SOUTHWEST ELECTRONIC ONE-STOP SHOPPING STATE AGENCY TESTREPORT

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Prepared By:
ARKANSAS STATE UNIVERSITY
Transportation Management Program
P.O. Box 59
State University, AR 72467

In conjunction with:
BOOZ-ALLEN & HAMILTON
and
WHM Transportation Engineering Consultants, Inc.

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1 EXECUTIVE SUMMARY

The Electronic One-Stop System (EOSS) used in this credential test was designed to replace current credentialling procedures with a personal computer-based electronic method that allows users to prepare, apply for, and obtain certain types of vehicle credentials widely used in interstate motor carrier operations. The purpose of this credential test is to evaluate motor carrier electronic credentialling potential for future national deployment. The EOSS software is Windows-based and designed for personal computer models generally available in industry today. The three interstate credentials used for this test were the International Registration Plan (IRP), International Fuel Tax Agreement (IFTA), and Single State Registration Systems (SSRS). Seven state agencies participated in the test: three each in Colorado and Arkansas with separate responsibility for IRP, IFTA and SSRS, and one agency in Texas responsible for SSRS only. These agencies and their representatives are identified in Appendix C of this report. Their activity throughout the test was observed and monitored by an independent evaluation team composed of representatives from the Transportation Management Program (Arkansas State University) in Jonesboro, Arkansas, and Booz-Allen & Hamilton in Washington, D.C.

For evaluation purposes, participants were asked to complete baseline surveys documenting opinions about current credentialling methods. Post-test surveys were collected that documented both their overall opinion of EOSS and its relative advantages or disadvantages over the current system. Finally, on-site interviews were conducted with each state agency to document opinions about their experience with the project and supplement the quantitative data collected in the surveys. This group of participants is a small and non-randomly selected population that provided good insight for the evaluation findings but did not provide sufficient quantifiable data to support a rigorous statistical analysis.

The test participants did form some useful and reliable opinions about the potential impact of EOSS. State agencies were generally neutral about the overall impact of EOSS on their activities. They expect few direct benefits, but foresee few, if any, obstacles to deploying EOSS. Their primary reason to support deployment is to provide additional benefits to motor carriers and, therefore, help improve the overall efficiency of the national transportation system. State agencies do expect to experience some very moderate benefits due primarily to more legible and accurate printed applications. Several agencies expect to enjoy significant operational gains if electronic data interchange (EDI) capability is available to them through electronic credentialling.

This test adequately demonstrated that existing computer and communications technology is not only capable of supporting national deployment of EOSS, but is already available in most state agency offices. All agencies owned personal computers that were both adequate and available for use in this test. This test revealed no significant technical barriers to EOSS. Several state agencies did express some concern over the possible development of various proprietary or multiple electronic credential systems and expressed a preference for uniformity among the states. In addition, motor carriers and state agencies are somewhat concerned about the accuracy and reliability of electronic funds transfers that are required to support EOSS. State agencies generally identified electronic payment concerns and the legal requirements to both obtain and issue “original” documents as the greatest barriers to the nationwide deployment of EOSS.

2 EOSS SYSTEM DESCRIPTION

The EOSS system provided a user-friendly, highly graphical electronic personal computer system that helped interstate carriers identify required commercial vehicle credentials and provided for their electronic application and issuance. Industry and state users could access the system from their own desk using a personal computer. The system included two functional modules – the Information and Credential modules. A user could determine what credentials were required from each state through the Information Module. Using the Credential Module, carriers potentially could:

