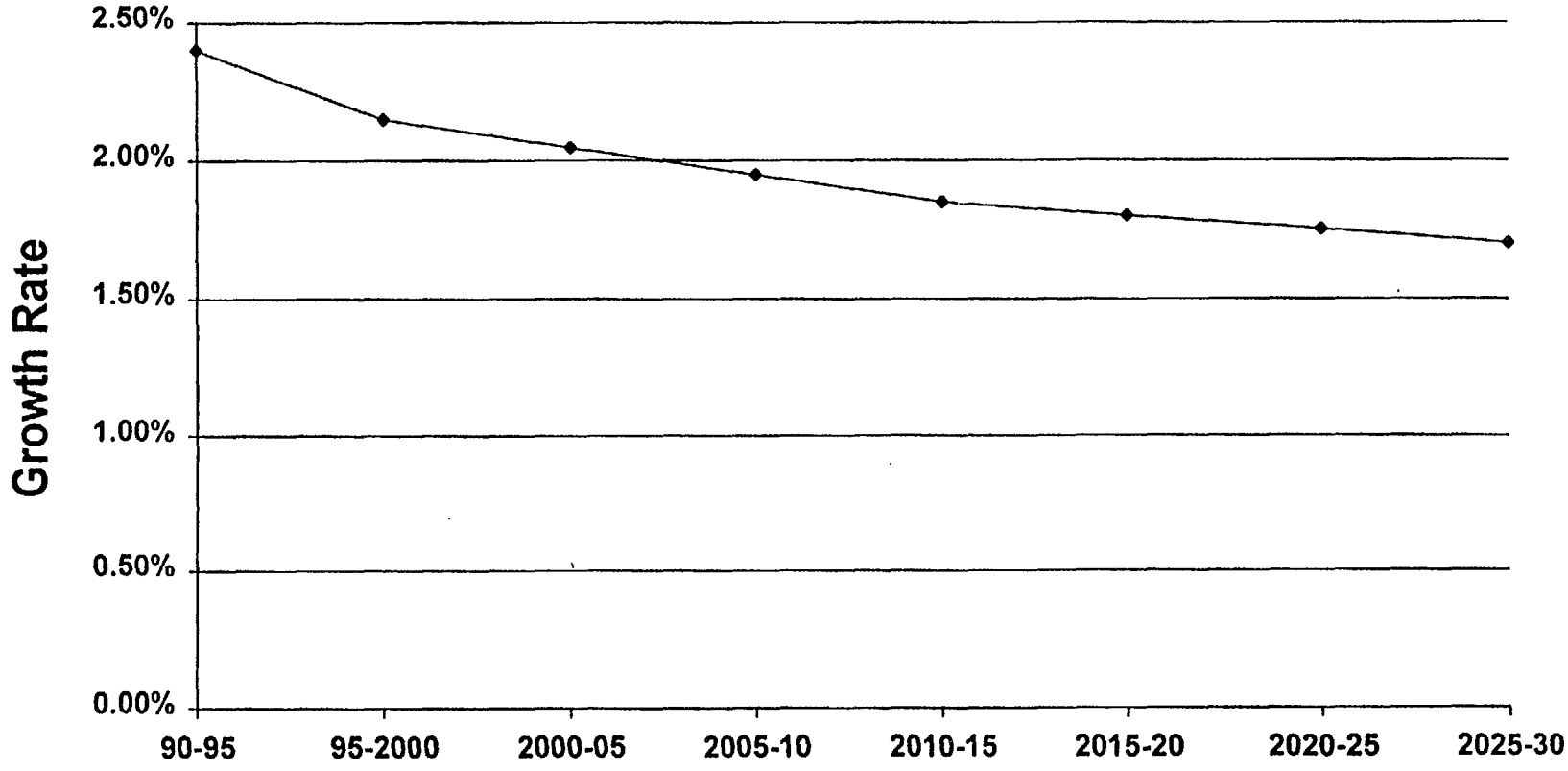
Vehicle Miles of Travel Factors of Increase (1983 - 1990)

