

Appendix C:
Motor Carrier Case Study

Evaluation Report
Volume II - Case Study Field Notes

by
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C The
rescent -Evaluation

CONTENTS

INTRODUCTION	1
GROUP 1 CARRIERS	3
1.0 Domino's Pizza, Kent, Washington	3
2.0 Interstate Distributor Co., Tacoma, Washington	5
3.0 Albertson's Inc.; Portland, Oregon	8
4.0 Wilhelm Trucking Company, Portland, Oregon	10
5.0 PLXPRESS Inc., Wilsonville, Oregon.....	14
6.0 Timber B-Products, Albany, Oregon	17
7.0 Nickel Plate Express, Eugene, Oregon	19
8.0 Chevron, San Ramon, California.....	22
9.0 Thrifty Corp., Ontario, California	24
10.0 Tabor Truck Lines, West Sacramento, California.....	26
11.0 Frito-Lay, Casa Grande, Arizona	28
12.0 United Parcel Services, Phoenix, Arizona	31
13.0 Texas Instruments, Dallas, Texas..	33
14.0 Tyler Pipe Industries, Tyler, Texas	35
GROUP 2 CARRIERS	38
15.0 Frito-Lay, Vancouver, Washington	38
16.0 FTL Inc., Portland, Oregon	39
17.0 Bi-Mart Corporation, Eugene, Oregon.....	40
18.0 Reed's Fuel & Trucking, Springfield, Oregon	41
19.0 United Grocers, Inc., Medford, Oregon.....	44
20.0 Willamette Industries Inc./Beaverton Bag, Beaverton, Oregon	46
21.0 Food Express, Inc., Arcadia, California..	48
22.0 Baxter Health Care, Ontario, California	50
23.0 TNT Bestway Transportation, Phoenix, Arizona.....	51
24.0 Zero Motor Freight, San Antonio, Texas	53
GROUP 3 CARRIERS	56
25.0 Frito-Lay, Fontana, California.....	56
26.0 Oil Transport, Abilene, Texas	57
27.0 Merchants Fast Motor Lines, Abilene, Texas..	58
GROUP 4 CARRIERS	59
28.0 KMD, Auburn, Washington.....	59
29.0 Inco Express Inc., Seattle, Washington	60
30.0 Gordon Trucking Inc., Sumner, Washington	61
31.0 Provisioners Express, Auburn, Washington	62
32.0 Post Trucking/Post & Sons Transfer, Tacoma, Washington..	63
33.0 Veneer Chip Transport Inc., Tacoma, Washington	64

34.0	Risberg's Truck Lines, Portland, Oregon	66
35.0	Gresham Transfer Inc., Portland, Oregon	67
36.0	Market Transport, Portland, Oregon.....	69
37.0	Troutman's Emporium Inc., Eugene, Oregon	70
38.0	Sessler Inc., Eugene, Oregon	71
39.0	Cardmore Trucking, Central Point, Oregon.....	73
40.0	TNT Reddaway Truck Lines Inc., Clackamas, Oregon..	74
41.0	Domino's, Hayward, California.....	76
42.0	WeigandButton Motor Express, Inc., Dixon, California	77
43.0	Husky Crane Inc., Stockton, California	78
44.0	Frito-Lay Inc., Modesto, California	80
45.0	Mark Wood Trucking/Wildwood Express Inc., Kingsburg, California.....	82
46.0	Condor Freight Lines, Goshen, California	84
47.0	Domino's Ontario, California	85
48.0	Calzona Tankways, Inc., Phoenix, Arizona	86
49.0	Refrigerated Transport, Texas	88
50.0	Central Freight Lines, Waco, Texas.....	89
51.0	Ralph Wilson Plastics, Temple, Texas	90
52.0	Parkway Transport, San Antonio, Texas.....	92
GROUP 5 CARRIERS		94
53.0	Haney Truck Line, Inc., Yakima, Washington.....	94
54.0	United Groceries, Portland, Oregon	96
55.0	L.S. Transport, Prineville, Oregon.....	97
56.0	KKW Trucking, Pomona, California.....	98
57.0	Leather Center, Carrolton, Texas	100
CARRIER INDEX		102

Forward

The Crescent Project element of the HELP Program is a bi-national multi-jurisdictional cooperative research and demonstration initiative involving the public and private sectors in an application of advanced technologies for the creation of an integrated heavy vehicle management system. This initiative is a leading example of the commercial vehicle operations (CVO) aspect of the Intelligent Vehicle Highway Systems (IVHS) concept. Some of the advanced technologies demonstrated in this project include: (1) automatic vehicle identification (AVI); (2) weigh-in-motion (WIM); (3) automatic vehicle classification (AVC); and (4) data communications networks and systems integration,

The HELP program, initiated in the early 1980s, consisted of three phases which included assessing the feasibility of the concept, technical studies involving laboratory and field tests, and lastly, a demonstration phase. Perhaps the most significant activity of this project centered on the subject of institutional arrangements, associated with the integration of emerging technologies with current operational policies and practices, within both government and industry sectors.

The demonstration element of the program, referred to as the Crescent Demonstration Project, began in 1991 and involved six U.S. states and one Canadian province. This project was phased into full scale operation over a three year period.

This document is one of several cited below which comprise the evaluation of the Crescent Project. The complete evaluation is reported in the following list of documents:

***The Crescent Project: An Evaluation of an Element of the HELP Program:
Executive Summary***

Appendices:

- A. On-Site Analysis of HELP Technologies and Operations Evaluation Report***
- B. State Case Study Evaluation Report***
- C. Motor Carrier Case Study Evaluation Report***
- D. Crescent Computer System Components Evaluation Report***
- E. Crescent Demonstration Office Evaluation Report***
- F. State Line Beacon Project User Case Studies***

The evaluation team consisted of the following groups:

WHM Transportation Engineering Consultants, Inc. (lead group)

Castle Rock Consultants

Western Highway Institute, ATA Foundation

In addition, the evaluation team was supported in this effort by:

Lockheed Information Management Systems

Booz-Allen & Hamilton Inc.

The team members wish to acknowledge the participation and support of the many individuals and organizations who provided guidance, assistance and encouragement during the evaluation process. While the team members are solely responsible for the content and accuracy of these evaluation documents, the process would have been greatly impaired without the recognition of the importance of this effort by all who contributed and their desire to promote efficiency and productivity in future freight systems. To all we are greatly appreciative and indebted.

C. Michael Walton

Chairman, Evaluation Team

MOTOR CARRIER'S EVALUATION

APPENDIX C - FIELD NOTES

INTRODUCTION

The Crescent Evaluation Plan has a two-pronged approach. The quantitative technical assessments are to provide a measure of how well the equipment installed actually performed the intended functions in the context of an integrated system. The qualitative assessments, on the other hand, are intended to measure the extent to which the defined functions provided application with identifiable benefits. Input for the qualitative assessments was to come principally from state and motor carrier case studies.

While the motor carrier's evaluation plan anticipated involving all participating carriers, primary emphasis was to have been placed on identifying, recruiting, and working with a representative subset of those enrolled on a case-study basis. During the course of personal contact and data gathering, considerable descriptive information concerning each case-study carrier's unique operation and opinion was acquired. To facilitate the broadest possible understanding of the evaluation assessment, carrier-specific case-study documents were produced.

The case-study documentation format adopted, each case-study report includes eight topical sub-elements. A numeric reference system was established for developmental purposes which uses the units and tens portion of each reference number as the case-study identifier. The decimal portion of the case-study carriers has the following topical relevance:

- x.1 Description of Operations and Involvement
- x.2 Transponders (received and installed)
- x.3 Experience with Crescent Database
- x.4 Experience with Lockheed hard copy AVI/WIM report
- X.5 Opinions on use of AVI/WIM data
- X.6 Experience with Weigh-Scale Bypassing
- x.7 Significance of Potential Applications
- X.8 Concluding Views/Comments

From the population of 60 enrolled carriers, 19 case-study carriers were recruited and scheduled for two personal visits. The first visit involved project orientation and participation instruction with the second planned to record evaluation response. An approximately equal number of visits were planned with respondents to the "mail out" survey utilized with the 41 non-case-study carriers. Needless to say, the evaluation plan evolved for several different reasons.

The default experience with case-study carriers, coupled with a poor response to the mail-out surveys, led to channeling more resources into expanded personal visits. Ultimately, personal visits were scheduled and accomplished with 35 of the 41 non-case-study carriers. Of these, 10 had returned the survey questionnaire, enabling expeditious clarification and enrichment of the written responses. Carrier time constraints

were a limiting factor in many of the remaining 25 visits, but information comparable to that gathered from the case-study carriers was sought. This enabled the development of “case study like” documentation for all 35 of these carriers. the following skeleton:

Personal visits could not be scheduled with six carriers, three of which returned a survey questionnaire. For those returning a survey, the fill-in of missing information and some response clarification were undertaken via telephone. These contacts produced yet another variation in the nature of personal contact involvement but did facilitate the development of “case study like” documents.

As the title suggests, “case study like” documentation is similar to but differs from the model described earlier. Generally speaking, these reports contain considerably less detail about the carrier, and the carrier’s Crescent involvement was typically limited to the mounting of transponders on trucks. As a result, the topical sub-elements of these reports have been ‘collapsed” to:

- X.1 Description of Operations and Involvement
- X.2 Opinions Stemming from HELP Involvement
- x.3 Significance of Potential Applications

This appendix to the Motor Carrier’s Evaluation has been titled “Field Notes” to call attention to the fact that the quality and content varies considerably related to the level of personal contact attainable. To drive that point home further, the following reports have been grouped to reflect the nature of the data collection. The groups are characterized as follows:

Group 1:	Case-Study Carriers, 2 visits	14 carriers
Group 2:	Survey response, 1 visit	10 carriers
Group 3:	Survey response, no visit	3 carriers
Group 4:	No response, 1 visit	25 carriers
Group 5:	Case-Study defaults, 1 visit	5 carriers
Total reports filed		57 carriers

The draft reports for Groups 1 through 4 were sent back to the individual carriers for their review and amplification and/or correction. Four carriers requested alterations, and those have been honored in the reports which follow.

GROUP 1 CARRIERS

1.0 Domino's Pizza. Kent. Washington

1.1 Description of Operations and Involvement

Domino's Pizza in Kent, Washington is a small, private carrier with a fleet of five tractors-trailers. The head office in Michigan originally heard of HELP and suggested that the Kent office become involved. However, this description and the evaluation of HELP/Crescent concerns only the Kent office. Information about the Kent office was obtained from Mike Griffen who is responsible for the operation of the fleet. Two interviews (September 1992 and March 1993) with Mike Griffen were held as well as a series of telephone calls in between the two meetings. Griffen's interest in the project is to have a means of monitoring drivers.

Food products are distributed from the Kent warehouse to stores located in Washington, Oregon and Idaho on a regular schedule. The trucks are used occasionally to haul products back to the warehouse (eg, boxes). The tractors themselves are owned by Rollins, a full-service leasing company. All maintenance, including the installation of the transponders, is done by Rollins. Given the small size of the fleet and the regular nature of the deliveries, fleet management is not a complex affair.

Two aspects of Domino's operations are important in terms of its evaluation of Crescent. First, Domino's route structure, while using Interstate 5, generally avoids the Woodburn POE/weigh-scale site. (It is understood that the trucks are off the I-5 at this point making deliveries.) Therefore, there is no possibility of Domino's evaluating weigh-scale bypassing.

Second, in terms of the use of Crescent data for fleet management, Domino's interest is in a technology which helps to monitor trucks, to communicate with drivers, and to simplify reporting and auditing procedures. Its interest in truck monitoring is to gauge driver performance. The interest in communications is to facilitate a system which now relies on drivers calling in from delivery points and/or the company leaving messages at the stores for drivers. A few years ago, the company did try on-board computers. Among other things, the company hoped this would facilitate the completion of driver logs. The equipment did not perform as expected and has been scrapped.

1.2 Transponders

As of September 1992, Domino's records indicated that they had two transponders installed. Lockheed records showed three at this location. By the spring of 1993 three replacement transponders had been received and installed. (The transponders are actually handled and installed by the leasing company, which may explain some of the confusion over numbers.)

1.3 Experience with Crescent Database

Contrary to expectations at the time of recruitment, Domino's does not have a modem for its computer and has no plans to acquire one. As a result, no monitoring of the transponders was completed by Domino's.

1.4 Experience with Lockheed hard copy AVI/WIM report

At the time of the March 1993 meeting, Domino's had received one hard copy report since the installation of the replacement transponders. The report covered the period from February 2, 1993 to March 11, 1993. From this report, it appears that one of the three transponders is not working: there is no data on tractor #53345 for the period February 2 to March 11 and, according to Griffen, this unit was on the I-5 on several occasions during this period.

Also, according to Mike Griffen, the Crescent database is missing most of the trips made by the other two transponder-equipped trucks. These two make trips on the I-5 approximately every three days. The hard-copy reports, however, only show a total of seven trips for the two trucks in the entire February 2 to March 11 period. (In a follow-up telephone call on May 12th, Griffen indicated that the hard copy reports received since the March meeting were "much more complete.")

Given the length of trips and the sites traversed, it is not possible to perform a consistency check (i.e., track one truck with a given load through a number of Crescent AVI/WIM sites). Nevertheless, Griffen saw nothing obviously incorrect about the weights shown on the Lockheed reports. A total of five trips showed AVI/WIM data.

One comment made in discussing the hard copy report was that it would be more useful if it could be tied in with the SLB project -- that is, if it could show state-line crossings just like any other AVI citing on the report.

1.5 Opinions on Use of AVI/WIM Data

Mike Griffen would like to use AVI data for checking the accuracy of log books. He is also interested in using AVI/WIM data for checking driver performance -- speed and, possibly, loading practices on backhauls where drivers are responsible for positioning the load. He feels that, if the polling could be shortened to a 30 minute cycle, Domino's would be able to use the data for locating drivers.

1.6 Experience with Weigh-Scale Bypassing

Since Domino's trucks do not use the section of I-5 through, Woodburn, no evaluation of weigh-scale bypassing is possible. In a general discussion of bypassing, Griffen indicated that he did not think Domino's would be willing to pay for mainline bypassing.

1.7 Significance of Potential Applications

Mike Griffen provided the following ratings andrankings of the potential HELP applications:

	Rating	Rank
fleet management	1	3
driver management	1	2
reporting/auditing	1	1
safety management	1	4
check on loading practices	2	7
private use of AVI at terminals	3	6
tracking stolen vehicles	4	9
regional one-stop shopping	2	8
bypass weigh scales/POEs	2	5

He would also be very interested in HELP technology if it could be used in a “call home” capacity (i.e., with transponders, AVI readers and the express receivers being used at Santa Nella).

1.8 Concluding Views/Comments

Mike Griffen is optimistic about the potential for HELP. At the completion of the second meeting, he noted that the “program needs to be continued. I believe it is going to benefit the trucking industry in the long run.”

2.0 Interstate Distributor Co.. Tacoma, Washington

2.1 Description of Operations and Involvement

Interstate is a large, for-hire general freight carrier operating in all western states and several provinces. Its specialty is operating as a contract carrier for large retailers such as Safeways and other consumer-product companies. Information about Interstate was obtained from Christa Bellefleur, the Fuel Manager, in the course of two meetings, a number of telephone conversations and a series of letters.-

The company has over 700 tractors and about 2,500 trailers in its fleet. (This is as of the fall of 1992; it is understood the fleet is growing.) Most of the trailers are dry-freight vans. Roughly half the drivers are company employees and half are owner-operators. The nature of the business is such that the routing of trucks and drivers is quite irregular.

Interstate and some of its shippers are technologically sophisticated. This may have a bearing on its evaluation of Crescent. For example, Interstate delivers on a just-in-time basis for some customers and is linked to others through EDI transactions.

The company agreed to participate in Crescent as it felt it is important to be in on the “ground floor” of new technological developments. “If carriers don’t do this, the states will design the system to serve only their purposes.” Interstate’s original expectations were that HELP technology would assist with communications, auditing, and weigh-scale bypassing. However, since agreeing to participate, the company has invested heavily in satellite tracking/communications and now finds that this serves many functions which might have been expected from HELP/Crescent. For example, Interstate now has little interest in any potential tracking capabilities of HELP as this would be superfluous to its ability to track by satellite. The satellite system has also answered any communications needs the company had with drivers.

Another characteristic of the fleet, which probably bears on the company’s evaluation of HELP/Crescent, is that many tractors now have modern, electronic engines and on-board computers. Monitoring or regulating driver speed with Crescent data is no longer something which interests Interstate. Further, there is no longer much need for Crescent data to be used for record keeping (or production).

2.2 Transponders

Interstate had 34 transponders installed on equipment operated by company drivers as of September 1992. Lockheed’s records showed that 17 of these transponders were active. It may be that 17 tractors did not operate on the I-5, I-10 or I-20 since transponders were installed. There may have been other possibilities -- eg, transponder malfunction, improper installation, tampering -- but Interstate did not investigate.

Thirty-four replacement transponders were delivered to Interstate sometime in January. It is not clear, however, how many were ever installed.

The Lockheed hard copy reports for the period February 11 to March 11 show at least 15 transponders for which there is no data in the Crescent database. However, without information on which replacement transponders have been installed and which of the trucks were on the Crescent corridor, it is not possible to verify the accuracy of the Crescent database.

2.3 Experience with Crescent Database

As of September 1992, Interstate had obtained a entry login from Lockheed but had not made use of it. By March 23, 1993, Interstate still had not attempted to use its modem access to the Crescent database.

2.4 Experience with Lockheed hard copy AVI/WIM report

While Interstate received a number of hard copy reports in March 1993, no one in the company analyzed the data. Copies of the reports were mailed to the WHI offices (after the second interview) along with a letter pointing out the obvious problems. According to Bellefleur: "The loads I was able to check usually went from the origin to their destination without dropping any

freight or changing their configuration. Gross weight and vehicle length should be constant, especially since some of the observations are as little as 19 minutes apart. However, they are not.”

She gives as an example, truck #3874 with a known weight of approximately 75,000 pounds on a southbound trip on February 15th. Here are the Crescent observations on this truck:

	GVW	Wheelbase
Woodburn	90,000	75.3’
Jefferson	84,700	72.3’
Ashland	61,300	71.1’
Redding	73,800	73.4’

There is also a duplicate record of truck at Redding.

2.5 Opinions on Use of AVI/WIM Data

Christa Bellefleur sees no use for the AVI or the WIM data for any management purposes at Interstate. The one possible exception mentioned was that it would be nice to have a second source of data for completing a PUC return in Oregon (the return used to calculate the weight-distance tax). Details on what this requirement is, or how the HELP data might be used as a back-up were not obtained.

2.6 Experience with Weigh-Scale Bypassing

As of the first interview in the fall of 1992, the company had no record of transponder-equipped trucks being given bypass clearance at weigh scales, nor had any. drivers reported such bypassing. By the spring of 1993, one driver completed a weigh-scale bypass evaluation form. He was given bypass clearance at Woodburn SB and estimates that this saved him 5 minutes. Christa Bellefleur is not sure how much mainline bypassing is worth to the company.

2.7 Significance of Potential Applications

Christa Bellefleur rated the potential applications of HELP and ranked them (or, at least, three of them) as shown below:

	Rating	Rank
<i>fleet</i> management	5	NR (not ranked)
driver management	5	NR
reporting/auditing	4	2
safety management	5	NR
check on loading practices	5	NR
private use of AVI at terminals	4	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	4	3
bypass weigh scales/POEs	3	1

2.8 Concluding: Views/Comments

As a final comment, Christa Bellefleur writes: “. . . we use satellite tracking systems for most of our fleet now and feel its technology to be more applicable to our operations.”

At the completion of the second interview, Bellefleur asked how she could discontinue her participation in Crescent and, on April 5, 1993, sent the following letter to Lockheed:

“Several years ago when we decided to participate in the HELP program, the technology and its proposed applications . . . seemed promising. But since then, our own individual progress in that area has been much more rapid.

“Our company trucks, with few exceptions, are equipped with satellite tracking devices. Some of our Independent Contractors are now planning to install these units in their vehicles after becoming convinced that they, too, could benefit from the technology. In addition, we recently converted to new software that allows us to make even better use of all the data received by satellite units.

“In my estimation, there is little added information that the transponders can provide us. It is for that reason that we have decided to leave the [Crescent] program. We have only placed a couple of the new transponders on the vehicles, the rest are still at our shop facility in Wilsonville, Oregon, and we are awaiting your instructions regarding their return.”

3.0 Albertson's Inc.. Portland. Oregon

3.1 Description of Operations and Involvement

Albertson's is a large retail company. The trucking fleet, serving all western states, is managed from the distribution center in Portland. There are about 75 tractors and a somewhat larger fleet of dry freight and refrigerated trailers. Dispatching and routing is a fairly routine business. Most drivers are company employees, although about a dozen loads a week -- some of the longer hauls -- are handled by owner-operators.

Current fleet management is handled by on-board computers (Rockwell's Tripmaster) for such things as electronically-prepared logs, maintenance schedules, speed and idle control. There is no particular need for a location capability because of the regular nature of the shipments. Trucks are dispatched and the stores know when they should arrive. Similarly, there is no great need for a communications capability as drivers are instructed to call-in if problems occur and as messages can be left for drivers at the destination stores.

Albertson's reason for participating in Crescent is simple: officials from Oregon asked the company to participate and Albertson's felt that, as a well-managed, responsible, “legal” operator, it was important to be a part of such a program. There were no specific expectations as to what the company would gain from its participation.

Information about Albertson's was developed during interviews on September 24, 1992 and on March 26, 1993 with Rich Wilson, the garage superintendent, and Ted Sturgill, the transportation manager.

3.2 Transponders

The company has received and installed 75 replacement transponders. Two have broken (the attachment ears) although Albertson's has managed to re-attach them. Albertson's did not complete the first monitoring form (transponder check), so it is not known how many of the new transponders are functioning.

Albertson's did not complete the second monitoring form (consistency check), although during the second interview a check of the Lockheed hard copy report was made. Most information appeared consistent (i.e., tracking one truck through several stations); however, several odd observations were photocopied and appended to the interview notes. One shows an 8-axle double appearing reasonably well at Jefferson SB but gaining an extra ninth axle at Woodburn SB. The extra axle was added to the very end of the configuration converting a tandem axle to a triple axle. The second odd observation was similar: an 8-axle double becoming a 9-axle configuration at Woodburn SB.

3.3 Experience with Crescent Database

At the time of the first interview in September, it was unclear as to whether or not Albertson's had received a login ID from Lockheed. Whether or not it had, the hold-up to the company's ability to access the Crescent database was the absence of a suitable telephone cable. All telephones at the office operate on a PBX and a separate cable is needed for the modem. By the time of the second meeting, Albertson's had acquired a modem connection with the Crescent database, although it was unclear as to how often this was being used.

3.4 Experience with Lockheed hard copy AVI/WIM report

As of April 1993, Albertson's had received two large hard copy reports from Lockheed covering February-to-March, with data based on the replacement transponders. While it appears that the report had been scanned, no use of the information had been made.

3.5 Opinions on Use of AVI/WIM Data

At the first meeting, it was evident that Albertson's had no expectations as to how Crescent data could be used for managing fleets. By the time of the second meeting, and based on what appeared to be a relatively cursory examination of the hard copy reports, Albertson's felt that AVI data might be useful for log checking. Because of this, the two-hour polling frequency was not of concern.

The addition of WIM information to AVI data would not increase the usefulness of Crescent data for Albertson's. The one minor exception is that it might -- assuming it is accurate -- allow the company to spot drivers shifting fifth wheels after leaving the yard or a scale site.

3.6 Experience with Weigh-Scale Bypassing

As of the September 1992 meeting, no driver had reported receiving a bypass clearance at Woodburn SB. (This may simply be because drivers do not routinely report such things.) At the second meeting in the spring of 1993, and even though Albertson’s has over 100 trips a week through both Woodburn SB and NB, neither Rich Wilson nor Ted Sturgill had any information on weigh-scale bypassing. Two driver-evaluation forms were completed. Both trucks were given bypass clearance and the drivers estimate they save an average of 2.5 minutes over the time it would take to run over the static scale. One of the drivers thought the traffic control signals are too closely spaced.

Rich Wilson did not think Albertson’s would be prepared to pay for mainline bypassing.

