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VEHICLE DETECTOR TEST CENTER STATUS

Ralph Gillmann
Federal Highway Administration

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By ***vehicle detector*** **is meant an automatic device for sensing the presence, speed, type, weight, etc. of a vehicle on a roadway. Whether vehicle detection equipment is used for traffic monitoring, surveillance, or control, the technologies are the same. With the advent of intelligent transportation systems such as Advanced Traveler Information Systems, Advanced Traffic Management Systems, and systems to improve Commercial Vehicle Operations, many kinds of vehicle detectors are being installed.**

Testing vehicle detectors is an expensive and time-consuming task that is necessary in order to make wise purchasing decisions. New non-intrusive, off-road detectors are coming to market which are unfamiliar to purchasers. When transportation agencies make investments in vehicle detectors, they must know not only that the technology has been tested, but the particular products under consideration have been adequately tested. Users interested in determining the adequacy of a device prior to purchase must often conduct their own product testing, investing a great deal of time and money.

The variety of technologies and the changes in succeeding versions of each application place a significant burden on the ability to carry out testing in a cost-effective manner. The time and expense for each transportation agency to do their own testing is clearly wasteful and inefficient. However, the lack of standard test protocols for vehicle detectors makes it difficult to avoid duplicative testing.

To address these problems FHWA funded a study through New Mexico State University to evaluate the potential feasibility, development and operation of a National Vehicle Detector Test Center. Market research from the study found that both vendors and users acknowledged the need for standardization and certification of equipment, and generally supported the concept of the test center. The report *National Vehicle Detector Test Center for Traffic Monitoring, Surveillance, and Control Devices* was completed in March, 1995.

A pooled-fund project, SPR-2(181), was approved for the purpose of establishing such a vehicle test center. Twenty-one States have made commitments to this project: California, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Massachusetts, Montana, Nebraska, Nevada, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas. However, sufficient funding to set up and maintain a test center has not been forthcoming. Even if funds were available, the test center would still be faced with a lack of standard test protocols that would be acceptable to all.' Accordingly, it has been decided that, as an interim step, a Vehicle Detector Clearinghouse should be established.

The mission of the clearinghouse is to provide information to transportation agencies on the capabilities of commercially-available vehicle detectors by gathering, organizing, and sharing information -- especially product test results -- in a timely, efficient, and cost-effective manner. The clearinghouse will also be a catalyst for developing standard test protocols so that no matter who performed the tests, the results would be widely accepmble.

The clearinghouse will be set up in I996 and managed by the Southwest Technology Development Institute of the New Mexico State University. They will be conducting surveys and starting a newsletter and web page soon to facilitate the exchange of information on vehicle detectors. To contact the clearinghouse, call Dr. Rudi Schoenmackers at 505-646-2639.

TESTING MANUAL FOR TESTING VEHICLE DETECTOR, TRAFFIC SURVEILLANCE, AND CONTROL DEVICES

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PRESENTATION FOR NATDAC '96

by
John Hamrick
Rudi Schoenmackers

A business plan for a National Test Center for Vehicle Detection Devices has been completed, and a testing plan is in draft form. The importance of a National Test Center cannot be overemphasized. Currently each State will Test vehicle detectors before purchasing it, and test the equipment again after delivery to determine its proper operation. Vendors have a large inventory of data recorders loaned to the various States that want to test their equipment. This represents a substantial duplication of effort, resources, and money being used by states and vendors. With the shortage of funds and available resources, a National Test Center will be a cost-effective resource to all states as well as vendors.

The mission of the National Vehicle Detector Test Center (NVDTC) is to:

- Consolidate and reduce the costs of testing vehicle detectors and recorders for its members, including states, city and county governments, and vendors,
- Influence the quality and reliability of future detection and recording devices,
- Promote communication and standardization within the vehicle detection industry, and
- Provide technical support regarding device operation and other issues

The NVDTC will allow the members requesting testing to choose from three basic testing services:

- Pre-qualification - Test manufacturer's devices against their own specifications; provide a company report as a potential vendor/bid list to members.
- Quality Control - Test a sample of member's recently purchased devices; assure its performance against the member's specification and verify manufacturing quality control.
- Verification - Test older equipment for the members to assure its continued accuracy and to determine the device maintenance and replacement history.