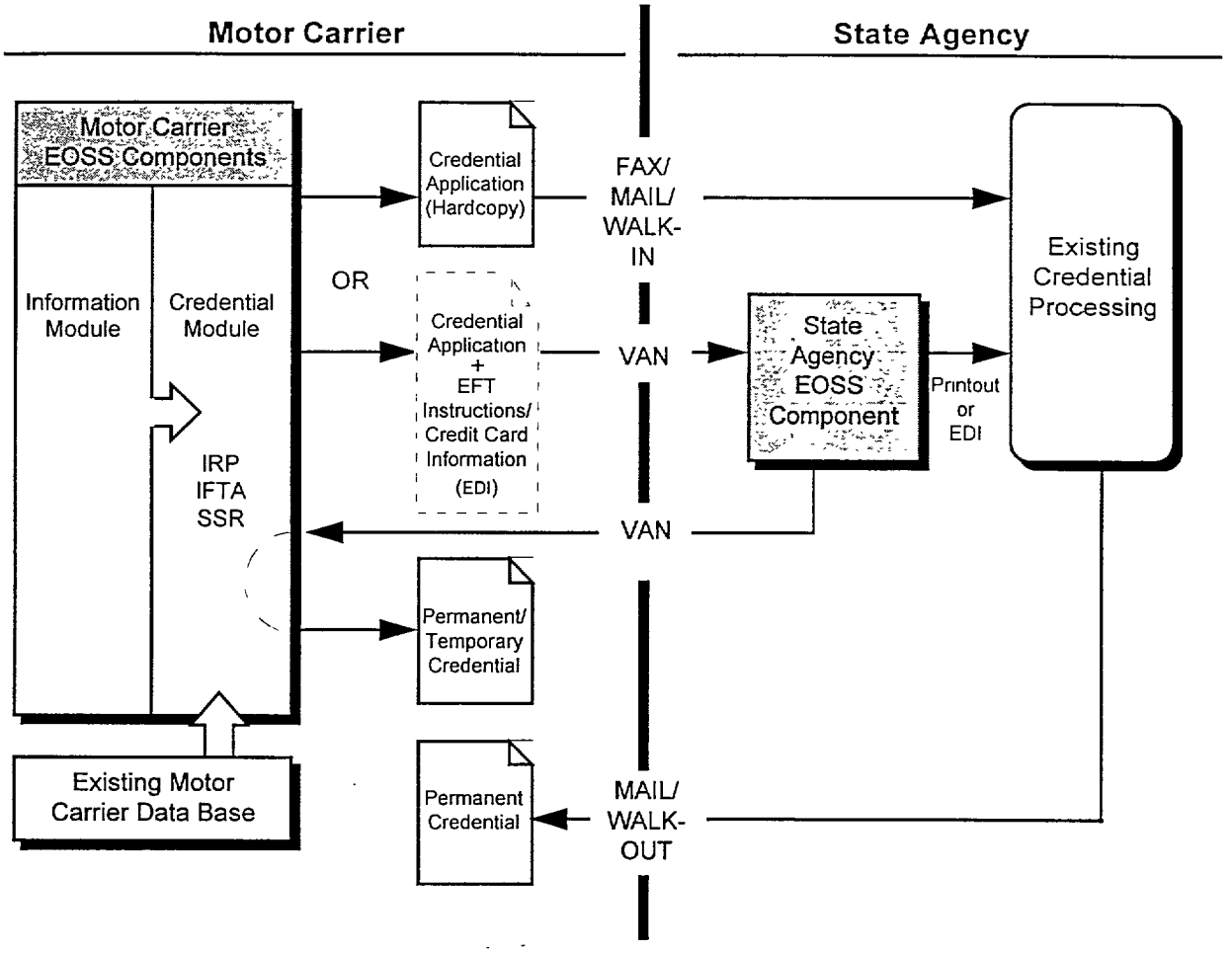
- Complete an application for International Fuel Tax Agreement (IFTA), International Registration Plan (IRP), or Single State Registration (SSRS) System credentials in New Mexico, Arkansas, Colorado, or Texas
- Identify associated fees for system issued credentials
- Arrange for electronic funds transfer to pay those fees
- Submit the completed application electronically, by fax, or print a copy for mailing
- Print out an IRP, IFTA, or SSRS credential for participating states

Exhibit 2.1 on the following page is a flow chart illustrating the EOSS process. A detailed description of the information and credential module follows.

The Information Module was designed for users who do not know what credentials are required in all or some of the states in which they travel. The system asked the user a series of questions regarding the states traveled in, the commodities hauled, the vehicles used, and current credential status. Based on this information, the system indicated which credentials were required and their general information requirements, as well as the supporting documentation needed. From this module, the user can then directly enter the Credential Module and apply for the credentials that are supported by the system.

The Credential Module was designed for the user who desires to apply for specific credentials. In this module, the user indicated the type of credential for which he wished to apply. During the operational test, the EOSS system supported applications for only IFTA, IRP and SSRS credentials. Upon indicating the desired credential type, the user was led through a series of screens which request the base state, fleet, vehicle, and company information required for the desired application type. The system calculated fees for temporary IRP credentials as well as permanent (annual) IFTA and SSRS credentials.

EXHIBIT 2.1
EOSS System Process



The user could complete the application in one sitting or could save the application after partial data entry for completion at a later time. Once completed, and application could be saved by the user, or submitted to the state (via a Value Added Network--VAN) with electronic funds transfer (EFT) instructions. If the latter submittal option was chosen, a credential was issued by the system instantly. The credential was printed at the carrier's printer or faxed to any fax number specified by the applicant. The credential could thus be sent to the carrier's desktop or to a remote site such as a truck stop or Port of Entry.

All applications submitted through the EOSS system were essentially applications for permanent (annual) credentials. However, the EOSS system will only issue permanent SSRS credentials. The EOSS system issued temporary credentials for those application types which currently issue temporary credentials prior to issuance of permanent credentials. This included IFTA in Colorado and Texas, and IRP in all three states. Permanent credential were processed and delivered through existing processes, with the exception of the SSRS credentials.

