

## **PURPOSE OF THE TEST**

The purpose of the Jurisdictional Issues evaluation is twofold. The first and primary purpose is to determine the partner states' intent to continue to offer either the Mainline Automated Clearance System (MACS) services or an enhanced version of electronic verification and to determine motor carriers' intent to continue to participate in MACS. A secondary purpose of the Jurisdictional Issues evaluation is to document issues and barriers to implementing MACS and the actions planned by the states to deal with issues and barriers.

A very basic objective of this operational test is to provide an actual operating environment for partners to experience and to collect data and information that is necessary for states and motor carriers to make decisions regarding continuing to offer MACS services and participating in electronic screening. In other words, operational tests and evaluations must provide for obtaining the data and developing the information necessary for states and motor carriers to make decisions to change their business practices.

Using the goals of the MACS test and the purpose of the evaluation as a foundation, evaluation goals can be stated as follows:

- “Assess whether states/province will continue to offer either MACS services or an enhanced version of electronic verification after the operational test is completed.”
- “Assess whether motor carriers will continue to participate in MACS services after the operational test is complete.”
- “Record all significant institutional issues addressed during the operational test and document the resolution to the issues.”

Test hypotheses resulting from these goals are:

- “The Advantage I-75 MACS Operational Test will provide jurisdictions with sufficient information to support a decision whether or not to offer MACS or an enhanced form of electronic clearance/verification in their jurisdiction”.
- “The Advantage I-75 MACS Operational Test will provide motor carriers with sufficient information to support a decision whether or not to adopt MACS or an enhanced form of electronic clearance/verification”.
- “The jurisdictional agencies involved in the MACS project will establish new or enhanced relationships and/or methods for resolving institutional issues as a result of the operational test.”

Evaluation objectives, numbered according to Operational Test Evaluation Goals and Hypothesis, can be formed as follows:

- 1.1 The Advantage I-75 Operational Test will identify the key jurisdictional agency positions that are, by charter and mission, empowered to support/make a decision on whether or no to adopt MACS or an enhanced form of electronic clearance/verification.
- 1.2 The Advantage I-75 Operational Test will identify the decision making process in place in each jurisdiction to address adopting MACS or an enhanced form of electronic clearance/verification.
- 1.3 The Advantage I-75 Operational Test will identify key advantages and disadvantages considered by jurisdictions when making the decision to adopt MACS or an enhanced for of election clearance/verification.
- 2.1 The Advantage I-75 Operational Test will identify the decision making process in place to address adopting MACS or an enhanced form of electronic clearance/verification.
- 2.2 The Advantage I-75 Operational Test will identify key advantages and disadvantages considered by motor carriers when making the decision to adopt MACS or an enhanced for of election clearance/verification.
- 3.1 Document state, regional and national issues as they arise.
- 3.2 Document approaches attempted solve issues and final resolutions.

States/province adopting electronic verification will require changes in business practices involving both interstate and intrastate relationships. The Advantage I-75 MACS project will require states, provinces, and jurisdictional agencies to work together and cooperate in new and innovative ways to resolve issues that may arise during the course of the project. For example, the weight data recorded on the transponder of a MACS participant vehicle in one state will be read and frequently accepted by another state. These repeated instances of cooperation among MACS jurisdictional agencies can provide bases for establishing and maintaining interagency relationships that may result in changes in business practices for participant states and agencies. This test will measure changes in interagency cooperation levels as a basis for predicting the opportunities for changes in business practices that may result from the implementation of electronic clearance systems. Such data could then be used to estimate the opportunities for changes in business practices that might result from nationwide implementation of electronic clearance systems.

### **Interstate Issues**

Determine the I-75 corridor region's intention to adopt either the MACS service or an enhanced version of electronic verification. The regional intention/direction will be identified by reviewing the region's business plan and by interviewing the chief officers of the departments of transportation and motor carrier enforcement of each state. The regional plan developed through

the efforts of the Southeastern States Consortium will provide the most current documented regional strategic direction. The governors' endorsement early in the project led the way to Advantage I-75 implementation and will continue to provide strategic direction for continued MACS implementation and deployment.

During the MACS project, an interstate weigh station processing standard was developed through the efforts of the Southeastern States Consortium on institutional issues. The standard will include states accepting the weight data placed on the transponder by another state. Weight enforcement staff and management will be interviewed regarding the effect of the interstate weigh station processing standard on their perceived mission.

### **Intrastate Issues**

Determine the states' intention to institutionalize either MACS services or an enhanced version of electronic verification into their everyday business practices and service offerings and to extend the service beyond the I-75 corridor. The states' intention/direction will be identified by reviewing the states' business plans and by interviewing the chief officers of the departments of transportation and motor carrier enforcement of each state. The states' decision making process and benefit/cost analysis supporting the business plan will be identified and included in the outcome of the report. The interview process mentioned above will involve motor carrier enforcement, departments of transportation, and other decision makers.

### **OVERALL TEST RESPONSIBILITY**

Specific duties of the Center for Transportation Research and Education in this Evaluation Design Phase are listed below:

- Develop interview guides and organize site visits and interviews that will identify the motor carriers' intention to continue to participate either in the MACS or an enhanced electronic verification service.
- Develop interview guides and organize site visits and interviews that will identify issues and barriers that were identified during the operational test and new or enhanced relationships and/or methods for resolving institutional issues.
- Perform an analysis and tabulation of the site visit interviews.
- Prepare a report providing (1) the states'/province's and motor carriers' intention to continue either MACS services or an enhanced electronic verification service and (2) a clear concise record of institutional issues and their resolution.

### **EVALUATION TEST DESCRIPTION**

#### **Overview**

The history of the Advantage I-75 MACS operational test provides a sound foundation for determining the states' and motor carriers' intention to adopt either MACS or an enhanced electronic verification service and change their business practices to support the continued

service offering. Early in the operational test the governors of each state and province wrote a letter stating their state/province will participate in the operation test. Motor carriers have participated in the operational test to insure MACS and future electronic verification services will meet their needs. This foundation led to the two-year operational test that provides an actual operating environment for partners to experience and to collect data and information that is necessary for states and motor carriers to make decisions regarding continuing MACS.

Two notable studies help provide a deeper understanding of the history of multi-state electronic screening projects. The report, “The CRESCENT PROJECT: An Evaluation of an Element of the HELP Program” in Appendices B: State Case Study Evaluation Report and C: Motor Carrier Case Study Evaluation Report Volume I - Analysis and Observations, dated February 1994, provides a view of the environment at a point in the electronic screening service migration path to implementation. The second study is more recent and deals with several large Intelligent Transportation Systems projects. The Research and Special Programs Administration, Volpe National Transportation Systems Center released three reports, “IVHS Institutional Issues and Case Studies, Analysis and Lessons Learned,” “IVHS Institutional issues and Case Studies, Advantage I-75 Case Study,” and “IVHS and Institutional Issues and Case Studies, HELP/Crescent Case Study,” all dated April 1994, that deals specifically with multi-state electronic screening projects. Both of these efforts provide a foundation for the evaluation of MACS.

