

HELP and Oregon's Demonstration Project: Status Report

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BACKGROUND

At some point in the course of getting almost any product from the producer to the consumer, a truck is involved. Our economy depends on transportation provided by heavy vehicles. HELP, an acronym for Heavy-vehicle Electronic License Plate, is a program intended to examine the applicability and practicality of employing advanced technology to assist in the management of the multi-billion dollar investment in roadways that supports the movement of goods.

The HELP project is an international, multi-state cooperative study, and demonstration project. It involves both government and industry participation in an investigation into current technologies that have potential to provide an integrated heavy vehicle monitoring system with applications to both highway management and vehicle management.

This project involves far more than just hardware. It is significant because it represents a coordinated effort not only between government agencies, but also cooperation between government and the trucking industry.

Currently, 13 states and the port authorities of New York and New Jersey are working in cooperation with Transport Canada and the Federal Highway Administration. Committee members are drawn equally from the government agencies and the trucking industry. We, in HELP, consider this arrangement to be of critical importance to the success of HELP, making it a truly cooperative effort between government and industry.

FEASIBILITY STUDIES

In 1983, concept papers were prepared by the Arizona and Oregon transportation departments. The initial interest was in improving truck weighing operations at weigh stations and ports-of-entry, and gathering planning data.

In 1984, the Arizona DOT completed a concept feasibility study regarding the use of Weigh-in-Motion/Automatic Vehicle Identification (WIM/AVI) in a multi-state environment. In the same year, the concept demonstration conducted in Oregon, using volunteer trucking firms, found the system operationally feasible with potential benefits to states and truckers alike.

In 1985, a concept development, multi-state meeting was held in Portland, Oregon. This meeting, attended by government and industry representatives, marked the beginning of the HELP project and resulted in the formation of a multi-state organization.

Policy and executive committees were formed. It was decided to have both government and industry representation on the committees to oversee the project. Technical subcommittees were also formed to make recommendations to the Executive Committee for letting contracts.

HELP PROGRAM

Until recently, the study focus of the HELP program centered on conducting research on five technologies:

1. Automatic Vehicle Identification (AVI);
2. Weigh-in-Motion (WIM);
3. Automatic Vehicle Classification (AVC);
4. On Board Computers; and
5. Data Communications Networks.

The technology study phase, now largely completed, is leading to the crescent demonstration phase. This phase will test the feasibility of integrating these technologies into a system to address the current government and industry needs regarding heavy vehicle monitoring and management.

The HELP AVI technical study, conducted by Castle Rock Consultants, reviewed the state-of-the-art in unique vehicle identification technology. A series of track, laboratory, and field tests led to the development of an open, generic specification for a preferred system. This equipment was then put through final testing in Virginia and Oregon. HELP has just finished negotiations with Vapor Inc., Canada, a subsidiary of Brunswick, to acquire AVI readers and transponders.

Within the HELP program, a WIM study was performed by the Texas Transportation Institute. The objective of this study was to evaluate currently available commercial WIM systems through laboratory and field trials to develop performance specifications to be used in assessing the suitability of WIM equipment for various applications. The final report is available. Low cost WIM equipment, such as piezo-electric cable, may be used for Automatic Vehicle Classification. Draft generic specifications were developed and submitted to vendors for review.

The Satellite study included the review of all the HELP technical studies as they applied to using a satellite data link to communicate AVI and WIM data to a central data base. A review of operational and available satellite technology was completed by Ernst and Whinney, the study consultants. The study addressed three cost and system scenarios.

The On Board Computer study, conducted by Arthur Andersen, was a technology and government agency audit requirement review. An OBC log format was developed. The recommendation of the subcommittee to the Executive Committee is to include, on a limited basis, the use of the OBC within the demonstration project.

Conceptual Elements

Additional studies that had to do with the development of ideas were sponsored by the HELP program. These included, site selection, system design, MCSP workshop and a review of management options.

The Site Selection study developed guidelines to enable government agencies to locate HELP stations along the planned demonstration route in conjunction with other reporting requirements such as SHRP and HPMS locations.