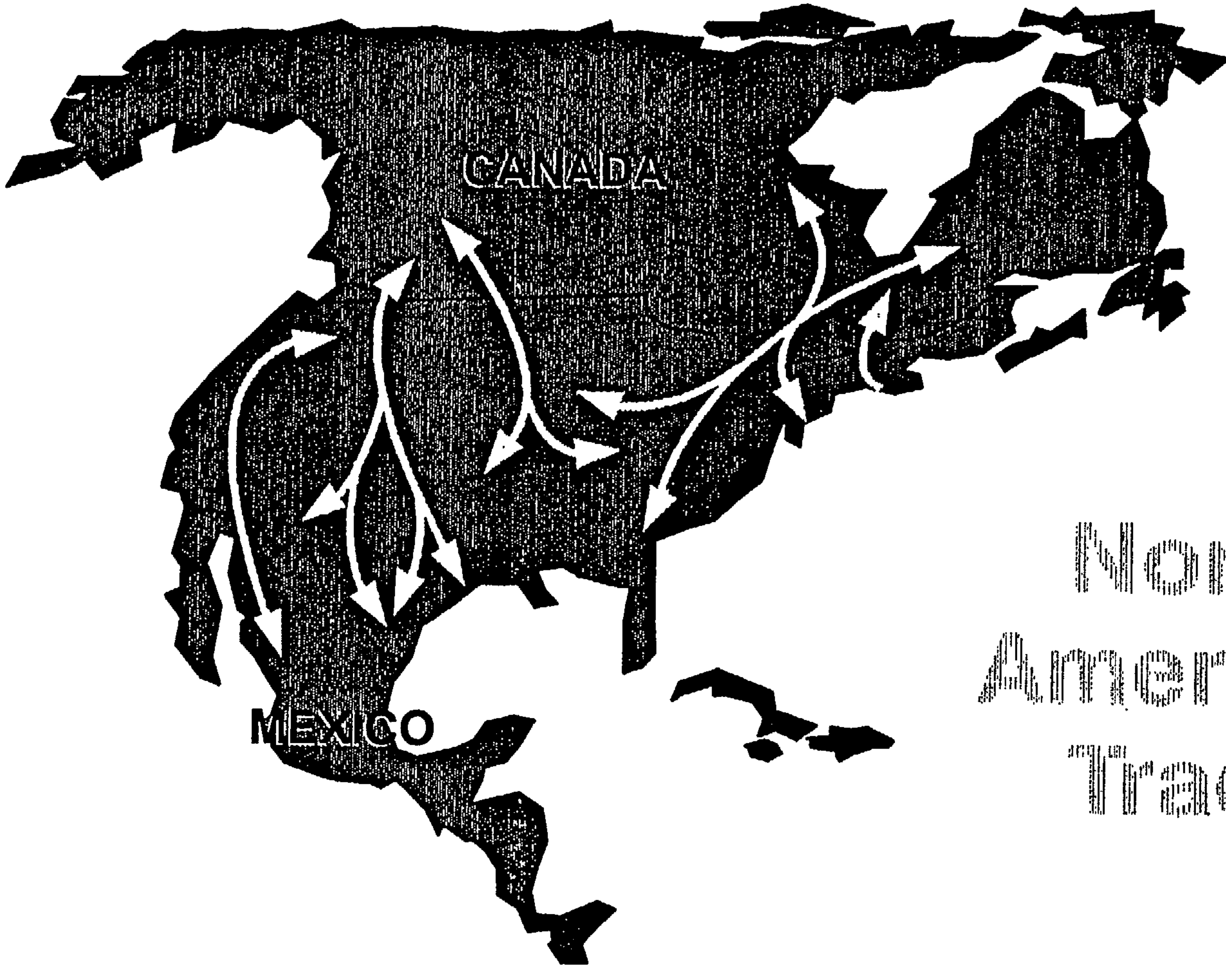


San Francisco Bay Area Office Clustering, 1988



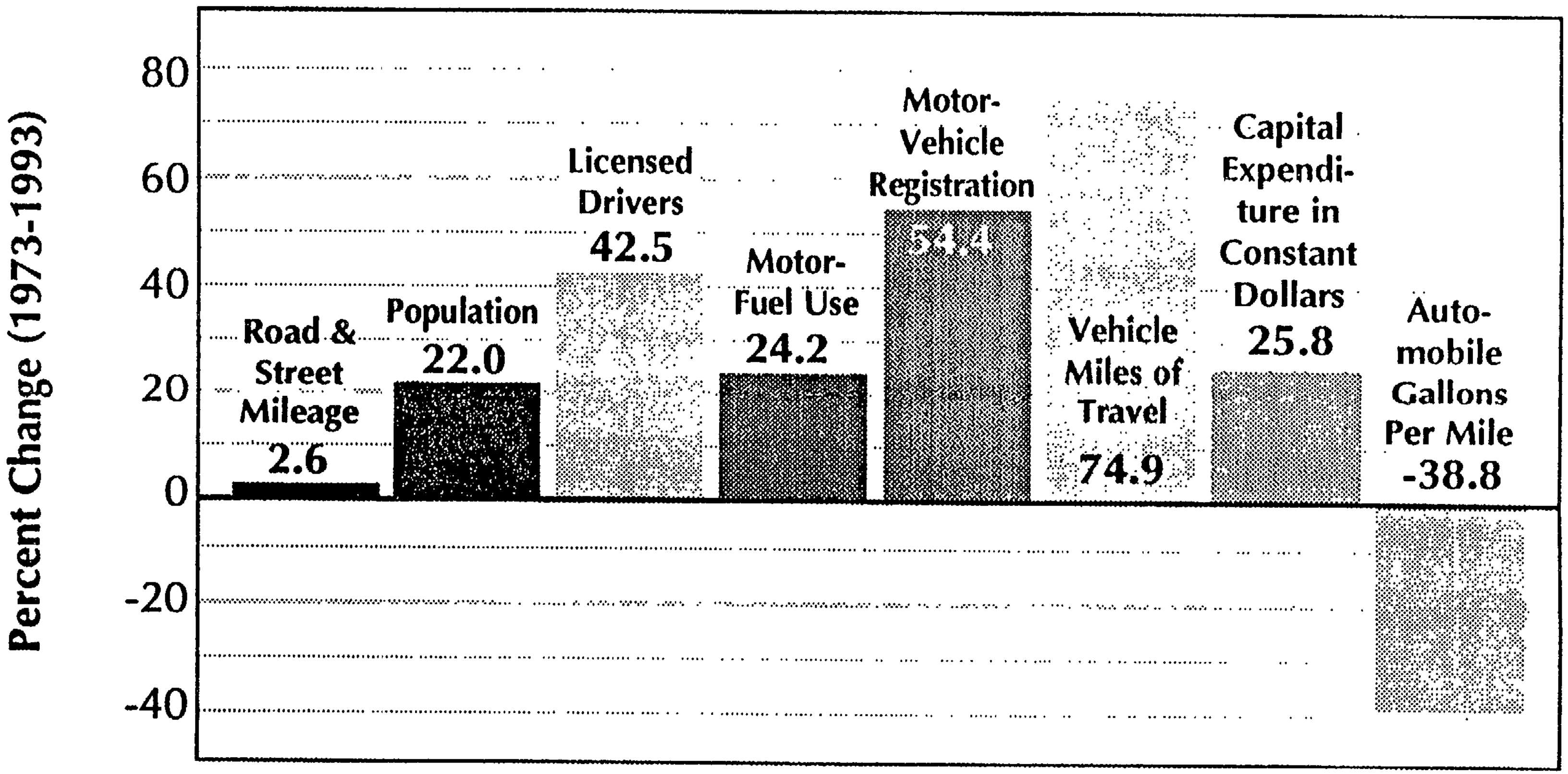
Personal VMT Growth