3.7 ‘Significance of Potential Applications

Rich Wilson and Ted Sturgill rated and ranked the potential applications of HELP technology as shown below:

	Rating	Rank
fleet management	2	9
driver management	1	4
reporting/auditing	1	3
safety management	1	6
check on loading practices	3	7
private use of AVI at terminals	5	8
tracking stolen vehicles	1	5
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	2

3.8 Concluding Views/Comments

As a final comment, Rich Wilson writes: “Would like to see this develop into ‘one stop shopping’ for all permits, licenses, etc. Very nice to ‘bypass’ scales/POEs when we run legal according to your WIM units. We can also use it for driver management and reporting and auditing.”

4.0 Wilhelm Trucking Company, Portland, Oregon

4.1 Description of Operations and Involvement

Wilhelm is a medium-sized, for-hire trucking company specializing in heavy equipment hauls. The service often includes both hauling and rigging (i.e., setting up). Wilhelm operates in all of

the northwestern states, although the nature of the business is such that much of the transportation is relatively short haul. There are 50 tractors, none of which operate at high annual mileage, and an assortment of flatdeck and lowbed trailers.

Routes are quite irregular but, in spite of this, there is no pressing need for an ability to locate trucks. Drivers, and sometimes crews, are sent out to a job; dispatch knows where the equipment and crew are; and, if the company has to communicate with drivers, it usually knows where to find them.

The first meeting, on September 24, 1992 was with Robert Wilhelm Jr, the General Manager. Robert Wilhelm Jr. sits on the HELP Board of Directors and, therefore, is well-acquainted with the Crescent demonstration. At the time of the September meeting, he had used his modem access to the Crescent database on several occasions and was not impressed with what he had seen. His concerns centered around “missing” observations and inaccurate weights being recorded by WIM. Additionally, he was frustrated by the apparent inability of the Woodburn weigh scale to bypass transponder-equipped trucks.

The second meeting in March 1993 was with Ron Murphy, Safety and Personnel Director.

4.2 Transponders

Three company tractors are equipped with replacement transponders. No monitoring of these transponders was done, however a check of the Lockheed hard copy report for February-to-March 1993 shows that all three transponders, plus one other, are showing up. Presumably, this fourth transponder is attached to a tractor belonging to another company and is showing up on the Wilhelm report by mistake.

Given the short distances of the trips, it is not possible to complete the second monitoring exercise (consistency check). However, a check of the Lockheed hard copy report suggests there are problems with the quality of the data at some Crescent locations: an extra two feet of length is being added at Woodburn SB for all trips; an extra “ghost” axle appears on a truck at Redding at a distance of 32.4 feet behind the last real axle.

4.3 Experience with Crescent Database

At the first meeting with Robert Wilhelm Jr., it was evident that company was not pleased with the quality of information in the Crescent database. Reasons for this dissatisfaction were provided during the course of the interview. One truck operating under permit between 160,000 to 170,000 pounds was shown at 209,600 pounds in the database (Portland I-205 NB, July 15, 1992). One screen print from the truck activity report showed that the database contains duplicate records. Another truck operating at less than 80,000 lbs is shown at 101,600 pounds (Jefferson SB, Sept. 14, 1992).

At the second meeting in March 1993, Ron Murphy was not certain that anyone in the company was using the modem access to the Crescent database. (The person who operates computers at Wilhelm was not available on the day of the meeting.)

4.4 Experience with Lockheed hard copy AVI/WIM report

At the September meeting, Robert Wilhelm Jr. suggested hard copy reports would be a “waste of time.” He was satisfied with his modem access to Crescent data.

Sometime just prior to the March meeting, the company received hard copy reports of Crescent data covering the period February 11 to March 11th. It had made no apparent use of the information. Further, there is one truck which does not belong to Wilhelm showing up in . February 27-to-March 11 report.

4.5 Opinions on Use of AVI/WIM Data

Ron Murphy feels that Wilhelm could use AVI data for log checking, post accident investigation and possibly for investigating freight claims. This last use is speculative. Apparently, Wilhelm has been in situations where a customer claims freight has been damaged because the driver was late and, as a consequence, drove too quickly for the safe transport of the equipment. Ron Murphy thinks AVI data could be used in these situations to show customers how fast the truck actually travelled. The two-hour polling cycle was not of concern.

Murphy feels that the addition of WIM information at Crescent sites increases the potential uses of Crescent data. It allows driver monitoring (speed) and might possibly enable the company to dispute overweight violations. This last use assumes that WIM data is accurate enough to be used in such disputes.

4.6 Experience with Weigh-Scale Bypassing

At the September meeting, Robert Wilhelm Jr. indicated he was disappointed with the bypassing experience at Woodburn SB. According to one driver, who sat in during the meeting, the only time a truck is given bypass clearance is when it is empty. On one occasion, according to this driver, with a load of over 150,000 lbs., he was given the green light, and then hurriedly stopped and told to park. The weigh-scale operator told him that he didn't care what his computer told him (i.e., presumably credential information on overweight permits), the driver was going to be called in every time he went through the scale. The driver also related a more recent experience at Woodburn where his total weight was only 46,000 pounds but he was still called in for static weighing.

An attempt was made to understand these anecdotal accounts by checking them with Oregon DOT officials. It appears that, **as** of the fall of 1992, there were significant misunderstandings on the part of motor carriers about the operation of weigh-scale bypassing. The computer at Woodburn SB is set such that it will not allow any permit truck above 105,500 pounds to proceed down the bypass lane. It is also appears that trip permits for trucks operating above 105,500 lbs cannot be checked by the Woodburn computer; that is, these permits do not appear to be a part of the credentials data. (Full details have not been confirmed with Oregon officials.) This explains the first incident related by the driver (when operating at 150,000 + lbs.) Second, any truck operating below what the WIM scale detects as 50,000 pounds is given bypass clearance at Woodburn SB with or without a transponder. However, this bypass is conditional on a number of other factors (all axle weights have to be “WIM” legal, the speed and position of the truck have to be correct). Therefore, in terms of the second incident related by the driver (operating at 46,000 lbs), it is possible that a truck at this weight will be called in for static weighing from time to time.

By March 1993, weigh-scale bypassing at Woodburn was better understood at Wilhelm than it had been in September 1992. The one driver who operates the very heavy trip permit loads is still being called in (i.e., told to “park” so that his permits may be examined visually). Another driver who operates a transponder-equipped truck with loads in the 80,000 to 90,000 pound range is reporting that he is receiving bypass clearance about half the time.

Ron Murphy is not sure what the company would be willing to pay for mainline bypassing. He did say, however, that the figure of \$20 was mentioned as being reasonable. However, this amount is not directly comparable with the value placed on bypassing by other carriers as Wilhelm is largely concerned with trucks operating on trip permits. While procedures for treating these trucks at the scales are not known, it is understood from Wilhelm that the requirement to park and have permits visually inspected can take up to 30 minutes.

4.7 Significance of Potential Applications

Ron Murphy rated and ranked the potential HELP applications as follows:

	Rating	Rank
fleet management	5	6
driver management	1	4
reporting/auditing	1	5
safety management	1	3
check on loading practices	5	9
private use of AVI at terminals	4	7
tracking stolen vehicles	4	8
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	2

He would also be interested in HELP technology if it could be used to develop a “call home” capability.

4.8 Concluding Views/Comments

As a final comment to the second meeting with the company, Ron Murphy wrote: “Why can’t the system be developed to handle trip and/or annual permitted units?” (The idea here is that once a trip or annual permit is purchased, the weigh-scales should be able to do a credentials check electronically, rather than having the truck park and have the permit visually inspected.)

5.0 PLXPRESS Inc.. Wilsonville. Oregon

5.1 Description of Operations and Involvement

PLXPRESS is the trucking arm of Payless Drug Stores. Trucks from Wilsonville serve Washington, Oregon, portions of California, Idaho, Nevada, Utah and Colorado. The freight is all related to the drug-store business. The company also has for-hire authority and is increasingly looking for backhaul loads in order to reduce operating costs. At Wilsonville there are 68 tractors and 270 trailers, all dry-freight vans and all operated as double or triple-trailer units.

Tractors are operated under a full-service lease and all drivers are company employees. Routing and scheduling of trips is quit regular. Because of this, there is no great need for technologically sophisticated fleet management techniques. The company has no on-board computers, no satellite tracking and no dispatch software. It knows when trucks are dispatched and the stores know when they should arrive. Messages to/from the driver can be handled through the stores.

The company was involved in earlier tests of HELP technology for the state of Oregon. Information on PLXPRESS was obtained from Craig Southard, Fleet Operation and Safety Manager, and Dale Lockyer, Assistant Trucking Supervisor in a meeting at the company offices on September 24th. Contact was maintained over the winter through a series of telephone conversations and a second interview with Lockyer was held on March 25, 1993.

5.2 Transponders

PLXPRESS has 63 transponders, although only 25 are on trucks based in Wilsonville. The other 28 are on trucks operating out of Auburn, Washington and Woodland, California,

By the date of the second interview, Dale Lockyer had completed all three status checks (Jan 18th, Feb 18th and March 18th). Of the 25 transponders at Wilsonville, one has never shown up -- that is, one transponder known to be on the I-5 has never appeared in the Crescent database. A second showed up to the period ending January 15, 1993 and has not shown up since (again, a transponder on a truck used on the I-5). All other 23 replacement transponders are functioning.

Dale Lockyer monitored three trips on the I-5 to check for consistency.

Trip #1: On March 15, transponder #114000 passed through Woodburn SB and Ashland SB. The first site shows a total length of zero feet and the Ashland site shows a length of 68.6 feet. A second anomaly appears to be the measurement of the spread of the last tandem-axle group at both scale sites: Woodburn shows 2 feet and Ashland shows zero feet. There are also noticeable variations in the recorded axle weights (over 1,000 lbs).

Trip #2: On February 25, transponder #114000 made a trip southbound through Woodburn and Ashland and then returned northbound through Woodburn. Again, Woodburn SB shows a zero length and, again, the spread of the last tandem on this 6-axle double is incorrect at all three cites. There are also axle-weight variations, although it is not known if they are significant.

Trip #3: On February 26th, transponder #114002 made a trip through Woodburn SB and Jefferson SB. This is a 7-axle double and, as in the two earlier trips, there is a problem with the measurement of the spread of the last tandem axle (2 feet at Woodburn, zero feet at Jefferson). Also, again there is a zero overall length at Woodburn. Gross weight drops by 6,900 pounds between the two stations, but it may be that the truck dropped part of its load (this was not checked during the second interview).

5.3 Experience with Crescent Database

At the time of the first meeting with PLXPRESS, the company had been using its modem to access the Crescent database periodically to check the information available. It was disappointed in the quality of the information, primarily because the database appeared to be missing so many observations. PLXPRESS had been in contact with Lockheed about the problems but, at the time of the first meeting, no explanations had been provided. (It is speculated that most of these problems were related to malfunctioning transponders.)

Southard and Lockyer used their modem to access the Crescent database from time to time throughout the winter of 1992/93. During the second interview, an attempt to dial up the computer was unsuccessful. For some reason, the Lockheed computer would not accept PLXPRESS's password.

5.4 Experience with Lockheed hard copy AVI/WIM report

PLXPRESS has received hard copy reports from Lockheed but has not made much use of them. To date (at least up to the time of the second interview), the company prefers to use its modem access to the Crescent database.

5.5 Opinions on Use of AVI/WIM Data

According to Dale Lockyer, AVI data is (or could be) useful to the company for a number of purposes: verifying driver's logs, estimating arrival times for the stores in some circumstances (the stores have to have everything ready for the trucks so that they can be unloaded quickly), calculating actual driving times, and conducting post accident investigations. He would prefer a minimum of 20 minutes for the polling frequency.

The addition of WIM data does not increase the potential use of the data, Weight, either axle or gross, is not needed as trucks are scaled prior to a trip. However, the speed information might be useful for driver monitoring.

5.6 Experience with Weigh-Scale Bypassing

At the time of the September 1992 meeting, PLXPRESS had been unhappy with its experience bypassing at Woodburn SB. For one truck, where the driver kept records of every trip from April through to June 8th, it only received bypass clearance 18 times out of a total of 48 trips (on two occasions the scale was closed for maintenance).

Bypassing was discussed again during the second meeting. PLXPRESS has about two dozen trips a week through Woodburn NB and SB. The northbound scale is not important to this evaluation as most trucks are returning either empty or lightly loaded (Woodburn NB bypasses any truck which WIM shows to be 80,000 lbs or less). On the southbound scale, Dale Lockyer is not sure how many trucks typically receive bypass clearance. His estimate of the typical times (and these are rough guesses) is three minutes for an ordinary trip through Woodburn (over the static scale) and perhaps a saving of half a ‘minute if the bypass clearance is given. Obviously these times vary considerably depending on traffic. PLXPRESS uses an estimate of \$1/minute for the cost of a truck and driver while being unloaded at its stores (it tries to encourages the stores to avoid delays). On this basis, then, bypassing of transponder-equipped trucks at Woodburn SB is “worth” roughly \$0.50 per trip.

Two driver evaluation forms were provided at the second meeting. One truck had received bypass clearance, one had not. The driver (the same for both trips) estimates that the bypass clearance saved him half a minute. However, in a later part of the evaluation form, the driver writes:

‘Drivers consider this [transponder technology] as just another tool for management harassment of drivers. No time savings in by-passing scale.’

5.7 Significance of Potential Applications

Dale Lockyer provides the following ratings and rankings of potential applications. Three applications were not ranked as these were of little interest.

	Rating	Rank
fleet management	2	6
driver management	1	2
reporting/auditing	2	5
safety management	2	4
check on loading practices	5	NR
private use of AVI at terminals	4	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	2	3
bypass weigh scales/POEs	1	1

In addition, he said the company would be very interested in a “call home” capability.

5.8 Concluding: Views/Comments

Dale Lockyer’s final comment, at the conclusion of the second meeting, was: “I feel this program is very valuable provided the bugs get worked out. Problems with readers going on and off line and weights fluctuating from reader to reader. Specifically, I-205 in Portland is about the most fickle reader in the system and is the most valuable to us.”

6.0 Timber B-Products. Albany. Oregon

6.1 Description of Operations and Involvement

Timber By-Products is a small for-hire carrier of wood chips, sawdust and bark. It operates primarily in Oregon and Washington. The hauls are irregular in the sense that there is no fixed pattern from one day to the next in terms of the loads and routes taken. Nevertheless, there are only a given number of origins and destinations for the products moved so that drivers are familiar with the loading and unloading sites. Drivers are responsible for the proper loading of the vehicles, which are equipped with scales both on the tractor (load cells attached to the fifth wheel) and the trailers (air suspensions which are set such that at a certain pressure the driver knows the load on the axles). The company has 28 tractors, 26 of which have transponders, and a fleet of about an equal number of possum-belly trailers.

Currently the company uses tachographs and radio phones for its fleet management. The tachographs are used to monitor the performance of drivers (speed, unscheduled stops, delivery times) and the radio phones are used to schedule and route the loads. The company has thought of buying on-board computers.

Timber By-products participated in earlier Oregon projects involving transponders and its agreement to participate in Crescent is seen as a logical continuation of its interest in new technologies. It is particularly interested in anything which might help it monitor drivers. The earlier Oregon DOT programs gave the company useful information (apparently, these were printed reports on the location, weight, etc of the trucks).

The first meeting with the company was held on September 25, 1992 when Dwayne Hayes, the Traffic Manager, was interviewed. Communications throughout the winter of 1992/1993 was also with Dwayne Hayes. However, sometime in the spring of 1993, the position of Traffic Manager was eliminated. The second interview was conducted with Ron Green, the manager, on March 29, 1993.

6.2 Transponders

At the September meeting, Dwayne Hayes reported that nine of the original transponders had broken -- the attachment ears were not strong enough. By the spring meeting, Timber By-products had received and installed 26 replacement transponders. The company did not (apparently) complete the first monitoring forms so it is not known how many of these transponders are functioning. The company also did not (apparently) complete the second monitoring forms, although it may be that none of the trips are long enough for this consistency check to have been performed. (There is some uncertainty here about the monitoring effort of Timber By-products on account of the change in personnel responsible for the Crescent demonstration.)

6.3 Experience with Crescent Database

Timber By-products does not have modem access to the Crescent database.

6.4 Experience with Lockheed hard copy AVI/WIM report

Hard copy reports could not be found at the time of the March 29th meeting.

6.5 Opinions on Use of AVI/WIM Data

Green suggests the company would not use AVI data. Apparently, only four of the trucks make trips of a sufficient length to require logs and it is understood the company is doing something to change its designation in terms of the necessity of completing logs. Therefore, the issue of log checking is not, or soon will not be important.

The company would be interested in using AVI/WIM data for monitoring driver speed (although at some point in the future their OBCs also will do this). Additionally, Green said he would like WIM data to be accurate enough to use it as a check on the loads being carried. His reason is his concern with the weight-distance tax in Oregon. Apparently, the tax is computed on the basis of the highest weight recorded by the weigh scales. It is important, therefore, that a truck which ordinarily is licensed at and which operates at 80,000 pound never get caught with at a weight of 90,000 pounds. In addition to the overweight ticket, the company will pay the weight-distance tax on this 90,000-pound basis. (None of the details on the computation of ton-miles taxes has been checked with Oregon officials.)

6.6 Experience with Weigh-Scale Bypassing

Ron Green has not had feedback from his drivers about their experience bypassing at either Woodburn SB or NB. However, in the (departed) Dwayne Hayes' files, four driver evaluation forms were located. All of these were permit trucks (over 80,000 lbs.) on trips through Woodburn SB. Two received bypass clearance and two had not. Significantly, one of the bypassed trucks was probably (according to Ron Green) operating fairly close to its 105,500 pound limit. (The significance here is that anecdotal accounts from other carriers suggest the closer to 105,500 lbs a truck is, the more difficult it is to receive bypass clearance.)

6.7 Significance of Potential Applications

Ron Green provided the following ratings and rankings of potential applications:

	Rating	Rank
fleet management	2	5
driver management	1	3
reporting/auditing	2	7
safety management	1	2
check on loading practices	2	4
private use of AVI at terminals	5	9
tracking stolen vehicles	4	8
regional one-stop shopping	4	6
bypass weigh scales/POEs	1	1

As the company uses radio phones, it is not particularly interested in the use of HELP technology for a “call home” application. As Ron Green explained, however, there are gaps in the radio phone coverage where a “call home” ability might be useful but this would only work for Timber By-Products if AVI/radio transmitter coverage was quite extensive.

6.8 Concluding Views/Comments

At the conclusion of the second meeting, Ron Green noted: “The concept behind weigh in motion is great. There are some areas that will need to be addressed as far as axle spread and weight accuracy. But all in all the information can be utilized in different aspects of our business.”

7.0 Nickel Plate Express. Eugene. Oregon

7.1 Description of Operations and Involvement

Nickel Plate Express is a large, for-hire truckload carrier. Dispatching and routing of the trucks is irregular, dictated by the demand for truckload service, but much of the actual travel occurs on the I-5 corridor. Nickel Plate Express serves all western states (excluding Texas and points east) and the province of British Columbia. It operates about 105 tractors (the number fluctuates from month-to-month), with 18 driven by company drivers and 87 by owner-operators. All of the (approximately) 135 trailers are dry-freight vans.

Current technology used for fleet management includes on-board computers on company tractors (used to monitor the drivers and the equipment) and a computerized dispatch system (“Innovative”). The dispatch software keeps track of tractors on a zone basis and matches available equipment with loads as salesmen book new orders. Although the company has no direct way of locating tractors or communicating with drivers, drivers have instructions to call-in as and when deliveries are made to receive new instructions or as and when problems occur.

Information about Nickel Plate Express was developed during the course of two visits to the company’s office. The first was with Joe Franklin and Alene Wilson, who both work in the office, and Tony Note, the President. The second interview was held on March 30th with Mike Olufson, who is responsible for drivers and safety. Mike Olufson had just recently been handed the responsibility for the Crescent demonstration project. Joe Franklin also sat in on the second interview.

7.2 Transponders

At the time of the first meeting, 13 of the company tractors were equipped with transponders. The company asked for and received 18 replacement transponders and had at least 12 installed by March 30, 1993. It is understood that the delay in installing the remaining six transponders has something to do with the credentials paperwork.

The first monitoring exercise (checking whether the transponders are working) was performed during the second interview. As far as it is possible to determine, all 18 transponders are being recorded in the Crescent database. (Whether six of these are the original transponders is not known -- that is, given that Mike Olufson says only 12 of the replacement transponders have been installed, it is not known why 18 transponders are showing up in the reports.)

The second monitoring exercise (consistency check) was not completed by Nickel Plate; however, from the Lockheed hard copy report, it is possible to reconstruct a few trips. Some observations on the data are:

- o Nickel Plate's trucks are generally shown as class 11, however there a significant number of times when they show up as class 9. (All Nickel Plate equipment is 5-axle tractor semitrailers operating at 80,000 lbs or less.)
- o Woodburn SB consistently records an extra two feet of axle spacing at the end of the configuration -- that is, two feet from the fifth to a non-existent sixth axle.
- o While it is difficult to judge the quality of the other information shown without data on loads, most of it appears reasonable. Nevertheless, some inconsistencies do show up:

unit #704 operating through Woodburn SB on March 1 at 75,600 lbs and, 37 minutes later through Jefferson SB at 87,300 lbs;

unit #707 on March 10th, was recorded at 11:47 am at both Tacoma 56th and Tacoma 84th (there are a couple of miles separating these two points);

unit #714 on February 28th operating through Jefferson NB at 74,800 lbs and 71 minutes later showing up at the Portland Crescent site at 65,900 lbs;

unit #718 on March 8th being recorded at the Portland SB site at 96,900 lbs. The company has no permit trucks.

unit #717 on March 2nd showing up at the Redding site with six axles and a wheelbase of 94.9 feet. The company only operates five axle equipment; in this case the sixth "ghost" axle is shown with a weight of 1,200 lbs and a distance from the fifth axle of 41.2 feet -- presumably the steering axle of another vehicle.

7.3 Experience with Crescent Database

The company dialled into the Crescent database for the first time during the September 1992 meeting. At the time of the second meeting, it was evident that no one at Nickel Plate was making use of this modem access to the Crescent Database. The company has yet to discover any uses for the information. This is likely a reflection of the "demonstration" nature of the project rather than a negative view of Crescent -- it takes time to integrate' new sources of information into management procedures.

7.4 Experience with Lockheed hard copy AVI/WIM report

The company received two hard copy reports from Lockheed just prior to the second visit covering about a month of time from early February to March 11th. Eighteen transponders are showing up in these reports. It is not know if (a) there are still six old transponders on the trucks; (b) the information about the installed replacement transponders is incorrect; or (c) the company is in the process of changing the tractors which have six of the new transponders.

7.5 Opinions on Use of AVI/WIM Data

Nickel Plate would use AVI data for log checking, checking the routing of drivers (i.e., drivers told to take a certain highway), and checking drivers call-ins (i.e., verifying the location of a driver when he/she calls in). The two-hour polling frequency was a minor concern. AVI/WIM data would be used to monitor drivers (speed). The company cannot think of any uses for the axle weight or GVW information: all trucks are scaled before beginning a trip.

7.6 Experience with Weigh-Scale Bypassing

No driver evaluation forms were completed. However, Mike Olufson estimates that about 50 percent of the transponder-equipped trucks are receiving bypass clearance at Woodburn SB, versus only 75-80 percent for non-transponder-equipped trucks. (These are “soft” estimates.) The effect of this weigh-scale bypassing is to reduce the 3-to-4 minutes that it generally takes to proceed through Woodburn by about half, that is, a saving of about 1.5-to-2 minutes. In Mike Olufson’s opinion, this time saving is not significant. The company is primarily an owner-operator fleet and it pays all drivers by the mile. One-to-two minutes saved at a weigh scale can easily disappear in any number of other activities.

When pressed, Mike Olufson suggested the company might be prepared to pay a few cents for each mainline bypass (he was reluctant to commit himself to a figure as he is not really sure the company would be willing to do this).

7.7 Significance of Potential Auolications

Mike Olufson’s rating and ranking of the potential applications is as follows:

	Rating	Rank
fleet management	1	4
driver management	1	3
reporting/auditing	1	8
safety management	1	2
check on loading practices	4	9
private use of AVI at terminals	3	7
tracking stolen vehicles	3	6
regional one-stop shopping	2	5
bypass weigh scales/POEs	1	1

He also feels the company would be quite interested in a “call home” capability with the HELP technology.

7.8 Concluding Views/Comments

Tony Note, in the September interview, was very positive about the potential benefits of the HELP technology. One reason given for this interest is the ability to monitor the routing of drivers, particularly owner-operators. As a final comment made during the second interview, Mike Olufson brought up several points. First, he raised a concern about driver acceptance. Second, he voiced a concern about the states using the HELP data for enforcement purposes. Finally, he noted: "Can't see states reducing scale personnel -- trucks will still be forced to enter scales."

