

## KEYNOTE LUNCHEON PRESENTATION

Presented at  
National Traffic Data Acquisition Conference  
Albuquerque, New Mexico

May 5-9, 1996

THE ROLE OF TRAFFIC MONITORING WITHIN A SYSTEMS APPROACH TO  
THE FUTURE OF TRANSPORTATION

Transcript of Presentation

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Good afternoon. It is a pleasure to be here. I particularly wanted to have an opportunity to speak with this audience. I am going to share a little of my background. I am going to talk to you today about a buzz word that *I am* sure none of you want to hear -- *a paradigm shift*. *So we will* get through that, and then we will get on with the luncheon presentation. I want you to have a sense that I know the business that some of you are in.

I started my public service career at the Chicago Area Transportation Study (CATS). One of my colleagues, Ed Christopher, is here. One of the things that we did for the agencies in the Chicago Metropolitan area was to collect a lot of data, whether it was on clipboard counts, which I have done on State Street or various kinds of volume counts with all kinds of data collecting equipment. I went from there to the Port Authority of New York and New Jersey, where again, I supervised the unit that performed all of the counting work and all of the data collecting work, not only for the surface transportation -- the tunnels and the Port Authority bus terminals -- but also for the aviation work as well. From there, I went to New Jersey DOT where, once again I had the same unit under me. It was the bane of my existence to figure out how we were going to keep the tubes in good repair. Does anyone relate to this and how we were going to keep the electrical equipment in good repair? This was a *major* problem amongst all the other things, that I was dealing with --just how to keep the stuff in good repair.

I am not the best lunch time speaker ever invited to speak to a lunch time crowd. I am far more comfortable in a technical presentation; so I am not going to have any wonderful jokes. I would probably forget the punch lines anyway.

I do want to talk to you about something fairly serious, that is looking at the data collecting work that you are engaged in from a different perspective. And that is really *all* a paradigm shift is.

I had an opportunity to read "*Popular Mechanics*." I do not ordinarily read "*Popular Mechanics*," but it was assigned to me as required reading by my husband on the plane, because it had a 100-year history of the automobile. He said, "With the business you are in, you really ought to read this." And it was good. I particularly liked the earlier text where they described the turn of the century . . . People beginning to come out of the horse-and-buggy age. I guess that is the only way you can say that -- the *inventing part* of the automobile, and then the *using part* of the automobile. Those first 20-30 years in this century were a time, I believe, that we are going through again -- of *great change*, and *great* upheaval. The business you thought you were in was not the business that you ended up in, and if you were smart, you did not want to go under. Nowhere was that more true than in the automobile industry. Folks who conceived themselves as

being in the horse-and-buggy business, either the manufacture of buggies or the maintenance of horses, essentially went under. Folks who conceived themselves as being in the bicycle business, which was at the time conceived to take over the transportation business, *also* went under, if that was all they thought that they were in. *But* automobiles came out of a combination of a few forward-sighted individuals in the buggy business and a few forward sighted individuals in the bicycle manufacturing business who began to apply the concept of motorized transportation and went with the flow of the industrialization of the United States. Today, we are so much in the same position -- moving into an information era in our own transportation business. I think we have an obligation to begin asking ourselves: "What business am I *really* in?" So, that is the question I would like to begin with today . . .

Now, I think that somewhere here I have a helper, Gary Maring, who got me into this in the first place. Going back to my days in New Jersey -- or my days at the Port Authority -- this is the way I conceived the unit that we had: we had a data collection unit, and it would bring in information from accident reports which were always troublesome; and from weigh-in-motion, fi-om tubes -- sometimes we did clipboard counts -- we used a variety of sources for getting information on the *system* that we were working on. And then we would weigh it so that statistically, it would represent *some* relationship to reality and have it in a database that hopefully was accessible to a variety of other people. And the variety of other people were used to calibrate the models, the planning models. It was used over in our design department to answer questions from: "Do we need a new and a different configuration in the intersection?" to "Do we need to have two more lanes in a road, and if so, how are we going to design it?" This is why we got into axle loads and of *course*, something we were always late on it seemed, the HPMS Report, which I am sure many of you know and love. I have no more comments on that. So, data collected had variety of uses.