1990 - 2030



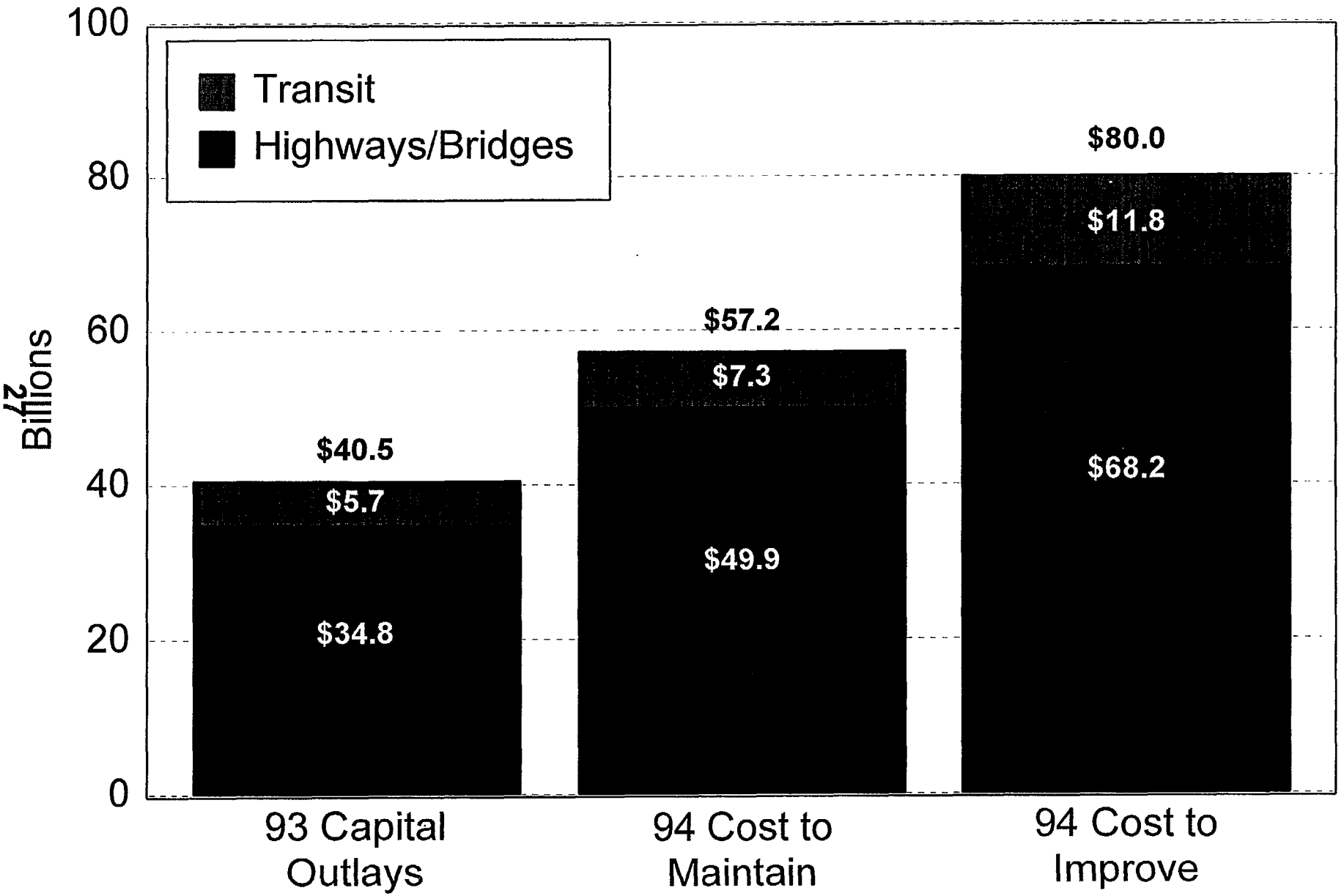


North American Trade

Highway Indicators



Highway and Transit Investment Requirements



Maring, Gary E.