The state agencies responsible for issuing permanent credentials downloaded the applications through the VAN interface, printed a copy of the application, and forwarded it for standard processing. The process was automated in Texas by allowing the state agency to

forward the credential application information from the agency EOSS dedicated computer directly to their databases via an electronic data interface (EDI).

Several guiding principles were established early in the system design to facilitate user data entry and interaction with the EOSS system. These included:

- Use of a Windows platform – The system is designed to operate in a Windows environment, using color screens and commercially available database software (Microsoft ACCESS). This was done for several reasons. First, use of a Windows platform ensures that the system will be supported by established and emerging hardware and software. Use of color and graphics simplifies user interaction with and understanding of the system. Use of the ACCESS database provides the functionality required, without requiring run-time licensing of the software to industry or state users. Commercial vehicle operators with existing databases will be able to input data into the EOSS system.

- A user need enter data only once – Where information is shared among applications or among company fleet screens, data already entered for one application will appear as a default whenever the same data are requested again. For example, if a user has applied for an IRP credential and provided a mailing address, that mailing address will appear in the IFTA mailing address screen. The user will have the option of overriding this information.

- The system asks only for required data – The user is asked to provide only the information required for the specified credential and base state.

- Default data will be highlighted in a different color – Where a user has previously entered data that is repeated by the system in a later screen or where information is calculated by the system, the data entry blocks will appear in blue to alert the user to the fact that the data should be verified.

- Users can enter and save incomplete information – When the user chooses to submit the application, the system checks to ensure that all required application fields are completed. These checks are credential and state-specific. The system also runs the application through a series of rule checks to ensure that particular fields are filled out appropriately given the application type and base state selected.

3 EOSS EVALUATION DESCRIPTION

The independent evaluation for this test was conducted by Arkansas State University's Transportation Management Program under the direction of Dr. Joe Horsley. Booz-Allen & Hamilton was the FHWA evaluation support contractor with Mr. David Millar as the primary contact. An Evaluation Plan (Document 95 1 0.EOSS.0 1) and State Agency Individual Test Plan (Document # 9522.EOSS.0c) were prepared in June 1996 by Booz-Allen & Hamilton and describes in detail the evaluation approach and methodologies for this test. These documents recognize and describe the need for this test and evaluation to lend support to ITS national programs. The State Agency Individual Test Plan describes in detail the evaluation analytical methodologies and technical aspects of the evaluation.

Due to the direct relationship between events that take place at the state agencies, and the effects of these events on motor carrier operations, data collected for the motor carrier test was needed for the state agency evaluation, and vice versa. The data collection instruments used during each of the state agency efforts were formulated in concert with those used in the motor carrier test, which was conducted in parallel with this test. The motor carrier test is described in detail in the Motor Carrier Test Plan (Document 952 1 .EOSS.Og), prepared in June 1996.

3.1 Evaluation Structure

The broad nature of the state agency operational test required the segregation of test activities into four distinct focus areas:

- System Productivity Impacts
- User Acceptance
- System Deployability
- System Performance and Suitability

3.1.1 System Productivity Impacts

The system productivity impact study contained both quantitative and qualitative aspects. The quantitative portion of the study originally dealt primarily with the accuracy and processing efficiencies realized by state agencies through the use of the EOSS system, while the qualitative portion addressed the ease of use of the user-machine interface. Log data was originally planned to quantitatively measure and evaluate time savings, but this data was not generated by state agencies. Therefore, surveys and interviews asking state agencies for the opinions or estimates of time savings were used for the analysis. The main measures by which time savings, and hence, productivity, were characterized are: amount of fee variation errors for like credentials; increased accuracy of carrier applications; and user-friendliness of EOSS. Measures and objectives used in this analysis are presented in detail in Objectives 1.1, 1.3, and 1.6 in Appendix D, Measures Data Summary.

3.1.2 User Acceptance

The assessment of the user acceptance was made based on responses to survey and interview questions received from state agency personnel regarding the preference of the system. The assessment focused on agency personal preferences, benefits, and compatibility with other activities. The specific measures and objective used in this analysis are presented in detail in Objectives 2.1 in Appendix D, Measures Data Summary.

3.1.3 System Deployability

The system deployability analysis required the collection and analysis of both quantitative and qualitative information regarding the technical, fiscal, and institutional requirements for, and impediments to, full, nationwide deployment of EOSS, or other similar systems, from a state agency perspective.

The minimum technical requirements were determined through research into the minimum specifications for the hardware and software state agencies must have in order to utilize the EOSS software applications. The fiscal capital and operating requirements for full motor carrier deployment of EOSS were estimated based on research into the individual agency costs incurred during the operational test implementation, and took into account training requirements for users and current market costs for hardware and software. The direct hardware costs to state agencies was minimal since all agencies (except Texas) were furnished hardware for use in the test.