Each of the above classes of testing will include up *to* three types of tests:

1. Bench test - to be completed in the laboratory shop
2. Simulation test - to be completed in the shop and laboratory
3. Field test - to be completed at a field site where various types of sensors are installed

The testing manual under development will provide an outline of the initial testing procedures to be utilized by the proposed test center. The plan may be used as a draft for the future creation of a set of national testing standards for the vehicle detection industry by organizations such as ASTM, AASHTO, ITS and other standard making organizations.

The overall objectives of the NVDTC testing program and this plan are to:

- Conduct fair, reproducible, and accurate tests
- Report accurate unbiased results to its supporters
- Maintain the confidentiality of proprietary information and product design
- Minimize the inconvenience, liability and expense of such testing.

This testing plan will initially address the testing procedures of commercially available vehicle recorders, classifiers, and sensors. After the creation of the NVDTC , it will be expanded to include Weigh-in-Motion (WIM) equipment and more recent state of the art technologies.

The NVDTC plans to integrate or work in conjunction with any existing standards or evaluation procedures. Currently applicable sources of testing standards include the Traffic Monitoring Guide, AASHTO Guidelines for Traffic Data Programs, ASTM Standard Guideline for Traffic Monitoring and ITS.

When testing standards and procedures are not available, the NVDTC will verify equipment performance against vendor specifications. Testing may also evaluate those requirements specifically requested by the NVDTC member seeking testing, and those developed by the NVDTC through its Advisory Board and/or its prior testing experience. The testing guide will be continually updated to add suggestions and recommendations of states and vendors, and to correspond with any national standards that may have been developed.

The facilities for simulation tests will house equipment to emulate sensors and equipment in different climatic conditions. The climate chambers will include the capability to simulate temperature extremes and wet/dry conditions. Simulation of multiple loop inputs to simulate axle hits for single and dual tires and other configurations will be required. The test chambers should be large enough to allow many devices to be tested simultaneously.

The field test site will be on an Interstate or roadway with a variety of vehicles. The site will have an Annual Average Daily Traffic (AADT) greater than 5,000 vehicles with 20% or more of those being two axle dual tired vehicles (1.5 tons) and heavier trucks. In addition, 50% of those trucks should be multi-axle types pulling trailers. The test site should be easily accessible and include a road side cabinet at least the size of a model 'P' traffic signal control cabinet with telephone jacks, AC power and a circulation fan.

It would be ideal to have a test rack and test vehicle in addition to the field test site. The installation of the variety of axle and vehicle sensors required for testing would be much safer. The test vehicle would include a 2-axle single unit truck (2D) and a 3-axle tractor pulling a Z-axle semi-trailer for ease of changing the load.

Several questions need to be addressed prior to testing each device. It is important to determine a device category, the appropriate test procedures and types of expected results. Following are the questions the test person will consider when deciding which test procedure to administer:

- What is being measured? (volume, vehicle classification, weight, speed, number of axles, date and time stamps, etc.)
- What are the measurement criteria? (accuracy, precision, validity, reliability, or repeatability)
- How are the measurements accomplished? (device methods and operational definitions)

Data recorded from different combinations of instrumentation provide different answers. One example is a volume recorder using inductive loops. It does not provide the same results as the volume recorder using road tube, as only the road tube requires an axle correction factor.

As the devices and/or sensors are received they will be categorized by function along with a description of expected results. Some models have more than one function, and therefore will be categorized more than once.

An example of device category is a traffic volume recorder using a single road tube axle sensor, recording the number of axle hits; and requiring an axle correction factor to calculate vehicle volumes. A traffic volume recorder using two road tube axle sensors does not require an axle correction factor and with some models can also classify vehicles by axle and speed groups and by different time intervals. This unit would be categorized under three different categories, i.e. volume, classification, and speed.

Vehicle and axle sensors would be categorized as follows:

- Topical mounted (on the surface of the roadway, portable type of sensors) such as road tubes, piezo-eiectric, tape switches and portable vehicle loop.

- Surface installation (installed flat in the. surface of the roadway) such as piezo-electric.
- Below the surface installation (installed below the surface of the roadway) such as vehicle loop and piezo-electric sensors.
- Pole mounted such as video, laser, and acoustical.

Once the device or sensor has bee categorized, it will progress through a general series of procedures. An example of a preliminary test would include:

- unpacking, and inspecting the device for damage due to shipping
- review manuals for accuracy, ease of use, completeness
- record the serial number to maintain the record of each test conducted with the device
- following the setup and installation procedures in accordance with the manual, turn the device on and check the battery level
- check the status of the device. Can you input site, location, type of sensor before being used, etc? Note the ease and intuitiveness of the software program.