Demand Management

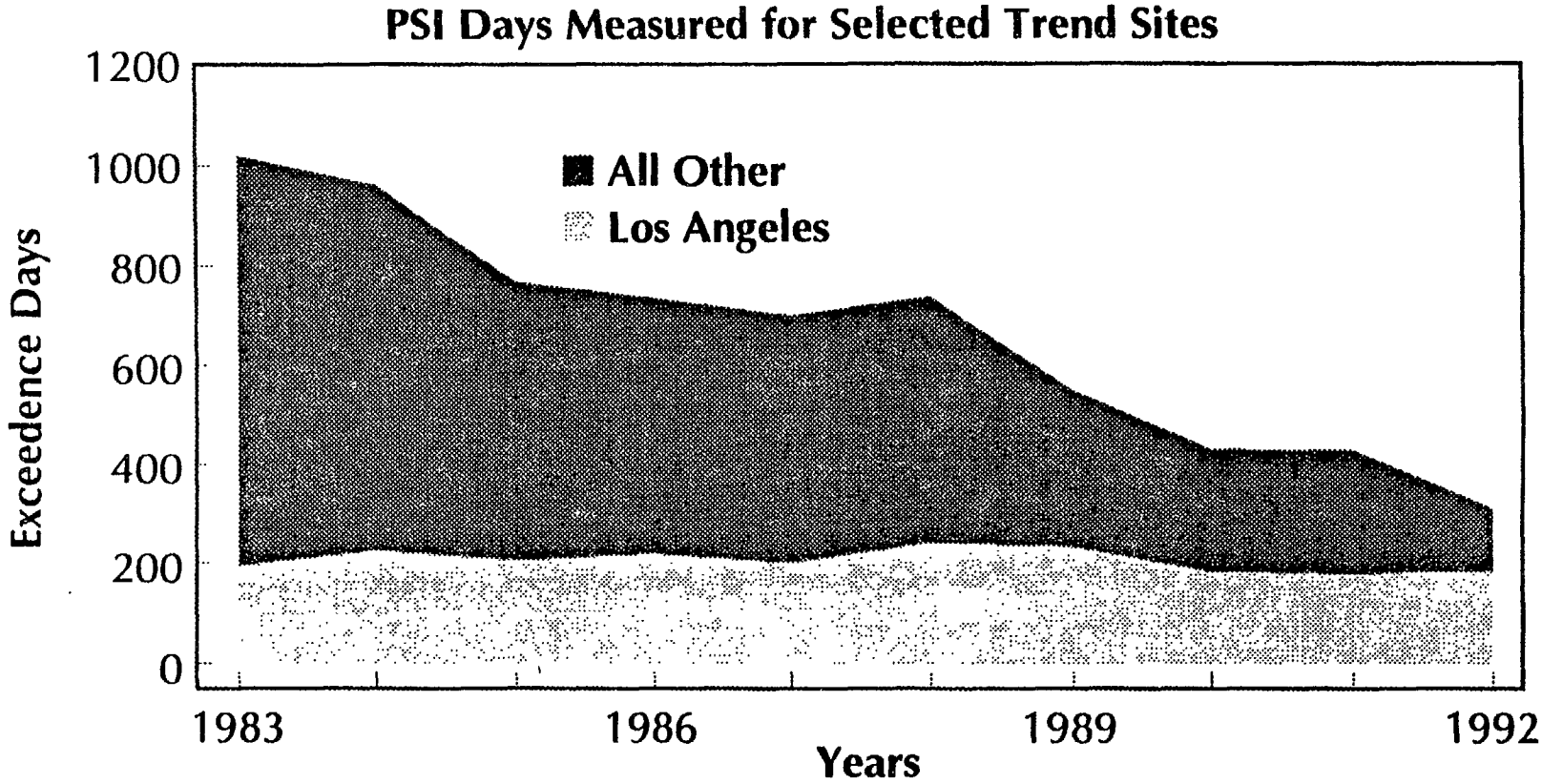
- HOV/Transit
- Pedestrian/Bicycle
- ITS Technology
- Telecommuting
- Pricing
- Growth Management

Maring, Gary E.

Environmental and Energy Considerations

- Clean Air Act
- National Energy Strategy
- Global Warming Concerns

Air Quality Trends

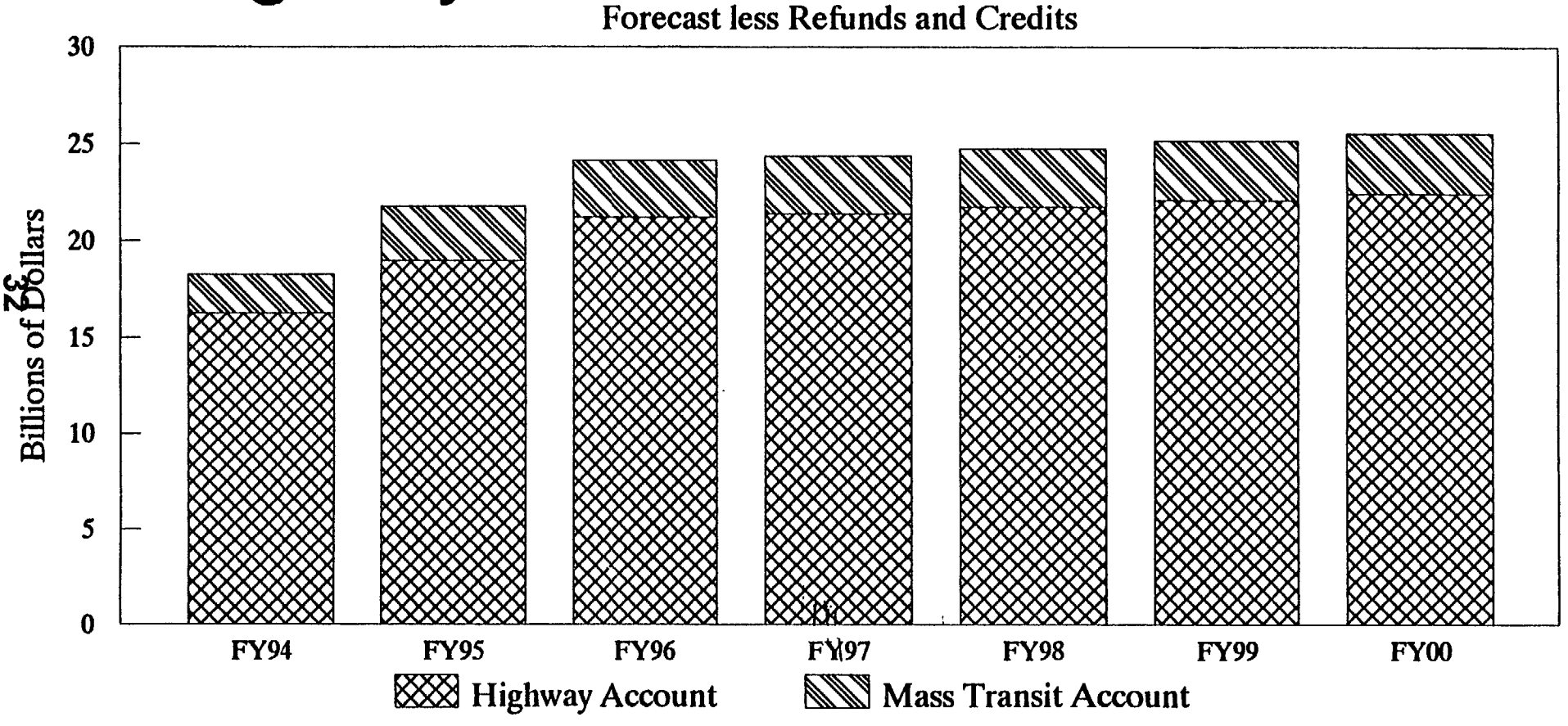


Source: Office of Program Development, Federal Highway Administration, *Transportation Air Quality Fact Book, 1994* (using 1994 Environmental Protection Agency data).