The State and Motor Carrier Case Study of the Crescent Project” ’ documented the experiences, issues, and opportunities for issue resolution. The Crescent Demonstration Project began in 1991 and involved six states and one Canadian province. State government personnel from a cross-section of thirty-seven agencies in six states were involved in the project.

The State Case Study of the Crescent Project was able to effectively determine and document conclusions in the following institutional/jurisdictional subject areas:

- The potential barriers to Commercial Vehicle Operations (CVO) services implementation that are caused by institutional policies and "turf" issues.
- The states’ concerns over technical standards to protect investments in roadside equipment.
- The need for standards and protocols among states to facilitate data sharing and reduceduplicate data entry.
- The need for demonstrated benefits to states through a benefit/cost analysis prior to states’ investments in ITS technologies.

The Motor Carrier Case Study of the Crescent Project was able to effectively determine and

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<sup>1</sup> Data and assumptions for ATA are from the “Benefit/Cost Analysis of the Intelligent Transportation Systems/ Commercial Vehicle Operations User Services”, Technical Memorandum #3, Task 8, Integrating ITS Research with Truck Regulations, DTFH61-93-C-00088, DRAFT, dated October 1995.

<sup>2</sup> Data and assumptions are from “Oregon’s Green Light Project, Strategic Plan IVHS/CVO in Oregon, Implementation Plan, Investment Criteria, dated July 1994.

document conclusions in the “Weigh-Scale/Port of Entry (POE) Bypassing” areas:

- Drivers believe time is saved bypassing the scale.
- Management discussed how much they would be willing to pay for bypass.
- Weigh-Scale/POE Bypassing was ranked the highest/most desired among the nine services discussed by the evaluator.

The Case Study evaluation approach used in the Crescent Project evaluation was an innovative method of assessing issues and concerns, and it could provide a basis for comparison with the outcomes of this evaluation. However, since the completion of the Crescent Project in 1994, states and motor carriers appear to have begun to change and reengineer business practices.

The studies conducted for Volpe considered projects providing ITS services in Advanced Traffic Information Systems, Commercial Vehicle Operations, and Advanced Traffic Management Systems. Although the projects dealt with different ITS services, lessons learned are common among all the projects. The following Lessons Learned<sup>9</sup> were presented for all the projects.

- Public/private partnerships require building trust, understanding, commitment, and communication.
- Partners’ roles and responsibilities need to be clearly defined early in the planning stage.
- Good leadership and full-time commitment are essential.
- Systems integrator and evaluation contractors should be brought on board early.
- The evaluation process should be initiated during the project planning phase.
- Complex projects require flexibility by all parties.
- Contracting flexibility is important.
- ITS operational tests need a buy-in at two management levels: upper- and mid-level.
- Inter-agency cooperation is facilitated by having an advocate in every key agency.
- Demonstrable benefits are critical to participants ,and participation by all is critical to success.
- It is important to make progress.

The following Lessons Learned<sup>9</sup> concerned the Advantage I-75 MACS project.

- Public/private partnerships require building trust, understanding, commitment, and communication.
- Securing upper management buy-in was a success factor.
- Complex projects require flexibility by all parties.
- Demonstrable benefits are critical to participation, and participation is critical to success.
- Mixed messages create confusion.
- Efficiency is important.

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<sup>3</sup> Data and assumptions for COVE from “Study of Commercial Vehicle Operations and Institutional Barriers (i.e., COVE Study)“, Appendix F, dated November 1994.

<sup>4</sup> Data and assumptions from “Oregon’s Green Light Project, Strategic Plan IVHS/CVO in Oregon, Implementation Plan, Investment Criteria Information” dated July 1994.

The Volpe IVHS Institutional Issues and Case Studies provide a basis for continued documentation of the institutional issues and the resolution of the issues that occurred during the Advantage I-75 MACS operational test.

### **Hypotheses to Be Tested**

The Advantage I-75 MACS operational test is expected to provide an actual operating environment for partners to experience and to collect data and information that is necessary for states and motor carriers to make decisions regarding participating in electronic verification. The specific hypotheses to be tested in this individual evaluation are listed below.

#### **Evaluation Hypotheses**

- H1. “The Advantage I-75 MACS Operational Test will provide jurisdictions with sufficient information to support a decision whether or to offer MACS or an enhanced form of electronic clearance/verification in their jurisdiction”.
  
- H2. “The Advantage I-75 MACS Operational Test will provide motor carriers with sufficient information to support a decision whether or not to adopt MACS or an enhanced form of electronic clearance/verification”.
  
- H3. “The jurisdictional agencies involved in the MACS project will establish new or enhanced relationships and/or methods for resolving institutional issues as a result of the operational test.”

### **Evaluation Approach to Be Used**

#### **Evaluation Goals**

This test will attempt reach these Evaluation Goals:

- G1. “Assess whether states/province will continue to offer either MACS services or an enhanced version of electronic verification after the operational test is completed.”
  
- G2.” Assess whether motor carriers will continue to participate in MACS services after the operational test is complete.”
  
- G3.“ Analyze all significant institutional issues addressed during the operational test and document the resolution to the issues.”

#### **Evaluation Objectives**

The Evaluation Test Objectives organized by Operational Test Evaluation Goal are as follows:

- 0 1.1 The Advantage I-75 Operational Test will identify the key jurisdictional agency positions that are, by charter and mission, empowered to support/make a decision on whether or no to adopt MACS or an enhanced form of electronic

clearance/verification.

- 01.2 The Advantage I-75 Operational Test will identify the decision making process in place in each jurisdiction to address adopting MACS or an enhanced form of electronic clearance/verification.
- 01.3 The Advantage I-75 Operational Test will identify key advantages and disadvantages considered by jurisdictions when making the decision to adopt MACS or an enhanced for of election clearance/verification.
- 02.1 The Advantage I-75 Operational Test will identify the decision making process in place to address adopting MACS or an enhanced form of electronic clearance/verification.
- 02.2 The Advantage I-75 Operational Test will identify key advantages and disadvantages considered by motor carriers when making the decision to adopt MACS or an enhanced for of election clearance/verification.
- 03.1 Document state, regional and national issues as they arise.
- 03.2 Document approaches attempted solve issues and final resolutions.

### **Evaluation Measures**

The Operational Test Evaluations Measures are organized according to Evaluation Goals and Objectives are as follows:

- M 1.3.1 Document the outcome of the decision making process.
- M2.2.1 Document the outcome of the decision making process.

Table 1 maps the Operational Test Goals, Objectives, and Measures for the MACS Jurisdictional Issues Evaluation.