The *use* of these data units, I think, have been incredibly valuable to the transportation industry, or at least the public transportation industry. I think that answering the questions "How did it work? How is it going out there?" has worked very well as long as the decisions and the business that we defined ourselves in was primarily the capital business, where decisions have a 10-to-20 year life cycle. However, I think our situation is changing in a number of dimensions. And that is what I would like to seed with your own thinking today. We are in a situation where it is increasingly difficult to widen freeways or to expand our transit systems. I cannot help but point out that we find ourselves in a very similar situation to our sisters in the aviation business. If you think about it (except in Denver, which is a unique situation), there has not been a major airport built in the last 20-25 years, and yet we are landing double the number of physical vehicles or airplanes and "gazillion" more passengers. We have done that without expanding our physical footprint a lot. Think about that. That is the situation we find ourselves in.

So, we have begun to learn a little bit about the situation. One of the things we have learned is that about 1/3-to-1/2 of our urban peak-hour capacity is being chewed up by somebody's flat tire, or somebody running out of gas, or an accident. And we have learned that *if we* can get real time information so that we can respond *instantly*, we can recapture about two thirds of that capacity. That is a lot cheaper than \$30-40 million a mile for urban freeways. But this *means* having an *enormous* surveillance capability.

We have also started to understand that while traffic signals were good (we started with those in the 1920's), that maybe even *synchronized* traffic signals were better. If we were able to adjust the green time in accordance with the actual pattern of demand that we were experiencing, not only at that intersection, but also areawide, we could increase the effective capacity of the section of that arterial by 10-20 percent. In an E-level of service condition, a small percentage can bring us back to a free-flow condition, so again, it was not rocket science that we began to go into this direction, *but* it required real-time information on not only what the volume was at particular intersections, but what was going on in all the other intersections around. One was going to effect the other. All of a sudden we were needing information, not just once a month, as our design department tended to need, but much more frequently, like once a minute. So it was a whole different way of looking at things.

Today we have another situation that is changing. There has been a new appetite for the information that we are collecting. The public is beginning to demand traffic data in the same way that they demand weather data -- every morning and every night on radio and television. Now, that does not mean that we are anywhere near the level and accuracy and prediction that we now report weather information. We are at the 1950's level in this respect. But the *appetite* for that data and the competitiveness among the various media to be more and more accurate is a growing phenomenon. Metro traffic has become National *operations* and smart routes have gone even further in supplying some of their own surveillance equipment. Indeed, in Cincinnati, they have actually agreed to run the traffic operations center and bear the cost of that for a fee back to all of the agencies *which* they will then discount up to zero if repackaging and reselling the data works. So it becomes a benefit from a number of dimensions to the public agencies. That is another sort of compartment we can set up to the side. A part of our world is changing again. Let's go on to another one . . .

Over in planning, we are getting increasingly accountable for the way we spend our money. We are talking in terms of setting targets and communicating with those people who give us, or do not give us, money. We are beginning to communicate a relationship between performance and level of investment. Well, that is a link that I know all of us have struggled to make. It is becoming increasingly important that we have data that links dollars and performance and strategy to achieve that performance, so we are using the most cost-effective strategies. That became reinforced with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 when there was a mandate for the various management systems, particularly the congestion management system to create a complete web between performance goals, performance, and strategies we were going to pursue. I think that will still be a force, in spite of the reduction in urgency to have the management systems. At that point we became interested not just in the vehicle counts, but also in the people flows and data that would help us actually link back to the money, and link to and make distinctions between the strategies that we were pursuing. So, we will set that aside.