Alternative Fuels

	Relative Cost	Ozone Reduction	CO Reduction	Greenhouse Gas Reduction	Energy Self-sufficiency
Gasoline		0	0	0	0
Reformulated Gasoline		Slight	Slight	Very Slight	0
CNG		Slight/ Moderate	Very Significant	Moderate/ Significant	Moderate
Methanol		Slight	Slight	Slight/ Moderate	Slight/ Moderate
Ethanol		?	Slight	0	Slight
Electricity		Very Significant	Very Significant	Significant	Significant
Fuel Cells	Highest	High	High	High	High

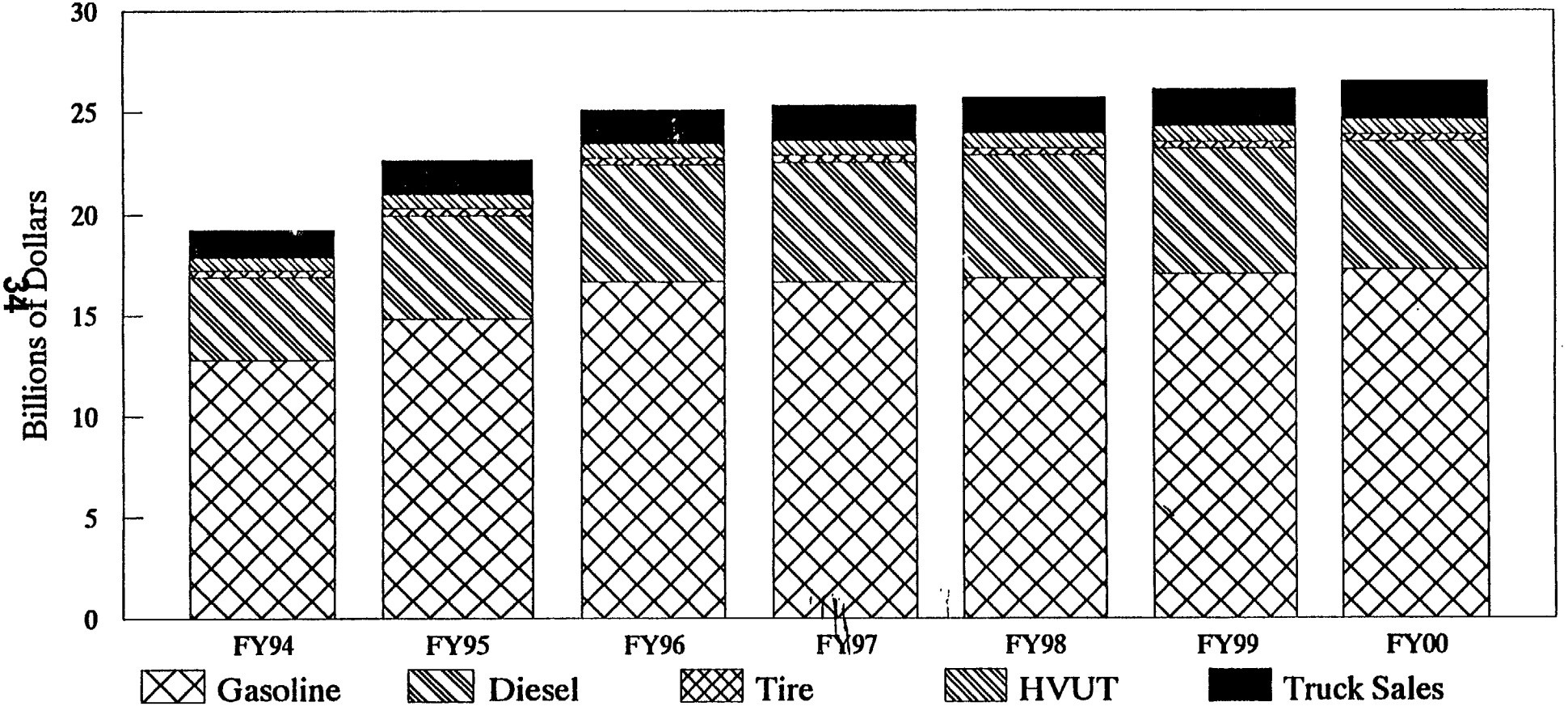
Highway Account and Transit Account



Federal Highway Cost Allocation Study

- First comprehensive federal cost allocation study since 1982
- September 1996 completion date to support reauthorization
- Will examine highway user revenues paid by different vehicle classes as compared to program costs imposed (also to consider externalities)
- Will examine implications of changing fuel tax base and alternative revenue sources for equity of overall user fee structure
- Will examine multimodal cost allocation implications

HTF Forecast Revenue



Maring, Gary E.

FHWA Comprehensive Truck Size and Weight (TS&W) Study

Rationale for TS&W Study

- FHWA has not done a comprehensive study in 30 years
- Changing global economy and logistics patterns
- International compatibility issues (e.g., NAFTA)
- Congressional questions regarding the extension of TS&W regulations to the entire NHS
- ISTEA reauthorization

MICHIGAN'S TRANSPORTATION MANAGEMENT SYSTEM AND **TRAFFIC MONITORING DATA**

Ronald L. Vibbert
Michigan Department of Transportation

Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9, 1996

Michigan's Transportation Management System and Traffic Monitoring Data

Ronald L. Vibbert, Management Systems Coordinator
May 5,1996

Thank you very much David. In some respects, I feel like I've come home. I was walking through the exhibits and I remember how all this equipment is used even though I haven't been working directly in the traffic monitoring area for maybe four or five years now. And I know four and five years, with all of the new technology coming, out is a lifetime. Things have changed a great deal. I know that many of you who deal with computers and information systems know what I mean.