**Table 1: Measures Supporting Evaluation Goals and Objectives**

Goal	Objective	Measure
1. Assess Jurisdictional View of MACS	1.1 Identify key positions	
	1.2 Document the decision making process	
	1.3 Document the key advantages and disadvantages of MACS	1.3.1 Document the outcome of the decision making process
2. Assess Motor Carriers View of MACS	2.1 Document the decision making process	
	2.2 Document the key advantages and disadvantages of MACS	2.2.1 Document the outcome of the decision making process
3. Assess Jurisdictional Issues	3.1 Document issues	
	3.2 Document attempted solutions and final resolution	

Measures are not appropriate for objectives that require documenting conditions. However, objectives 1.3 and 2.2 require documentation of the outcome of the decision making process based on the advantages and disadvantages of MACS.

The following steps will be taken to conduct this individual test:

### **Hypotheses H1 and H2**

Step 1. Prepare a guide that will be used during site visit interviews with state/province and motor carrier people. Independent meetings will be held with each state, province, and participating motor carrier. A draft guide to support site interviews with each province and state is in Appendix 1. A draft guide to support site interviews with motor carriers is in Appendix 2.

Step 2. Schedule and conduct site interviews. State and province contacts and visits will be arranged through state/province Policy Committee and Evaluation Task Force members. Policy Committee members will be asked to provide a background briefing for the those to be interviewed. Motor carrier interviews will be arranged through either the MACS Operations Manager or direct contact with the participating motor carrier.

Step 3. Prepare an initial draft of the results of the state and province and motor carrier interviews.

### **Hypothesis H3**

Step 1. Prepare a guide to support visit interviews with state and province people. Independent meetings will be held with each state and province. The “IVHS Institutional Issues and Case Studies, Field Guide” prepared to support the “IVHS Institutional Issues and Case Studies, Advantage I-75 Case Study” will be used to develop the guide. A draft outline guide to support site interviews with a province and states is in Appendix 3.

Step 2. Prepare a questionnaire to support contacting a larger number of people than can be reasonably contacted by visit. The “IVHS Institutional Issues and Case Studies, Field Guide” prepared to support the “IVHS Institutional Issues and Case Studies, Advantage I-75 Case Study” will be used to develop the questionnaire. A draft questionnaire is in Appendix 4.

Step 3. Schedule and conduct site visit interviews. State and province contacts and visits will be arranged through state/province Policy Committee and Evaluation Task Force members. Policy Committee members will be asked to provide a briefing that will set the stage for the people attending the interview. This interview can be scheduled with the interviews dealing with hypothesis H1 and H2.

Step 4. Prepare an initial draft of the results of the state and province interviews.

### **Analysis Method**

The Jurisdictional Issues evaluation is based on 1) identifying partners’ intent to implement either MACS or an enhanced version of electronic verification and 2) identify and document institutional issues, new or enhanced relationships among jurisdictions, and methods for resolving issues. The results of the interviews with the partners will be reported and copies of strategic plans will be included as appendices.

### **Data Collection Method**

In order to obtain results that can be compared to the “IVHS Institutional Issues and Case Studies, Advantage I-75 Case Study” conducted for Volpe, the same three methods of data collection are proposed: relevant documentation, interviews (face to face and telephone), and questionnaires. These methods of data collection are presented in detail in the “IVHS Institutional Issues and Case Studies, Field Guide” prepared to support the “IVHS Institutional Issues and Case Studies, Advantage I-75 Case Study.” The possibility of combining visits associated with H1 , H2, and H3 will be considered.

### **The Baseline Data Collection**

This individual test is relevant from the standpoint of the partners' strategic view of MACS and intent to continue to participate in electronic verification. In addition, therefore, the methods discussed in the "TVHS Institutional Issues and Case Studies, Advantage I-75 Case Study," conducted for Volpe, will be used as the general baseline or point of comparison.

### **Test Outline and Duration**

The duration of this test is critical because the partners will be on a learning curve the first year of the two-year operational test. Over the two-year test the system will become more known to users and users will become more confident using the system. The partners will be using the system and finding areas that may need improvement or fixing during the first year. By the same token, the system will undergo debugging in the first year. The second year of the operational test will set the stage for either accepting or rejecting MACS.

- Event 1. Finalize the guides (interview and questionnaire) supporting contacts with states/province and motor carriers. The questionnaire focuses on the states'/province's and motor carriers' intent to continue either MACS services or an enhanced version of electronic verification and to document issues.
- Event 2. Develop contacts with states/province and motor carriers through the steering members and project manager. The contacts will be encouraged to assemble the people that have decision making authority and responsibility for deciding the future of MACS. Obtain the list of people contacted during the Volpe study and compare the list with the people recommended by the steering committee.
- Event 3. Conduct introductory visits with states/province and motor carriers to set evaluation test objectives and schedule. The visit will include a presentation regarding the operational test that will concisely provide the information states and motor carriers require to make the decision to continue some form of electronic verification and document issues. Identify the agency team that will do the work.
- Event 4. Conduct a mid-evaluation visit with states/province and motor carriers to review the information provided by the team and add emphasis where necessary.
- Event 5. Conduct the final interview with states/province and motor carriers during the latter part of the second year of the operational test.
- Event 6. Prepare results of the interviews and a rough draft of the final report.
- Event 7. Send rough draft to the states/province and motor carriers that were interviewed and to the Evaluation Task Force for comment.

Event 8. Submit the draft final report to the Evaluation Task Force for comment.

Event 9. Finalize the report.

### **Schedule**

The proposed schedule of events is shown in Appendix 4. Dates will be set in cooperation with the Evaluation Task Force.

### **Key Conditions**

Prior to the start of the test, the following conditions must be met:

- Test plan acceptance by the Evaluation Task Force.
- Consent to participate in the test from key jurisdictional agency personnel.
- Complete installation and integration of MACS weigh station equipment scheduled within two months of the beginning of the test.

### **Key Assumptions**

The key assumption of this test is that members of jurisdictional agencies and motor carriers will agree to participate in site interviews and maintain high levels of project involvement.

### **Key Constraints**

The primary constraint to this evaluation method could be the cost of repeated visits to multiple jurisdictional agency offices.

### **Security Considerations and Provisions Specific to the Evaluation Test Plan**

Benefit/cost analysis conducted by motor carriers may require that a nondisclosure agreement be signed and the report not refer to a specific motor carrier.

### **Safety Considerations and Provisions**

No major safety concerns or problems in collecting the data and performing the test are predicted.

### **Privacy Considerations**

Sensitive issues that may arise during the interviewing process will be dealt with in a confidential environment.

### **Potential Impacts on the Operational System**

This test must be conducted after the operational test system has been debugged and has become stable. Further, states and motor carriers must have reached a level of experience, understanding, and proficiency with MACS that will enable them to provide informed answers during interviews.

### **BUDGET**

The budget for conducting the Simulation Modeling Test is provided in Table Two. This budget provides two separate expense subtotals (e.g., personnel and equipment and travel). The total project budget for this plan is the sum of the personnel and equipment subtotals and the Iowa State University indirect cost.