Now, all the while, as we have had this changing situation, we have been going through State governments. I am looking to see if there is somebody here from New Jersey. Hopefully you will

validate the statement that when I was there, we went through two downsizings. I understand that we have gone through, at least in my old home State, yet another one. And when I was there, and we went through these downsizings, who do you think they hit? It was not a big mystery -- more than proportionally -- they hit the data collecting unit. I think we had to cut our data collectors in half, which was very difficult to do. And the money that we were spending to maintain the equipment went down proportionally. The point I want to make is that we have two things going on. We have got a real increase in our appetite for information; at the same time, we have got real monetary pressures that I think have been disproportionately filled in our data collecting bureaus. Who is going to know if you did not go out and get that volume count, or if you used a volume count or if you used a volume count of two, four or five-years ago, or in our case, sometimes ten years ago. Who was going to know if you did not fill a pothole? That is an easy political decision to make. There is something wrong with this picture, and that is the distorted nature of the situation in the way we are doing business today.

All the while, this has been going on. . . yet another phenomenon of ITS. There is some guy that is working on it. We think of it as "Star Wars," thinking we will never have to deal with it. And, other people are really excited about it. But, I dare say, that it is thought of with a different perspective than people tend to think of the data collection that you and I know and love. Let me carry this just a little bit further. We have set a National goal -- something like an interstate goal - - to achieve over the next decade: to implement the intelligent transportation infrastructure across the United States to improve safety and the quality of lives and save time for all Americans. Undoubtedly, that raises a lot of questions. But what you might be surprised to know is this mysterious Intelligent Transportation Infrastructure (ITI) is something that we have been working with in most of our communities - lie in Albuquerque, for example, or in our State Departments of Transportation, or in other County agencies, for quite awhile. It involves advance traffic control systems. There are already many traffic control systems in most of our major metropolitan areas.

I do not know if you have traffic management systems in Albuquerque particularly, but I could point to Denver, the Twin Cities, or Seattle. Sixteen or seventeen major metropolitan areas have automatic vehicle location (AVL) which is a major breakthrough in the way the productivity of and the way these systems are managed. That approximately is yielding 20/25 percent improvement in productivity and saving hundreds of thousands of dollars a year. It is also freeway management, whether that is ramp metering or the HOV control, which is logged back into a traffic operations center. Or it is the incident management that brings in the emergency response, communicates it either over HAR's or signal systems. Every one of these things involve some kind of surveillance or electronic toll collection. As I recall, in my years in the West, there are not a lot of toll roads out here. But, in the East, and now growing in California, there are a lot of toll roads. We are getting more market penetration of cars that are going down the highways with tags in their windshields, that just fly by toll booths. They get a bill similar to a telephone bill in their mail or payments are actually deducted as a debit card. It is not just any one of these individual things, a traffic signal or a freeway management system; it is all of these systems linked in an information and communication system. The key is to begin to understand that there is more to a traffic signal system; there is more to a transit management system than just

that individual function. What we are doing is not unlike what our sisters in aviation have done -- they have managed to achieve double the amount of vehicles or airplanes that they are landing by pushing the envelope of technology, of creating a web of information between the pilot, the vehicle, and the space that he is occupying in the system. By linking these systems together, we can do the same thing.

Now I want to bring it back to that *paradigm* shift. If we begin to link some of these operations, that are fairly common to all of us, what do we find? We find that if we have even a market penetration of 20 percent of the vehicles in a metropolitan area with these little tags in their windshield, we suddenly have a complete system for a minimum surveillance of speed. We can get *more* information, but that makes it quite a bit less expensive to get a complete network surveillance in real time. We can dispatch faster; we can substantially reduce the emergency response time. But there is one other thing that we can do. All of sudden we have a less *expensive* way for collected information to come back into the design and the planning unit. If we think in those terms, we consider the needs of planning and design in the same terms that is growing up in the operating side of the units that we are in.