The following is an example of the bench test procedure:

- set the device to monitor and attach it to an initial bench test apparatus and test the unit for one hour at ten minute intervals
- for a road tube recorder, are the air switches responding to pressure input from a puff ball?
- for piezo inputs, is the unit responding to inputs from an automatic pressure simulator?
- evaluate the device data storage and data retrieval system
- did the unit create the proper files and its associated information?
- were the files easily transferred to a computer file?

Following the bench test, the device and testing apparatus is place in an environmental chamber and cycled slowly from one extreme to another to test at each of the extremes. The unit is tested for an extended time at ten minute intervals, verifying its accuracy.

During a field test of a device its accuracy between channels is checked by attaching the sensors in the same lane and identifying each sensor input as a channel. After setting the device to record volumes only, data is collected at 10 minute intervals for one hour. For a properly functioning device there should be no difference between channels.

For a visual comparison check, the device is connected to the field test site sensors and set to record vehicle volumes, speed, and length classification. The video equipment is prepared by synchronizing the clocks between the video camera and the traffic recording device. The video is then recorded for a manual visual verification of the traffic flow. The unit is tested for four hours with the recorders set for ten minute intervals. Additional

field testing involves checking the modem or transfer procedure by downloading the data files for further analysis and comparison with the manually collected data.

After the tests have been completed, the results are entered into a data base by device number or sensor number for archiving and long term performance evaluation.

Standardization and sharing of testing resources and results is vital to the vehicle detection industry. With the reduction of resources and funds each State is currently facing, any duplication of efforts in vehicle detector testing and device evaluation needs to be minimized. The National Vehicle Detector Test Center is vital in accomplishing that task.

DISCUSSION OF RESEARCH NEEDS

David Huft
South Dakota Department of Transportation

Presented at
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DISCUSSION OF RESEARCH NEEDS

David Huft
South Dakota Department of Transportation
and
Chairman of the TRB Traffic Monitoring Committee

NATDAC '96 "HOT TOPICS

Technology Concerns

- Fidelity of measurements to truth
- Reliability in daily field operation
- Flexibility to meet specific agency needs
- Lag between State of Art and State of Practice

Information Management

- The need to begin managing information closer to the point of measurement
- The need for methods to assure data quality from beginning to end
- The desire to devote less time to information system maintenance and more time to analysis

Information Integration

- Information management should extend seamlessly across individual systems
- Information should be shared and integrated among jurisdictions
- Data collected for traffic operations should be used for traffic monitoring

Analysis & Presentation

- Better methods are needed for systematic description of temporal and spatial variability in data
- The sensitivity of various analysis techniques to variability in source data needs to be more completely determined
- Source data must be appropriate to the analysis which is applied to it; this can be difficult if the end users of data are unfamiliar with how the data was collected and what it means
- Methods are needed to facilitate meaningful analysis and presentation of large data volumes

Performance Measures

- Interest in developing transportation system performance measures is keen
- Performance measures are needed to assess the effectiveness of traffic monitoring processes themselves

Rudi Schoenmackers: The rapid development and innovation in sensors and systems demands better test methods. For this reason there is a real need for a national test center.

Frank Jarema: There is a strong need to close the gap between the state of the art and the state of practice. However, part of the reason for the gap is the rapid advance of the state of the art. In this respect, the gap is not all bad.

Lou Whitely: It's true that traffic operations, especially for Intelligent Transportation Systems, and traffic monitoring have taken separate paths so far. For the sake of efficiency and quality, they should be integrated.

Barbara Ostrom: I'd like to address a topic that covers both the technology that we are currently using and will be available in the near future, and the analysis particularly for weight and classification. A lot of the datasets that I am seeing in LTPP, you have to strip about 20-25 percent of the information as being irrational, and nobody seems to be looking at what we can say about the errors. What conditions do they indicate of the data that we have to strip from people who don't understand traffic. What can we tell them about how we have biased the results that we presented. Are our errors random? Are the errors showing up in longer vehicles? Are they ending up in shorter vehicles? And I don't see anybody looking at that data to figure out what we can do to account for its impact on various types of performance measures and analyses.

David Huft: Do you feel that it is a problem of the people who are supplying the data not having sufficient time to look at it or is it a problem of lack of understanding of what to look for?