**Table Two: Jurisdictional Issues Test Plan Budget**

<b>Personnel Budget</b>	<b>Time (Hrs)</b>	<b>Rate/Hour</b>	<b>Budget</b>
<u>Faculty</u>			
Tom Maze	30	\$55.94	\$1,678
Hal Stem	87	\$35.47	\$3,074
<u>Professional and Scientific</u>			
Jim York	87	\$19.87	\$1,722
Bill Mc Call	693	\$38.20	\$26,485
Marcia Brink	12	\$16.51	\$198
Jan Graham	106	\$18.69	\$1,978
<u>Merit Staff</u>			
Dianne Love	137	\$14.44	\$1,978
Secretary	144	\$13.74	\$1,978
<u>Research Students</u>			
Iowa State University Student (Case Studies)	30	\$14.64	\$1,903
<u>Post Doctoral Research Associate</u>			
Dr. Ali Kamyab	<b>0</b>	\$20.19	\$0
<u>Fringe Benefits</u>			
Faculty Fringe @@24.55%		24.55%	\$1,167
Professional and Scientific Fringe @@30.8%		30.80%	\$9,358
Merit Fringe @@ 39.45%		39.45%	\$1,560
Research Student Fringe @@ \$625/year		\$0.00	\$0
Post Doctoral Fringe Benefits		0.16	\$0
<b>Total Personnel Budget</b>			<b>\$53,077</b>
<b>Equipment and Travel Budget</b>			
Supplies			\$250
Phone, postage, and communications equipment rent			\$450
Subcontracts			
Additional Domestic Travel	Cost Per Trip	\$1,460.00	\$26,280
<b>Total Equipment and Travel Budget</b>			<b>\$26,980</b>
<b>Subtotal Project Budget</b>			<b>\$80,057</b>
Indirect Cost @25%			\$20,014
<b>Total Project Budget</b>			<b>\$100,071</b>

## APPENDIX

## **Appendix 1: Guide for Site Interviews with States and the Province of Ontario**

H1 .“The Advantage I-75 MACS Operational Test will provide jurisdictions with sufficient information to support a decision whether or to to offer MACS or an enhanced form of electronic clearance/verification in their jurisdiction”.

Interview agenda:

- State the objective of the meeting. For example, the leader could say “The reason for meeting with you today is to discuss the MACS operational test and your intention to continue to either offer MACS in some version or discontinue MACS.”
- Describe MACS services in detail. The MACS Program Manager may make the MACS presentation. The descriptive presentation of MACS will be organized to facilitate the interview discussion.
- Conduct the interview with the following topics for guiding the discussion:
  - )) Ask for a description of the decision making process used to reach a decision to adopt or not to adopt MACS services to support your commercial vehicle enforcement work. The discussion will be guided by following the topics below:

a. Discuss the decision making process and identify the key contributors.

b- The mission of commercial vehicle enforcement is clearly described. The basic mission of motor vehicle enforcement is to cause motor carriers to comply with federal and state regulations. More specifically commercial vehicle enforcement goals are<sup>10</sup>:

To promote commercial vehicle safety.

To protect the roadway infrastructure from damage due to overweight trucks.

To facilitate compliance with and collection of commercial vehicle taxes.

To encourage equitable competition without unfair advantage by noncompliant motor carriers over compliant and legal motor carriers.

c. Determine if a commercial vehicle enforcement strategic plan influenced the decision. Use the simulation model developed by the Center for Transportation Research and Education to provide an example of MACS. Obtain a copy of the plan and measures of effectiveness.

Elements that may be included in the strategy are:

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<sup>5</sup> Data and assumptions for COVE from “Study of Commercial Vehicle Operations and Institutional Barriers (i.e., COVE Study)”, Appendix F, dated November 1994.

Increase compliance.

Increase enforcement productivity, i.e., more focused enforcement.

Provide technology supports to motor carrier enforcement, i.e., computers, pen based computers, weigh in motion, MACS.

d. Determine if a commercial vehicle enforcement resource plan influenced the decision. Obtain a copy of the plan.

Elements that may be included in the plan are:

Benefit/Cost Analysis

A generalized Benefit/Cost spreadsheet is presented in Appendix 6. A discussion of the estimates made for the Oregon Green Light and COVE projects is presented in Appendix 7.

Operations staff

Information availability

Electronic/computer support staff

Capital investment plan, e.g., “pay for pass”

e. Determine the state’s view of the MACS operational test and how the MACS worked.

f. Identify additional key factors that influenced the jurisdictions decision to either adopt or not to adopt MACS on an enhanced version.

g. Determine the outcome of the decision making process.

## Appendix 2

### Guide for Site Interviews with Motor Carriers

H2."The Advantage I-75 MACS Operational Test will provide motor carriers with sufficient information to support a decision whether or not to adopt MACS or an enhanced form of electronic clearance/verification”.

#### Interview agenda:

1 State the objective of the meeting. For example, the leader could say “The reason for meeting with you today is to discuss the MACS operational test and your intention to continue to either participate in MACS or some version of electronic verification.

2.Describe MACS services in detail. The MACS Program Manager may make the MACS presentation. The descriptive presentation of MACS will be organized to facilitate the interview discussion.

3.Ask for a description of the process used to reach a decision to participate in MACS. Guide the discussion by following the topics below:

a.Why did your company participate in MACS? (expectations)

b.Will your company continue to participate? (expectations)

c.Ask for a description of the process used to reach the decision to participate in MACS operational test and use MACS services after the MACS operational test is completed. Guide the discussion by following the topics below:

1 .Business decisions are based on, for example:

A.The proposed change in business practice will improve service to customers. Further, the improvement in service to customers can be measured.

B.The proposed change in business practice will reduce operating cost.

A generalized Benefit/Cost spreadsheet is presented in Appendix 7. A discussion of the estimates made for the Oregon Green Light and COVE projects is presented in Appendix 8.

d.Determine the motor carriers' view of the MACS operational test and how MACS worked.

e.Determine the outcome of the decision making process.

## Appendix 3

### Guide for Site Interviews with States and the Province of Ontario

H3. “The jurisdictional agencies involved in the MACS operational test will establish new or enhanced relationships and/or methods for resolving institutional issues as a result of the operational test.”

Purpose of the interviews.

The purpose of the site interviews is to address four questions”:

What institutional and legal impediments did the project participants encounter while establishing partnerships and deploying ITS services and products?

Where in the life cycle of the operational test did these impediments occur?

What were the causes of these impediments and how were they overcome?

What lessons were learned in dealing with these impediments that can be applied to other deployments of ITS products and services?

Interview agenda:

1 State the objective of the meeting. For example, the leader could say “The reason for meeting with you today is to discuss the MACS operational test and your intention to continue to either offer MACS in some version or discontinue MACS.”

2. Describe MACS services in detail. The MACS Program Manager may prepare the MACS presentation describing the services in detail. The descriptive presentation of MACS will be organized to facilitate the interview discussion and will be made by the interviewer.