So that is the shift that I would like to plant in your heads today. Are we in the business of clipboard counting, or tube counting, or weigh-in-motion counting? Or, are we in the business of information management and the provision of information not only for the operation of a system, but also the design of operating that system, and the planning for the design of operating that system? Again I ask the question: "Were you in the transportation business or were you in the buggy whip business?" I think that is the *transition* that you who are in this room, are in today, and what I would like to leave with you is the challenge -- if you are not talking with the people who are installing these kinds of equipment in other parts of your organizations, I hope you *will* be when you go home.

There are two or three things that you can do without spending any money that will bring you into the loop and begin this communications and information infrastructure that we are talking about. You can begin asking the question by looking at your transportation improvement programs and say: "Ah hah, I see bus radios being purchased over here, and I see that they are buying call boxes and changeable message signs over here, and I see somebody is going to invest in a traffic operations center over there." Has anyone asked the question, "Can all of these things talk to each other? Whether they have a common geographic referencing point? Whether data can flow from one agency to another with a common protocol?" If not, if no one else is doing it in your region, be the catalyst to bring people around the table.

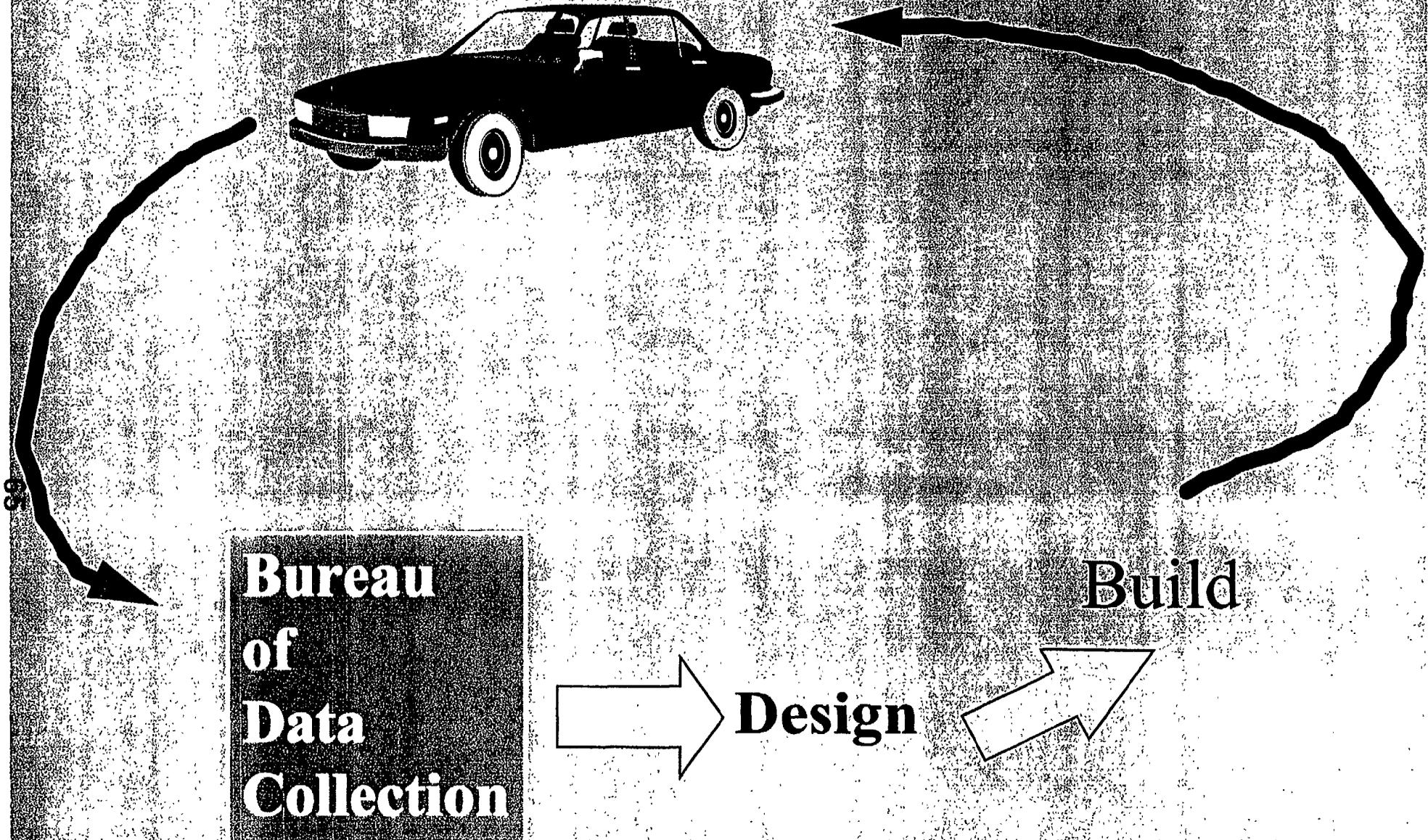
People generally do not *want to be uncooperative*. It is just easier to go about their thing than to worry about everyone else. If you get beyond that point, begin to ask questions: "What kind of communications backbone are we worrying about?" and, "Does it include the kind of planning and design needs that we have, as well as the day-to-day operations that other people are worrying about?" I bring that up second because we are starting to see the first fruits of the telecommunications act. Within the next two or three years many [partnering] agencies, whether transit with right-of-way or highway with right-of-way, or city with right-of-way, these will be hot