8.0 Chevron, San Ramon, California

8.1 Description of Operations and Involvement

Chevron has approximately 400 trucks. While this is a private trucking, irregular route operation, the "irregular" nature is not the same as it is for the large, for-hire truckload carriers. The retail and other outlets served by Chevron are all well-known locations. As and when they call-in their orders, a computer matches the available equipment/drivers so as to complete a delivery schedule that does not exceed an eleven-hour day. This may be one long trip or several shorter trips to and from the supply depot.

The San Ramon office is responsible for about 80 trucks which operate from a number of supply depots in western states. The five trucks with transponders operate in central California and generally pass through only two Crescent sites: Lodi and Santa Nella. These five trucks, and not the whole Chevron operation, constitute the extent of the HELP/Crescent evaluation.

The nature of this dispatching/routing is likely an important factor in Chevron's need for fleet management systems and its evaluation of the usefulness of Crescent data. Chevron trucks are equipped with on-board computers (Cadec) and cellular telephones. Any monitoring (equipment or driver performance) or location/communications aspects of the fleet management can be handled by this equipment.

Information about Chevron was developed during the course of two meetings (September 1992 and April 1993) with Darold Loshonkohl, Operations Specialist, and Jim Fleming, who works with Darold Loshonkohl.

8.2 Transponders

As of September 1992, three of Chevron's five transponders had failed and one may or may not have been working (this is based on communications with Lockheed). As of the end of January 1993, the company had received and installed five replacement transponders. While Chevron did not complete the monitoring forms between this point and the April meeting, a check of the Lockheed hard copy report showed that all transponders are reading (the one question mark being in the early February report when a couple of trucks showed "no data"). Given the nature of the loads and routes, it was not possible to conduct the second monitoring exercise (consistency check through several Crescent sites).

8.3 Experience with Crescent Database

The company had just made its first attempt to dial up the Crescent database a few days prior to the meeting on September 30, 1992. Between this interview and the April meeting, Chevron used its access to the Crescent database occasionally. Darold Loshonkohl and Jim Fleming feel that, if HELP technology were to be used, some work needs to be done to make this system of accessing the database easier. Currently, the only way the company can download information for analytical purposes is to perform a "screen print" command -- a slow and cumbersome procedure.

8.4 Experience with Lockheed hard copy AVI/WIM report

Chevron has received hard copy reports from Lockheed and Loshonkohl and Fleming had two (minor) observations. First, the reports contain a good number of duplicate records. This seemed to be a problem only with the early report (February 7 to February 22). Second, some transponders did not show up in the reports but, at the time of the second interview, it had not been determined if the trucks in question had, in fact, been on the I-5.

8.5 Opinions on Use of AVI/WIM Data

At the September 1992 meeting, Loshonkohl and Fleming were not sure that the information from the Crescent database would be useful for their operation. The one aspect of the HELP technology that might interest them, they said, is the state-line beacon.

By the time of the April meeting, Loshonkohl and Fleming could think of no uses for AVI data. Log checking is not an issue -- the OBCs develop logs and the company does not believe there is any reason why drivers would try to misrepresent any of the information (drivers do have to manually enter geographic locations into the computers). Estimating arrival times or locating trucks is not something for which the company needs HELP (it uses cellular phones).

Darold Loshonkohl and Jim Fleming also could think of no uses for AVI/WIM data: speeds are monitored by the OBCs and weight information for a regular tanker operation is generally not of concern (i.e., given that the volumes to be put in any tank are known).

8.6 Experience with Weigh-Scale Bypassing

Chevron has no experience with weigh-scale bypassing. The company did suggest, however, that it probably would not be cost effective to pay for mainline by-passing. Currently, drivers are only paid for delay time in a weigh scale or port of entry if the time spent equals or exceeds 30 minutes. Therefore, a mainline bypassing that saved only a few moments at each scale would not materially reduce the company's costs (drivers are paid by the mile).

8.7 Significance of Potential Applications

Darold Loshonkohl and Jim Fleming provided the following rating and rankings of the potential HELP applications:

	Rating	Rank
fleet management	5	NR
driver management	5	NR
reporting/auditing	2	1
safety management	5	NR
check on loading practices	5	NR
private use of AVI at terminals	2	4
tracking stolen vehicles	5	NR
regional one-stop shopping	1	2
bypass weigh scales/POEs	3	3

8.8 Concluding Views/Comments

As a final comment, Darold Loshonkohl and Jim Fleming note: “We currently have Cadec on-board computers and cellular phones that provide us with the vehicle and driver management information we need. Being able to obtain mileage/state/truck would be valuable and reduce administration time [i.e., having HELP technology used for state-line beacon marking and performing some of the reporting/auditing applications].” At the conclusion of the second meeting, it was clear that Chevron wanted to terminate its participation in Crescent. The company is willing to stay in the program in the interests of being a good corporate citizen but suggests it would prefer not to put any more manpower into the program. The company, it is understood, will leave the transponders on the trucks but does not intend to access the Crescent database and/or use the hard copy reports.

9.0 Thrifty Corm. Ontario, California

9.1 Description of Operations and Involvement

Thrifty operates a chain of retail stores and the trucking arm is responsible for supplying these stores in California, Oregon, Arizona and Nevada. The scheduling and routing of trucks is on a fairly regular basis. Where possible, the trucks are used to haul TL loads of inbound goods on their return trips. There are 72 tractors and roughly 300 trailers in Ontario. (This information was as of the October 1992. As of June 1993, the number of tractors at all locations was 60.)

Drivers, who are all company employees, are paid on both an hourly basis for short trips and a mileage basis for long trips. They are given specific routes to follow and narrow windows (+/- 15 minutes) within which to make deliveries. Because of this, the company has little need for the capability to either locate trucks or communicate with drivers. It also has no need of dispatch software, although this may change if and when the available software becomes more sophisticated than it currently is.

All tractors are operated under a full-service lease arrangement with Ryder so that aspects of fleet management are not directly in the hands of Thrifty (eg, all fuel is purchased by Ryder, all maintenance is done by Ryder, all fuel tax reporting and all vehicle registration is done by Ryder). Tractors are equipped with on-board computers (Rockwell's Tripmaster) and these are downloaded as the tractors enter the company's facilities in Ontario (there is a connecting mechanism at the gate). No satellite tracking, cellular telephones, or driver call-in procedures are used. Drivers do call-in in the event of trouble, break downs, or other problems. If the company has to communicate with drivers, it leaves a message at the next delivery point, ("We even know the truck stops where they'll be and can leave a message there if need be.")

Information about Thrifty was developed during a meeting with Dan Smith, Director of Traffic and Transportation, in October 1992. Following this meeting, responsibility for the Crescent project was handed to Kim Montgomery, a Field Supervisor. A number of calls were made to her between October and May 1993. However, as far as can be determined, the WHI monitoring forms were either lost or not given to her. At a second evaluation meeting in May 1993, neither Dan Smith nor Kim Montgomery could attend. Mitch Teich, the Field Supervisor in the Dispatch Office who had assumed Ms Montgomery's responsibilities, answered questions at this second meeting. He, too, knew nothing about any monitoring forms nor had he any personal experience accessing the Crescent database.

9.2 Transponders

Four transponders were issued to Thrifty and, to the best knowledge of Dan Smith in October 1992, all four were working. Four replacement transponders were installed at some point in January or February 1993. No monitoring of these transponders has been done. During the second meeting in May 1993, the only hard copy report available showed three transponders with data and one with "no data." However, whether or not the "no data" was because of a malfunctioning transponder or the routing of the truck could not be determined.

9.3 Experience with Crescent Database

Thrifty was issued a login ID in May 1992 and Dan Smith did access the Crescent database on occasion over the summer and fall of 1992. He could see many potential uses for the information: improving equipment utilization by having a historical record of truck movements; driver monitoring (routes taken); easing the reporting/auditing burden; backing up OBC data for safety management (eg, post-accident investigations); and assisting in the development of one-stop-shopping.

As far as can be determined, neither Kim Montgomery nor Mitch Teich had modem access to the Crescent database.

9.4 Experience with Lockheed hard copy AVI/WIM report

Thrifty is receiving hard copy reports from Lockheed. Although at the time of the second meeting it was not clear that these were being used, a June 22, 1993 letter from Dan Smith indicates the company is using the Crescent database to compare the information with the information from the company's Tripmaster reports. This would be difficult to do given the

amount of information available. For the period March 27-to-April 8, 1993, the four transponders Thrifty has only generated four observations in the Crescent database. (The scarcity of observations is because these trucks are used primarily in Southern California where there are only a few Crescent sites.)

9.5 Opinions on Use of AVI/WIM Data

Mitch Teich believes AVI data would be useful for log checking and for estimating arrival times. However, the density of AVI sites would have to increase over the routes the company serves before this use could be realized.

9.6 Experience with Weigh-Scale Bypassing

The company has no experience with weigh-scale bypassing. Mitch Teich believes, however, that the company would be willing to pay \$1 for mainline bypassing.

9.7 Significance of Potential Applications

Mitch Teich provided the following ratings and rankings of the potential HELP applications. This brings a somewhat different perspective than the vision offered by Dan Smith in the October 1992 meeting (eg, notice the rating for one-stop shopping).

	Rating	Rank .
fleet management	2	2
driver management	2	4
reporting/auditing	3	7
safety management	2	3
check on loading practices	5	9
private use of AVI at terminals	1	1
tracking stolen vehicles	3	6
regional one-stop shopping	4	8
bypass weigh scales/POEs	2	5

9.8 Concluding: Views/Comments

In terms of the company’s evaluation of HELP/Crescent, Dan Smith is very positive about the potential for the technology. He is (or was) also somewhat frustrated by the pace of events and the problems he saw with the organization of HELP/Crescent.

10.0 Tabor Truck Lines. West Sacramento, California

10.1 Description of Operations and Involvement

Tabor is a small, for-hire truckload carrier operating five tractors, all equipped with transponders, and five refrigerated trailers. A typical trip, with a duration to two-to-three days, is a load of frozen or other processed foods to the Bay area or Los Angeles and a load of

bananas on the return haul. Generally the company is able to match front and back hauls. Currently, the company only operates intra-California, although in the past it has operated into Oregon and Arizona.

Fleet management relies almost entirely on management's ability to keep track of everything with a telephone and a pad of paper. Orders are received, trucks are dispatched, drivers call-in both at two designated truck stops and at other times such as after making a delivery. New dispatch orders are given to the drivers over the telephone. None of the more advanced technologies are used (on-board computers, cellular telephones, satellite tracking, etc).

Information about Tabor was obtained from Tom Burton, the President, over the course of two meetings -- one in September 1992 and one on March 23, 1993 -- and a series of intervening telephone calls.

10.2 Transponders

Five replacement transponders were installed as of late January. No monitoring of these transponders has been done: there is no modem access and, as of the date of the second meeting, the company had only been receiving hard copy reports from Lockheed for a short period. A quick check of these reports suggests there are no missing observations.

No monitoring of consistency has been done. While none of the trips on the I-5 are, long enough to perform a consistency check the way they were originally intended, it is possible to check the data on the Lockheed reports. On one particular trip a 5-axle tractor semitrailer loses approximately 10,000 pounds and one axle between two Crescent sites (there was no actual change in the load or configuration). It was also recorded passing through the second site at a respectable 212 mph.

10.3 Experience with Crescent Database

As of the end of September 1992, the company had not yet obtained the new telephone line needed to access the Crescent database. By the date of the second meeting in March 1993, Tabor had acquired the telephone line and modem. However, its request of February 20th for a login ID and password had not yet been met.

10.4 Experience with Lockheed hard copy AVI/WIM report

Just prior to the second meeting, Tabor received two hard copy reports from Lockheed covering the period February 11th to March 11th.

10.5 Opinions on Use of AVI/WIM Data

Tom Burton has little use for Crescent data if all it contains is AVI "sightings." In saying this, though, he noted that there may be special occasions when such data would be useful. The example given was a recent citation received from the police where the claim was made that the driver's log book was fictitious. Burton felt that Crescent AVI data would have been able to prove the validity of the log book information. He felt that AVI/WIM data may be of some use to the company in managing drivers. When pressed for details, however, he had to admit that there was not much in the data he could use. A company of this size can be well-managed by one person without the aid of any data systems.

10.6 Experience with Weigh-Scale Bypassing

No Tabor trucks have had experience with weigh-scale bypassing. The routes taken do not include any Crescent sites capable of bypassing transponder-equipped trucks.

10.7 Significance of Potential Applications

Tom Burton provided the following ratings and rankings:

	Rating	Rank
fleet management	3	2
driver management	3	3
reporting/auditing	3	5
safety management	2	4
check on loading practices	2	6
private use of AVI at terminals	4	8
tracking stolen vehicles	4	7
regional one-stop shopping	4	9
bypass weigh scales/POEs	1	1

He also indicated an interest in a “call home” application of the HELP technology.

10.8 Concluding Views/Comments

Tabor’s original interest in participating in the Crescent demonstration project was sparked, in part, by wanting to know more about low-cost technologies which might assist in communicating with drivers and tracking trucks. The example given of the need is where new dispatch orders have to be sent to a driver prior to the time when the driver is expected to call-in.

The intrastate aspect of Tabor’s operations is important in understanding its evaluation of Crescent. During the first meeting in September 1992, little interest was shown in the potential applications of Crescent information of interest to interstate operators (reporting, auditing, beacon marking, etc).

As a final comment at the conclusion of the second interview, Tom Burton suggested that: “Driver acceptance may be an issue.”

11.0 Frito-Lay, Casa Grande, Arizona

11.1 Description of Operations and Involvement

Frito-Lay makes a variety of snack foods at plants throughout the western states. The fleet of 23 over-the-road tractors based in Casa Grande serves southern California, Arizona, Nevada and Utah, with the occasional trip to the northwest. The trucks haul products from one plant to

another and to distribution centers (as each plant only makes a limited number of products, it is necessary to move products to the other plants so that each area has a full range of products to supply the depots from which salesmen operate). The company also has an ICC authority which it uses as a contract hauler to make up for the empty miles that would otherwise occur within its distribution network. One of its larger shippers is Pepsi for whom Frito Lay hauls empty bottles. Frito Lay trucks are designed for cube-out freight -- that is, light products which fill the cube of the trailer before reaching the maximum weight allowed. Empty bottles are an ideal commodity for these trailers.

In addition to the 23 over-the-road tractors, the company has 78 highway trailers (a mixture of double 28-footers and 53-foot semitrailers), and a number of local tractors based at sites throughout the western states.

Much of the hauling done by Frito-Lay is on a regular schedule (at least compared to for-hire truckload carriers), so the fleet management -- in particular, dispatching -- is not as complex as in some companies. Currently, the over-the-road tractors are equipped with on-board-computers (Cadec) and the two tractors used in the contract haul for Pepsi also have cellular phones. Given the nature of the routes and the delivery schedules, there is no great need for the ability to locate trucks. Perhaps this explains the decision of the company some time ago not to purchase satellite tracking services. Trucks are dispatched -- whether hauling their own products between locations or hauling for contract customers -- and drivers are given a "window" within which to make the deliveries. Although drivers, who are paid by the mile, have some discretion in choosing routes and driving hours, these windows do not give them much latitude. Since the company pretty well knows when the trucks will show up and what the return load will be, there is no need to communicate with drivers (i.e., to give new dispatch orders). Nevertheless, the drivers do call-in on most days as they have to bid on the various routes available (which are given to the drivers are the basis of seniority).

Information about Frito-Lay, and its opinions about HELP/Crescent, were developed during two interviews with Alan Rau, the Inter-mountain Area Fleet Manager. The first meeting was on October 7, 1992 and the second on May 6, 1993.

11.2 Transponders

As of October 1992, Frito-Lay had received 21 transponders. Other than one which was broken, there was no known problem with the remaining 20. Replacement transponders were sent to Frito Lay sometime near the beginning of the year and, according to a series of telephone calls between January and May, they were going to be installed "soon." As of May 6, 1993, the replacement transponders had still not been installed.

11.3 Experience with Crescent Database

Although the company had a modem (at least as of the October 1992 meeting) and although Lockheed records indicate a login ID was issued on August 24, 1992, it appears that it never used this capability to access the Crescent database. At the May 1993 meeting, Alan Rau said he had been receiving the hard copy reports. As best as can be determined, these reports have not been used (it is understood that they generally show "no data" for most of the transponders -- either because of the routes travelled, the operational status of Crescent sites in Arizona, or because the old transponders are not working).

11.4 Experience with Lockheed hard copy AVI/WIM report

It is understood that Frito-Lay has not used the hard copy reports.

11.5 Opinions on Use of AVI/WIM Data

Alan Rau says he could use AVI data to check routing (the Cadec OBCs rely on drivers punching in locations), to check that drivers are punching in state line crossings correctly, to back up the OBCs if they fail (which they do occasionally), and for estimating arrival times. Rau was very interested in the last of these potentials: Frito-Lay operates tight windows for its deliveries and, on occasion, would like to have the ability to see if the time slots are going to be kept. Rau would like a polling frequency of one hour or less.

AVI/WIM data would not be particularly useful to Frito-Lay. As Rau points out, speed is not of concern (given the OBCs) and neither is weight (given the freight).

11.6 Experience with Weigh-Scale Bypassing

Frito-Lay has no experience with weigh-scale bypassing as the routes taken generally do not pass Crescent sites with bypassing capabilities. When told about the Santa Nella demonstration, Alan Rau was interested but could not put a dollar value on what a bypass was worth to his operation.

11.7 Significance of Potential Applications

Alan Rau gave the following ratings and rankings of potential HELP applications:

	Rating	Rank
fleet management	2	7
driver management	1	1
reporting/auditing	1	3
safety management	2	8
check on loading practices	4	9
private use of AVI at terminals	1	2
tracking stolen vehicles	1	6
regional one-stop shopping	1	4
bypass weigh scales/POEs	1	5

He also indicated he would be very interested if the potential applications included a “call home” capability.

11.8 Concluding Views/Comments

At the October 1992 meeting, Alan Rau indicated the main interest of Frito-Lay in participating in the Crescent project was to reduce the amount of time drivers spend in POE or weigh-scale stations. The head office of Frito-Lay is also interested in the potential of transponders to be used for keeping track of equipment.

12.0 United Parcel Services, Phoenix, Arizona

12.1 Description of Operations and Involvement

UPS is a very large parcel-delivery firm. Other than wanting to keep abreast of new developments, UPS did not have any preconceived expectations about what use it might make of the data available from Crescent or what other benefits might follow from other HELP applications. This description and evaluation concerns only the UPS Phoenix fleet. Most of the information obtained for the evaluation was from Frank Cademarti, System Manager for the North-West Region, based in San Ramon, California. In addition, one meeting was held in Phoenix with management from the Operations and Maintenance departments.

At Phoenix, there were (October 1992) roughly 21 tractors operating on the I-10 corridor between New Mexico and California (four Crescent sites). The routes assigned for the linehaul tractors are such that the vehicles return to home base on a daily basis. While details on how UPS manages its fleet are not known, procedures are evidently well-planned and tightly organized ("We measure everything."). The Operations persons in Phoenix knows where all trucks are at all times -- the routing and delivery schedules are precise. This is without the benefit of any tracking system. Tractors are equipped with tachometers which satisfies the monitoring that has to be done. There are also plans to equip tractors with on-board computers in the future. At the second interview, it was also learned that UPS is evaluating a number of electronic tags to use for its entire fleet (tractors, trailers, dollies).

12.2 Transponders

Although 21 transponders had been shipped to UPS, as of early October 1992 they had not been installed. In fact, at the time of the October meeting it was not clear that anyone knew where the transponders were (the operational people in Phoenix had no knowledge of them). As of the second interview on April 7, 1993 the Phoenix UPS fleet had 35 replacement transponders installed according to Frank Cademarti. No monitoring of these transponders had been done (i.e., to see if they are working or to check the consistency of Crescent sites).

12.3 Experience with Crescent Database

While UPS received its entry ID in August 1992, it is not clear that there has ever been much use made of this method of accessing the Crescent database. As of March 5, 1993 telephone call with Cademarti, a person was about to be trained to pull data from the modem access. Evidence that this ever happened has not been provided.

At the second meeting, in April 1993, it was explained that UPS has systems in place that now do most of what HELP/Crescent data might be used for.

12.4 Experience with Lockheed hard copy AVI/WIM report

No information was obtained to suggest that UPS has made much use of the Lockheed hard copy report.

12.5 Opinions on Use of AVI/WIM Data

UPS does not need AVI data for its fleet management (log verification, tracking, or ETAs). AVI/WIM data is also of no use to UPS. According to Frank Cademarti, Lockheed has been informed of this lack of interest in the AVI/WIM data.

12.6 Experience with Weigh-Scale Bypassing

The Phoenix-based fleet of UPS has no experience with weigh-scale bypassing; there are no Crescent scales capable of bypassing on the routes traversed. UPS is enthusiastic about the prospects for Santa Nella project and, as of information received in early February 1993, has applied for 100 express receivers. (These were not for the Phoenix-based tractors.) As of the date of the second evaluation interview, however, UPS was still waiting to receive this equipment.

According to Frank Cademarti, UPS would not be willing to pay \$1 to \$2 for mainline bypassing.

12.7 Significance of Potential Applications

Frank Cademarti provided the following ratings/rankings of the potential applications:

	Rating	Rank
fleet management	4	NR
driver management	4	NR
reporting/auditing	5	NR
safety management	3	3
check on loading practices	5	NR
private use of AVI at terminals	4	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	2	2
bypass weigh scales/POEs	1	1

In terms of his response to the potential use of electronic tags for “private use of AVI technology at terminals,” it has to be noted that UPS is, itself, testing electronic tags. The above ranking (“4” or “questionable value”) is in respect of HELP-associated AVI. In terms of the response to “tracking stolen vehicles,” UPS trailer design makes the possibility of theft questionable. In terms of the response to “regional one-stop shopping,” UPS is interested in the potential of HELP technology and, in this regard, noted that the company has a real problem with trailer registrations. That is, there is a large effort required making sure the right registrations are attached to the correct trailers. The hope, for HELP technology, is that electronic identification would ease this difficulty.

UPS expressed no interest in any other potential HELP applications (“call home,” etc).

12.8 Concluding Views/Comments

In concluding the second interview, Frank Cademarti said “At the present time, United Parcel Services is developing on board computers and monitoring devices on its tractor/trailer operations. The information available [from the Crescent project] is of little or no use for our management (fleet). The sole use of the system would be for scale bypass and possible registration purchasing.”

13.0 Texas Instruments, Dallas, Texas

13.1 Description of Operations and Involvement

Texas Instruments hauls many of its own products to distribution centers and, on the backhaul, uses these trucks to bring in raw materials. It also has for-hire authority and uses this to fill up what would otherwise be empty miles. The total fleet in Dallas numbers about 72 tractors and it operates into all western states and occasionally into Canada.

Drivers are paid by the hour and, within limits, are free to chose their own routes, given that certain delivery schedules have to be met. Tractors are equipped with cellular telephones and electronic tachs. In addition, tractors and trailers are equipped with Texas Instruments own tags (TIRIS, or Texas Instruments Registration Identification System). These radio frequency tags are not compatible with HELP technology and are used by Texas Instruments more-or-less to keep track of equipment as it enters or leaves company premises.

The main interest of Texas Instruments in agreeing to participate in the Crescent project was to speed up the passage of trucks across state lines. On a typical round trip to the west coast, the company estimates it could save one hour if trucks did not have to stop at Port-of-Entry and/or weigh-scale stations. The company is also interested in using the data in the Crescent database for vehicle and driver monitoring and hopes that HELP technology will eventually eliminate some or all of the current reporting requirements.

Information about Texas Instruments was obtained in two meetings -- October 1992 and May 1993 -- with Jeff McLaughlin, Manager of Corporate Material Services, and Ed Rutter, Administrator. Between the two meetings, there were several telephone conversations to check progress with the evaluation

13.2 Transponders

As of October 1992, Texas Instruments had acquired 20 transponders for this fleet of 72 tractors. Some had broken or otherwise were not working (precise numbers not known). By early February 1993, the company had replaced all but four of the transponders (it appears that four of the original trucks were sold and, as a result, Texas Instruments' involvement in Crescent dropped, to 16 tractors as of the date of installing the replacement transponders). No monitoring of these 16 transponders was done. At the May meeting, hard copy reports from

Lockheed for the period from March 12 to April 27 were checked and there appeared to be eleven transponders that were not being recorded in the Crescent database. After some checking, it was more-or-less established that five of these should have shown up -- that is, they were on trucks used on the Crescent routes during this March 12 to April 27 period. One difficulty in being confident about this number is that drivers are free to take whatever routes they chose.