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<sup>6</sup> WHM Transportation Engineering Consultants, Inc., “The CRESCENT PROJECT: An evaluation of an Element of the HELP Program,” *Appendix B: State Case Study Evaluation Report*, February 1994.

3. Sensitive issues might arise during the interviewing process. If such a situation develops, the interviewer will offer confidentiality to the interviewees in order to encourage frank and open discussions. To assure confidentiality, the interviewer will not identify the interviewees by name or position in the evaluation report. In the report, sensitive issues will be discussed generically and no direct quote will be attributed to any individual. Interview notes may be kept but the identity of the interviewee will be obscured. To indicate the extent of the interview process, the organizations that the interviewees represent will be listed in the report.

3 Conduct the interview with the following interview protocol<sup>13</sup>:

1 (a). Can you tell me a little about your experience/history with the project?

1 (b). How long have you been involved?

1 (c). What stage was the project in when you first became involved?

Planning \_\_\_ Design/Devpt/Integ \_\_\_ Impl/Test \_\_\_ Eval \_\_\_ Deployment-

1 (d). **At** what stage would say the project is in now?

Planning \_\_\_ Design/Devpt/Integ \_\_\_ Impl/Test \_\_\_ Eval \_\_\_ Deployment

2. In your own words, what are the project goals?

3. Whom would you say were the initiators of the project?

4. Whom would you consider to be the champions of the project? Who is really pushing for it to continue?

5. What do you consider to be the (3 to 5) most important institutional issues that either have or have the potential to impede the progress of the operational field test?

6. Please address the following questions for those issues you identified as applicable or that has been encountered:

6 (a). ISSUE #

ISSUE Title: \_\_\_\_\_

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<sup>7</sup> Western Highway Institute, ATA Foundation, "The Crescent Project: An Evaluation Of An Element of the HELP Program," *Appendix C: Motor Carrier Case Study Evaluation Report Volume I - Analysis and Observations*, February 1994, 51-54.

<sup>8</sup> *IVHS Institutional Issues and Case Studies, Analysis and Lessons Learned*, DOT-VNTSC-FHWA-94-15, FHWA-SA-94-06 1, Final Report April 1994.

i) Among what institutions were these evident?

ii) What specifically was the issue?

iii) When in the project life cycle did this occur?

Planning    Design/Devpt/Integ\_\_Impl/Test Eval\_\_Deployment    \_\_

iv) How did the issue affect the overall project?

v) Was the issue resolved? If so, how? If not, why not?

vi) How could it have been handled better? What advice would you give the members of a similar project in identifying and/or resolving these issues?



Allocation of Responsibilities: To what degree does the allocation of responsibilities across program partners/participants (i.e. knowing who's in charge of what) impede the achievement of program cost, schedule, or performance goals?	
Upper Management "Buy-in": To what degree does inconsistency in upper management buy-in impede the achievement of program cost, schedule, and performance goals?	

7. Specific types of issues can also impact your project as well as other ITS projects. Of these types of issues listed below, please determine which issues have emerged on your project. For those issues that are applicable, please rate each one on the degree of severity each has (or bad) impacted the project within each phase of the project.

Degree of Issue Severity NA = Not Encountered 1 = Encountered, but Not Severe 2 = Slight, An Irritant 3 = Moderate, Hinders Progress 4 = Severe, Impedes Progress 5 = Critical, Could Stop the Project + = Did not Impede, But Facilitated Progress	Program Phase
	Plan
2. REGULATION/LEGAL	
Corporate Favoritism: To what degree do concerns that taxpayer funds are contributing to the competitive advantage of private sector parties impede the achievement of program cost, schedule, or performance goals?	
Authority: To what degree does local authority over arterial roads and state highways impede the achievement of program cost, schedule, or performance goals?	

<p>Administrative Requirements: To what degree do administrative requirements(e.g. accounting, reporting, etc.) Associated with the conduct of this ITS operational test impede the achievement of program cost , schedule, or performance goals?</p>	
<p>Standards and Protocols: To what degree does the demand for or absence of a national architecture impede the achievement of program cost, schedule, or performance goals?</p>	
<p>3. HUMAN RESOURCES</p> <p style="text-align: center;">I</p>	
<p>Staff Size: To what degree does the availability of sufficient numbers of staff impede the achievement of program cost, schedule, or performance goals?</p>	
<p>Staffing Expertise: To what degree has the availability of people with particular expertise (e.g.,engineering - electrical, communications, systems, hardware, software, human factors, systems integration, federal contracting) impede the achievement of cost, schedule, or performance goals?</p>	

7. Specific types of issues can also impact your project as well as other ITS projects. Of these types of issues listed below, please determine which issues have emerged on your project. For those issues that are applicable, please rate each one on the degree of severity each has (or bad) impacted the project within each phase of the project,

<p>Degree of Issue Severity</p> <p>NA = Not Encountered</p> <p>1 = Encountered, but Not Severe</p> <p>2 = Slight, An Irritant</p> <p>3 = Moderate, Hinders Progress</p> <p>4 = Severe, Impedes Progress</p> <p>5 = Critical, Could Stop the Project</p> <p><del>X</del> Did not Impede, But Facilitated Progress</p>	<p>Program Phase</p>
<p>4. FINANCIAL</p>	
<p>National Priority: To what degree does the uncertainty regarding continued federal funding or public support of ITS programs impede the achievement of this program's cost, schedule, or performance goals?</p>	
<p>Market Uncertainty: To what degree does the uncertainty regarding people's willingness to pay for this product or service impede the achievement of program const, schedule, or performance goals?</p>	
<p>Program Cost: Is the program budget sufficient? If not, to what degree is it insufficient?</p>	
<p>Technology Development Cost: To what degree has the underestimation of technology-related cost, schedule, or performance impeded the program from obtaining its goals?</p>	
<p>Liability/Insurance: To what degree does the concern over product liability and the cost of obtaining insurance impede the achievement of program cost, schedule, or performance goals?</p>	
<p>Cost Sharing: To what degree does the cost sharing approach for the program impede the achievement of program cost, schedule, or performance goals?</p>	

5. OTHER

Privacy Issues: To What degree have privacy issues and development of appropriate confidentiality safeguards been an impediment to achieving program cost, schedule, or performance goals?

Environmental Concerns: To what degree have environmental concerns, e.g., increasing automobile usage/emissions, impeded the achievement of program cost, schedule, or performance goals?

8. If you were to project out past the operational test and into the deployment phase, which institutional issues do you think would be most critical? Why?

9 (a).What do you consider to be the most important measures of success of this project (i.e., how will you know that it has succeeded or met its goals)?

9 (b).In your opinion, is the program a success? If so, what are its positive contributions?

10.Knowing what you know now, how would you have done your job differently if you had it to do over from the beginning? Why?

11 Knowing what you know now, if you were assigned to be the project manager in charge of all resources, how would you have done the project manager's job differently if you had to do it from the beginning? Why?