An important element of the HELP project is the System Design study that reviewed various system scenarios using the technologies I have already discussed. The contractor, Cimarron Software Services, developed computer models of four scenarios and performed system analysis studies as to the benefits of implementing each scenario.

During the development of the scenario models, the factors that were considered were:

1. The alternatives of developing a national versus a state or regional system;
2. Private versus government management of the system;
3. The role of AVI in the system;
4. One-way versus two-way communication capabilities; and
5. Mandatory participation as opposed to a voluntary program.

MOTOR CARRIER SERVICES PLAN PROGRAM

As I mentioned earlier, motor carrier industry input and participation in such a project is essential to ensure that all the motor carrier industry concerns and requirements are addressed. This is being done through a Motor Carrier Services Plan Program element that provides the trucking industry perspective to the technology studies and application of a HELP system.

To help address the trucking industry concerns and reaction to HELP, the Motor Carrier Services Plan subcommittee endorsed conducting a trucking industry focus group to sample a cross-section of trucking industry representatives. This sample was based on the type of trucking operation, the size and the geographic location. A consultant, Riva, Inc., was hired to be program facilitator.

Regretfully, there was a small turn out for this meeting, so the results remain inconclusive. The consensus of those present was that the biggest advantage of a HELP system would be if WIM/AVI could cut down on regulatory reports required by government agencies or foster agreements that would lead to one-stop shopping. This subcommittee also oversees the OBC study and provides direction for the recruitment effort for the Crescent Demonstration.

CRESCENT DEMONSTRATION

As we moved forward to the running of the Crescent Demonstration, we commissioned a management options study. This review focused on the private versus public management of the data that led to the development of an RFP for a Crescent Demonstration operator. The Crescent Demonstration will be performed at thirty-three highway sites on the I-5/I-10/I-20 corridor running from British Columbia through six states. From 5,000 to 10,000 trucks will be equipped with transponders for the purpose of the demonstration, which is scheduled to start in 1990 and run for twelve months.

The Crescent Implementation Group is responsible for overseeing the physical implementation of the equipment and software development. Membership in this group is made up of industry and government representatives of those states or provinces that will have test sites. Additionally, this subcommittee is responsible

for investigating the institutional arrangements that are necessary to facilitate the management of the demonstration.

As part of the planning for the Crescent Demonstration, a series of goals and objectives have been developed. The major goals of the demonstration, which have equal priority, are to improve institutional arrangements and to determine the viability of the technology in the highway environment. The secondary goals are to measure efficiency and productivity changes by implementing the system and to identify additional applications for technology.

In order to evaluate the progress made by the Crescent Demonstration in achieving its goals, a new subcommittee structure has been developed. Each subcommittee is responsible for the evaluation of a particular element of the demonstration reflecting one of the Crescent goals.

The Technical Performance Subcommittee is responsible for evaluating the performance of the equipment during the demonstration, and making recommendations regarding any additional research and development necessary to achieve HELP goals.

As I pointed out earlier, the trucking industry would like to see the HELP program break down what they consider institutional barriers. The Institutional Arrangements Subcommittee is charged with evaluating and documenting institutional arrangements. Each state or province must identify those government agencies that motor carriers must deal with in the course of managing their business, and see what needs to be done to facilitate arrangements (i.e., this may require special legislation or administrative rules). In Oregon truckers must work with DMV, Weighmasters, PUC, and the State Police.

The Efficiency and Productivity Subcommittee has the task of measuring the goals we achieve. This may be an arduous assignment, as the limited saturation of sites may not offer a lot to measure. In the end it may only indicate potential areas for gain. For example, a motor carrier may say "I did not receive any benefit, but I think I would if you did this."

The Additional Applications Subcommittee was formed to identify and explore any additional opportunities that come about as the result of HELP research. Just as teflon was a spinoff of space exploration and penicillin was discovered by accident, we do not know what might evolve as a result of the HELP program.

UNITED STATES SITUATION

There are many potential uses for a HELP system. Currently, there is little or no uniformity between states. Present day methods of regulating size and weight, operating authority, hours of operation, taxation and vehicle safety require labor intensive monitoring by government agency personnel.

Utilizing state-of-the-art technology, HELP aspires to demonstrate that data electronically interchanged from the roadside, via the truck, can be employed to perform many of the enforcement and auditing functions, and reduce or eliminate paperwork.