It was not possible to undertake the second monitoring exercise (consistency check) given that none of the trips passed through enough Crescent sites. However, from a quick check of the Lockheed hard copy reports, neither McLaughlin nor Rutter could see any obvious problems with the axle weight or gross weight information shown.

13.3 Experience with Crescent Database

In October 1992, Texas Instruments was one of the few case-study carrier actually using its modem access to the Crescent database. Curiosity about the information contained was likely the main reason for this access -- that is, no specific uses were ever made of the information.

13.4 Experience with Lockheed hard copy AVI/WIM report

Texas Instruments is receiving Lockheed hard copy reports. It does not appear to be making much use of them -- presumably, it prefers its modem access.

13.5 Opinions on Use of AVI/WIM Data

At the May meeting, neither Jeff McLaughlin nor Ed Rutter thought the company would have much use for AVI readings in the Crescent database: log checking or checking routes or estimating arrival times are not major concerns. For this reason, the current two-hour polling frequency is not seen as a problem.

There may be occasional instances of where Texas Instruments could use the AVI/WIM data. The example given, of an actual attempt, is a situation where there is some question as to whether or not a shipper had loaded one of the company trucks. In this case, Ed Rutter did try to use the Crescent data to see if WIM data would show that the truck was loaded. Unfortunately, in this particular case, the trip did not pass through any working Crescent WIM sites.

13.6 Experience with Weigh-Scale Bypassing

The company has no experience with weigh-scale bypassing. Nevertheless, Jeff McLaughlin felt the company might be willing to pay up to \$2.14 for mainline bypassing (this is simply his estimate of \$30 for a trip to the west coast which passes through 14 scales and/or POEs on both legs of the trip).

13.7 Significance of Potential Applications

Jeff McLaughlin provided the following ratings and rankings:

	Rating	Rank
fleet management	1	5
driver management	3	6
reporting/auditing	1	4
safety management	3	7
check on loading practices	4	8
private use of AVI at terminals	1	1
tracking stolen vehicles	4	9
regional one-stop shopping	1	3
bypass weigh scales/POEs	1	2

The response to the “private use of AVI” should be seen in light of Texas Instruments’ current use of its own tags for this purpose (i.e., not the current Crescent tags). Texas Instruments is not interested in any “call home” applications of the HELP technology (it has cellular phones).

13.8 Concluding Views/Comments

At the conclusion of the May meeting, Jeff McLaughlin listed three issues: seamless borders (which he would like to see); congestion management (a potential application that interests him); and driver acceptance (a concern).

14.0 Tyler Pine Industries, Tyler, Texas

14.1 Description of Operations and Involvement

Sometime over the winter of 1992/93 the transportation division of Tyler Pipe changed its name to Swan Transportation. However, for the purposes of this report, the original name is maintained.

Tyler Pipe Industries manufactures cast iron waste and drainage pipes. It distributes this product from Tyler to all parts of the United States and Canada, using a combination of its own trucks and for-hire carriers. Currently, the company has a fleet of 57 tractors and a couple of hundred trailers (flatbeds with low sides). Company trucks handle the shorter hauls -- generally no trip over two days -- and haul product either to distribution centers or to construction sites. As a result, about one-half of the trucks (the ones hauling to distribution centers) are used on a fairly routine schedule (routes, delivery times, destinations, etc are all well known). The other half of the deliveries from Tyler are irregular -- they depend on orders received for various construction sites. In this case, the deliveries are quite time-sensitive with a form of JIT being used to ensure the pipe arrive as the construction proceeds.

Company trucks are also used to bring inbound goods -- scrap iron and other materials used in the processing -- back to Tyler. Shipments out of Tyler can be loaded a day or two before the truck is dispatched. Similarly, the inbound goods are often stored on the trailers until needed at the plant. This use of trailers explains the high ratio of trailers to tractors (roughly four-to-one) and, in turn, explains one of the company's interests in HELP technology (using transponders to keep track of equipment in and out of the Tyler plant).

No technologically sophisticated procedures are used for fleet management (tachs, OBCs, cellular telephones, etc). Drivers are instructed to call-in only if problems develop (eg, a delivery schedule which cannot be met). The company is investigating the purchase of a computerized dispatch system and hopes to make a decision shortly. The company's interest in HELP technology is primarily to track equipment. This tracking includes everything from locating a truck and a driver, to checking the routes drivers take (driver monitoring), and to tying-in the transponder technology with AVI readers at the company premises (and, presumably, the pending purchase of a computerized dispatch system).

Information about Tyler Pipe was obtained during the course of two interviews with Wayne C. Whitaker, the Transportation and Traffic Manager.

14.2 Transponders

As of October 1992, the company had had 50 transponders installed. One was stolen and one broke, leaving 48 on tractors. As of February 1993, Wayne Whitaker reported that all 50 replacement transponders had been installed. No monitoring of these transponders has been done, so it unknown how many of these replacement transponders are working.

14.3 Experience with Crescent Database

The company has no modem access to the Lockheed database. Lockheed records indicate that a login ID was issued on August 17, 1992. Wayne Whitaker, however, says he has received no login ID from Lockheed. The company has mailed in a request twice and faxed in a request once for a total of three requests to date. According to Whitaker's records, no response to these requests has been received. At the May, 1993 meeting, Whitaker indicated that, after these three attempts in the fall of 1992, he had abandoned any efforts to obtain a login ID.

14.4 Experience with Lockheed hard copy AVI/WIM report

Tyler Pipe is receiving Lockheed hard copy reports. At the May meeting, a check of these reports for the period February 27 to March 11 and March 27 to April 8 shows one of the problems with Tyler Pipe's participation in the Crescent demonstration: for 50 transponders for a total of four weeks, there are only seven observations! With this amount of information, the apparent lack of interest in the Crescent database by Tyler Pipe may be understandable.

14.5 Opinions on Use of AVI/WIM Data

Wayne Whitaker says that AVI data would be useful for log checking, route checking and driver monitoring (speed). AVI/WIM data would also be useful for driver monitoring (speed); the weight information itself is of no use. He also indicates that he would be somewhat concerned if the AVI/WIM sites were located in weigh scales with the result that there would be “black outs” in the recorded data.

14.6 Experience with Weigh-Scale Bypassing

Tyler Pipe has no experience with weigh-scale bypassing. Nevertheless, Wayne Whitaker indicated the company might be prepared to pay up to \$1 for mainline bypassing.

14.7 Significance of Potential Applications

Wayne Whitaker provided the following ratings and rankings:

	Rating	Rank
fleet management	1	1
driver management	1	5
reporting/auditing	1	4
safety management	1	2
check on loading practices	5	NR
private use of AVI at terminals	1	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	4	NR
bypass weigh scales/POEs	1	3

He also indicated that he might be interested in a “call home” capability.

14.8 Concluding Views/Comments

Nothing offered.

GROUP 2 CARRIERS

15.0 Frito-Lay. Vancouver. Washington

15.1 Description of Operations and Involvement

Frito-Lay completed and returned a survey. Further information was obtained during an interview with Jim Bennett, Traffic Supervisor, on March 24th.

From the Vancouver location, Frito-Lay operates 45 tractors distributing product to depots throughout the western states. Trucks are also used in a for-hire capacity on backhauls. Frito-Lay has received and installed its replacement transponders. Jim Bennett was not sure of the number, although Lockheed records indicate the company had 44 of the original transponders.

Onboard computers are the main feature of the company's fleet management. With these, and the associated software at the terminal, most aspects of driver and equipment monitoring are already satisfactory, according to Bennett. Drivers on long trips are instructed to call-in daily; drivers on local trips have cellular phones in the truck.

15.2 Opinions Stemming from HELP Involvement

Bennett could use AVI data for tracking trucks (although this did not seem to be a pressing need). Ideally, he would like the polling to be done at a minimum of every 20 minutes. The addition of WIM data to the AVI would not add anything for Frito-Lay in terms of using Crescent data for management purposes. Bennett did say, however, that, if there were WIM data at all Crescent sites, the company would like to be able to use this to calculate the weight-distance tax in Oregon. He points out that they now spend 10-to-15 person hours a week calculating this tax.

Bennett has not had enough feedback from drivers to know anything about weigh-scale bypassing at Woodburn SB. (Woodburn NB is not important as these trucks are all under 80,000 lbs.) He did think, however, that mainline bypassing could be worth up to \$5-to-\$10 per bypass.

15.3 Significance of Potential Applications

Bennett provided the following ratings and rankings:

	Rating	Rank
fleet management	3	5
driver management	3	4
reporting/auditing	3	6
safety management	4	8
check on loading practices	3	7
private use of AVI at terminals	4	3
tracking stolen vehicles	4	9
regional one-stop shopping	3	2
bypass weigh scales/POEs	2	1

Jim Bennett would be very interested in the HELP technology if it included a “call home” feature.

16.0 FTL Inc., Portland, Oregon

16.1 Description of Operations and Involvement

FTL Inc. completed and returned a survey and an interview was held on March 25th with Dave Asbury, Safety Manager, to clarify details.

FTL is a for-hire interstate and international (Canada) carrier. Most of its trips are relatively short; only a few involve a truck being out of the terminal over night. The company operates 44 tractors, 43 company-owned and one owner-operator. About half the business is a regular route, delivering newspapers. The remainder is irregular route, truckload freight --primarily general freight, although the company does have six refrigerated trailers.

The company has received nine replacement transponders but has yet to install them. This may have been an oversight as the fact that they were not installed only came to light through prompting during the interview -- Dave Asbury had to check with maintenance to find out about it. There is no modem connection to the Crescent database. The company has recently received a hard copy report from Lockheed and it appears that five out of the nine (old) transponders are not working: there is no data for five units for the February-to-March reports and it is known that these trucks frequently use the I-5.

About half the trucks are equipped with OBCs. These are used to monitor the truck and the driver; they are not used to produce driver's logs. Drivers, other than those on the newspaper routes (which are very regular runs), are instructed to call-in twice a day. Some tractors are equipped with cellular phones, some with mobile radio phones and others have no communications capabilities.

16.2 Opinions Stemming: from HELP Involvement

Asbury says the company could use AVI data for aspects of its fleet and driver management. Two examples given were estimating arrival times, and fleet/safety management (presumably checking logs). Ideally, the company would like the HELP sites polled every 10 minutes.

AVI/WIM data would add to the company's ability to monitor drivers (speed, loading).

No information was available on bypassing experience at Woodburn NB or SB, for transponder-equipped or other trucks.

16.3 Significance of Potential Applications

Dave Asbury gave the following ratings and rankings of the potential HELP applications:

	Rating	Rank
fleet management	1	2
driver management	1	3
reporting/auditing	3	4
safety management	1	1
check on loading practices	3	5
private use of AVI at terminals	4	6
tracking stolen vehicles	4	9
regional one-stop shopping	4	8
bypass weigh scales/POEs	1	7

He would also be interested in a “call home” capability with the HELP technology.

17.0 Bi-Mart Corporation, Eugene, Oregon

17.1 Description of Operations and Involvement

Tom Swarts, Traffic Manager, completed and returned a survey plus one driver evaluation form. An interview was held on March 29th to expand on the information provided.

Bi-Mart is a private carrier servicing a chain of retail outlets in Washington and Oregon from its distribution center in Eugene. It has 20 company-owned tractors and operates a number of configurations of dry-freight vans, including doubles registered at up to 105,500 pounds. Twenty replacement transponders have been received by the company and 19 are installed. Most trucks operate on a regular route and return to the terminal each day. For fleet management the company uses speed-o-graphs, tachs and instructions for the drivers to call-in once a day.

The company has no modem access to Crescent. The reason, according to Swarts, is that the company was told it's existing 1200 baud modem was not adequate. The company does not believe the cost of a 2400 baud modem is worth the data which might be obtained.

17.2 Opinions Stemming from HELP Involvement

Swarts says Bi-Mart would find AVI data useful for log verification. In addition, there may be occasions when tracking a truck might be important -- say when a store telephones to find out why a truck is late. While the two-hour polling frequency is not seen as a problem (the main use of AVI data was perceived to be log verification), a shorter cycle would be desirable if truck location and tracking ever became important.

The company would use AWWIM data for driver monitoring (speed) -- since the company has speed-o-graphs in the truck, this is more-or-less a double check on drivers. Weight information might also be useful as the trucks are not scaled before being dispatched (the warehouse depends on its knowledge of shipments to estimate load weight and much of the freight is relatively light in any case).

In terms of bypassing experience, Bi-Mart had one driver evaluate the Woodburn SB POE. This particular truck, a double-trailer configuration with a GVW of 98,160 was not given bypass clearance. The driver’s understanding as to why he was called in for a static weigh was that he was “close to the weight limits.” Tom Swarts guesses that about half of his loaded, transponder-equipped trucks are receiving bypass clearance through Woodburn SB (the trucks are generally loaded in the southbound direction). He does not consider the time saving for weigh-scale bypassing to be significant (drivers are paid by the mile). He would be prepared, however, to pay in the range of \$1 for mainline bypassing.

17.3 Significance of Potential Applications

Tom Swarts provided the following information about the value of potential HELP applications:

	Rating	Rank
fleet management	2	2
driver management	2	1
reporting/auditing	3	5
safety management	3	3
check on loading practices	2	4
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	5	NR
bypass weigh scales/POEs	2	NR

He is not sure the company would be interested in a “call home” application.

As a final comment, Tom Swarts says: “We are mainly participating [in the Crescent demonstration] to be a good corporate citizen as opposed to any expectation that we will get data that we can use.”

18.0 Reed’s Fuel & Trucking. Springfield. Oregon

18.1 Description of Operations and Involvement

Reed’s Fuel & Trucking completed and returned a well-thought out survey plus one driver evaluation form. An interview was held on March 29th with three people from Reed’s to clarify and expand upon aspects of the information: Garry Reed, Jason Reed and Daniel Leavitt.

The company operates a fleet of 60 tractors, all company-owned, in Oregon and Washington hauling primarily general freight on relatively short hauls. Most trucks return to their terminals at the end of every day. The routes are irregular (i.e., as dictated by the loads available) and many of the tractors operate on a permit (over 80,000 lb) basis.

Tractors are equipped with tachs and a few of the newer ones have electronic engines. The company uses custom software for it maintenance. It also has developed its own software for dispatching. Details are not known other than that it keeps track in real time of equipment on a zone basis but has no communications capabilities.

Communications with drivers is maintained with two-way company radios (although this may not blanket all the territory served). In addition, drivers are instructed to call-in.

Twenty-five tractors were equipped with replacement transponders in late December 1992 and the company has modem access to the Crescent database and appears to be using it.

18.2 Opinions Stemming from HELP Involvement

Reed's is receiving hard copy reports from Lockheed and all replacement transponders appear to be reading properly (i.e., showing up in the Crescent database). The company is not happy with the accuracy of some of the information shown: weights are incorrect and extra axles appear for some configurations. The company provided a lengthy hard copy report from Lockheed with anomalies noted (this was for the period January 1 to January 15th). The most serious problem is the large number of duplicate records shown. Other records highlighted are:

- o On January 6th, unit #11 is shown passing through Jefferson NB at a weight of 95,100 pounds and a wheelbase of 77.9 feet. One hour and 13 minutes later, it is shown passing through the Portland site with a weight of 165,400 pounds and a wheelbase of 126.4 feet.
- o On January 13th, unit #7 is shown passing through Jefferson SB with a wheelbase of 134.1 feet.
- o On January 5th, unit #18 is shown passing through Jefferson SB with a gross weight of 127,400 pounds and a wheelbase of 148.9 feet.

There are many other records highlighted by Reed's in the Lockheed report provided. The inaccurate wheelbase measurements always seem to occur at Jefferson SB. Duplicate records seem to occur at several sites. Woodburn SB is generally shown with an extra two feet tacked on to the end of the vehicle and (apparently) in the measured wheelbase. Kelso is the only site which appears to generate triplicate records on occasion.

In terms of modem access, the company makes the point that the procedure to determine truck speed is cumbersome. A user has to go into the individual truck activity record to find this information rather than being able to see it on the daily or weekly summary screen.

The Fuel Management group within the company is using AVI data to check driver's logs. In addition, the company would consider using AVI information for truck tracking. If it did use it for tracking, it would prefer a polling frequency of a minimum of ten minutes.

The company raised a concern that states might have access to the HELP data for enforcement purposes. The persons interviewed indicate that the company has received Oregon State Scale crossing printouts which contained transponder readings. They point out that Oregon officials could use this information, along with the manually-collected readings, to audit logs.

Reed’s would use AVI/WIM data for driver monitoring (speed). It was not clear that it had any use for the weight data: the three persons interviewed were preoccupied with the issue of accuracy which, currently, rules out the use of this data for anything.

Three driver evaluation forms were submitted, all for Woodburn SB. Two of the trucks received bypass clearance, one did not. (Details on weights are not known.) The average time saved, according to the two bypassed drivers, was 2.5 minutes.

In the first week of March, the company estimates it had 50 trucks passing through Woodburn SB of which 20 were transponder equipped. According to the company, all loaded trucks (with or without transponders) were called in for a static weigh whereas empty trucks were given a bypass clearance. The company writes: “Oregon can’t calc. weight correctly with WIM. All drivers that I talk to proceed to scales when loaded. All trucks are legal weight!”

Reed’s would not pay for a mainline bypass. Drivers are paid a percentage of the hauling revenues and the company would gain nothing from the time saved.

18.3 Significance of Potential Applications

Reed’s provided the following information on potential HELP applications:

	Rating	Rank
fleet management	1	4
driver management	1	3
reporting/auditing	1	1
safety management	1	2
check on loading practices	5	9
private use of AVI at terminals	1	6
tracking stolen vehicles	3	8
regional one-stop shopping	2	7
bypass weigh scales/POEs	4	5

The company would also be interested in a “call-home” capability, although it writes: “this would be good if the distances between readers were within a reasonable range of one another.”

As a final comment, the company write: “Oregon has more transponder readers then Crescent shows. Oregon also has all reader info (speed, time) before it is passed to Crescent, this info could become costly [i.e., fines, ton-mile taxes] to a company if the state were to use it [illegible] we see good things from Crescent as log & speed [illegible], scale bypass when loaded has not been a factor to our fleet.”

19.0 United Grocers, Inc., Medford, Oregon

19.1 Description of Operations and Involvement

Stan Schlosser, Maintenance Foreman, returned a well-completed survey. This was supplemented with an interview with Stan Schlosser, and two other employees of United Grocers, on March 31st. (The names and positions of the other two were not recorded: one was from dispatch and the other, Eileen, appeared to have control of driver and fleet records.) Based on this interview, an important concern about the Crescent/HELP project was raised: what is the control on matching the correct transponders and trucks?

United Grocers operates a large supply depot in Medford and operates from there north (roughly half way to Portland) and south (roughly as far south as the Sacramento area). The company is primarily a private carrier, distributing goods to its own stores and bringing truckloads of supplies back to the depot. It also has a for-hire authority to reduce empty backhauls. It owns 35 tractors and all are equipped with replacement transponders. Most of the trips are short, being completed in a day or less.

The company has a relatively sophisticated fleet management system. Most tractors have electronic engines which control such things as driver speed and maintenance scheduling, and all tractors are equipped with OBCs (Stemco). The computers are used for monitoring as well as the production of logs. In addition, there are detailed trip reports compiled which match drivers, tractors, trailers, routes, etc.

There are no particular instructions to drivers about calling in (there is one cellular phone used on occasion). Since most deliveries are regular and the destinations are the stores the company serves, there is no great need to communicate with drivers. Drivers know their delivery routes and backhaul loads the day before being dispatched.

The replacement transponders are well-secured to the bumpers as, in addition to the two mounting holes, the company has used a strong glue on the back of the transponder to firmly affix it to the tractor. Although the company has a modem, it does not have access to the Crescent database. This is more of an oversight than a lack of desire to have computer access the data.

19.2 Opinions Stemming from HELP Involvement

During the course of the March 31st meeting, it was revealed that 19 tractors had been replaced since the original transponders had been installed but that the "paper work" for these changes had not been sent to Lockheed. This revelation led to a discussion of how the Crescent system checks credentials, specifically, how the system knows that a tractor is, indeed, the tractor for which the credentials apply.

Schlosser says the company would use AVI data for a number of purposes. First, it would use it to check the accuracy of their current system (the Stemco OBCs and the resulting logs and other records). Drivers have to physically punch in locations on the OBCs and the company does not know how accurate this is. Secondly, there is a concern that at times when the Stemco computers fail to operate ("a blown fuse," etc) the company is not in a position to know

if driver sabotage is involved. With AVI data, the company would be able to know if the driver's manual records about routes and location were accurate. United Grocers did not express any interest in using AVI data for log checking (the OBCs do this), checking routes, or checking call-in locations. Ideally, United Grocers would prefer a polling frequency of 20 minutes or less.

United Grocers would use the AVI/WIM data for checking loading practices. Speed monitoring is not a concern, given the electronic engines. The concern with loading is complex: because of the different loads and different trailer used, there sometimes is a concern that the axles are not properly placed. Tractors have sliding fifth wheels and the trailer axles also move. The company occasionally receives an axle overload ticket. It would like to be able to have the records to show where and why this is occurring. It could be that some drivers, on some routes, with some trailers are not placing axles in the correct position. In the course of this discussion, one particular trip was examined from the Lockheed hard copy report. A 5-axle tractor-semitrailer is shown as legal through a number of cites and with a distance of about 32 - 33 feet between the third and fourth axle (the last drive axle and the first trailer axle). On the next trip, with a different load, the unit is shown with an overloaded trailer tandem through several Crescent sites and with a spacing between the third and fourth axle of about three feet less than before. This seemed to be exactly the type of information United Grocers wanted to be able to detect from the Crescent data. The question now was what trailer was the unit hauling (i.e., to determine if the driver was hauling a shorter trailer or whether it was a long trailer where the driver had forgotten to change the trailer axles). The company records, which are understood to be accurate, showed that the tractor in question was not used on this particular day. This, again, raised the question as to whether or not the replacement transponders had been placed on the correct tractors. No answer was forthcoming during the course of the March 31st meeting, but there is a clear suspicion that neither the states, if they are using Crescent data to check credentials, nor the company, if they are using the Crescent data for fleet management purposes, knows which transponders are on which trucks.

As the company does not operate through Woodburn NB or SB, no information on weigh-scale bypassing was developed. (The company trailers may sometimes be switched with United Grocers tractors from Portland, but this is a different operation.) However, in the course of discussing weigh-scale bypassing and mainline bypassing, one important point emerged. Whereas most of the carriers to the north of Medford discuss weigh-scale bypassing -- and, consequently, the value they put on mainline bypassing -- in terms of scales such as Woodburn SB, United Grocers in Medford views the issue more in terms of their experience at Ashland or Mount Shasta. There is, apparently, an important difference between Woodburn on the one hand and Ashland and Mount Shasta on the other: the time it takes a truck to proceed through the scales. Most carrier to the north suggest a time of about 2 to 5 minutes, depending on traffic, at Woodburn SB. United Grocers' records indicate an average of about 8 minutes at Ashland. This is the time in the scale. Drivers have to punch this into the OBCs as they are paid lay-over while in the scale, and the records are considered accurate as the driver cannot punch it in until the truck has stopped (or come close to a stop?). Adding a few minutes for slowing down and re-accelerating, United Grocers estimates the time to proceed through Mount Shasta or Ashland is about double the time at Woodburn. At a labor cost of \$20 an hour, the company would be willing to pay in the range of \$3.33 per mainline bypass.

19.3 Significance of Potential Applications

United Grocers rated and ranked the potential applications as follows:

	Rating	Rank
fleet management	2	4
driver management	2	2
reporting/auditing	2	3
safety management	4	7
check on loading practices	3	5
private use of AVI at terminals	5	9
tracking stolen vehicles	4	8
regional one-stop shopping	3	6
bypass weigh scales/POEs	1	1

It was also interested in a “call home” capability.

As a final comment, Schlosser said that he thinks the idea of electronic license plates is wonderful and that, someday, he would like to see vehicles manufactured with the transponders built right in.