12.A number of types of institutions are involved in your project and can be envisioned as participating in ITS projects in general.

12 (a).What is the process by which participation organizations were/are selected for your project?

12 (b).What are the benefits and risks for participating in this operational field test for:

Your organization \_\_\_\_\_?

Benefits:

Risks:

Other participating organizations \_\_\_\_\_?

Benefits:

Risks:

13 .It is possible that several points of contact within your organization eventually became involved during the course of your organization's participation in this ITS operational field test. For the benefit of others contemplating the start of an ITS operational field test, please help us list the names of such offices within your organization that have been active participants in one phase or another:

14 (a).Of the institution types listed in the following table, please list the most actively participating organization (If the most active organization will change from Test to Deployment Phase, please annotate form).

14 (b).What degree of involvement does the most active participant within each category have or will have in your project's operational test phase and deployment, respectively? The operational test phase includes planning, design, development, integration, bench and field testing, and evaluation. The deployment phase assumes that the operational field test has been successful and a commitment has been made to commercially market a product.

14 (c).Which of the institutions listed in the following table have or will be in your critical path to successfully completing your project's operational test and deployment phases, respectively? An organization is in your organization's critical path is the project could not be successful without it being involved.

14 (a). INSTITUTION TYPE		14 (b). TO WHAT DEGREE INVOLVED IN PROJECT?  NA = No Involvement    3 = Moderate 1 = Slight                    4 = Active 2 = Minimal                 5 = Intense		14 (c) WHICH ARE IN Y CRITICAL PATH?  (Check all that apply)	
General	Specify Most Active Participant	Test	Deploy	Test	Deploy
US DOT					
State DOT					
Law Enforcement Agencies					
Department of Motor Vehicles					
Public Service Commission					
Private Sector					
Universities					
Bridge/Tunnel Authorities					
Port Authorities					
Regional Agencies					
Transit Agencies					
MPOs					
Counties/Cities					

Environmental Groups/Agencies					

15. Have we missed any other issues/concerns that were not covered that you would like to talk about?

Appendix 4

Questionnaire for States and the Province of Ontario

H3 .“The jurisdictional agencies involved in the MACS operational test will establish new or enhanced relationships and/or methods for resolving institutional issues as a result of the operational test.”

Purpose of the questionnaire:

The purpose of the site interviews is to address four questions<sup>14</sup>:

What institutional and legal impediments did the project participants encounter while establishing partnerships and deploying ITS services and products?

Where in the life cycle of the operational test did these impediments occur?

What were the causes of these impediments and how were they overcome?

What lessons were learned in dealing with these impediments that can be applied to other deployments of ITS products and services?

Draft Questionnaire

Institutional Issues That May Affect ITS MACS Operational Test

Name: \_\_\_\_\_

Job Title: \_\_\_\_\_

Project Role: \_\_\_\_\_

Telephone #: \_\_\_\_\_

FAX#: \_\_\_\_\_

E Mail Address: \_\_\_\_\_

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<sup>9</sup> *ZVHS Institutional Issues and Case Studies, Advantage I-75 Case*  
FHWA-SA-94-056, Final Report April 1994.

1 .A number of types of institutions are involved in your project and can be envisioned as participating in ITS projects in general. The following table lists these institutions. Pleasetake a minute to review the list and, based on your experience and knowledge with MACS, please rate the institutions on their involvement and criticality to the project on a scale from 1 to 5. For degree of involvement, decide how much participation or activity you associate with each institution. When considering the degree of criticality, determine how much the success of the project hinges on each institution.

INSTITUTION TYPE		DEGREE OF INVOLVEMENT	DEGREE OF CRITICALITY
		1 = Minimal Involvement 2 = Slight Involvement 3 = Moderate Involvement 4 = Active Involvement 5 = Intense Involvement NA = Not Applicable	1 = Not Necessary for Success 2 = Slightly Critical 3 = Moderately Critical 4 = Very Critical 5 = Cannot Succeed Without this Member
General	Specific (Please Specify)		
Federal Government			
State Transportation Agencies			
Law Enforcement Agencies			

INSTITUTION TYPE		DEGREE OF INVOLVEMENT	DEGREE OF CRITICALITY
		1 = Minimal Involvement 2 = Slight Involvement 3 = Moderate Involvement 4 = Active Involvement 5 = Intense Involvement NA = Not Applicable	1 = Not Necessary for Success 2 = Slightly Critical 3 = Moderately Critical 4 = Very Critical 5 = Cannot Succeed Without this Member
General	Specific (Please Specify)		
Private Sector			
Counties/Cities			
Regional Agencies			
Port Authorities			
Highway/Toll Authorities			
Bridge/Tunnel Authorities			
MPO's			
Universities			

Other			
Other			

1 (a) Of those institutions in the critical path, which *three to five* would you say are the most important to your success and why?

INSTITUTION 1: \_\_\_\_\_ Why?

INSTITUTION 2: \_\_\_\_\_ Why?

INSTITUTION 3: \_\_\_\_\_ Why?

INSTITUTION 4: \_\_\_\_\_ Why?

INSTITUTION 5: \_\_\_\_\_ Why?

2. Specific types of issues can also impact your project as well as other ITS projects. Of the types of issues listed below, please determine which issues have emerged during your project. For those issues that are applicable, please rate each on the degree of severity each has (or had) impacted the project.

ISSUE TYPE	DEGREE OF SEVERITY NA = Not Encountered 1 = Encountered by not Severe 2 = Slightly Severe, as Irritant 3 = Moderately Severe, Hinder 4 = Very Severe, Impedes Prog 5 = Could Stop the Project
1. Organizational	
Intra-agency	
Inter-agency	
Public/Private Partnerships	
Management	
Culture Differences	
Upper Management “Buy-In”	
Role Clarity	
Responsibilities	
Goals	
2. Resource	

Administrative Burden	
Education/Staffing/Training	
Labor	
3. Public Acceptance	
Societal Equity	
Environmental Concerns	
Privacy Issues	
ISSUE TYPE	<p><b>DEGREE OF SEVERITY</b></p> <p>NA = Not Encountered  1 = Encountered by not Severe  2 = Slightly Severe, as Irritant  3 = Moderately Severe, Hinder  4 = Very Severe, Impedes Prog  5 = Could Stop the Project</p>
4. Regulatory/Legal	
Antitrust	
Patent Rights	
Standards/Protocols	
5. Financial	
Liability/Insurance	
Procurement/Acquisition	
Benefits	

Profits	
Market Uncertainty	
R & D to Deployment Strategy	
Cost Sharing	
6. Other Issues	

3. For the three *to five* most severe issues (those issues that will have the most impact on the project) you identified in the Table above for Question 2:

3 (a) ISSUE # : \_\_\_\_\_

i) Among which institutions were these evident?

ii) What specifically was (were) the impacts/impediments/constraints?

iii) When in the project life cycle did each of these occur?

iv) How did the issue(s) affect the overall project?

v) Was each issue resolved? If so, how? If not, why not?

vi) Could each have been handled more efficiently/effectively? What advice would you give the members of a similar project in identifying and/or resolving these issues?