Michigan has been very aggressively pursuing the management systems mandated by the ISTEA requirements. We have gone through extensive design effort. We are currently a short way into the second year of the two-year development process. We have software on people's desks. So we are in the developing and the implementing stage right now.

It's taken an enormous amount of effort from within MDOT and with our local partners, counties and cities, to put the Management Systems together and what I would like to do is to briefly describe what these management systems look like, what they include, and end up talking about how we've dealt with traffic in the management systems.

Just as a brief background, the ISTEA legislation was passed in 199 1 It had an included a lot of planning requirements, which I promise I will not discuss. These did however, affect how we did our long range planning, how decisions were made, and how we accounted for those decisions through TIPS, STIPS and more acronyms. The ISTEA legislation did require six management systems, which at least I'm sure you're all somewhat familiar.

Traffic monitoring was mentioned. Traffic information is important. The legislation recognized this, but there were no real requirements that we do anything additional. Most of the states responded accordingly. In fact, I was at a meeting this last weekend--with the Management Systems Integration Committee (a group of states concerned with the implementation of management systems), and one of the questions outstanding is "What do we do with traffic information, and how do we get all this data into the management systems. We think it's really important now and how are we going to cope with this?'

I'd like to describe where Michigan was in 1992. Certainly, there was more going on than just the ISTEA legislation passed in 1991.

I'm sure many of the states here are faced with such issues as downsizing or if you're more up on things, 'right sizing'. You've probably experienced extensive retirements, where people who had been working in your departments for several years have or are reaching the age where they can leave the state, representing a lot of expertise that walks out the door, that you need to try to capture.

MDOT realized that when the management systems requirements were established much of our software was on our mainframe computer. The software was so old we couldn't change it. The costs were going to be extremely prohibitive. It was going to take a lot of time, and it was going to be a daunting task to put all the systems together, and have them work. And have them work for more than six months.

Another factor was that our mainframe was at the end of its useful life. We were looking at whether we should change. Did we want to replace it? What should we do?

We also had this set of things that we knew that we wanted to change and also a series of things that we knew we wanted, or that people & they wanted and never could quite figure out how to get there.

One of those things, and I'm sure that this is an issue in many states, is how do you even account for your road system? Do you have a common linear referencing system? Can you easily transform data collected in your pavement system to the Bridge system? Or from pavement into safety? or visa- versa?. In fact there's an N-squared number of programs involved in writing to accomplish this, where N is the number of systems you have. Can these systems speak to each other? Can they communicate? Can you reuse this data?

MDOT's answer to these questions was NO! MDOT had known problems with our referencing system dating back 1952. Every four years or so we would try to address this problem and decide how we could fix it. We failed, partially because we had so much legacy code out there, and partially because of programs that people either could not or would not change.

We all wanted to implement GIS. Looks great, you can do an awful lot with it, but what is required to make GIS work on a department-wide level? This was another issue and a desire out there that people wanted, and we could never quite address.

We also knew that there was considerable duplication in the department. This may sound like I'm exposing this huge problem, but we all know that it exists. Because our systems cannot communicate, we collect data two, three, four times. Then we spend a lot of time trying to figure out how to move it around.

There were a lot of institutional and technological issues and opportunities that we were facing, and that MDOT was trying to wrestle with. Fortunately, the ISTEA legislation had a requirement in it that turns out to have been key. This key part was:

> (b) Each State shall have procedures, within the State's organization, for coordination of the development, establishment, implementation and operation of the management systems. The procedures must include:
>
> > (b)(2) The use of data bases with a common or coordinated reference systems *[which MDOT didn't have]* and methods for data sharing... *[which was impossible before]*

This requirement caused us to step back, and instead of looking at six management systems, we really had to implement one management system. MDOT manages a transportation system. Some people are expert in pavement, some are expert in bridge, some are expert in safety and on and on. Most of us are responsible in some way for a huge infrastructure that is composed of pavement and bridges. We are all concerned about safety--each system needs safety information.

MDOT was now looking at one system, including traffic information. Traffic has been a part of our fundamental design from the beginning and this was done consciously. (And it might have had something to do with me being a traffic guy at that time--who knows?)

Michigan would develop the six required management systems in one application. We would put that together with a common interface, and since we were going to, and we did establish a common linear referencing scheme, we would also get GE--for free as long as you can tie your data, including traffic data, to this referencing system.

All of this information is stored in one, monolithic, relational data base. One piece of data collected by one person is available to every other person regardless what system they're looking at, regardless what their intent is. A further advantages of relational data base is that, at least in today's world, you don't need a special application to look at it. You just go look at it. This enables *ad hoc* queries, and the ability for people to answer the random question that no one has ever asked before, and to see what data is available.

The Management Systems technical environment is essentially two-tier client/server, using an Oracle back end database. This database is rather extensive. There are about 600 tables that just store data in them right now, that's not code or system tables or anything

The database was designed by users, that means folks like us, not commuter people. We had to sit down and actually agree on what everything meant and how it worked together. We had traffic people in the room, we had pavement people in the room, bridge people in the room, all these folks in the room, to get us to agree on what data we used, and what it meant. Our objective was to identify where we duplicated data, where we were duplicating each other's efforts, and to then stop this duplication so that we all could benefit

Our screens are also user designed. The development is being done using a PowerBuilder front end and we're using Intergraph for our mapping capabilities. For MDOT, Intergraph is a good choice. Our design platform is Intergraph, and by selecting Intergraph for GIS we could at least approach having only one technical environment to maintain.

There has been development in the area of the management of traffic monitoring information as well. PowerBuilder is a pretty hefty tool for users to use, so MDOT selected FoxPro. These programs still run in the Windows environment, and currently, the data files reside on Novell servers.