20.0 Willamette Industries Inc./Beaverton Bag. Beaverton. Oregon

20.1 Description of Operations and Involvement

Ron Smith, Transportation Manager at the bag division of Willamette Industries was visited on April 1, 1993 for the purpose of clarifying aspects of his response to the survey. There was confusion about Willamette’s participation in Crescent. According to Ron Smith, he is only responsible for 11 tractors; other divisions of Willamette, with more trucks, are also participating in Crescent. Smith believes that, at one time, Lockheed had sent about 50 transponders to him. He felt these other divisions also should be interviewed. (WHI has no information on any other division of Willamette Industries participating in Crescent.)

Willamette Industries (bag division) is a private carrier with 11 tractors operating on the I-5 from about the Seattle area to as far south as the I-10. Most of the trips, however, are relatively short: the mill is located in Albany, just south of Portland, and this Albany-to-Portland haul appears to account for most of the work. The company also has for-hire authority to help reduce empty backhauls. Willamette has 11 replacement transponders. It has no modem access to Lockheed and the hard copy reports recently received include, in addition to the 11 replacement transponders, readings from other trucks operated by other divisions of Willamette Industries.

Fleet management is relatively simple. Other than tachs and some electronic engines, the only device used to keep track of the trucks is to have drivers call-in.

20.2 Opinions Stemming from HELP Involvement

Ron Smith says Willamette has no use for AVI data. There may be a problem here in the sense that Smith is only thinking about his duties at Willamette which do not appear to include responsibility for logs. Smith also suggested that “tracking a truck” is something he might have a need for, but only once or twice a year.

AVI/WIM data is of more interest to Smith for driver monitoring (speed and axle weights). Drivers are responsible for having trucks scaled prior to a trip and, as a consequence, they pay any overweight tickets. Smith feels it might be useful to be able to spot a problem if and when it occurs.

In terms of bypassing experience, a variety of opinions and information were obtained from Willamette. One driver evaluation form for Woodburn SB was completed for a trip with a tractor-semitrailer weighing 63,500 pounds made in early February. Significantly, although the driver was not given the bypass clearance, it took only 1.5 minutes from the time the truck slowed as it approached the ramp until it regained cruising speed. The driver writes: “Woodburn south pulls us in 95% of the time with medium gross weights.” (None of the company trucks exceeds 80,000 lbs.)

Ron Smith’s own information suggests the following for the first week of March:

	Woodburn SB	Woodburn NB
total trips	80	80
loaded trips	80	48
bypass clearance	20	?

Further, Smith estimates that bypassing would save about four minutes (this is difficult to reconcile with the driver who took 1.5 minutes for a complete static weigh).

While the interview was being conducted (Ron Smith was continuing with other duties) a driver passed by and was asked his opinion of Woodburn SB. According to this driver, Bob Langford, he is almost always given bypass clearance at Woodburn SB when loaded. He did add that this experience of obtaining bypass clearance was a relatively new phenomenon. Ron Smith thought the company might be willing to pay in the range of \$1 to \$2 for mainline bypassing.

20.3 Significance of Potential Applications

Ron Smith provided the following evaluation of potential HELP applications:

	Rating	Rank
fleet management	2	2
driver management	4	3
reporting/auditing	3	4
safety management	1	NR
check on loading practices	4	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	5	NR
bypass weigh scales/POEs	2	NR

He would also be mildly interested in a “call home” capability.

As a final comment, Smith wrote: “I’ve looked through all sheets [Lockheed hard copy reports] as they’ve been sent and find the information interesting. As far as using it in any of the applications mentioned, I haven’t.”

21.0 Food Express, Inc., Arcadia, California

21.1 Description of Operations and Involvement

Walt Keeney, President, returned a well-completed survey. This information was supplemented with an interview on May 11, 1993 in Fontana, California.

Food Express is a medium-sized bulk hauler with 90 tractors operating up and down the West Coast. Most of the trailers are bulk, hopper-bottom, using pneumatic unloading mechanisms, and, in those states allowing it, these trailers operate with loads of up to 70,000 pounds. Gross vehicle weight in Oregon and Washington is 105,500 pounds on a permit basis. The routes are quite regular and quite short -- from flour mills or other sources to bakeries. The company also operates a few dry-freight vans for deliveries of flour and other products to the smaller bakeries. The short, regular nature of most routes accounts for the relatively low-tech approach to fleet management. Generally, other than the electronic engines on the newest tractors, few other devices are used to monitor, govern or record information. Some of the trucks are equipped with mobile radios and, in other cases, a driver call-in procedure is used. Dispatching is likewise relatively simple. The exceptions to this are the four tractors equipped with OBCs because of the company’s involvement with the State Line Beacon Project.

Sixteen of the tractors are equipped with replacement transponders and Walt Keeney is a regular user of the modem access to the Crescent database. Keeney is an active participant in HELP and is the co-chair of the evaluation committee (that is, unlike many of the other interviews, there were no difficulties making sure the respondent understood the questions).

21.2 Opinions Stemming from HELP Involvement

Keeney believes in HELP technology and the applications that follow from it. Although he has critical views on aspects of the Crescent project -- for example, the accuracy of piezo-cables for WIM installations -- these views are not particularly important for this evaluation.

Keeney is the only known participant in the Crescent project who is not receiving the Lockheed hard copy report because of a request that hard copy reports are unnecessary. He prefers his modem access to the Crescent database.

In terms of the potential use of Crescent data, Keeney suggests his company could use AVI data for log verification. Other uses, such as ETAs or tracking trucks are not important for this operation. For this reason, the current two-hour polling frequency for Crescent mainline sites is not viewed as a problem.

The addition of WIM data to the AVI readings would be useful to Food Express. Some loads hauled (flour, corn starch but not the liquid cargoes) can cause axle overload problems -- either because of the way they are loaded (heaped to one end) or because of shifts occurring **while** in transit. While spotting one of these axle load problems on the modem does nothing to solve a particular occurrence, having data on particular routes or shippers or drivers over a period of time might enable the company to take a more analytical approach in remedying the situation.

Food Express had difficulty with weigh-scale bypassing during the early days of Woodburn SB's experience with transponder-equipped trucks. According to Keeney, Woodburn SB was not set up to handle permit trucks (Food Express trucks operate under annual permits at weights up to 105,500 lbs.) However, as of the spring of 1993, Keeney reports that about 60 to 70 percent of his loaded southbound trucks are receiving bypass clearance at Woodburn SB. The significance of this is that these bulk haulers typically operate at weights very close to their design (or legal) limits. In other words, the WIM scale at Woodburn, or the software operating the bypass clearance, does not have much tolerance for the decision to be made that a particular truck can bypass. Walt Keeney estimates that his trucks save 2-to-3 minutes when they receive a bypass clearance.

One issue discussed during the May 11th meeting was the potential problems created for users of Crescent data by the lack of synchronization in all the clocks used in the process. It is understood that WIM scales, AVI readers and, perhaps, the computers at scale sites all have clocks and that there is no means to synchronize these different clocks and, further, that there is no method available to synchronize the time at one Crescent site with another. How much or to what degree times vary from one site to another is not known. Nor is known if this potential lack of synchronization leads to problems in using the Crescent data (eg, in calculating the elapsed time between two points or for ETAs).

Woodburn NB bypassing cannot be evaluated by Food Express as the trucks are empty on the northbound leg. Although Food Express trucks have been used for some demonstrations at Santa Nella, at the date of interview, Santa Nella was still not operational.

At a cost of \$0.70 per minute, Keeney estimates that weigh-scale bypassing at Woodburn is worth between \$1.40 to \$2.10 for every bypass. Presumably, mainline bypassing is worth something more -- \$2.80 to \$3.50 given his estimate of 4-to-5 minutes for the total time it takes to for a truck to travel through a static weigh scale.

21.3 Significance of Potential Applications

	Rating	Rank
fleet management	2	5
driver management	1	3
reporting/auditing	3	7
safety management	2	4
check on loading practices	4	8
private use of AVI at terminals	5	9
tracking stolen vehicles	2	6
regional one-stop shopping	1	2
bypass weigh scales/POEs	1	1

In addition, Walt Keeney suggests that a “call home” capability with the express receivers would be “very useful.”

22.0 Baxter Health Care, Ontario, California

22.1 Description of Operations and Involvement

Adam Pinsky, Transportation Supervisor, completed and returned a survey and the information was supplemented with further questioning during a short meeting on May 10, 1993.

Baxter Health Care has 40 full-service lease tractors operating from its Ontario warehouse. These are used to supply hospitals in the Los Angeles area with its own products. The short-haul nature of its routes is important in Pinsky’s evaluation of Crescent. Tractors are equipped with OBCs, two-way radios and pagers. Five of the tractors are equipped with replacement transponders. Baxter has no modem connection with the Crescent database.

22.2 Opinions Stemming from HELP Involvement

Adam Pinsky, in responding to the survey question “Are you receiving the Lockheed . . . hard copy . . . report?” writes: “Yes. The format is useful but I have no need for it.” He would find the AVI data from HELP technology useful for tracking (validating a driver’s call-in location) and even, possibly, would be interested in the ability to estimate arrival times. The problem, however, is that with the spacing of current Crescent sites and even with the known planned additions to HELP Inc. sites, Pinsky is not optimistic that there ever will be enough closely-spaced AVI or AVI/WIM locations in the southern California area to. make the system useful for his operation.

The company has no experience with weigh-scale bypassing. However, Adam Pinsky thought the company might be willing to pay up to \$0.50 per minute for every weigh-scale bypassing. (This is a maximum amount based on the company’s overtime driver pay scale.)

22.3 Significance of Potential Applications

	Rating	R a n k
fleet management	2	4
driver management	1	2
reporting/auditing	3	5
safety management	4	6
check on loading practices	2	3
private use of AVI at terminals	5	9
tracking stolen vehicles	4	7
regional one-stop shopping	4	8
bypass weigh scales/POEs	1	1

Pinsky would also be interested if the express receivers to be used at Santa Nella had a “red light” emergency light.

In concluding the survey, he writes: “My operation does not utilize these programs [the potential HELP applications] very much. I have a few vehicles which cross a couple of scales, but we mainly service the LA/SD area. When you expand to I-15 and Highway 91, this will be much more useful.”

23.0 ~~██████████~~ Bestway Transportation, Phoenix, Arizona

23.1 Description of Operations and Involvement

Dave Cormier, Tripmaster Supervisor at TNT Bestway, returned a well-completed survey and agreed to a follow-up interview on May 6th, 1993. Tony Duval, Manager of Central Dispatch, sat in for a portion of the meeting.

TNT Bestway is a large interstate LTL carrier with 558 company-owned tractors and 55 leased tractors. Only 124 of these tractors are linehaul (i.e., operating on the highways between terminals.) These linehaul tractors operate on the I-5 corridor from about the Sacramento area south and along the I-10 corridor from Los Angeles into Texas. Being an LTL carrier, all linehaul routes are quite regular (i.e., between terminals). The tractors are equipped with Rockwell Tripmaster OBCs and some of the newer tractors have electronic engines. In fact’ the company plans to phase out its use of OBCs as these engines are introduced to the fleet (they can replace the monitoring function of OBCs).

The company has 114 replacement transponders installed and has another 33 on order. It has modem access to the Crescent database and is using it on occasion (starting in March 1993). TNT Bestway also has just installed, as of May 6th, ten express receivers to be used in the Santa Nella demonstration.

23.2 Opinions Stemming from HELP Involvement

Dave Cormier feels that TNT Bestway's views on HELP are not yet finalized as it did not become actively involved in the Crescent demonstration until 1993. The company just received a login ID to the Crescent database in February/March 1993 and, at the time of the completion of the survey and the follow-up meeting it had not fully investigated the uses of the information.

Cormier suggests AVI data might be useful in driver management. Unlike other respondents, however, he did not think the data is needed for checking logs. This is probably because the company routes are so regular (unlike the TL carriers). Ideally, Cormier would like the polling frequency to be every five minutes. Anything over 30 minutes is probably too infrequent for the uses Cormier sees in the Crescent data.

The addition of WIM to AVI readings would be useful for the more specialized analyses Cormier thinks the company would like to do. Speed information itself is probably not important (the electronic engines can be governed, the OBCs now do the monitoring, and Dave Cormier feels that drivers will soon find out the HELP sites if they are ever really used for speed checking). The use of AVI/WIM data which may be of interest is a large scale analysis of where the company experiences axle overload problems. This might be, for example, an analysis of a period of several months, trying to determine which terminals or which shippers are responsible for overloads. During the course of this part of the interview, the example was given of a shipper who calls in for a pickup of a 10,000 pound shipment. The company has no way of scaling the load and sometimes these "10,000 pound" shipments may be considerably heavier. WIM data, even with its slight variations from static weights, might be good enough for the company to use in re-billing such shippers.

The company has no experience with weigh-scale bypassing, although it will be a part of the Santa Nella demonstration. As of May 6 1993, the driver of one of the ten trucks equipped with an express receiver had reported a red light as it passed Santa Nella (the scale was closed at the time). The company estimates that it would save seven to ten minutes for every truck that could bypass Santa Nella (these estimates may be on the high side of actual times). Dave Cormier and Tony Duval are not sure how much the company would be willing to pay for mainline bypassing, but were doubtful it would be as high as one dollar.

23.3 Significance of Potential Applications

Dave Cormier provided the following ratings and rankings:

	Rating	Rank
fleet management	1	2
driver management	1	1
reporting/auditing	2	8
safety management	1	3
check on loading practices	1	5
private use of AVI at terminals	3	9
tracking stolen vehicles	3	7
regional one-stop shopping	2	6
bypass weigh scales/POEs	1	4

He would also be interested if the express receivers used for mainline bypassing contained a “call home” capability.

24.0 Zero Motor Freight. San Antonio. Texas

24.1 Description of Operations and Involvement

Zero Motor Freight completed and returned a survey in February 1993, just at the time it was installing replacement transponders. (It was recruited too late to have had the original transponders.) Because the company had no experience with Crescent at the time, the responses were somewhat incomplete. A meeting was held with Sam Bishop, President and CEO, and Joe Tomlin, Vice President, Maintenance, on May 19th and fuller information on the responses was obtained.

Zero Motor freight is a TL carrier hauling mainly refrigerated goods in 28 states and parts of Canada. The area of operation includes the whole Crescent route. There are 121 tractors, all but two of which are company owned, and there are over 150 refrigerated trailers. The nature of the shipments generally results in long trips -- all tractors are equipped with sleepers.

Some tachs and electronic engines are used on the tractors for driver/fleet management. In addition, the company uses dispatch software (Innovative). Drivers call-in daily and when deliveries are made. The company is considering a number of fleet management options, including Motorola’s tracking service (which includes a cellular phone and OBC). In fact, much of the evaluation of the HELP technology during the course of the meeting on May 19th was dominated by a comparison of HELP with Motorola.

Zero Motor Freight never had any of the original transponders but now has 50 replacement transponders installed. Five of these replacement transponders have had to be replaced (the exact nature of the problem is not known except that in at least several of the five cases it was Zero Motor Freight that determined the transponders were not showing up in the Crescent database when they should have been). The company is receiving the hard copy reports but has no modem access to the Crescent database.

24.2 Opinions Stemming from HELP Involvement

Zero Motor Freight is receiving the Lockheed hard copy reports. Sam Bishop does not see much use for the information received to date. He notes there are what appear to be many errors and/or inconsistencies in the data (duplicate records, obviously incorrect weights and axle-spacing measurements). He has written a letter to Lockheed expressing his dissatisfaction. Axle weights on a given truck varying by as much as 6,000 pounds from one Crescent site to another, and wheel base differences of as much as five feet, with one extreme example of a 68’4” total wheelbase showing up at 108 feet.

Another point made in the letter to Lockheed and during the course of the May 19th meeting is that it is difficult to determine the direction of travel in many of the hard copy report’s listing of certain scale sites.

Bishop cannot see any use for AVI data in the Crescent database and says it is also doubtful the company would find any use for AVI/WIM data. There are two points in this observation, however, to be emphasized. First, during the interview, Bishop was continuously comparing Crescent data to the information a system such as Motorola’s would provide. In his opinion, Motorola is superior to HELP. Second, in his responses, he was obviously thinking about the current and future location of HELP AVI sites on the highway. He believes that far more extensive coverage would be required before HELP technology could generate useful data.

Zero Motor Freight has no experience with weigh-scale bypassing. No driver of a transponder-equipped truck has reported anything different at Woodburn SB or NB since the installation of the transponders. (This may simply be because drivers have not noticed or have not thought there was anything they should report.) Sam Bishop did think that Zero Motor Freight might be prepared to pay up to \$5 for mainline bypassing.

24.3 Significance of Potential Applications

Sam Bishop provided the following ratings and rankings:

	Rating	Rank
fleet management	5	NR
driver management	5	4
reporting/auditing	1	1
safety management	5	NR
check on loading practices	5	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	4	NR
regional one-stop shopping	1	3
bypass weigh scales/POEs	1	2

In addition, he could see that a “call home” capability would be beneficial for the industry but, again, he compared this ability with Motorola’s cellular telephone.

As a final thought on HELP technology, Sam Bishop noted that he can see a real potential for it if it is used to record data electronically about vehicles to ease the burden of reporting at weigh scales (or, presumably, auditing, registering, paying taxes, or anything else). What he has trouble seeing, however, is any great need for the information that is generated by HELP . technology for fleet management.

GROUP 3 CARRIERS

25.0 Frito-Lay, Fontana, California

25.1 Description of Operations and Involvement

George Smith, the Garage Manager at Frito-Lay (Fontana) completed and returned a survey.

There are 24 tractors based at the Fontana distribution center of Frito-Lay. These are used to service a number of distribution centers in southern California. The routes are regular and all trucks return to their home terminal every day. Tractors are equipped with OBCs (Cadec 3000) and drivers are instructed to call-in periodically.

Frito-Lay has received and installed 21 replacement transponders, but does not have modem access to the Crescent database.

25.2 Opinions Stemming: from HELP Involvement

Frito-Lay is receiving hard copy reports from Lockheed “sometimes,” according to George Smith. He sees no use for AVI data (“Our Cadec system gives this information to us now.”) The addition of WIM data to the AVI does not change Smith’s opinion about the usefulness of Crescent data.

Frito-Lay has no experience with weigh-scale bypassing.

25.3 Significance of Potential Applications

	Rating	Rank
fleet management	4	3
driver management	4	4
reporting/auditing	4	2
safety management	4	5
check on loading practices	5	9
private use of AVI at terminals	4	8
tracking stolen vehicles	4	7
regional one-stop shopping	4	6
bypass weigh scales/POEs	3	1

26.0 Oil Transport, Abilene, Texas

26.1 Description of Operations and Involvement

Melvin Hancock completed and returned a survey. The company hauls refined petroleum products in Texas. There are 300 trucks, some of which are equipped with electronic engines. Drivers are instructed to call-in. All of the trips are completed within one shift.

The company has 50 replacement transponders installed. As of the date of the survey (February 22, 1993), Oil Transport did not have modem access to the Crescent database and was not receiving Lockheed’s hard copy reports.

26.2 Opinions Stemming from HELP Involvement

With no Crescent data and no experience bypassing weigh scales, Melvin Hancock’s opinions are based only on the descriptive material about Crescent/HELP sent out by various agencies. Hancock would be interested in AVI data to monitor the location of his trucks: time and speed are the two variables mentioned. Weight information is not needed. He has no concerns with the current polling frequency or the occasional black out in the data caused when AVI sites are located in weigh scales.

26.3 Significance of Potential Applications

Melvin Hancock provided the following ratings (the rankings are not shown as, evidently, there was a misunderstanding about what was being requested):

	Rating	Rank
fleet management	2	
driver management	2	
reporting/auditing	2	
safety management	1	
check on loading practices	4	
private use of AVI at terminals	4	
tracking stolen vehicles	1	
regional one-stop shopping	2	
bypass weigh scales/POEs	1	

He also expressed a strong interest in a “call home” capability.

27.0 Merchants Fast Motor Lines. Abilene. Texas

27.1 Description of Operations and Involvement

Ron Bredemeyer, Vice-President, completed and returned a survey. Merchants Fast Motor Lines is a large, for-hire carrier with a fleet of 750 tractors. It operates along the I-10 and I-20 Crescent corridor from Arizona to Texas.

Six replacement transponders have been installed. Although the company has a modem, it has not established a link with the Crescent database. As of February 22, 1993 (the date the survey was completed), the company was not receiving the Lockheed hard copy report.

27.2 Opinions Stemming from HELP Involvement

At the time the survey was completed, Merchants had no Crescent data (hard copy or modem access) and no experience with weigh-scale bypassing. In his responses, Ron Bredemeyer expressed a general interest in using AVI and AVI/WIM data for driver management (speed, safety, axle loading). He was not concerned about the two-hour polling frequency or the occasional black outs in the data caused where AVI sites are located within weigh scales.

27.3 Significance of Potential Applications

Ron Bredemeyer provided the following ratings and rankings of potential HELP applications:

	Rating	Rank
fleet management	2	4
driver management	2	3
reporting/auditing	3	6
safety management	2	2
check on loading practices	3	7
private use of AVI at terminals	4	8
tracking stolen vehicles	2	5
regional one-stop shopping	4	9
bypass weigh scales/POEs	2	1

He also expressed a strong interest in HELP technology if it incorporated a “call home” capability.

GROUP 4 CARRIERS

28.0 KMD. Auburn. Washington

28.1 Description of Operations and Involvement

KMD did not complete or return a survey. However, Don Alexander, the Director of Human Resources, was interviewed on March 23rd.

The company is a large, for-hire carrier hauling both LTL and TL freight for a number of consumer-based shippers (K-Mart was given as an example). It operates about 100 tractors along the I-5 corridor from the Seattle area to as far south as Los Angeles. One hundred tips a week is the approximate volume on the I-5. The fleet is managed through a combination of satellite tracking, on-board computers and dispatch (and other) computer software. Data from the satellite tracking is entered directly into the dispatch and maintenance software.

KMD had about 50 transponders (Don Alexander did not know the exact number) and, although replacement transponders have been sent, the company has chosen not to install them.

28.2 Opinions Stemming from HELP Involvement

The company has no information on any of its transponder-equipped trucks bypassing either Woodburn SB or NB. Alexander sees no use for AVI data or AVI/WIM data for any tracking, monitoring or other purposes. However, he would be mildly interested in Crescent technology if it led to regional one-stop-shopping.

28.3 Significance of Potential Applications

Don Alexander provided the following ratings and rankings:

	Rating	Rank
fleet management	4	9
driver management	5	8
reporting/auditing	4	4
safety management	5	6
check on loading practices	5	7
private use of AVI at terminals	5	5
tracking stolen vehicles	2	2
regional one-stop shopping	2	3
bypass weigh scales/POEs	2	1

Don Alexander’s final comment, at the end of the interview, was that he would like to drop out of the Crescent project. KMD has opted for what it views as an alternative to HELP technology and has given up on the Crescent demonstration.

29.0 Inco Express Inc. Seattle. Washington

29.1 Description of Operations and Involvement

Although Inco Express did not complete and return a survey, Fred Capps, the Safety Director, did have responses prepared by the time of the interview on March 23rd. He also had seven driver evaluation forms completed.

The company is a large carrier of refrigerated products, both LTL and TL. It has 55 of its own tractors and another 21 owner-operators. It operates from the Canadian border into Arizona. Little is known about current fleet management practices other than the fact that drivers are instructed to call-in on a daily basis.

Inco has received and installed 28 replacement transponders.

29.2 Opinions Stemming from HELP Involvement

Inco is interested in the AVI data available in the Crescent database as a means of checking logs. It does not have any use for AVI/WIM data: trucks are scaled prior to a trip, so weight information is not of interest.

While the company did have seven drivers complete evaluation forms on bypassing Woodburn (both SB and NB), there are many gaps in the information provided. Capps indicated, however, that the company might be prepared to pay \$1 for a mainline bypass.

29.3 Significance of Potential Applications

Capps rated and ranked the potential HELP applications as follows:

	Rating	Rank
fleet management	2	4
driver management	2	3
reporting/auditing	3	5
safety management	2	2
check on loading practices	5	9
private use of AVI at terminals	5	8
tracking stolen vehicles	3	6
regional one-stop shopping	5	7
bypass weigh scales/POEs	1	1

30.0 Gordon Trucking Inc.. Sumner. Washington

30.1 Description of Operations and Involvement

A survey was completed in an interview with Roy Livingston, Safety Director, on April 1, 1993.

The company is a large, irregular route, TL carrier operating on all segments of the I-5, I-10 and I-20 corridors. It has 497 tractors, 308 of which are company owned and the balance of which are driven by owner-operators. Livingston believes the company had about 150 transponders but is not sure how many of the replacements have been installed. Although the company has a modem, it does not have access to the Crescent database.