3(b) ISSUE# —: \_\_\_\_\_

i) Among which institutions were these evident?

ii) What specifically was (were) the impacts/impediments/constraints?

iii) When in the project life cycle did each of these occur?

iv) How did the issue(s) affect the overall project?

v) Was each issue resolved? If so, how? If not, why not?

vi) Could each have been handled more efficiently/effectively? What advice would you give the members of a similar project in identifying and/or resolving these issues?

3 (c) ISSUE # : \_\_\_\_\_

i) Among which institutions were these evident?

ii) What specifically was (were) the impacts/impediments/constraints?

iii) When in the project life cycle did each of these occur?

iv) How did the issue(s) affect the overall project?

v) Was each issue resolved? If so, how? If not, why not?

vi) Could each have been handled more efficiently/effectively? What advice would you give the members of a similar project in identifying and/or resolving these issues?

3 ( d ) ISSUE#: \_\_\_\_\_

i) Among which institutions were these evident?

ii) What specifically was (were) the impacts/impediments/constraints?

iii) When in the project life cycle did each of these occur?

iv) How did the issue(s) affect the overall project?

v) Was each issue resolved? If so, how? If not, why not?

vi) Could each have been handled more efficiently/effectively? What advice would you give the members of a similar project in identifying and/or resolving these issues?

3 (e) ISSUE # \_\_\_\_\_

i) Among which institutions were these evident?

ii) What specifically was (were) the impacts/impediments/constraints?

iii) When in the project life cycle did each of these occur?

iv) How did the issue(s) affect the overall project?

v) Was each issue resolved? If so, how? If not, why not?

vi) Could each have been handled more efficiently/effectively? What advice would you give the members of a similar project in identifying and/or resolving these issues?

4. At what stage is your project now?

Planning \_\_\_\_\_  
Design \_\_\_\_\_  
Testing \_\_\_\_\_  
Evaluation \_\_\_\_\_  
Deployment \_\_\_\_\_

5. In what year did you become involved with the project? In what stage was it when you first became involved?

6. If you were to project beyond the operational test phase into deployment, which issues and institutions do you think would be most critical and why?

7. In your own words, what are the project goals?

8. Who were the initiators of the project?

9. Whom do you consider to be the champions of the project?

10. What do you consider to be the most important measures of success of your project (i.e., how well you know that it has succeeded or met its goals)?

11. Knowing what you know now, how would you have done your job differently if you had it to do over again from the beginning?

why?

12. Knowing what you know now, if you were assigned to be the project manager in charge of all resources, how would you have done the project manager's job differently if you had to do it from the beginning?

why?

13. Other comments (please feel free to note any concerns, issues, topics):

## Appendix 5

### Proposed Schedule

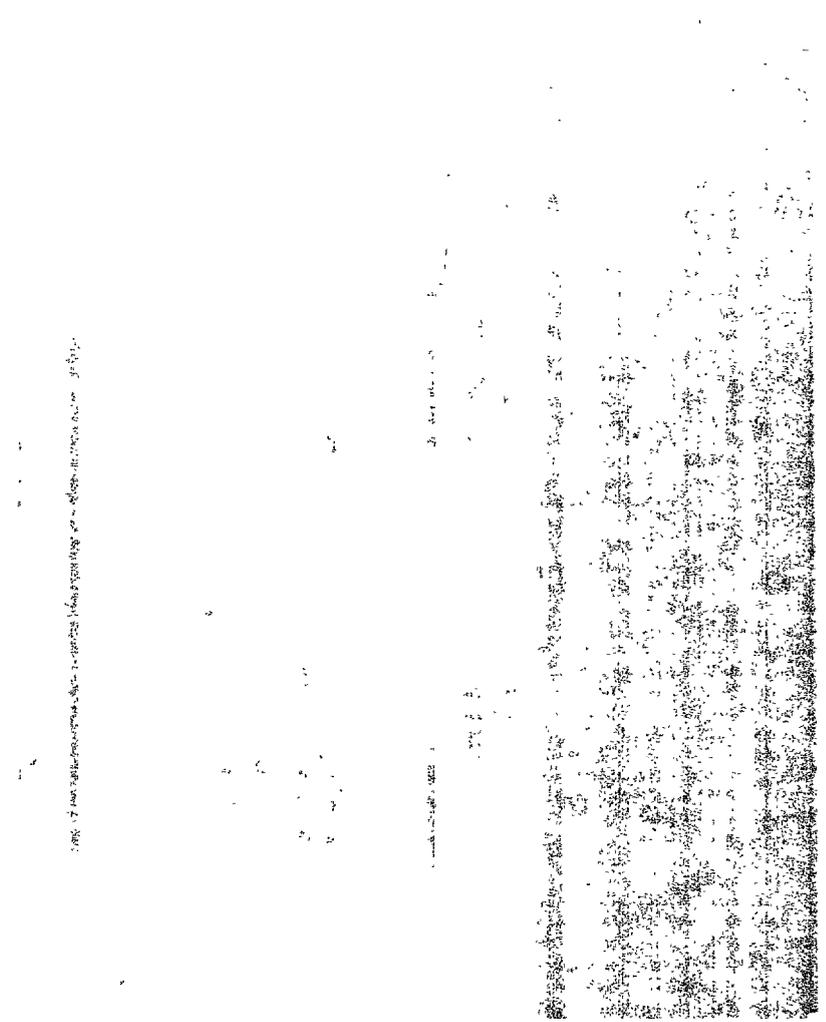
The Jurisdictional Issues Individual Test is scheduled to begin June 3, 1996 and to be completed at the end of the Operational Test. A detailed schedule, including events and sub-events, will be prepared in cooperation with the Policy Committee and motor carriers by July 3 1, 1996.

## Appendix 6

### Model Benefit/Cost Analysis for States/Province

# Appendix 7

## Model Benefit/Cost Analysis for Motor Carriers



## Appendix 8

### Benefit/Cost Analysis

Appendix 8 provides a general discussion of the benefits and costs of electronic screening. Two notable attempts have been made to conduct a benefit cost analysis that applies to both states and motor carriers. The first was the FHWA funded *Study of Commercial Vehicle Operations and Institutional Barriers* (i.e., *the COVE Study*), dated November 1994. The COVE Study reported in Appendix F, "Benefit Cost Analysis":

In considering the following analysis, the reader should keep in mind that the CVO marketplace is still in its infancy. There is as yet little hard data regarding the true costs and benefits of implementing IVHS/CVO services. Overall, the existing data should be viewed with caution. Furthermore, most of the data used in this analysis was obtained either from national sources (providing aggregated U.S. data) or from projects under development in other regions of the nation. Accordingly, the data may not be representative of CVO conditions as experienced within the overall COVE region or individual states.....