Barbara Ostrom: I think in large part we're generating such large volumes of data that you really can't go in unless you've got some kind of a software package that looks for axles that weigh nothing. I've got some states with datasets for every other vehicle that has at least one axle with a zero weight. You don't necessarily have the time to think about all the things that could possibly **be** wrong until you see it for the first time. And absent knowing all the possible ways the equipment can tell you something that isn't quite **rational, you** have no way to check some of these datasets. I've been continually surprised going through some of the datasets about the things that the equipment doesn't account for, or that the QC programs that are available to me have not thought were possible.

He asked me not just to make a comment about the Traffic Data Editing project that Minnesota has the lead on, but for coming up with ways of editing vehicle class and weight data in particular. The datasets are so huge, and the problems can be very subtle; that's an enormous problem. Perry Kent used to say he created a monster — that wasn't just Perry, but certainly now that we're getting all these datasets, what are we going to do with them, and how are we going to separate the chaff fi-om the wheat? It's an immediate need. And then, again, there is the problem of educating the users who just want a number, or who are going to take these datasets and play around with them without realiig the weaknesses. It's a tough problem.

David Huft: Go ahead, John.

John Hamrick: In relation to data editing and processing that you're talking about, a lot of times the equipment that we use aggregates the data too soon before we can look at it. And a lot of the information that tells us whether that's a good vehicle or not a good vehicle has been lost. I think that's something that creates an awful lot of data to work with, but there is software and faster computers that are coming out on the market right now. These are really the issues that were difficult to address when memory and handling large datasets were problems. But the technology and the electronic equipment that's available now provides us with access to data differently than what we've had in the past. I think that sometimes we lose a lot of information about that characteristic of that vehicle when we aggregate it too soon. I know that in Idaho, we've looked at data, down to that basic element that we can get. We've found that, just as an example, with the trucks and trailers being split up you have four axle 32 thousand pound Volkswagens going down following a track-following a three axle vehicle. You don't know how much that is until you start summarizing your data, and you start seeing that the number becomes pretty hefty. That can be corrected. That can be dealt with, but it has to be seen and viewed first. So I agree with you with what you're talking about.

Allan Heckman, Missouri Highway and Transportation Department: I want to speak about LTPP data. It is such a mass of data. We have eighteen continuous sites, and we don't have the resources to go through and check that data. The data we submit to SHRP is exactly the data that comes in, and we submit that. Now the data we use as far as for ATR or for volume, we check that, but we just don't have the resources to check the class data and the weight data. We submit that as we collect it. We rely on the QA's from SHRP when they send it back to us. If there's a problem, we will look at the site and try to fix it as far as class and count, but we just want our resources to check that type of data.

David Huft: Is there any way that research products would help you in that respect?

Allan Heckman Were looking at buying the Chaparral system in Santa Fe, and we're going to hope to use that to do our QA checks before we submit it. But now we have no software to do that type of checking, but we are planning to resolve that.

David Huft: Thank you. Yes?

Chris Koniditsiotis, Australian Research Board: Just hearing the comments, I thought it might be appropriate if I offered, not a solution, but an option on what we're doing to solve similar problems in the Weigh-In-Motion area. We have a huge amount of data, just like yourselves. We have observations — individual vehicle observations -which we know are wrong, but the system for some reason says it's correct or it's classified something. We're proposing a research project. We will videotape the worst sites that we have in the country, and build a filtering algorithm where we will try to match what we see on the video screen to what the system tells us as a first filtering system for all the data. In other words, we are very conscious of the fact that there are so many different possibilities of error that you must at least have visual account of them. and we're not offering this as a means of getting 90 or 100 percent of the errors

out, or even 80 or 70 percent, but what we are trying to do is give us better confidence in the data so that we can actually use it.

David Huft: Thank you.

Ralph Gillmann: I can make a comment about that. We sponsored a test of vehicle classification equipment in Georgia, but we also videotaped at the same time. We have several vendor's equipment, and we have the results that came out of that as well as the ground-truth from the video. That's an excellent resource to see what types of errors are made. I've asked Jim Elliot, as part of another contract that he has been working on vehicle classification data and neural networks, to use some of those dataset to suggest some validation criteria. Like I said, what are the characteristic errors that we should be looking for.

Keith Dickinson, Napier University, Scotland: I think that I have a completely different area to discuss. I was wondering about the effects on the human behavior of the massive information that is becoming available. How people cope with it in terms of data management (and information management is a big issue), but whether it actually results in improved performance within the system. I think it's probably most related to the performance measures. I don't have any solutions, but I have the feeling that we may, as a group of engineers and planners, have a view about the information we are producing, and we might have confidence. Unless other people outside this room have this confidence, they might behave in different ways which we are not expecting. And certainly in terms of ITS systems, once you're give the public information then it becomes a massive issue about how they behave, and they don't behave in the way that we assume, I think. Not all the time anyway.