properties. But, during this period of time, there is a great deal of bartering that can go on; we can acquire some of the communications network we need for virtually no money. We may have to exchange some things for it, but there are trades and deals to be made if you will perk your ears up and begin to say, “Can we work this together?” Or, “Can we consider it an information system not just a signal system?”

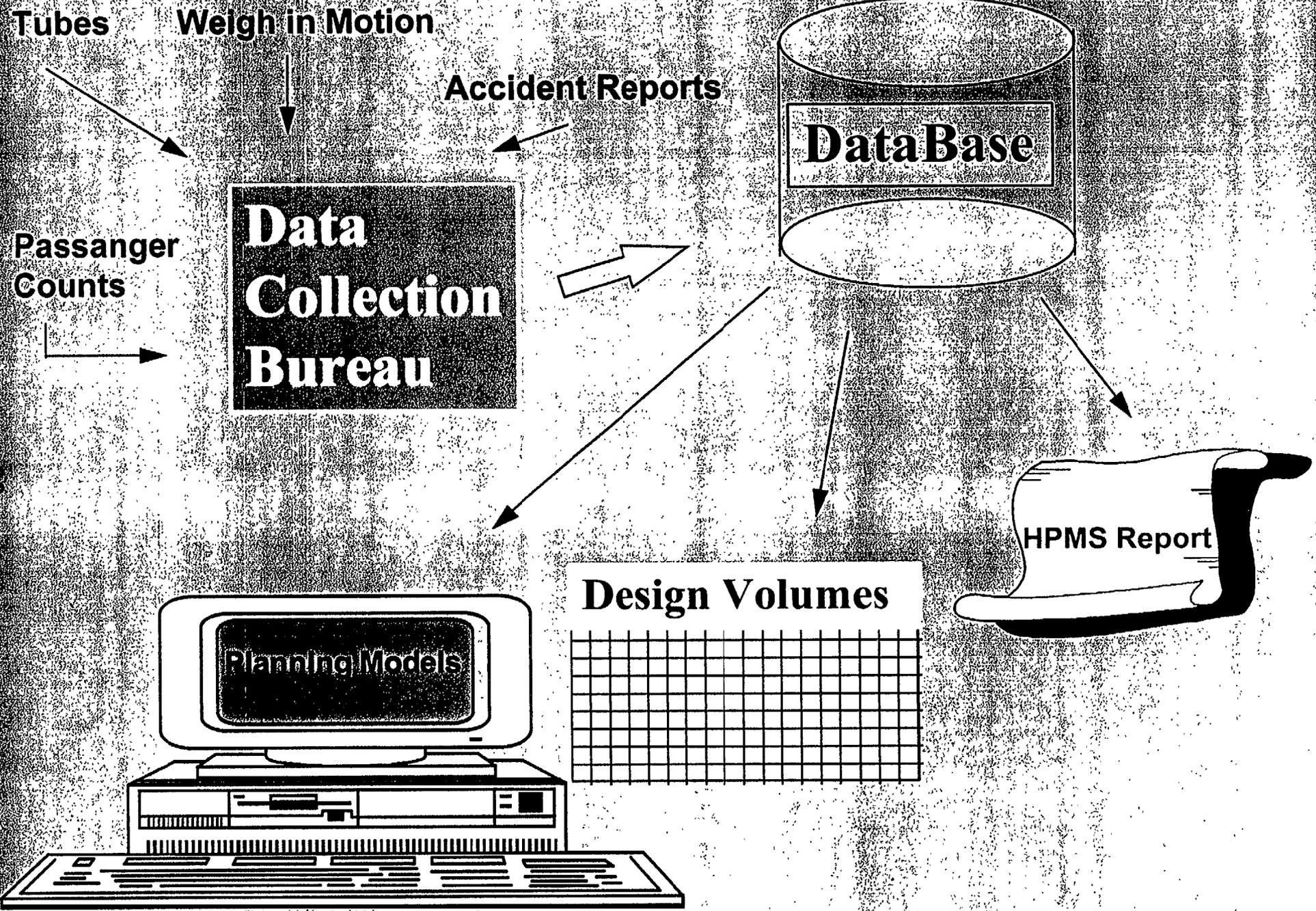
With that, I would like to thank you for this opportunity, and hopefully I have given you something to go home and think about.