The second is Oregon's "GREEN LIGHT" Project, *Strategic Plan for IVHS/CVO in Oregon, Implementation Plan* with the benefit cost analysis contained in the "Investment Criteria Information," dated July 1994. Currently, the ADVANTAGE I-75 Mainline Automated Clearance System (MACS) evaluation is attempting a benefit cost analysis. The MACS evaluation has not yet produced results that have been made available for distribution.

Tables I and 2 present information from the public sector (state) benefit/cost analyses developed for the COVE and Oregon Green Light projects. The COVE study estimated the benefit/cost ratio for the state to be about 7 to 1, and the Oregon Green Light study found the state benefit/cost ratio to be about 2 to 1.

Tables 3 and 4 present a comparison of motor carrier benefit/cost analyses developed for the COVE and Oregon Green Light projects. The American Trucking Association (ATA) has also conducted a study that looks at the benefits and costs of ITS/CVO services from the perspective of the motor carriers only. The ATA information is shown in Table 5.

The COVE study estimated the benefit/cost ratio for motor carriers to be about 10 to 1, and the Oregon study estimated the benefit/cost ratio for motor carriers to be about 7: 1. ATA found the benefit/cost for motor carriers to be about 6: 1. Although COVE, Oregon, and ATA used differing methods and base figures, the estimates do provide a range for consideration, and it should be noted that all of the studies used conservative assumptions. The most important factor is that all of these studies have found that the benefits of these types of electronic screening projects outweigh the costs.

**Table 1****Public Sector Benefit Cost Comparison from the COVE Study**

Values from COVE Study <sup>5</sup>	
Elements evaluated in Benefit/Cost Analysis for Public Sector (States)	Assumptions
<b>-@Style #5@ BENEFITS</b>	
Percent of Non-Compliant Trips	Many trips are not currently recorded station and limited hours of operation
Fees and Taxes Collectable per Non-Compliant Trip	
Percent of Non-Compliant Trips that avoid Weigh Stations	
Estimated Increase in Collections at one Weigh Station	Based on capturing non-compliant carri
Staff that can be made available for other enforcement Tasks	2 persons @@ \$40,000 per year
Annual Savings for Cost of Utilities per Weigh Station	
Annual Savings per Weigh Station	Fully Automated
<b>Total Annual Benefit per Weigh Station</b>	
<b>-@Style #18@ COSTS</b>	
Non-Recurring Cost of Automating a Weigh Station	
Annualized Cost for Automated Weigh Station	Over 25 years
<b>Total Annual Cost per Weigh Station</b>	
<b>Annual Benefit/Cost for Public Sector</b>	

**Table 2****Public Sector Benefit Cost Comparison from the Oregon Green Light Study**

Data from Oregon Green Light Study <sup>4</sup>		
Elements evaluated in Benefit/Cost Analysis for Public Sector (States)	Assumptions	Net Pr
<b>-@Style #5@ BENEFITS</b>		
Reduced Road Damage From increased roving weight enforcement And other actions)	20% reduction over 20 years	\$23,0
Increased Collection of Taxes and Fees	Tax evasion reduced by 1% over 20 years	\$12,6
Reduced Administrative Costs for Operation of Weigh Stations	Over 20 years	\$24,9
<b>Total Benefit</b>		<b>\$60,6</b>
<b>-@Style#18@COSTS</b>		
Construction	16 mainline preclearance sites; 35 enforcement sites (Constructed over 6 years)	\$ 10,4
Operations / Maintenance	Includes sensor calibration, hardware/software upgrades, field maintenance, sensor repair and replacement, spare parts inventory and pavement rehabilitation (over 20 years)	\$ 11,1
Information Systems	Includes database management & development, communications operations, system enhancements, applications development, computer costs, and systems integration (over 20 years)	\$5,37
R & D / Testing	Various operational tests and feasibility studies (over 6 years)	\$682,
Planning / Coordination	Maintaining knowledge of other research efforts and studies (over 20 years)	\$878,
<b>Total Cost</b>		<b>\$28,5</b>

<b>Benefit/Cost for Public Sector</b>		2.1
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**Table 3****Motor Carrier Benefit Cost Comparison from the COVE Study**

Motor Carrier Data from COVE Study <sup>3</sup>	
Elements evaluated in Benefit/Cost Analysis	Assumptions
<b>Annual Benefits</b>	
Average Weigh Station Processing Time	Minutes
Reduction in Weigh Station Processing Time with Automation	Minutes
Value of Time (vehicle, driver, fuel and other)	Dollars per minute
Value of Reduction in Time per Visit	
Average Number of Weigh Station Visits per Year	
<b>Total Benefits per Vehicle per Year</b>	
<b>Annual Costs</b>	
Transponder and Associated Costs per Vehicle	
Installation and Maintenance Costs per Year	
Cost per year	Assume 5 year capitalization
<b>Total Cost per Vehicle per Year</b>	
<b>Annual Benefit/Cost for Motor Carriers</b>	

**Table 4****Motor Carrier Benefit Cost Comparison from the Oregon Green Light Study**

Motor Carrier Data from Oregon Green Light Study <sup>2</sup>	
Elements evaluated in Benefit/Cost Analysis For Motor Carriers	Assumptions
<b>-@Style#5@BENEFITS</b>	
Value of Reduction in Time per Weigh Station	Over 20 years
Reduced Tax Administration Costs	Over 20 years
<b>Total Motor Carrier Benefits</b>	
<b>-@Style#18@COSTS</b>	
AVI Installation*	Cost per transponder = \$35; Percent of Equipment estimated over 20 years
AVI Maintenance*	Over 20 years
AVI Replacement*	Over 20 years
Onboard computer Installation Costs*	Over 20 years
Onboard computer Replacement Costs*	Over 20 years
* Note: Assumed that Oregon state government shared some equipment costs at 28.6%	
<b>Total Motor Carrier Costs</b>	
<b>Benefit/Cost for Motor Carriers</b>	

**Table 5**

**Motor Carrier Benefit Cost Comparison from ATA Study**

Motor Carrier Data from ATA Study <sup>1</sup>	
Elements evaluated in Benefit/Cost Analysis	Assumptions
<b>ANNUAL BENEFITS</b>	
Average Weigh Station Processing Time for size/weight inspections (minutes)	Based on a survey of motor carriers for site inspections
Average Processing Time for Roadside Safety Inspections (minutes)	Based on a survey of motor carriers for site inspections
Average Number of Hours per Year that a Power Unit Is Stopped for Roadside Compliance Checks (Hours/year)	Size/weight inspections plus Safety inspections
Average cost of Roadside Compliance Stops per Power Unit	Total value per year based on an average Driver cost
Total Savings per Year	If 100% of trips are electronically verified weigh station visits occur
<b>Total Annual Benefit</b>	
<b>ANNUAL COSTS</b>	
Transponder Cost	
Assumed life of the element (years)	
Cost per year	
<b>Total Annual Cost</b>	
<b>Annual Benefit/Cost for Motor Carriers</b>	