Tony Esteve, Federal Highway Administration: One of the things that we've been doing lately is looking at the quality of vehicle classification and WIM data collected from permanent and continuous counters. We find not only a tremendous error in some categories, but in many cases, we're collecting in certain categories, such small number of vehicles with such tremendous variability as to be worthless from a statistical perspective for any kind of analysis. In many cases, we're collecting zeroes in these categories. We spend a lot of effort, and we look at the number of vehicles in thirteen categories, for example, and find that half of these categories have zeros in them. At the same time, we find a tremendous amount of unknown vehicles, so perhaps we need to reexamine our standards. Perhaps by simplifying those categories, we can reduce the number of unknowns as well as to provide more information that is useful by reducing the variability and by raising the numbers in those categories. For example, in urban areas, it is very diicult to collect thirteen categories. I don't know how many states are attempting that, but perhaps we need to reexamine some of these issues.

Rick Reel, DOT: Ralph Gillmann, this might be more in your area, but I was wondering.. . are you working on something to possibly improve the file formats for data submission? Four card and seven card seem to be a standard. But it's an incomplete standard now that WIM and some of the other types of data are collected. I know it would make my job a lot easier and it would probably help the manufacturers if we could say, here's a-format, and if everybody could produce that format, we could have one set of programs that could process the data.

Ralph Gillmann, FHWA: Well, we did revise the formats because we had to change to metric. At that time, we did some surveys under the auspices of this TRB Committee, and most of the states didn't want to make any major changes. They wanted to stick with the ASCII flat files, and also we did away with the continuation card and so forth. So there is a standard as specified in the Traffic Monitoring Guide. What I find is that the states produce these records often at the end of their processes. They produce it for the federal government, and for their own purposes they have their own formats, and of course, the vendors have their own formats. So, to answer your question, really there is a standard, but does that mean that anybody is going to use it? The question beyond that is if you really want to get into a better format, you really want to get into a binary format, more compressed format for compression purposes. And that raises a lot of issues and , again, as I said, the states told me they want to stick with something very simple and easy like ASCII formats that they could easily deal with.

Rick Reel: I use an ASCII format for everything I do, and then I turn around and generate a card to send you, but it would be a lot simpler if we had something that was one all-encompassing format in the beginning. It would make it easier if the vendors come in and want to sell you a piece of equipment, if they're going to help with a format that's going to fit into your programs. You consider them a lot more favorably.

Ralph Gillmann: I think most of the vendors do support standard TMG formats. Again though, you may want to include other data items such as speed on that record, and we don't include that. So you get into questions about what all you want to put in there. We've gotten away from the static weight data types of fields, but there are a number of different approaches, and it's tough to get everybody to agree on exactly what type of record and what should go in there. The TMG is a format, it's a compromise, and some people use it certainly for their own processes as well.

David Huft: Thank you, Ralph. Frank.

Frank Jarema, Federal Highway Administration: Just another comment, David. The area of information integration is certainly a fertile area. He probably heard yesterday the presentation made of some work done at Georgia Tech, where the City of Atlanta, the Regional Planning Commission, and the DOT are in a sharing arrangement. Certainly in an era of constrained resources this certainly is really important. As an example, at the region-wide level. We're also getting ready to launch a research project regarding the New England states as far as data collection sites. We are analyzing the data there right now and looking at how many sites would be needed to serve that area, as if we erased the state lines rather than each state coming up with a full-blown program. I just mention those two examples, and there are probably other initiatives along those lines. This would certainly introduce a lot of efficiency.

David Huft: Thank you. Alan.

Alan Chachich, MIT: There are two things that occurred to me. I'm not sure how they fit into the list, but I thought I'd mention them. One is that I don't think it's too early **to** start anticipating the impact of privacy issues, especially sitting in the sessions on video monitoring and

license plate recognition. There's a real potential problem there in terms of storing travel time data for a long period of time so you can actually find someone's individual license plate. I was just anticipating the kind of problems we could get into. If other people start to realiie that this data is there, and law enforcement people or, divorce lawyers start going after data like that. It's amusing to think about, but it could result in a backlash. If something like that really takes off, the baby could go out with the bath water, which would then hurt the traffic monitoring community because it would deny them access to the things that they would like to have. They just want the numbers, but then that's sort of an institution problem.