# **The Role of Traffic Monitoring within a Systems approach to the Future of Transportation**

**Presentation by: Dr. Christine Johnson**  
**Where: NATDAC conference**  
**When: May 6, 1996**



**Data Collection Closed the Feedback Loop**



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# Our Situation is Changing

Reporting Traffic Data on Morning  
and Evening News -- like the Weather

**Meanwhile .....**

**Downsizing State Governments**

**Reducing Outlays for Maintenance**

# Our Situation is Changing

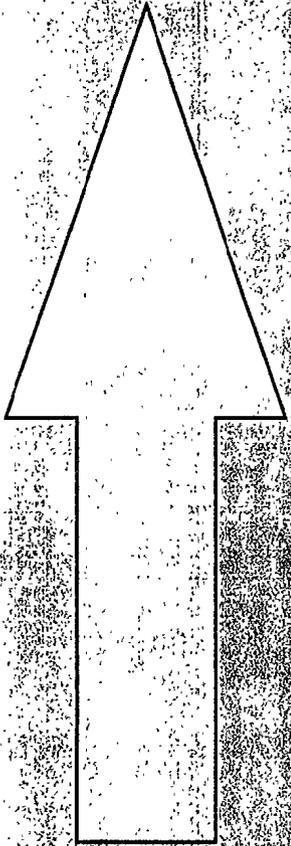
Real time traffic and Freeway Management

# **Our Situation is Changing**

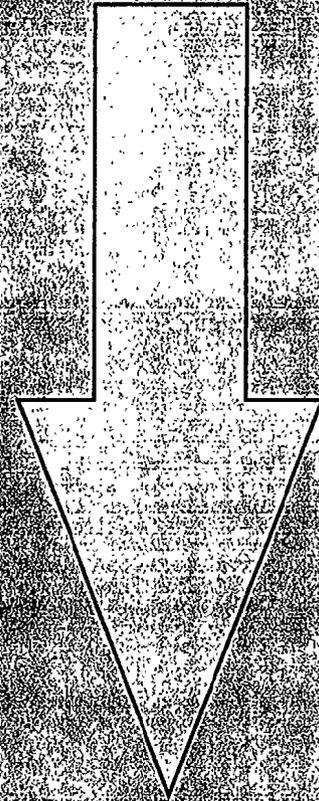
**Performance Planning**

**With Management Systems**

# Something is Wrong with this Picture



**Information  
Appetite**



**Investment in  
Data Collection**