A computerized data network can create the effect of uniformity by facilitating transparent borders and other management options such as one-stop shopping, which will reduce the cost of administration by easing the paperwork load for government and industry.

OREGON CONCEPT AND FUTURE PLANS

In Oregon, we are very excited about the future uses of the new technological tools available from managing our highway system. The automation of our SB Woodburn POE came about as a result of what we learned from the early concept demonstration.

The motto of our Weighmaster Unit, which is a part of the Highway Division, is "weigh the load and save the road." Oregon has had POEs since 1975. They are jointly operated by Weighmasters and PUC. Our POE's serve as a single location where all governmental functions relating to motor carriers can be provided. We currently have five operational POE's and a sixth one in the planning stage for this biennium. Three of the older POE's will be retrofitted with WIM/AVI and the supervisory system computers by fiscal year 1992.

Why are we so excited about automated POE's? Let me share with you a few of our reasons for considering SB Woodburn such a success. The POE was designed for a peak traffic of 2,300 trucks per day. Our peak is currently 3,600. If the POE were not automated, we would require a third static weight scale and a third person to operate it. We cannot afford to let the traffic back up to the freeway for safety reasons.

Weighmaster staff levels have remained constant since 1985. However, weighmaster responsibilities have expanded to include truck safety inspections. By automatically sorting out the legal trucks, we have time to concentrate our enforcement efforts on those vehicles not in compliance and patrolling potential by-pass routes. The manpower savings at this POE is 30 percent, or about \$82,000 annually.

A chronic offenders list has been developed. Those individuals that show up on the list are contacted at their headquarters and faced with the possibility of losing their authority to operate in Oregon unless they come into compliance.

The additional cost for automation of the port was \$120,000. Weighmasters estimate that the system paid for itself in less than six months. One carrier was found to be \$40,000 behind in tax payments. The company had to pay before the truck was allowed to leave the port.

The Oregon legislature enacted a landmark bill. ODOT, working with representatives of the trucking industry, conducted a review of motor carrier taxation. The group recommended the development of an axle weight distance tax for those vehicles over eighty thousand pounds. We all recognize that road damage is caused by heavy axles. House Bill 2737 affords incentives for heavy vehicles to spread the load over more axles.

More timely tax audit information is now available. We used to face a two month delay of PUC data because it was recorded manually and then key-punched. The automated system allows the information to be down-loaded every three hours. The reduction of data entry errors is, of course, also notable.

A member of my staff has had the unique opportunity of being the contact person with the trucking industry on this project. The two biggest advantages that Oregon truckers participating in the demonstration project see are:

1. time savings at weigh stations and ports of entry; and
2. the possibility of this type of system promoting fairer competition.

Most of the company officials say they don't mind paying taxes — as long as everyone is paying them. Additionally, working in cooperation with regulatory agencies promotes a positive industry image.

Fleet management applications are constrained because of the limited number of sites. However, bimonthly reports are developed from the “reading” information we pull from each site, and sent to the industry volunteers. These reports include: vehicle identification numbers, location, weight, date, time, and speed. The reports are generally reviewed by the safety officer.

What future strategies are being investigated in Oregon? One of the most interesting challenges is the concept of using a highway speed WIM as a sorter in the highway. AVI would be used to identify the vehicle, and the supervisory computer would be used to check PUC files on that vehicle for taxes, inspections, safety violations, and other information. If it meets legal weight and PUC requirements, the vehicle would be allowed to go through without taking the exit ramp to the port. The data collected from WIM/AVI would be stored for enforcement and tax audit purposes.

OSHD is working on this. If the system works, then we have a truly automated system where only overweight, illegal and non-PUC registered vehicles would be directed into the POE. The savings in manpower could be tremendous.

There are many exciting opportunities out there for the use of the new technological tools available for gathering pertinent heavy vehicle data. The purpose of research is to discover things that are presently unknown. What we hope to learn from the testing of the HHELP system is what functional applications there are for this type of system on the highways. The possibility of addressing a number of institutional issues of interest to both government and industry is inherent with the development of a dependable, automated, heavy vehicle monitoring system.