Tractors are equipped with electronic engines and tachographs. Drivers call-in twice a day. Gordon Trucking has looked at satellite tracking (in fact they tried it for a while) but was dissatisfied. The reasons for this dissatisfaction are unclear and, in any case, may not be important for this evaluation. However, one aspect of this dissatisfaction is interesting as it may relate to the relative advantages/disadvantages of HELP technology versus commercial satellite services. Apparently the company's routes are so concentrated on the I-5 corridor that Satellite tracking is unnecessary -- at least given the cost of the system. If this is true, this would seem to be an ideal situation for HELP technology to provide a better and lower-cost tracking capability.

30.2 Opinions Stemming from HELP Involvement

Livingston says Gordon Trucking would find AVI data useful for log checking, estimating arrival times and locating a truck and/or driver. The current two-hour polling frequency is not perceived to be a problem for any of these uses. Livingston does not think the company would have much use for AVI/WIM data: speed is not of interest as trucks have electronic engines (speed is governed); weight information is not of interest as trucks are scaled prior to a trip. No information was available on weigh-scale bypassing. However, Livingston is fairly sure that the company would not pay for mainline bypassing.

30.3 Significance Of Potential Applications

Roy Livingston rated and ranked the potential HELP applications as follows:

	Rating	Rank
fleet management	1	1
driver management	1	3
reporting/auditing	3	9
safety management	1	2
check on loading practices	2	8
private use of AVI at terminals	2	7
tracking stolen vehicles	2	6
regional one-stop shopping	1	4
bypass weigh scales/POEs	2	5

He also says that Gordon Trucking would be very interested in a “call home” application.

3 1.0 Provisioners Express. Auburn. Washington

31.1 Description of Operations and Involvement

A survey was completed in an interview with Bill Duke on April 1, 1993.

Provisioners is a medium-sized LTL for-hire carrier, hauling fresh and frozen foods. All trailers are refrigerated. It operates irregular routes from California to Canada. There are 83 company tractors and 91 installed replacement transponders. (It is not clear where eight of these transponders are installed.) Although the company obtained a login ID from Lockheed, it has no modem. It has received the latest hard copy report from Lockheed and has begun to use the information for log checking.

Tractors are equipped with tachs and electronic engines; dispatching is handled by computer software (Innovative); and drivers are instructed to call-in twice a day.

31.2 Opinions Stemming from HELP Involvement

Duke says the company would use AVI data for log checking, estimating arrival times and locating trucks. The two hour polling frequency is not seen as a problem as estimating arrival times and locating trucks is something that would only be done occasionally.

The company does not have much use for AVI/WIM data. Speed is governed by the electronic engines and trucks are scaled prior to a trip. Duke suggested that he could use WIM data in disputes about overweight tickets.

Bill Duke has had **no** feedback from his drivers on weigh-scale bypassing. He estimated, however, that it probably would be worth about \$1 per mainline bypass.

31.3 Significance of Potential Applications

Duke's evaluation of the potential applications is as follows:

	Rating	Rank
fleet management	2	NR
driver management	3	NR
reporting/auditing	2	3
safety management	1	1
check on loading practices	5	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	2	2
regional one-stop shopping	2	NR
bypass weigh scales/POEs	2	NR

He was not particularly interested in a "call home" application.

At the conclusion of the April 1st meeting, Bill Duke said that his biggest concern was the possibility that the states would use HELP data for enforcement purposes.

32.0 Post Trucking/Post & Sons Transfer, Tacoma, Washington

32.1 Description of Operations and Involvement

No survey was completed by Post Trucking. However, in an interview with Steve Post, the President, on March 24th information for the survey was collected.

Post Trucking (both companies) operates about 120 power units: 30 owned, 30 leased and 60 owner-operators. Its primary business is for-hire, TL freight up and down the west coast. The company uses no OBCs, tachographs or other equipment to manage its fleet or drivers, although some trucks are equipped with mobile radio phones. The company has tried a land-based tracking system but was not satisfied with the results. The main tool in the current management practices is to have drivers call-in twice a day. Although Post Trucking has received replacement transponders (number unknown), Steve Post was not sure they had been installed.

32.2 Oninions Stemming from HELP Involvement

The company would find AVI data useful for such things as checking driver's logs or doing a post-accident investigation. The current two-hour polling cycle is not of concern.

AVI/WIM data would be even more useful if it could provide a method for checking Oregon’s calculation of the weight-distance tax. Other potential uses for the weight data are minimal as all trucks are scaled prior to a trip.

Steve Post had no information on bypassing at Woodburn NB or SB (for transponder-equipped or other trucks). He did indicate that mainline bypassing might be worth up to \$5 per pass for his operations.

32.3 Significance of Potential Applications

Steve Post provided the following information on potential HELP applications:

	Rating	Rank
fleet management	1	2
driver management	1	5
reporting/auditing	1	3
safety management	1	6
check on loading practices	3	9
private use of AVI at terminals	1	7
tracking stolen vehicles	1	8
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	4

In addition, the company would very interested in the HELP technology if it included a “call home” capability.

As is evident from the ratings, Steve Post is enthusiastic about the potential for HELP technology. The final comment made at the conclusion of the March 24th meeting was: “Extremely interested in further developments of project. Can be used as a tool to reduce costs.” He did have, however, one reservation: he is concerned that the data resulting from HELP applications might be used by the state departments of transportation.

~~**33.0 Veneer Chip Transport, Inc., Tacoma, Washington**~~

33.1 Description of Operations and Involvement

Veneer Chip had completed a survey at the time of the interview with Dan Smith, Safety Director, on March 24th.

Veneer Chip is an interstate, general freight carrier with about 80 tractors: 30 owned and 50 owner-operators. It has installed eight replacement transponders but has no login ID with the

Crescent database. The company has applied for the express receivers to be used in the Santa Nella mainline bypass demonstration. At the time of the interview, it had just recently received a large hard copy report from Lockheed. Dan Smith finds the data interesting. (The actual report could not be found at the time of the interview.)

Current fleet management techniques involve the use of OBCs and electronic engines. Contact with drivers is maintained through a combination of call-ins and radio phones.

33.2 Opinions Stemming from HELP Involvement

Dan Smith says he would find AVI data useful. Examples of applications given were: tracking a truck (to tell a customer where it was or estimate the time of arrival) or tracking a truck to relay a message. Ideally, the company would like the polling to be done on a five minute frequency. AVI/WIM data would be somewhat more useful than just AVI data as, with it, Smith feels he could investigate such things as overweight tickets.

No information was available on bypassing experience at Woodburn NB or SB. Smith indicated he might be willing to pay \$1 per bypass.

33.3 Significance of Potential Applications

Smith provided the following ratings and rankings:

	Rating	Rank
fleet management	5	NR
driver management	3	5
reporting/auditing	1	3
safety management	2	4
check on loading practices	5	NR
private use of AVI at terminals	5	6
tracking stolen vehicles	4	NR
regional one-stop shopping	1	2
bypass weigh scales/POEs	1	1

He also suggests the receivers used for the Santa Nella demonstration might be improved if they had a fourth light indicating a “call home” signal.

Dan Smith is optimistic about HELP technology and a number of the possible applications, His main interest, however, is to see the development of mainline bypassing.

34.0 Risberg's Truck Lines. Portland. Oregon

34.1 Description of Operations and Involvement

A survey was completed during an interview with Lee Sprauer, Fleet Superintendent, on March 25th.

Risberg's is a regional LTL carrier operating in Washington and Oregon with 95 tractors on the road and a mixture of dry freight, reefer and flatdeck trailers. In addition to its own freight, it handles interline shipments for national LTL carriers that do not operate into the small points on Risberg's routes. Most of Risberg's trucks are dispatched from and return to a home terminal on a daily basis. The longest run is 280 miles, one way. Lee Sprauer had no knowledge of any replacement transponders being sent to him and has never received a hard copy report from Lockheed.

The main element used in fleet management is a mobile radio phone; the company has its own tower in the Portland area and uses other towers elsewhere. Some drivers have their own cellular phones.

34.2 Opinions Stemming from HELP Involvement

Sprauer does not think the company would use AVI data ("we can always call the driver on the radio phone.") The addition of WIM information would give the company a means of monitoring driver speed, but the weight information itself is not seen as useful ("we scale everything before it leaves the yard.").

While no specific information was provided on bypassing at Woodburn (without the replacement transponders it is not clear that information would have been useable), it was noted that most drivers report being given the bypass signal at these scales. This includes Risberg's permit trucks (over 80,000 lb).

34.3 Significance of Potential Applications

Sprauer provided the following ratings and rankings:

	Rating	Rank
fleet management	3	NR
driver management	2	1
reporting/auditing	4	NR
safety management	4	NR
check on loading practices	4	NR
private use of AVI at terminals	4	NR
tracking stolen vehicles	4	NR
regional one-stop shopping	4	NR
bypass weigh scales/POEs	3	2

35.0 Gresham Transfer Inc., Portland, Oregon

35.1 Description of Operations and Involvement

A survey was completed in an interview with Keith Lowe, Safety Director, on March 25th.

The company is a large (150 tractors) special commodity hauler, using a variety of pneumatic dry-bulk, dump, lowbed and flatdeck trailers. Most trips are relatively short; that is, truck leave and return to their home base in a one-day period. The company operates irregular routes in Washington and Oregon, with the occasional trip as far south as California and as far east as Texas. The two main tools used for fleet management are speed-o-graphs and mobile radio phones (in Washington and Oregon).

The company has received and installed three replacement transponders. It had a modem connection to the Crescent database, but its password is no longer working (Keith Lowe has contacted Lockheed about this).

35.2 Opinions Stemming from HELP Involvement

In the course of the interview, photocopies of recent Lockheed hard copy report were made available. Casual inspection suggests that most Crescent sites are having difficulty measuring the axle spreads of the last tandems on double-trailer configurations. What seems to happen is that for every nine-axle double recorded, the last tandem spread (this is a pup trailer with two tandem axles) is shown identical to the distance between the two tandem axles. In addition, in all cases, the weight of the last tandem is exactly split between the two axles (something which rarely occurs in the real world).

The following is an example from Jefferson SB on February 25, 1992 (not to scale):

	tractor			trailer		trailer			
	-----			-----		-----			
feet	⁰ 112.0	⁰ 14.21	⁰	⁰ 12.7	⁰ 14.01	⁰ 18.2	⁰ 14.01	⁰ 12.2	⁰ 12.21
lbs. ('000)	9.4	15.8	17.1	11.1	12.3	8.1	8.1	11.2	11.2

In this example,' the last tandem spread is shown at 12.2 feet (not possible) and there is exactly 11,200 pounds on each of the axles in the tandem (rare).

Lowe says AVI data would be useful for driver log verification -- in fact, he was enthusiastic about this potential. He would also like to use AVI data for locating a truck. The example given was when someone, say an automobile driver, complained about one of the trucks and the company would like a means of verifying that, indeed, its trucks had been in that location at that time. The company is not too interested in AVI data for tracking/locating drivers as the mobile phones now do this (at least in Washington and Oregon). Lowe suggests that AVI data on the occasional longer trips might be of interest. The two-hour polling cycle is not of concern.

The addition of WIM data to the AVI data would allow the company to check their speed-o-graph information. This is probably an “interesting” use of AVI/WIM data as compared to a “high priority” use.

While little specific information was available about bypassing experience at Woodburn NB or SB, Keith Lowe is under the impression that his three transponder-equipped trucks are regularly receiving bypass clearance at Woodburn SB. The trucks, on the southbound trip, are loaded and all three are permit trucks operating over 80,000 lbs -- two on an annual permit, one on a trip permit basis. Lowe’s guess is that the bypass saves one to two minutes. He does not consider, however, this significant in terms of company costs. Drivers are paid by a combination of hourly and milage rates -- the formula varies from one driver to another -- but it may be that on any trip through Woodburn a driver would normally be on a mileage rate. In terms of mainline bypassing, Lowe thought he might be willing to pay \$1, and perhaps as much as \$5, per bypass.

35.3 Significance of Potential Applications

Keith Lowe provided the following ratings and rankings of potential applications:

	Rating	Rank
fleet management	3	5
driver management	2	3
reporting/auditing	4	NR
safety management	3	4
check on loading practices	5	NR
private use of AVI at terminals	3	6
tracking stolen vehicles	4	NR
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	2

He would also be mildly interested in a “call home” application for those areas without mobile phone coverage (i.e., the longer trips).

36.0 Market Transport. Portland, Oregon

36.1 Description of Operations and Involvement

The survey was completed during an interview with Tom Stott, Vice-President, on March 26th.

The company is a large for-hire carrier, with 172 tractors serving seven western states and one Canadian province. About half the operations are regular route -- that is, serving the same customers on a more-or-less regular schedule -- and the other half are irregular route -- that is, serving seasonal or other demands for truckload service to/from any number of points. Sixty-eight of the tractors are company owned and of these, 62 operate on the longer routes. Fifty-eight of the company tractors are equipped with replacement transponders. The remaining tractors are operated by owner-operators.

The company uses computer software (Innovative) for dispatching and Rockwell’s Tripmaster in the company trucks. The OBCs are used to monitor the trucks and drivers; logs are still prepared manually. Owner-operators are “on their own” in terms of any on-board devices. The company is looking into both satellite tracking (Qualcom) and Motorola’s terrestrial system. The primary method of communicating with drivers currently is the instruction to call-in. The frequency varies from one operation to another.

Tom Stott is enthusiastic about the potential for HELP technology. The company has received and installed 58 replacement transponders and has modem access to the Crescent database. It does not dial into the Lockheed computer frequently.

36.2 Opinions Stemming from HELP Involvement

Stott says the company could use AVI data for log checking, verifying location (or other information) when drivers call-in, and for ETAs for shippers (or receivers). The two-hour polling frequency is not a problem, although a one-hour cycle would be more desirable.

With AVI and WIM data, the company could monitor drivers in terms of speed. Additionally, it could check on drivers to see if they were moving fifth wheels (assuming WIM readings are accurate enough for this purpose).

Stott had no information on weigh-scale bypassing experience. He did suggest, however, that the company might be willing to pay from \$1 to \$5 per bypass if the mainline bypassing were available.

36.3 Significance of Potential Applications

Tom Stott rated and ranked the potential applications as follows:

	Rating	Rank
fleet management	2	6
driver management	1	5
reporting/auditing	1	3
safety management	1	4
check on loading practices	4	9
private use of AVI at terminals	3	8
tracking stolen vehicles	2	7
regional one-stop shopping	1	2
bypass weigh scales/POEs	1	1

He also might be interested in a “call home” application; however, as he pointed out, once the company decides on a tracking system (Qualcom or Motorola), it will not have any use for such a capability.

37.0 Troutman’s Emporium Inc., Eugene, Oregon

37.1 Description of Operations and Involvement

A survey form was completed during a meeting with Bill Scorse, Truck Supervisor, on March 29th.

Troutman’s Emporium is a small private carrier with a fleet of five tractors. It supplies a chain of retail stores from its Eugene distribution center. The company does not use tachographs, speed-o-graphs, OBCs, radio phones, or anything else to manage its fleet. It does own, however, two cellular phones which the drivers are free to take with them if they choose. This is more for driver convenience than because of any management function. When drivers deliver their loads at the stores they are instructed to call home. Most of the trips (estimated two-thirds) are of less than a day’s duration.

The company has four replacement transponders installed but has no modem access to the Crescent database.

37.2 Opinions Stemming: from HELP Involvement

At the time of the March 29th meeting, the company has recently received a hard copy report from Lockheed and Bill Scorse suggests the information provided is not very accurate. He mentioned three problems: one transponder-equipped truck is not showing up; the triple-trailer combinations are often shown with nine axles instead of eight; and at Woodburn SB there appears to be a re-occurring problem with the measurement of axle spacing (an extra two feet always appears at the end of the configuration).

Scorse says he would use AVI data for log checking and for estimating arrival times at their stores. For this second use, the company prefers a 30 minute (or less) polling frequency. The AVI/WIM data would be used for driver monitoring (speed); none of the weight information is of use.

Scorse had no information on weigh-scale bypassing, but believes the company’s trucks are being called in for static weighing at Woodburn SB more often since the replacement transponders were installed (the trucks are generally empty in the southbound direction). He thought the company might be willing to pay \$1 to \$2 for a mainline bypassing.

37.3 Significance of Potential Applications

Scorse rated and ranked the potential applications as follows:

	Rating	Rank
fleet management	3	NR
driver management	3	4
reporting/auditing	2	NR
safety management	3	3
check on loading practices	5	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	4	NR
regional one-stop shopping	2	2
bypass weigh scales/POEs	1	1

He would be mildly interested if the HELP technology included a “call home” capability. As a final comment, Bill Scorse notes “We’re really in this for the mainline bypassing; anything else we get is a bonus.”

38.0 Sessler Inc., Eugene, Oregon

38.1 Description of Operations and Involvement

Sessler did not complete an All-Carrier survey and Paul Casper, Controller, declined several opportunities to be interviewed. He suggested his dispatcher, Kevin McGee be contacted (“I asked him to complete the survey.”) Kevin McGee was interviewed on March 29th. It is likely that Kevin McGee is unfamiliar with the orientation material mailed. Further, as the interview had to be conducted while he continued to weigh trucks, dispatch, pay for in-coming loads of scrap steel, and conduct various other of his duties, the quality of the information obtained for this evaluation is “soft.”

Sessler is a dealer in scrap metals and, in this capacity, has a fleet of eight trucks, five of which have replacement transponders. The trucks operate on the I-5 between the Washington and California borders. All trips are “local” in the sense that the trucks return to the yard every evening.

There are no particular devices used for fleet management (OBCs, dispatch software, tracking devices, cellular phones, etc). Drivers call-in after making a delivery of scrap metal to mills in northern Oregon.

38.2 Opinions Stemming from HELP Involvement

McGee thinks the company might use AVI data for tracking a truck, although this does not appear to be a burning issue. He also suggests the company could use the AVI/WIM data for driver monitoring (speed) and for monitoring axle weights (the trucks leave some yards without being scaled).

He had no information on weigh-scale bypassing.

38.3 Significance of Potential Applications

McGee provided the following evaluation of HELP applications:

	Rating	Rank
fleet management	1	1
driver management	1	1
reporting/auditing	3	1
safety management	1	1
check on loading practices	2	4
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	5	NR
bypass weigh scales/POEs	3	5

He ranked the first four applications equally; for later purposes, where the opinions of all carriers are tallied, these are given a rank of 2.5 each (i.e., so that in total, the rank of the first four choices still sums to 10). There may also be some interest in a “call home” application; this was difficult to determine.

39.0 Cardmore Trucking Central Point, Oregon

39.1 Description of Operations and Involvement

Cardmore Trucking completed a survey during an interview with Dave Wharton, Maintenance Manager, on March 30th.

The trucking arm of the company is “Combined Transport (or Transportation)”; Cardmore owns the tractors and leases to Combined. Combined operates 104 company-owned (Cardmore) tractors and has another 75 owner-operators. It hauls heavy commodities, primarily on flatdeck trailers, and has a heavy haul division operating a variety of specialized equipment. It operates in all 48 states and Canada and has three or four terminals in addition to the one in Central Point.

Many company trucks are equipped with electronic engines which look after such things as speed monitoring (governing) and maintenance schedules. The tractors used in the heavy haul division are equipped with cellular phones and some have fax machines. Cardmore is considering satellite and/or other methods of tracking. There are no requirements for any fleet management or communications equipment for the tractors operated by owner-operators.

The company has received one replacement transponder but has not yet installed it. As far as Wharton knows, the company does not have modem access to Lockheed. The most recent hard copy report shows “no data” for the one transponder.

39.2 Opinions Stemming from HELP Involvement

Wharton says he could use AVI data for tracking (i.e., where is a particular truck?) and for route checking (i.e., did a particular driver take the route he was instructed to?). He is not sure the company would be interested in AVI data for log checking (this was a difficult question for the maintenance manager who has nothing to do with driver logs). The two-hour polling frequency is not considered a problem by Dave Wharton.

AVI/WIM data would be used for driver monitoring (speed) and for load checking. Although trucks are generally scaled before leaving a yard, Wharton described a number of circumstances where the company would like to be able to check on how the driver had positioned the load. The company hauls a variety of dense commodities (e.g., glass) which have to be positioned correctly on the trailers in order to satisfy axle-load limits.

Cardmore has no bypassing experience with transponder-equipped trucks. Further, Wharton is not sure the company would be willing to pay anything for mainline bypassing (drivers are paid by the mile).

39.3 Significance Of Potential Applications

Wharton provided the following ratings and rankings:

	Rating	Rank
fleet management	2	3
driver management	2	1
reporting/auditing	4	9
safety management	2	5
check on loading practices	2	6
private use of AVI at terminals	2	7
tracking stolen vehicles	4	8
regional one-stop shopping	3	2
bypass weigh scales/POEs	3	4

In addition, he is very interested in a “call home” possibility with the HELP technology.

40.0 TNT Reddaway Truck Lines Inc.. Clackamas. Oregon

40.1 Description of Operations and Involvement

TNT completed a survey during a meeting with Tom Solheim, Director of Safety, on April 1. He is optimistic about the future of HELP technology and felt that his company’s performance in the Crescent demonstration has been less than it should have been (responsibility has been shuffled around somewhat).

TNT is a large, for-hire LTL carrier. The Clackamas operation, which is linked to other TNT operations throughout North America, operates up and down the west coast (California to British Columbia). It has 425 company-owned tractors. Six replacement transponders have been received but have not been installed. Further, the company does not have modem access to the Crescent database.

The tractors are equipped with electronic engines, tachs and speed-o-graphs and dispatching is handled with computer software. Significantly, for a large sophisticated company such as this,. it does not use OBCs, tracking devices (satellite or ground-based) or any communications technology. Drivers call-in if they have to. The reason for this absence of “high-tech” fleet management devices is the regular nature of the routes and scheduling. As Solheim noted, “if we want to know where a truck is at any point of time, we have a pretty good idea of where it should be.”

40.2 Opinions Stemming from HELP Involvement

Solheim says TNT would use AVI data if it were available. Because of the regular nature of the routes, there is less concern with checking the accuracy of logs in a large LTL company than there is, for example, in a large TL carrier. What TNT would use the AVI data for is the (occasional) need to track a truck, say in bad weather or in heavy traffic, and to estimate arrival times for special shipments (the term used was “hot” shipments -- that is, where they are handling a high priority shipment).

Because of this potential use of AVI data for tracking and/or estimating arrival times, the company would prefer a polling frequency of a minimum of 10 minutes.

AVI/WIM data is of marginal interest to TNT: occasionally they may have a problem with axle overloads and a means to spot this might be useable (assuming it were accurate). Speed monitoring is not a concern as all tractors are company-owned and, with electronic engines, speed can be governed.

The company had nothing to offer on bypassing experiences with transponder-equipped trucks. It did have, however, this thought to offer on the subject. Because of the regular nature of their routing, drivers are given “windows” of time during which they have to complete their runs. What the driver does if he/she has extra time is up to the driver. As a result, Solheim does not think TNT would be prepared to pay for mainline bypassing. In other words, on a typical run involving three to four weigh scales, the saving in time would not result in any cost savings for the company, other than the minor decrease in fuel consumption, brakes, etc.

40.3 Significance of Potential Applications

Tom Solheim provided the following information on potential HELP applications:

	Rating	Rank
fleet management	1	2
driver management	1	5
reporting/auditing	1	4
safety management	2	6
check on loading practices	2	8
private use of AVI at terminals	1	1
tracking stolen vehicles	2	7
regional one-stop shopping	1	3
bypass weigh scales/POEs	2	9

He was intrigued with the potential of transponders to be used with private AVI readers at company terminals to keep track of equipment. He also was quite interested in a “call home” capability.

41.0 Domino's, Hayward, California

41.1 Description of Operations and Involvement

Domino's did not complete a survey and several attempts to discuss the Crescent Demonstration project with Mark Prudhomme, "Commissary Leader," were unsuccessful. Although Prudhomme agreed to a visit by the evaluation team, on the appointed day he turned the meeting over to Harry Brown, "Delivery and Service Team Leader," and left. His understanding (apparently) was that the evaluation team wanted to talk to the person in charge of the trucks.

Harry Brown, who had been a truck driver four months prior to the May 3, 1993 meeting, was only vaguely aware of the Crescent demonstration. He had seen the transponders on the trucks and knew roughly what their function was. With Harry Brown's help, a rough attempt was made to complete the survey.