We recognized that traffic was actually the seventh, or 'missing' management system. We modeled the traffic data along with the rest of the data, and we are ready to start to populate,

meaning fill up, the data tables in our central transportation management systems data base with traffic data.

As we did this, we eliminated any dependence whatsoever on our mainframe environment. There is no more main frame at MDOT. That was really quite a monumental task not only for the department but I also think for our traffic folks as well. We had to rewrite a lot of programs to make them work on the PC environment. As we rewrote these, we covered a pretty broad range of data types, and uses of data.

Dave Schade is the supervisor for that unit now. If you would like to get with him later, he'd be happy to show the programs to you. Bill Tansil is also back there. Either one of those gentlemen would be happy to go over this effort in detail.

The point is we have tried to account for every piece so that every piece of data will be accessible by whoever needs it. And it looks something like this..... We've tried to cover all the steps and considerations. We have data inputs of various types, when data comes in it has to be validated. Was it collected correctly? Does it meet our parameters? Getting back to the quality issues that we were talking about before, this data stored out on a network so that anybody in the department can get, at it.

The next step is writing a program to populate the ISTEA data base with the monitoring data. This will allow the Novell file storage to go away. At that point the data will be available to the entire department

Part of our underlying motivation for re-writing our traffic monitoring software, other than the change in technology that existed when I started in traffic, is that we were spending 70% of our time, within the analysis and data management data area, maintaining data bases **that** even within the that area, that could not be combined. We could not do things. Every type of count seemed to have a somewhat different accounting system. We had to have people working to figure out how to pull different types of counts together when we did ADTs, for example. It was hard...because the accounting system for our counts were different. We spend most of our time trying to figure out how to store and maintain data and get it to work together.

What we have found since is the rewrite is our staffing usage has changed. We have been able to reduce the amount of time and effort we spend maintaining data, allowed ourselves to increase the amount of time we spend looking; at the data, seeing if it's any good, making the analyses that our pavement folks, and our bridge folks, and our safety folks need for them to do their job, so we can produce a better product. And we've done that at the same time we've reduced staff. We've had retirements but we've been able to cover. A lot of this has been due to us thinking ahead of time, and knowing that, first of all, we were going to change our platforms but also that traffic information is an integral part of the way the department operates.

You know, all of us work in departments that are primarily engineering. But traffic information is non-engineering data that is critical. You cannot make a decision on the engineering and the design and the scope of what we need to do without the information that you in the audience

provide. And it's critically important that this information is available in a timely fashion when it's needed.

In terms of MDOT's current status, we have an RFP out on the street to complete that last piece of integration of traffic information with the ISTEA database and to get rid of reliance on our Novell data. We will make traffic data available to the rest of the department or anyone else who needs it.

This is going to have an enormous impact on people. Right now, for example, if you need a traffic count you have to know who to call. And you have to get to get the right person at the right time to run the right report for you--that requirement is going to go away. If you want traffic information you will be able to click a computer screen and get the traffic information that you want, whether it's statistics or raw counts. And that's our intention.

We will also take all the historical data that we that we have collected over time and move that to the ISTEA database as well, so we'll have not only the current but also the historical data available so that we can do trends.

Again, I'm sure Dave would be happy to show you any of the software that we've got. We invite you to do that. Maybe you can have some ideas that would help us, or we might have an idea I would hope that might help you. Also, if we can get modem connections I'd be happy, if anyone's interested, to show the Management Systems as well. We're very excited about those.

The Management Systems do run over a modem. We are going to have people all over the state running the management systems and it has to run from remote locations. So, assuming we can get our modem connection from this long distance, we'll be happy to show them to you.

Are there any questions?

(Clap, clap, clap……)

[David Albright]
Thank you Ron, I think that's certainly keeping with presentations of the morning is the sense of the importance of traffic data from the field being mean fully integrated into the applications, whether those are state applications or federal applications. Cheryl has shared with us the commitment of Senator Dominici, which is reflected among many of our representatives in Congress, to begin now crafting in a thoughtful manner re-authorization legislation. Rubin Thomas has shared with us that ultimately all of the issues before us, whether in the drafting of legislation or the collection of data in the field, the development of management systems, the application in terms of the real world affect to those management systems such as in pavement all comes back to the question of quality.

So perhaps that's the way in which we really begin this conference in which each of us from our 47 state agencies, the persons representing the federal government, our 10 representatives of other nations perhaps the one recurring theme which should characterize all of our efforts this

week is that search to improve the quality of our activities from the very beginning point in the field to final appropriate use of those in the way in which we serve the public. Are there any questions of any of the four speakers this morning before we have any general announcements that may need to be made and then break. Are there any general questions?

I'm Ralph Basil with PennDOT. Mr. Vibbert, how much has Michigan invested into the systems that you're developing? and how much is left? How much more is there left to invest?

All right, that is a fair question. I was asked the same question at TRB and at that time the moderator, I think, tried to divert the question.

At the end of the contract that we're currently under, we will have invested, and I think invested is an important word here, we'll have invested about 20 million dollars. That's a lot of money. That's why investment is important. If was an expenditure, we would be nuts, because an expenditure is typically something that we think of that may not last that long. We are investing in our data, we are investing in the ability of people to do their jobs, we are hopefully setting ourselves up so that we can create an environment that's going to last a long, long time, and will be flexible and be able to get changed over time.

The investment part of this, I think, is real important. It's a matter of perspective. 20 million dollars is a lot of money and **it** means that somebody out there is not getting some transportation facility that they need. So we have to be very careful that what we develop is developed to actually leverage what we spend on pavements or bridge, that we are making the right decision, at the right time, with the right treatments, and we need better data to do that. We need more sophisticated ways of looking at how those decisions are made, and that's what we're doing. So its an investment in our ability to make the right decision. 20 million dollars ti a lot of money.