And there are two aspects to that. One is the technology aspect in that you can develop technologies to try to actually side-step some of these issues. And we're doing some of that at MIT for at least travel time measurement. A way to do that uniquely enough to make the measurement, but not uniquely enough to identify that that was O.J.'s white Bronco. And then there's the social aspect of it. As a research topic, it probably wouldn't hurt to try to get somebody thinking about that and anticipating the implications for this community so that they can take the right steps, have the right arguments, and have the right kind of thinking in mind so as not to get blindsided by that if it develops. It's the ITS community that's probably going to trigger it, but it would have an impact here. The other thing has to do with the way vehicles are classified. The axle-based classification is a barrier to a lot of the newer technologies, non-intrusive ones. Again, the technology seems very impressive in what it can do, but in terms of this community being able to capitalize on it-if you have devices, I can give you a very good image of your vehicle, but it doesn't really count axles. Then you're sort of blocking yourself out from those technologies. You might want to think about how to broaden the way to do vehicle classification.

David Huft: I think that something that is very much needed in that area is a classification scheme that's not axle based. I agree with you.. . good suggestions. Thank you. Anyone else? Yes?

Scott Fugit, Idaho Transportation Department: When I look at the hot topics, I can only think of the hottest one which is privatization. I think that I can attest that it's a subject that not a lot of states are quick to deal with, and it presents a lot of problems particularly in the area of contracts' administration, contracts' authoring, etc.

It was standing room only and there were quite a few questions left to be asked. So, I was going to say I was hoping that you could cover that topic.

David Huft: I'll ask a question I asked of someone else earlier. Is there a particular product that you think would be useful, a synthesis of people's experience so far or recommendations?

Scott Fugit: Generally, comments from folks who are addressing the same issue helps. You know, there's a lot of experience in there and, like I say, the session kind of ended quickly, and a lot of people are facing the same questions. Just to communicate would help. As people faced an issue that they hadn't really looked at much before, it was a contributing factor to have the ability

to talk to others about that. So, it smells like politics, and a lot of people don't want to approach it. And the idea is that it's least on the list, and I think warrants discussion.

David Huft: Thank you.

Bruce Littleton, Delaware, DOT: Taking that one step further, and you ask, is there research that you can do and a synthesis, I think it would be interesting if you could come back into the states that have done it and do a cost analysis from the outside. Because repeatedly states have said that they won't talk about it. They won't do the numbers to the nth degree. When you go to contract stuff out, what's the cost of the man's time to write the contract and administer it? Most people don't put that into the equation, because they're told not to. So externally, what you could do is get into the details and actually cost out the program as an outside in several different states and do a report on that so we can stem the tide. I'm not saying that there aren't reasons to privatize. There are many. But to do it blindly just to do it when it may be more cost effective to do it in-house, to me, is a sad state of affairs.

David Huft: Would you suggest doing that early and after a period of experience as well?

Bruce Littleton: Yes.

David Huft: Anyone else? I really appreciate it, and you've had a very good presentation. You made a good presentation. Thank you.

David Alhright: Frank Jarema will now give closing comments from the Federal Highway Administration perspective.

Frank Jarema, FHWA: On behalf of the Federal Highway Administration, I would like to thank you for your participation. It was a most productive conference, and those of you in front of me have certainly made that possible. This week we've heard about many projects which certainly represent a true federal, state, local partnership, and I think that partnership is quite important. To the staffs of the various organizations which represent the Alliance for Transportation Research, I offer a very Sincere thanks. At the same time I would be very **remiss** if1 did not say thanks to David Albright. He has, during the week, thanked many people, but I think we should also thank him for his dedicated effort and support through these many months. So, please join me in a hand of appreciation.

Where do we go from here? NATDAC '98; yes we plan on having one. We were thinking about the same time frame.. . Spring of 1998, at a location to be decided. In the next couple of months, we'll probably be sending something out to our field offices asking them to solicit among the states, interest in hosting the next conference. We will need to make that decision sometime later this year. It takes a long lead-time as those of you who are involved, and as Ralph Gillmann knows, to organize logistics. The main thing **is** getting a suitable location reserved way ahead of time. So, once again thank you very much for coming, and we certainly look forward to seeing you at NATDAC '98.

David Albright: Well, closing comments on behalf of Nancy Whalen and all the staff at ATR, the State of New Mexico, and from all the people of the State of New Mexico, the "Land of Enchantment." I trust you all have had a productive and happy experience here, and may you have a safe trip home. Good day.