Domino's is a private carrier operating five trucks, on full service lease from Ryder, from the Hayward facility. From Hayward, the trucks serve retail stores in the northern part of California and Nevada. In California, the trucks operate as far north as Redding and as far south as Porterville. There are only three Crescent sites on the I-5 corridor between these points and, even then, it is not clear how often Domino's trucks actually operate through the Redding site. This paucity of Crescent sites and its obvious ramifications on the amount of data Domino's might expect from HELP were important considerations when Harry Brown responded to the survey.

With five trucks, on full-service lease, operating on a regular pattern to a given set of retail stores, there is no requirement for sophisticated fleet management techniques. Drivers are instructed to call-in before 10:00 am every morning and other calls to/from the driver are handled by telephoning the retail outlets.

It could not be determined, at the meeting on May 3rd, whether or not the replacement transponders had been sent to Domino's. The trucks have the old transponders installed, but it is possible the replacement transponders were sent to Ryder. Harry Brown has never seen them and has no knowledge about them.

41.2 Opinions Stemming from HELP Involvement

Harry Brown's opinions about HELP are based on scanty knowledge as he has not been given the orientation material previously sent, as the company has no modem access to the Crescent database, and as the latest hard copy report from Lockheed simply shows "no data" for five transponders. However, after a brief description of what HELP/Crescent was supposed to do, Brown thought that AVI data might be useful for log checking. He could see little, if any, use for WIM data. The two-hour polling frequency and the potential for "black outs" are not seen as problems.

41.3 Significance of Potential Applications

Harry Brown provided the following ratings and rankings of potential applications:

	Rating	Rank
fleet management	4	NR
driver management	4	NR
reporting/auditing	5	NR
safety management	2	1
check on loading practices	4	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	3
regional one-stop shopping	5	NR
bypass weigh scales/POEs	3	2

He would also be mildly interested in a “call home” application but points out that with the current location of sites it would be of no use to Domino’s.

42.0 Wiegand Button Motor Express, Inc., Dixon, California

42.1 Description of Operations and Involvement

Donnell Wiegand did not complete a survey. He did agree to an interview; however, only a few minutes were available for the meeting on May 3rd. This makes it difficult to describe either WeigandButton’s operation or its opinions of HELP/Crescent.

WiegandButton is a TL for-hire carrier operating from Washington to Los Angeles and into Arizona. As a rough guess, 50 percent of the company trips are on the I-5. The company has 70 tractors and somewhere in the neighborhood of 28 transponders. (Wiegand was not sure of the number; Lockheed records show 29 original transponders issued.)

Most HELP/Crescent correspondence had been placed in a pile in Wiegand’s office. Much of it had only been scanned. While he remembered a survey from the WHI, it could not be found at the time of the May 3rd meeting. Further, it was clear from the discussion that none of the Lockheed hard copy reports had been examined, at least not since the replacement transponders had been installed. There is no modem access to the Crescent database.

During the May 3rd meeting, Wiegand, who had made an initial claim about the inaccuracy of the Crescent data, checked the latest Lockheed hard copy report and noted that four of his transponders were not working. He was questioned closely about the routing of the four trucks involved over the reporting period but still maintained that four transponders were not working.

42.2 Opinions Stemming from HELP Involvement

There is only one aspect of HELP that interests Wiegand: weigh-scale bypassing. AVI and WIM data are of little interest and, as he points out, since the company is planning to buy satellite tracking services, they will be of even less interest in the future.

When questioned about his interest in weigh-scale bypassing, and when informed about Santa Nella (he had not heard of this demonstration), Wiegand said he would be willing to pay up to \$4.25 for a mainline bypass. It is not known how this number was derived, although when asked the question, Wiegand reached for a calculator -- presumably the number is based on a cost per minute and some estimate of the time it takes to clear a scale. He notes that the company is providing 20-hour service between Los Angeles and Portland and every minute saved is important.

42.3 Significance of Potential Applications

Wiegand provided the following evaluation of potential HELP applications:

	Rating	Rank
fleet management	3	NR
driver management	3	NR
reporting/auditing	2	2
safety management	3	NR
check on loading practices	5	NR
private use of AVI at terminals	2	3
tracking stolen vehicles	2	4
regional one-stop shopping	3	NR
bypass weigh scales/POEs	1	1

43.0 Husky Crane Inc.. Stockton. California

43.1 Description of Operations and Involvement

No survey was completed by Husky Crane and Jim Dickson, the person in charge of the trucks, had no knowledge of receiving a survey from the WHI. However, information for the survey was obtained on May 4th during an interview with Jim Dickson.

Husky Crane operates a variety of equipment, including a number of tractors used to haul heavy machinery on a trip permit basis. A typical configuration consists of a tractor, a “jeep,” a lowbed trailer, and a “booster” for a total of nine axles. Loads are sometimes over 200,000 pounds. While the company has authority in eleven western states, most of the activity tends to be local.

The tractors are equipped with speed-o-graphs and radio phones which work within about a hundred mile radius of the company’s Stockton facilities. Beyond that range, drivers are instructed to call-in both after they load and after they deliver.

Three of the tractors used in the heavy-haul work are equipped with replacement transponders.

43.2 Opinions Stemming from HELP Involvement

While Husky does not have modem access to the Crescent database, it is receiving hard copy reports. Dickson considers the information on the hard copy reports to be fairly accurate. He had not given a great deal of thought as to how the company might use the information although, when questioned, he did say that being able to estimate arrival times for customers would be interesting. To this end, he thought a polling frequency of one hour would be more useful. The speed and weight information available from WIM is not too useful (the tractors have electronic engines so speed can be governed and generally the trip permit loads are known in advance so WIM weight information is not important.) The one point about WIM data that is of interest is on those occasions when the company has a piece of machinery to pick up in an out-of-the-way place where there is no way of knowing the weight or no means of scaling the truck. However, as Dickson points out, what it the point of seeing it show up on the Crescent database with overloaded axles (that is, by this point the truck is overloaded and there is nothing the company can do).

43.3 Significance of Potential Applications

Jim Dickson provided the following ratings and rankings:

	Rating	Rank
fleet management	1	2
driver management	3	NR
reporting/auditing	2	NR
safety management	5	NR
check on loading practices	1	4
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	1	3
bypass weigh scales/POEs	1	1

Jim Dickson’s main interest in the HELP technology is weigh-scale bypassing; however, and unlike other carriers participating in the Crescent demonstration. his interest in bypassing is tied to the trip permit process. Currently, there does not appear to be a means to add trip permit data to the credentials data in the Crescent demonstration (i.e., the “institutional” arrangements appear not to have been made). Dickson says the company would pay up to \$15 to be able to bypass -- but, again, this has to be compared to the time it now takes a trip permit truck to clear a scale. He would not pay to have an ordinary load or an empty truck bypass.

44.0 Frito Lay Inc., Modesto, California

44.1 Description of Operations and Involvement

Frito-Lay (Modesto) did not complete a survey. This is probably because of a personnel change at the company. Eric Woods, who was interviewed on May 4th, has only recently taken over the position of “NorCal Area Fleet Manager” and, although well versed on IVHS technology and the HELP/Crescent project, he was not aware of the WHI survey.

The company has about 28 tractors at Modesto, of which 25 have replacement transponders. The fleet of concern to Woods (and some of his opinions about HELP) is larger than this. The company rents many trailers during peak seasons and it also has a responsibilities for several hundred vehicles operating out of smaller distribution centers. These centers are supplied by the Modesto facility.

The 28 linehaul tractors are equipped with OBCs (Cadec) and electronic engines. Frito-Lay is also considering satellite tracking. Its head office is investigating the possibility of identifying equipment with either a transponder technology or bar coding. Frito-Lay does not have a great need for any communications technology. Messages can be left or drivers can telephone from the distribution centers served. Most trips are of one day or less duration.

44.2 Opinions Stemming from HELP Involvement

Eric Woods suggests that Frito-Lay (Modesto) is not in the best position to offer opinions about HELP both because of the personnel change and, through some mix up possibly related to the personnel change, the company has had no useful data from Crescent. While the replacement transponders have been installed, the credentials information, apparently, has been mixed up. The reasons for this are unknown, but the important point is that Frito-Lay is receiving erroneous information from the Crescent database (eg, truck #xxx crossed Crescent site AAAA on such a date when, in fact, truck #xxx was in the shop).

Woods could not see any need for AVI information. However, he did agree that the driver manager might be able to use it for log checking (although he also speculates that since the OBCs were doing everything now, this potential might be more hypothetical than real). The one problem the company does have from time to time is drivers forgetting to punch in the crossing of a state line. Another possibility discussed is the use of AVI data for ETAs for the distribution centers. However, as Woods noted, a telephone call from one of these centers generally informs Modesto of a late arrival and it is not obvious how Crescent data could be used to do much about this. Woods has no strong opinions on the polling frequency. As he pointed out, even if the data were in real time it is unlikely to be of much help to his operation given the geographic dispersion of the Crescent sites (i.e., there would have to be many more, closely-spaced AVI readers to make AVI data useful to Frito-Lay for such functions as ETAs).

The addition of WIM to the AVI data does not increase the usefulness of Crescent data for Frito-Lay. Speed is not an issue (they have electronic engines and the OBCs can monitor the drivers). Weight information is only of marginal interest. Generally the trucks are lightly loaded, although occasionally on a backhaul the trucks might haul heavier loads with the potential for an axle overload. Possibly the WIM data in a HELP system could be used to analyze where and when this problem occurs so that remedial action could be taken.

The company is also interested in using some technology (HELP transponders or something else) to keep track of equipment entering and leaving company facilities. In fact, Frito-Lay has already been in communication with Vapor to find out how much it would cost to install transponders on all of its equipment (tractors and trailers). As Woods explained, it is not just company equipment which is the problem. Frito-Lay has to rent, on a short-term basis, many trailers during the peak seasons. These can be sent to many different destinations and where they eventually end up is sometimes difficult to predict. What the company would like is a means of identifying this equipment electronically (or some other way) so that it could keep track of all this equipment. Last year the company paid roughly \$80,000 for late trailer returns.

No information was developed on weigh-scale bypassing. The only scale through which the trucks operate that is potentially capable of by-passing transponder-equipped trucks is Santa Nella and, at the time of the interview, it was not operational. In terms of future developments Woods thought the company would be willing to pay \$1 to \$2 for mainline bypassing. (He had been in contact with Lockheed and was aware of the probable plans for HELP Inc.)

44.3 Significance Of Potential Applications

Eric Woods gave the following evaluation of potential HELP applications:

	Rating	Rank
fleet management	2	NR
driver management	2	NR
reporting/auditing	1	4
safety management	2	6
check on loading practices	3	NR
private use of AVI at terminals	2	3
tracking stolen vehicles	1	5
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	2

He would be quite interested in the HELP technology if the express receivers being used for Santa Nella included a “call home” capability. Again, this interest is only if the future location of HELP sites is on the routes used by Frito-Lay and if the spacing of these sites is relatively close.

45.0 Mark Woods Trucking/Wildwood Express Inc. Kingsburg, California

45.1 Description of Operations and Involvement

Mark Woods, the owner of both Mark Woods Trucking and Wildwood Express, did not complete a survey. However, in an interview on May 4, 1993, most of the information for the survey was developed.

The two trucking companies operate only in California and the freight given as an example of the typical operation was glass bottles for wineries (and presumably other food processors). The two companies have 26 tractors all of which are equipped with replacement transponders. In addition, Lockheed has contacted Woods to see if he would be interested in installing transponders on trailers (he would). As of May 4th, Woods had been in possession of five express receivers (for Santa Nella) for a week or so.

Tractors are equipped with OBCs and Mark Woods noted that he was the first company in the world to do this (1983). Tractors are also equipped with cellular phones. This equipment -- the on-board computers and phones -- is important as it seems to give the company most of the monitoring, tracking and communicating capabilities required. Nevertheless, Woods feels there is still a need for Crescent data.

45.2 Opinions Stemming from HELP Involvement

While Mark Woods does not have modem access to the Crescent database, he is receiving hard copy reports from Lockheed. He suggests there are errors in the Crescent database and, to prove his point, he referred to a Newhall entry on the latest Lockheed report. The weight, at over 86,000 pounds was obviously incorrect. But, of more interest, Mark Woods says that the time of the observation is incorrect. To prove this, he referred to the printout from the onboard computer. While the explanation was difficult to follow, according to Woods, it unequivocally demonstrated that the truck could not have been at Newhall at the time shown.

The question at this point is this: if the on-board computer gives Mark Woods everything he needs for fleet and driver management, why does he need the Crescent data? Mark Wood's response is interesting: he feels the Crescent data -- time of observation, axle weights, etc -- can be used in "enforcement" situations to show state officials data the state has collected to prove that allegations made by an enforcement officer are incorrect. When it was suggested that WIM data was probably not sufficient for enforcement purposes, Mark Woods said he realized this but hoped that someday it would be.

In terms of weigh-scale bypassing, Mark Woods said that his trucks, with the "express boxes" were being bypassed at Santa Nella. Mark Woods was quite sure about this, although when questioned, he did admit that "drivers will say anything." A check the next day with Max McDade at the Santa Nella scale suggests that none of Mark Woods trucks have, in fact, been bypassed at Santa Nella using express receivers.

Another surprising opinion of Woods was that he quite liked the “call home” capability of the receivers being used for the Santa Nella demonstration. (The surprise was that the evaluation team was unaware that the receivers had this capability.) Asked whether he had ever used this capability, Mark Woods said “no,” but he did promise to let the evaluation team know the first time he did. The other surprising aspect of this response is that the company equips its trucks with cellular telephones. It could be there are areas not served by the cellular phones although it seems unlikely that any existing or planned HELP cites would remedy this.

45.3 Significance of Potential Applications

Mark Woods provided the following ratings and rankings:

	Rating	Rank
fleet management	1	3
driver management	1	5
reporting/auditing	5	NR
safety management	1	7
check on loading practices	1	4
private use of AVI at terminals	1	6
tracking stolen vehicles	1	2
regional one-stop shopping	5	NR
bypass weigh scales/POEs	1	1

The intrastate nature of the company explains the response to “regional one-stop shopping.” Woods was also interested in a “call home” capability (in fact, as noted, claims to have it) but it is not clear why he would want this given that he already has cellular phones.

Mark Woods is an enthusiastic believer in HELP technology but, having noted this, it is less clear how Crescent data would be used by the company. At the end of the interview, it was suggested that his main interest was in mainline bypassing. Woods agreed. Furthermore, he suggested, the reason he wants to bypass the scales is to reduce the number of enforcement incidents. Woods says the savings in time in bypassing are not significant (drivers are paid by the mile). However, when a truck has to report to a scale, officers find some reason to charge the company with a violation. In fact, Mark Woods noted, it is when the scales are not too busy that the greatest possibility of being charged with something occurs. For this reason, then, Mark Woods would like to keep his trucks on the freeway, as compared to in a weigh scale, as often as possible.

46.0 Condor Freight Lines Goshen California

46.1 Description of Operations and Involvement

Condor Freight Lines did not complete a survey; however, in an interview with William Crites, Vice President, on May 5, most information requested was collected.

Condor is an LTL carrier located in Goshen as this is the midpoint of the territory served (roughly from Fontana in the south to Hayward in the Bay area to Nevada). It has a total of seven terminals. All trucks use the Goshen terminal as the focal point of their activities. Trailers are switched in Goshen and tractors return to their home terminals every evening. The company has 54 tractors and uses radio phones to communicate with drivers. Thirty-two of the tractors have the old (black) transponders installed. Replacement transponders have been received but not yet installed.

46.2 Opinions Stemming from HELP Involvement

The company does not have modem access to the Crescent data and this, coupled with the fact that the hard copy reports are showing many transponders with “no data” and the fact that most of the company routes are on Highway #99 (and not the I-5) means that Condor Freight Lines does not have much experience with Crescent. It also has no experience with weigh-scale bypassing (at least for transponder equipped trucks) and Crites was not familiar with the Santa Nella demonstration.

Despite this limited exposure, Crites sees considerable potential for HELP technology. Part of this potential arises from the company’s plans to expand its operations (possibly into other states) and the realization that its current fleet/driver management methods will have to change.

William Crites sees AVI data being used to track drivers (eg, for log-checking purposes) and for monitoring speeds. He does not, however, view the two-hour polling frequency as a problem. He also sees axle-load information as useful in helping the firm determine where problems originate. For example, while the spotting of an overloaded axle in the Crescent data is not too useful on the day of the occurrence (if the truck is on the highway with an overloaded axle it is too late to do much about it by the time someone spots it in the Crescent database), it would be useful to analyze data over a period of time to find out if particular shippers or particular terminals are the source of the problem.

Crites is also interested in several other potential applications: as an aid in tracking stolen vehicles, (for companies larger than Condor) as a method of keeping an on-line inventory of equipment (with private AVI readers), and as a means of achieving one-stop-shopping.

In terms of weigh-scale bypassing, William Crites thought his company would pay up to \$5 a bypass.

46.3 Significance of Potential Applications

William Crites provided the following evaluation of HELP applications.

	Rating	Rank
fleet management	2	4
driver management	2	NR
reporting/auditing	1	2
safety management	2	NR
check on loading practices	1	1
private use of AVI at terminals	3	NR
tracking stolen vehicles	1	5
regional one-stop. shopping	3	NR
bypass weigh scales/POEs	2	3

He is also interested in a “call home” application for those areas where there are gaps in the radio phone coverage.

47.0 Domino's. Ontario. California

47.1 Description of Operations and Involvement

Domino’s (Ontario) did not complete a survey. However, in an meeting with Helio Gomez, the Transportation Coordinator, on May 10 1993, most of the information requested was collected. Mr. Fontana, to whom Helio Gomez reports, sat in for the part of the meeting.

Domino’s supplies a number of retail outlets from its Ontario center. The eleven trucks, all on a full-service lease, operate in the southern California area -- as far north as Bakersfield -- and into Nevada, Utah and Arizona. The routes taken, however, do not include the I-10 so Domino’s exposure to Crescent is limited to a few cites on the I-5.

Tractors are equipped with sleepers as many of the trips from Ontario involve driver teams. However, other than two electronic engines on the newer tractors, there is no other equipment used for fleet management. Drivers call-in after completing each delivery. The fact that the tractors are full-service lease is important as many of the functions which might benefit from HELP technology (reporting, paying prorated registration fees or fuel taxes) are handled by the leasing company. Further, the log-checking aspect of the operation at Domino’s is handled by an outside firm (J.J. Keller).

Three tractors are equipped with replacement transponders. Domino’s has no modem access to the Crescent database, but it is receiving the hard copy Lockheed reports.

47.2 Opinions Stemming: from HELP Involvement

Helio Gomez could not think of any use for AVI data or for AVI/WIM data. Estimating arrival times is not a concern as the stores know when the trucks will arrive and, if something such as

traffic causes a delay, the drivers will stop and call-in. The company did try a number of communications technologies in the past (eg, beepers) but found they did not have a need for them. Routing, or checking which routes trucks take, is not of concern, nor is log-checking. Weight information from WIM scales is not of interest to the company: the freight is generally light and the weight of the loads is always known before the truck is dispatched.

Domino’s has no experience with weigh-scale bypassing. Neither Helio Gomez nor Mr. Fontana were prepared to say how much the company would pay for mainline bypassing.

47.3 Significance of Potential Applications

Helio Gomez provided the following ratings and rankings of potential HELP applications:

	Rating	Rank
fleet management	5	NR
driver management	5	NR
reporting/auditing	5	NR
safety management	5	NR
check on loading practices	5	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	5	NR
bypass weigh scales/POEs	1	1

Neither Helio Gomez nor Mr. Fontana were well-versed in the HELP/Crescent demonstration. A copy of the WHI orientation document was left at the end of the meeting to answer their questions. This unfamiliarity with HELP may have had an impact on their evaluation of the potential uses of Crescent data.

48.0 Calzona Tankways. Inc.. Phoenix. Arizona

48.1 Description of Operations and Involvement

Calzona Tankways did not complete a survey, however during an interview with Douglas Burkard, Vice President, on May 4 1993, most of the requested information was obtained.

Calzona is a for-hire tank operation hauling a variety of petroleum products. The territory covered takes in most of the I-5, I-10 and I-20 Crescent corridor. However, most of the trips are local, with the trucks returning to home terminals every night. The trucks are equipped with OBCs (Cadec) and some of the newer ones have electronic engines. Drivers call-in as required and some drivers are equipped with pagers.

Twenty-five of the trucks are equipped with replacement transponders.

48.2 Opinions Stemming from HELP Involvement

Calzona does not have modem access to the Crescent database. It has been receiving the hard copy reports from Lockheed and Douglas Burkard says most of the data looks reasonable. He did note, however, that the “bridge formula” looked too short on some of the reports (??)

Burkard says AVI information in the Crescent database would be useful for such things as estimating arrival times or checking which routes drivers take. He was not concerned with checking logs (presumably because of the Cadec OBCs). The current two-hour polling frequency is not of concern.

AVI/WIM data, according to Burkard, would save the company from some citations for overloaded axles. He is aware that WIM data may not be accurate enough for legal purposes but’ being a tank truck operator, is concerned about the way his trucks are sometimes weighed. He feels that AVI/WIM data could be used to show the authorities the problem. (Tank operators face a particular problem when being weighed at a scale site. Often, given the movement of the load, it takes an experienced weigh-scale officer to do the weighing properly. Burkard believes the AVI/WIM data might be useful in showing the authorities this problem.)

Calzona has no experience with weigh-scale bypassing. In the course of discussing the Santa Nella demonstration with Douglas Burkard, he indicated the company might be prepared to pay from \$5 to \$10 to be able to bypass a scale.

48.3 Significance of Potential Applications

Douglas Burkard rated and ranked the potential HELP applications as shown below:

	Rating	Rank
fleet management	4	5.
driver management	4	6
reporting/auditing	1	2
safety management	4	7
check on loading practices	1	4
private use of AVI at terminals	5	8
tracking stolen vehicles	3	9
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	3

He was not particularly interested in a “call home” application.

4 9 . 0 Refrigerated Transport. Texas

49.1 Description of Operations and Involvement

No survey was completed by Refrigerated Transport; however, during an interview with George Martin, Director of Personnel, on May 17th, most of the information requested was collected.

Refrigerated Transport, and associated companies, have 535 tractors and haul both TL and LTL loads of food products. All tractors are owned by owner-operators and this aspect of the fleet is important in George Martin's assessment of HELP technology. To over-simplify somewhat, owner-operators have control of the equipment in the tractors (tachs, OBCs, cellular phones or anything else that other companies might use for fleet management); owner-operators are responsible for such things as axle overloads, most aspects of safety inspections, the accuracy of log books, the routes they take and the time they work. They are paid on a load basis (percent of revenue) and there is little the company can do to "manage" them. The owner-operators are under instructions to call-in every morning and upon completing deliveries. If the company has to communicate with a driver at other times, there is little it can do.

Although very few of the company's hauls are west of Dallas, Refrigerated Transport agreed to take one transponder which they gave to one of their owner-operators who runs west from Dallas. That is about the extent of the company's involvement in the Crescent demonstration: George Martin does not know if the transponder was installed and he knows nothing about replacement transponders. The company has no modem access to the Crescent database and, although it is receiving hard copy reports, all these reports show is "no data" for the one transponder which may or may not be on a truck.

49.2 Opinions Stemming from HELP Involvement

George Martin has few opinions stemming from HELP involvement as its involvement has been limited. However, after a description of potential HELP applications, he did express some views on the subject.

AVI data might be useful to the company in estimating arrival times. However, any other uses associated with driver or fleet management are of extremely limited use on account of the owner-operator nature of the fleet -- drivers are free to chose their own routes and are responsible for their logs. Similarly, the AVI/WIM data is of limited interest to the company -- drivers are responsible for any overloaded axles that occur.

49.3 Significance of Potential Applications

George Martin offered the following opinions about potential HELP applications:

	Rating	Rank
fleet management	1	NR
driver management	5	NR
reporting/auditing	4	NR
safety management	4	NR
check on loading practices	4	NR
private use of AVI at terminals	1	3
tracking stolen vehicles	1	2
regional one-stop shopping	2	NR
bypass weigh scales/POEs	2	1

Weigh-scale bypassing ranks fairly high in George Martin's opinion. He said he would be prepared to pay up to \$5 for mainline bypassing; however, as he pointed out, the owner-operators themselves would have to pay this amount.

50.0 Central Freight Lines. Waco. Texas

50.1 Description of Operations and Involvement

Central Freight Lines did not complete a survey (to be more precise: the Western Highway Institute did not receive a completed survey from Central Freight Lines; Joe Gentry, the Director of Transportation thought that one had been completed and returned). In any case, information for the survey was obtained during a meeting with Joe Gentry on May 17, 1993.