[Commentary from ????]
Let me place in perspective in relationship to Pennsylvania though, that amount of money. Dr. Tom Larsen who is a former Federal Highway Administrator last week made the comment that there one 350 mile long segment of roadway in Pennsylvania that because of poor truck weight data, was under designed and the annual cost to maintain that roadway, only 350 miles of their system, is 150 million dollars each year. So you talk about 20 million dollars for the state of Michigan to put into place a state-of-the-art technology to make information out of the data that are collected, seems high but not when you compare it with the cost of not collecting quality traffic data. As Rubin said, if you just focus on the pavement, and you totally set aside the public concern for safety, public concern for air quality and the importance of the data for those other applications, you still have an enormous return on investment. So for what it's worth in Pennsylvania, there's a very compelling story to tell that would support the development of a system such as Michigan.

Are there other questions?

I'd like to know how you persuaded the structure, "powers that be" to spend the 20 million

dollars. We, in Connecticut., right now have completed a strategic plan for traffic records. We've included state police, motor vehicle, other agencies and ours tries to cover more than just traffic, or traffic data. We're getting into accident data, inventory data so on and so forth. The transportation portion is estimated for us to be about 2.4 million. And very time we mention 2.4 million people look at us like, you know, we must have something wrong with us. So, I'd like to know what your process was to go through and persuade those that you needed to persuade.

I'm not sure there was a process. Gloria Jeff, who was originally scheduled to be here, was one of the leaders in the department for advocating this kind of change. Much of the impetus for the change came from the top. Our top executives, knew we were going to have to get off the mainframe, they knew they were facing a lot of retirements, and they looked around and looked at the department as the department, and the legislation. From where I sit, the legislation just was another straw, that the ISTEA legislation was an opportunity to go forward and redesign the department and the way it did business the way they thought it should be done. So, it wasn't a ground-up kind of effort, it was very much top-down executive leadership on this one. I'm amazed, frankly.

So am I. It's amazing. One other thing, was most of this work done with outside vendors? Or within the department?

The technical work has been done by vendors. The process that is being used requires very heavy user involvement. For each of the subsystems, if you will, there's a team. And the person leading that team has a clear charge to make, for example, the pavement management system, what the pavement management system should be. If they don't get that, it's their fault. So there's a lot of user responsibility, a lot of user involvement. And at this point, users have a lot at stake.

Do you have any project reports describing the process that you went through?

We have very extensive design documents, which you probably won't want to read. I don't know if I have what you might be interested in--why don't we talk afterwards.

[Dave]
I saw one more question of Tony Esteve. And part of the answer to the question about how it succeeded was partnership between state andfederal government. And I know that Tony Estave, who's gonna ask the last question of this morning, in fact worked very closely with Gloria to deal with the data integrity issues and to help lead to the process, so in addition to talking with Ron, you may want to speak with Tony as well who saw the federal perspective of how federal government supported the state's decision. Tony.

Ron, this question relates to the cost savings that are also achieved by the development of your system. For example, converting from mainframe to micro computer has a tremendous benefit. Maintaining a mainframe operation must also be very expensive. I know from our experience at federal highway when we converted the traffic encounter

processing system from a mainframe to a micro, we realized tremendous benefit not just in cost by in timely of information. Would you comment on that please?

PC's can be very fast. Development can occur quickly. If you read the trades on client-server, client-server initially appears to be less expensive but the development costs and development hits are very high.

I think we need to look at costs savings from two perspectives: one of them is the cost for the hardware, and the software, and those sorts considerations. The other is how you look at the effectiveness of the answers that we get out. I think the jury is still out on whether or not we're really going to save money on computing, but I thii the effectiveness is going to be considerably higher.

I think if we manage our resources and as we make the move to a different environment this will allow us to redesign our business so that it's what we want it to be.

Most of our worlds were built incrementally. We have a system here, a system there, a system some place else. I believe that it's going to be, in the long term, much cheaper to use a PC based or PC oriented system in client-server environment. They're much more scalable, they're more adaptable, you can do more with them and they're easier to update. MDOT did not do in-depth comparative cost-savings, but we saw that moving to PC's as a way of actually radically changing our environment.

I'm not sure I really answered your question Tony, but PCS are faster. They're faster to develop with, there are a lot more utilities, and I think if your states aren't doing it now, within five years you will probably be looking very seriously at dumping your mainframe, or at least radically changing its function, and moving into this new environment.

GENERAL SESSION II - SELECTED TOPICS

Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9, 1996

OVERVIEW OF TRAFFIC DATA COLLECTION AND USE IN MEXICO

Jose San Martin
National Toll Road Commission

Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9,1996

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NEW MEXICO'S TRAFFIC MONITORING STANDARDS

Chris Blewett
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Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9, 1996

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THE DEVELOPMENT AND APPLICATION OF THE NEW MEXICO STATE TRAFFIC MONITORING STANDARDS

CHRIS BLEWETT

BERNALILLO COUNTY PUBLIC WORKS DIVISION

Research activities conducted by the New Mexico State Highway & Transportation Department in 1986 revealed that substantive analysis of transportation related issues could not be vigorously pursued until standards were developed for the collection and summarization of traffic monitoring data. This presentation focuses on the process that lead to development and acceptance of trafiic monitoring standards in the State of New Mexico including the formation of the State Traffic Monitoring Standards Committee, the process utilized to generate and institutionalize the initial set of standards and subsequent efforts related to the maintenance and modification standards. In addition, a brief review of how these standards were actually applied within the State's largest MPO will be provided. This portion of the presentation will focus on the resources required to implement the standards, and the profound changes that occurred as a result of the standards related to the collection, analysis and utilization of traffic monitoring data.

FUTURE DIRECTION OF LTPP

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Presented at
National Traffic Data Acquisition Conference
Albuquerque, New Mexico

May 5-9, 1996

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