Central Freight Lines is an LTL and TL carrier operating primarily in Texas. It makes the occasional nip to California but the critical point for the evaluation of HELP is that most of its trips are relatively short haul within Texas. It has a total of 466 company-owned tractors, 50 of which have replacement transponders installed. More than half of the tractors have electronic engines and the company is looking at OBCs. No other equipment is used on the tractors for fleet management. Drivers call-in after making deliveries.

50.2 Opinions Stemming from HELP Involvement

Central Freight Lines is receiving the Lockheed hard copy report. Joe Gentry sees no use for AVI data. This opinion is heavily influenced by the short haul nature of most trips: log checking, rout checking and estimating arrival times are not critical in this situation. Similarly, Gentry sees no use for the AVI/WIM data: weight is not an issue for the type of freight handled (the average load is only 24,000 lbs).

Central Freight has no experience with weigh-scale bypassing and Gentry is not sure the company would be willing to pay for mainline bypassing.

50.3 Significance of Potential Applications

Joe Gentry provided the following ratings and rankings:

	Rating	Rank
fleet management	3	NR
driver management	3	NR
reporting/auditing	3	NR
safety management	3	NR
check on loading practices	5	NR
private use of AVI at terminals	5	NR
tracking stolen vehicles	5	NR
regional one-stop shopping	2	1
bypass weigh scales/POEs	4	2

He would also be interested in a “call home” application; however, given the short length of his routes, he assumes the future location of AVI sites will never be dense enough for this application to have much use for him.

Joe Gentry’s final comment at the May meeting was “Overall usefulness of this based largely on number of sites in states we operate in.” In other words, unless HELP technology were to be used on a large number of closely-spaced sites on most highways in Texas, it would not be of much use to Central Freight Lines.

51.0 Ralph Wilson Plastics. Temple. Texas

51.1 Description of Operations and Involvement

Ralph Wilson Plastics did not complete a survey and, when telephoned, John Jones, the Transportation manager, indicated he was frustrated with the project and was in the process of wrapping everything up to send back to Lockheed. Notwithstanding this frustration, John Jones agreed to a meeting on May 18th so that his experience could be documented.

Ralph Wilson Plastics makes Formica and ships it from Temple to all 48 states. From the plant in Temple, the company is currently running 28 trips a week to the west coast (i.e., on the Crescent route). The company also has a for-hire authority which it uses to fill empty backhauls.

The company has 50 company-owned tractors in Temple which are used to haul finished goods to distribution centers. The trips are all long-distance (all tractors have sleepers and drivers teams are used). Other than electronic engines in all tractors (with speed governed) there is no other equipment used for fleet management (OBCs, tachs, etc). Drivers call-in daily and when completing a delivery. in addition, since the company knows where the drivers fuel, it can use these fuelling stations to relay urgent messages.

The company received 14 replacement transponders but never installed them as the experience with the original transponders had not been satisfactory: some broke; some did not work; and, at other times, Crescent stations were not working so there would have been no possibility of having any data. By the time the replacement transponders were shipped, the original 14 trucks had been largely shifted to other routes. The installation of the 14 new transponders, therefore, would have required more paperwork.

5.1.2 Opinions Stemming: from HELP Involvement

Ralph Wilson Plastics is receiving the Lockheed hard copy report and, according to John Jones, there is one unit showing up (i.e., there is data on one of the old transponders, presumably on a truck still being used on west coast service).

Jones says the company has no use for either AVI or AVI/WIM data. Checking routes, logs or estimating arrival times are not tasks which the company feels it has to worry about. As for weight, the trucks are actually loaded while parked on axle scales.

The company has no experience with weigh-scale bypassing, but Jones thought it would be willing to pay a fee of \$1 for mainline bypassing.

5.1.3 Significance of Potential Applications

John Jones provided the following ratings and rankings:

	Rating	Rank
fleet management	4	6
driver management	5	5
reporting/auditing	4	4
safety management	3	3
check on loading practices	5	7
private use of AVI at terminals	5	8
tracking stolen vehicles	5	9
regional one-stop shopping	2	2
bypass weigh scales/POEs	1	1

He also expressed a mild interest in a “call home” application, although he pointed out that there was only one occasion in the past year when he would have used such a capability.

John Jones is frustrated with his experience in the Crescent demonstration project and has effectively withdrawn. At the end of the meeting with him, he pointed out as a final observation that most of the information HELP technology would supply to fleet managers could also be obtained from OBCs.

52.0 Parkway Transport, San Antonio, Texas

52.1 Description of Operations and Involvement

Parkway did not complete a survey but in an interview with Jimmie Jaye Wells, manager of Contract Development, on May 18 1993 most of the requested information was obtained.

Parkway is a truckload carrier with 355 tractors and a larger number of refrigerated and dry-freight vans. Three hundred and forty-one of the tractors are owned by owner-operators. The company operates on all Crescent routes and has 25 replacement transponders on owner-operator tractors. It does not have modem access to the Crescent database.

Because the fleet is essentially an owner-operator fleet, the company has little direct control of the equipment installed in the tractors (OBCs, tachs, electronic engines or any form of tracking device). It has looked at both Qualcom's and Motorola's tracking system and, while no decision to install such devices has been made, Jaye Wells points out that the owner-operators would have to be involved in such a decision. Likewise, when the company agreed to take 25 transponders, it depended on the agreement of the owner-operators to actually install them.

Drivers do call-in on a regular basis and Parkway has a sophisticated system for handling these calls. Not all details on this were obtained but the essential features seem to be a voice-mail system that both receives and sends messages to individual drivers and a software that takes the in-coming information (location, time) and feeds it into the dispatch software.

52.2 Opinions Stemming from HELP Involvement

Parkway is receiving the Lockheed hard copy report. It does not appear to have used any of the information to date. Jaye Wells says the company would find the AVI information very useful. Uses mentioned include: after-the-fact analytical studies tracking on-time deliveries (for particular shippers, routes, or, possibly, drivers); estimating arrival times; log checking; and route checking. These last two uses need clarification. In the first instance, it is the owner-operators who are responsible for the completion of accurate logs. However, the company's safety record can be impaired if an audit shows up any inaccuracies. On route checking, Jaye Wells suggested that it would actually be owner-operators who would be most interested in this. Some of the owner-operators operate fleets within the Parkway management and themselves have other owner-operators to manage.

The two-hour polling frequency is not perceived as a major issue by Wells, nor is the occasional "black outs" that might be inherent to a system where some of the AVI readers were located within scales.

AVI/WIM data would only be of idle interest to Jaye Wells. Owner-operators are responsible for weight and have to have the trucks scaled if they suspect a problem.

Parkway has no experience with weigh-scale bypassing, but Wells suggests they -- that is the company and the owner-operators -- might be prepared to pay a fee in the range of \$1 for mainline bypassing.

52.3 Significance of Potential Applications

Jaye Wells provided the following ratings and rankings:

	Rating	Rank
fleet management	1	2
driver management	1	4
reporting/auditing	1	7
safety management	1	5
check on loading practices	3	9
private use of AVI at terminals	1	6
tracking stolen vehicles	3	8
regional one-stop shopping	1	1
bypass weigh scales/POEs	1	3

He would also be very interested in a “call home” capability.

Jaye Wells is quite positive about the possibilities for HELP technology. At the conclusion of the meeting on May 18th, he wrote this on the survey form: “We’ve had very positive experiences with the transponders. Our contractors [owner-operators] are becoming aware of the advanced opportunities. The apparent cost savings over satellite technology are very lucrative for a mid-sized O/O company like ours.”

GROUP 5 CARRIERS

\$3.0 Haney Truck Line, Inc., Yakima, Washington

53.1 Description of Operations and Involvement

Quality Transportation Services is the holding company for both Haney Truck Line and Easley Hauling Services. Both companies (Haney and Easley) are irregular route, for-hire truckload carrier. They haul a variety of dry freight in all western states and into British Columbia, although 90 percent of their mileage is accounted for in Washington and Oregon. In fact -- and this is important in terms of understanding the fleet management -- all company drivers return to home base every night. The two companies operate 177 tractors and about 600 trailers. Most trailers are vans or flatdecks, although there are some refrigerated trailers, some hopper-bottoms (for hauling fruit), and a variety of other equipment. All Haney tractors (86) are driven by company drivers and about two-thirds of Easley tractors (91) are likewise driven by company drivers. The remaining third of the Easley fleet is accounted for by owner-operators who handle the longer hauls south (to Texas and perhaps beyond) and British Columbia.

The company is technologically sophisticated in the sense that it has some JIT services and in the sense that it is linked to some of its customers through EDI. The business is very service orientated. For example, larger customers use a rating system to evaluate the service (on-time deliveries, etc). Despite this technological sophistication, the company does not feel it has a need for such things as on-board computers or satellite tracking. It did try a number of OBCs but abandoned them after a while as it felt it was not getting the anticipated benefit. This feeling that on-board computers, satellite tracking, or other sophisticated means of fleet management are not for this company may be because of the essential short-haul nature of its work: all drivers are at their home base as night; if something does occur during the day, drivers can easily call-in.

The company uses a computerized dispatch system which keeps track of equipment on a zone basis. For example, if a large order comes in for hundred or so truckloads of freight, the system will know if (or when) equipment is (or will be) available.

Information about Haney Truck Line was developed during an interview with Dave Kerns, the Safety & Personnel Director, in September 1992 and in a series of follow-up telephone calls. In December 1992 Haney Truck Line dropped out of the Crescent demonstration.

53.2 Transponders

For the Crescent demonstration, 30 transponders were installed on tractors operated by Haney Truck Line. As of a letter to Lockheed dated December 17, 1992, the company began removing its transponders to return them to Lockheed.

53.3 Experience with Crescent Database

Haney did receive a login ID for the Crescent database in the spring of 1992. For some reason -- perhaps it was never used -- they had to establish a new login ID in the fall of 1992, just prior to the first evaluation meeting. It is unlikely that the modem was ever used access to the Crescent database.

53.4 Experience with Lockheed hard copy AVI/WIM report

Haney's experience with Lockheed hard copy reports is not known.

5.5 Opinions on Use of AVI/WIM Data

Since it is not known if Haney Transport ever received hard copy reports based on replacement transponders, no proper evaluation of the company's views on the use of AWWIM data can be made. However, during the course of the September interview, Dave Haney expressed reservations about the potential use of AVI/WIM information.

53.6 Experience with Weigh-Scale Bypassing

While Haney does occasionally have trucks operating through Woodburn SB and NB, no information was developed on weigh-scale bypassing. (In the September meeting, David Kerns said he thought his transponder-equipped trucks were being "waved through" Woodburn SB.)

53.7 Significance of Potential Applications

No information was developed on the company's ranking or rating of potential HELP applications.

53.8 Concluding Views/Comments

Haney dropped out of the Crescent demonstration prior to the second evaluation interview. In a letter to the WHI dated January 21, 1993, David Kerns explains the reason for the decision:

"Enclosed is a copy of the letter we sent to [Lockheed] . . . in which we withdrew our participation in the test process.

Bottom line: it's just too much paperwork and hassle for zero benefit, been going for too long, and too many other irons in the administrative fire.

In our operation, as a short haul distance carrier, the reports we get about our trucks crossing the Woodburn scale is meaningless at this point."

54.0 United Groceries- Portland Oregon

54.1 Description of Operations and Involvement

United Grocers is a large, private trucking operation with about 105 tractors. In the fall of 1992, there was a change in management at United Groceries and this may have an influence on the company's evaluation of HELP/Crescent. Dale Sutton, the Dispatch Manager, took over the company's file on Crescent/HELP only three week prior to the initial visit on September 28, 1992. In a telephone conversation prior to the visit, it was clear that Mr. Sutton knew little about the project.

54.2 Transponders

Lockheed records, in the fall of 1992, indicated that the company had 74 transponders. It is not known if these were ever installed or whether replacement transponders were ever sent to the company.

54.3 Experience with Crescent Database

Dale Sutton does not have a computer with a modem and there appear to be no plans to acquire such equipment.

54.4 Experience with Lockheed hard copy AVI/WIM report

It is not known whether hard copy reports were ever sent to United Groceries in Portland.

54.5 Opinions on Use of AVI/WIM Data

No information was received from the company on its views about AVI/WIM data.

54.6 Experience with Weigh-Scale Bypassing

No information was received from the company as to whether or not it had had any experience bypassing Woodburn SB with transponder-equipped trucks.

54.7 Significance of Potential Applications

The potential applications of Crescent/HELP data were not discussed with the company.

54.8 Concluding Views/Comments

The company's views on the use of the transponders and the HELP/Crescent project may be summed up by a comment made by Dale Sutton during the first interview which lasted for approximately two minutes: "We are not interested in participating in this program any longer, I would recommend that our company purchase no transponders." A follow-up letter was sent to Ron Dove, Director of Operations on November 9, 1992 asking the company to reconsider its decision to discontinue its participation in Crescent. On December 22, 1992 a telephone call to Ron Dove confirmed that the company had dropped out of the program.

55.0 L.S. Transport, Prineville, Oregon

55.1 Description of Operations and Involvement

L.S. Transport is the trucking arm of Les Schwab, a large tire distributor. Trucks are scheduled and routed on a regular basis, delivering goods from the distribution center to the retail outlets. Occasionally, trucks are in a position to backhaul inbound goods to the distribution center. Other than cellular phones in the trucks, no other technology is used for fleet management.

There are about 30 trucks stationed at this distribution center. All drivers are company employees who are paid by the hour. Driver monitoring, however, is not a high priority as the routes are well-enough known that the distribution center and the retail stores have a fairly good idea of when trucks should make their deliveries. Any problems en route or any information the distribution center wants to communicate to the drivers (a return load, etc) can be handled by the cellular phones.

Information about the company and its views on Crescent were obtained from Mike Fisher, the Operations Manager, during the course of one visit in September 1992 and a series of follow-up telephone calls. According to Mike Fisher, the company's reason for participating in Crescent is that it wanted to be in on the ground floor of any new technologies which might be developed.

55.2 Transponders

As of September 1992, the company had one truck with a transponder. As the nature of its delivery routes is such that a truck is only on the I-5 for a short stretch, the company did not feel there is any reason for having more transponders. In early February 1993, L. S. Transport had received and installed a replacement transponder.

55.3 Experience with Crescent Database

At the time of the first interview, in September 1992, Mike Fisher had not yet acquired a modem or the software necessary to access the Crescent computer. At the time of the last telephone contact with the company in March 1993, there was still no modem.

55.4 Experience with Lockheed hard copy AVI/WIM report

According to Mike Fisher, in a telephone conversation on February 11, 1993, L.S. Transport had installed the replacement transponder and had telephoned Lockheed to find out when it would receive a hard copy report. In a further telephone conversation on March 4, 1993, Mike Fisher said that he had still not received a hard copy report and was just about ready to "give up." It is not known whether the company ever did receive such a report.

55.5 Opinions on Use of AVI/WIM Data

No evaluation of the use of AVI/WIM data could be made by L.S. Transport. However, during the September interview, Mike Fisher expressed doubts as to whether or not any information that could be produced would be of use to his operation. This was discussed in the context of the Orientation package produced for carriers by WHI.

55.6 Experience with Weigh-Scale Bypassing

L.S. Transport trucks are not routed through Woodburn NB or SB so there was no opportunity to evaluate weigh-scale bypassing.

55.7 Significance Of Potential Applications

It was not possible to ask the company to rank or rate the potential applications.

55.8 Concluding Views/Comments

In the September interview, it became evident that the company was not particularly sure there is much in the HELP/Crescent program which could be of value to it. In the final telephone conversation with Mike Fisher, he expressed the view that “we are not getting anything out of this [Crescent demonstration].” Shortly afterwards, Mike Fisher wrote WHI a letter:

‘As per our conversation on Wednesday, March 3, 1993, I would like to have LS Transport removed from the Crescent Project. The reason I would like to drop out . . . is that I do not see any information coming from this project that would be beneficial to our company.’

56.0 KKW Trucking. Pomona. California

56.1 Description of Operations and Involvement

KKW is a medium-sized, irregular route, for-hire carrier hauling such things as furniture. It operates in all western states with a mixture of owner-operators (about 60%) and company drivers (about 40%). It has 86 tractors and roughly 225 sets of double-trailers (450 trailers in total).

The company has experimented with satellite tracking but found it to be expensive. Currently, its fleet management techniques are relatively simple: drivers are equipped with pagers and call-in as and when necessary. Drivers have delivery schedules to meet and, as deliveries are made, they call-in for their next pick-up.

Information about KKW was obtained from Steve Benninghoff, the Operations Manager. A meeting was held with him on October 8, 1992. Unfortunately, only 15 minutes was available for this meeting and portions of the interview had to be completed by telephone on October 14, 1992. Between October 14 and May 7, 1993 a total of ten calls were made to KKW to find out how their evaluation of Crescent was proceeding. Most of these calls went unanswered. However, from those where contact was made, it became clear that the company’s commitment to assist with the evaluation was weak. As of May 7, 1993 KKW had not sent in the required material to Lockheed to obtain the replacement transponders and, as far as is known, had never accessed the Crescent database. No useful purpose would have been served in making a second visit to this case-study carrier.

\$6.2 Transponders

Fourteen transponders were issued to KKW, but it has never been established how many were installed and/or were installed and actually worked. No application for replacement transponders was submitted to Lockheed (as far as the evaluation team can determine) and, in fact, at one point in February 1993, Lockheed informed the evaluation team that KKW was planning to drop out of the Crescent demonstration.

56.3 Experience with Crescent Database

As far as can be determined, KKW has never had access to the Crescent database. Lockheed records indicate a login ID was requested in May 1992. However, as of the October 1992 interview with Steve Benninghoff, no attempt had been made to use this.

56.4 Experience with Lockheed hard copy AVI/WIM report

It is not known if KKW ever received hard copy reports or whether there was any data that could have been included in such reports.

56.5 Opinions on Use of AVI/WIM Data

From information obtained during the October 1992 interviews, the one interest KKW has in the HELP technology is the ability to track trucks. It would like to be able to determine where a truck was on those occasions when a customer telephones asking “where is your truck?”

56.6 Experience with Weigh-Scale Bypassing

The company has no experience with weigh-scale bypassing.

56.7 Significance of Potential Applications

Potential applications of HELP were not rated or ranked by KKW.

\$7.0 Leather Center, Carrollton, Texas

The Leather Center manufactures furniture in Dallas and distributes to retail stores throughout the United States. There are seven tractors and a fleet of a corresponding number of double 28-foot van trailers based in the Dallas facility. Two of these units, the two with transponders, operate on regular schedules to the west coast, one to Los Angeles and one to San Francisco.

While the Leather Center is classified primarily as a small, private carrier, it also has for-hire authorities which it uses to haul furniture on backhauls. It also uses the trucks to haul inbound goods to the Dallas plant (for example, leather).

As the schedules, pickup and delivery points, and routes are all quite regular, there is no need for sophisticated fleet management technology. Generally, the west-coast trucks are loaded by Friday evening and the drivers are free to decide what time Saturday they depart. The equipment itself is operated under a full-service lease, so that some aspects of fleet management are not under the direct responsibility of the Leather Center (maintenance, registration, and various reporting requirements). The drivers are paid by the mile so that there is no particular concern on the part of the Leather Center about schedules, as long as deliveries are made within the appropriate time frame. The company does dictate the routes to be taken because of a concern about winter driving conditions for double-trailer units.

The tractors have no "high tech" fleet-management devices (tachs, on-board computers, cellular telephones, etc). The only concession made to fleet management (other than the leasing arrangements) is that the drivers are instructed to call-in twice a day. While 60 percent of the time the return loads are known before the trucks leave Dallas, the other times return loads may have to be arranged after the trucks have left. These driver call-in instructions can be used to relay any such pickup orders.

Other than a general interest in finding out what the HELP technology has to offer, the company had no particular expectations about what this technology could do for its distribution system.

Most information about the Leather Center was obtained from Jerry Branch, the Transportation Manager. Oscar Rivers, who works in Dispatch, also provided critical information. A meeting was held with Jerry Branch in October 1992. Between that date and February 18, 1993, Jerry Branch was telephoned eight times to see if the replacement transponders had been received and if the WHI monitoring had begun. Only twice was contact made; the other six times the voice mail messages were ignored. In the February 18th conversation, Jerry Branch suggested that, as he would be tied up for a few months, Oscar Rivers would be the person taking over the HELP/Crescent project. As of February 18th, the replacement transponders were not on the trucks and no monitoring had been done. Between February 18th and May 17th, a further nine telephone calls were made to the Leather Center -- none of the messages was ever answered. When contact was finally made with Oscar Rivers, he had no knowledge of the HELP/Crescent project and knew nothing about replacement transponders. According to Rivers, "things are real hectic and Jerry wants to drop out of the Crescent." In a conversation on April 15th with Oscar Rivers, it was explained that it would be helpful if the decision -- one way or the other -- could be confirmed and documented. A request was made for a short meeting with Jerry Branch on May 17th and a follow-up letter asked Oscar

Rivers or Jerry Branch to inform WHI if some problem prevented a meeting. On Monday, May 17th, at the appointed hour, the evaluation team was told that Jerry Branch was in Boston. This, presumably, ends the "Leather Center file" in this evaluation.

According to Oscar Rivers, the Leather Center did receive a box with two "things" in them that may have been replacement transponders. As far as is known, they were never installed. As of October 1992 the Leather Center had not yet logged on to the Lockheed computer. As far as is known, between October and May, 1993, it never did use the modem access to Crescent.

CARRIER INDEX

Albertson's Inc., Portland, Oregon	8
Baxter Health Care, Ontario, California	50
Bi-Mart Corporation, Eugene, Oregon	40
Calzona Tankways, Inc., Phoenix, Arizona	.86
Cardmore Trucking, Central Point, Oregon	73
Central Freight Lines, Waco, Texas	89
Chevron, San Ramon California..	.22
Condor Freight Lines, Goshen California..	84
Domino's, Hayward, California	76
Domino's Ontario, California	85
Domino's Pizza, Kent, Washington	.3
Food Express, Inc., Arcadia, California..	.48
Frito-Lay, Casa Grande, Arizona..	.28
Frito-Lay, Vancouver, Washington..	.38
Frito-Lay, Fontana, California..	56
Frito-Lay Inc., Modesto, California	80
FTL Inc., Portland, Oregon	39
Gordon Trucking Inc., Sumner, Washington.....	61
Gresham Transfer Inc., Portland, Oregon.....	67
Haney Truck Line, Inc., Yakima, Washington.. ..	.94
Husky Crane Inc., Stockton, California..	78
Inco Express Inc., Seattle, Washington..	60
Interstate Distributor Co., Tacoma, Washington.. ..	.5
KKW Trucking, Pomona, California..	98
KMD, Auburn, Washington	59
L. S. Transport, Prineville, Oregon	97
Leather Center, Carrollton, Texas..	100
Mark Woods Trucking/Wildwood Express Inc., Kingsburg, California	82
Market Transport, Portland, Oregon.....	69
Merchants Fast Motor Lines, Abilene Texas	58
Nickel Plate Express, Eugene, Oregon	19
Oil Transport, Abilene, Texas	57
Parkway Transport, San Antonio, Texas	92
PLXPRESS Inc., Wilsonville, Oregon	14
Post Trucking/Post & Sons Transfer, Tacoma, Washington	63
Provisioners Express, Auburn, Washington.....	62
Ralph Wilson Plastics, Temple, Texas..	90
Reed's Fuel & Trucking, Springfield, Oregon	.41
Refrigerated Transport, Texas	88
Risberg's Truck Lines, Portland, Oregon	66
Sessler Inc., Eugene, Oregon	71

Tabor Truck Lines, West Sacramento, California 26

Texas Instruments, Dallas, Texas 33

Thrifty Corp., Ontario, California 24

Timber B-Products, Albany, Oregon..... 17

TNT Bestway Transportation, Phoenix, Arizona 51

TNT Reddaway Truck Lines Inc., Clackamas, Oregon.. 74

Troutman’s Emporium Inc., Eugene, Oregon 70

Tyler Pipe Industries, Tyler, Texas.. 35

United Groceries, Portland, Oregon..... 96

United Grocers, Inc., Medford, Oregon 44

United Parcel Services, Phoenix, Arizona 31

Veneer Chip Transport Inc., Tacoma, Washington 64

WeigandButton Motor Express, Inc., Dixon, California 77

Wilhelm Trucking Company, Portland, Oregon..... 10

Willamette Industries Inc./Beaverton Bag, Beaverton, Oregon..... 46

Zero Motor Freight, San Antonio, Texas.. 53