The assessment of the state agency position on the deployment of the EOSS system is a composite of responses to survey and interview questions, and a review of the institutional issues that arose during the operational test. The specific measures and objectives used in this analysis are presented in detail in Objectives 3.2, 3.3, 3.4, 3.7, 4.1 and 4.3 in Appendix D, Measures Data summary.

3.1.4 System Performance and Suitability

The system performance and suitability study was very similar to other portions of the system study in that they both contain quantitative and qualitative aspects, and they both take into consideration system technical and user interface characteristics. In fact, the assessment of the credential application module performance relied on much of the same data collected under the productivity impacts study, namely the time required to process a credential application, and the rejection and re-application rates required by the state agency and referenced in their survey and interview responses. The specific measures and objectives used in this analysis are presented in detail in Objectives 5.1 and 6.3 in Appendix D, Measures Data Summary.

3.2 EVALUATION DATA COLLECTION DOCUMENTS

Collection of data was accomplished through a combination of methods. Information regarding the specific data collection methods is presented below. Appendix E contains examples of each type of collection document used during this test.

- Baseline **Surveys –** Baseline, or current activity, surveys were completed by all participating state agencies prior to actually using EOSS. These questionnaires collected information about perceptions, opinions, and attitudes about the existing credential processes.

- **Post-Test Surveys –** Post-test, or follow-up, surveys were completed by state agencies after motor carriers had used EOSS and completed their participation in the operational test. This information was asked primarily for two purposes. First, state agencies were asked to express their overall opinions about the EOSS process. Second, they were asked to compare EOSS to the current manual system and help identify any significant differences or improvements between the two methods.

- **Interviews –** On-site interviews were conducted with all state agencies representatives at the conclusion of the test. The purpose of these in-depth interviews (about one hour per participant) was to reinforce the findings of the surveys, supplement data from these sources that was lacking or indifferent, and identify any institutional issues or unforeseen results of the test.

- **Logs –** State agencies were asked to maintain detailed logs documenting each use of the system. For a number of reasons (see section 3.10.1 about test plan changes) log data was insufficient to provide any meaningful quantitative analysis. Where state agencies did use logs to make comments or suggestions, the information was integrated into survey or interview data.

. **Simulation –** Simulation runs of various computer systems, or platforms, were originally planned, but never conducted, because it became apparent very early in the test that variances among computer systems used in the test was a non-issue since practically all state agencies already had computers exceeding the minimum configuration required for EOSS and were competent in their use.

3.3 KEY ASSUMPTIONS AND THEIR IMPACT

The results of this evaluation were dependent on several factors or conditions involving the expected levels of effort and timing of activities by the state agencies participating in the operational test. This evaluation made several assumptions about each participating agency's ability or willingness to collect and provide certain types and amounts of quantitative data by maintaining a set of activity logs provided by the test evaluators. These assumptions were:

- Participating state agencies were originally expected to use logs to document application processing, follow-up, and time delays for their current process and EOSS activity. In fact, state agencies did form strong opinion about EOSS's ability to impact application processing activity and compare this experience to the current systems. But log usage was minimal and incomplete. Therefore, agency opinions were anecdotal or qualitative in nature and not documented with any rigorous record of actual activity.

- The collective group of participating carriers was expected to be able to actually apply for all the credentials used in this test during the time selected to conduct the operational test. For various reasons, most often a lack of coincidence between annual renewal date deadlines and test timing, not all carriers actually applied for credentials and not all agencies issued all available credentials during the test. Therefore, training, experimenting, and other "on-line" exposure besides actual applications processing played a significant role in forming state agencies' opinions and attitudes about EOSS.

3.4 KEY LIMITATIONS

There were a number of test and evaluation limitations that restricted a completely objective and statistical evaluation of this test. Key limitations and their consequences are described below.

- Carriers were asked to divide their registration activity for each credential type equally among their current and new EOSS registration system. This was not operationally possible for many credential types, for example, single fleet renewals, and thus reduced the ability to obtain adequate comparative baseline data from state agencies.

- State agencies carefully screened carriers in a manner that severely limits any generalizations about the overall motor carrier industry. For example, carriers were screened for financial responsibility, interviewed about their willingness to participate, asked to selectively volunteer, and be trained and coached in using the system by the system developers. The result was a non-random and rather specific class of actively involved carriers willing to cooperate with state agencies and make extra efforts to support the test.

- Participating state agencies had no definitive historical records that documented their experiences with existing credentialling systems, or their direct costs associated with credentialling activity by their agency. Credentialling was seldom a full-time job on individual office and costs were not broken out by specific credential type.

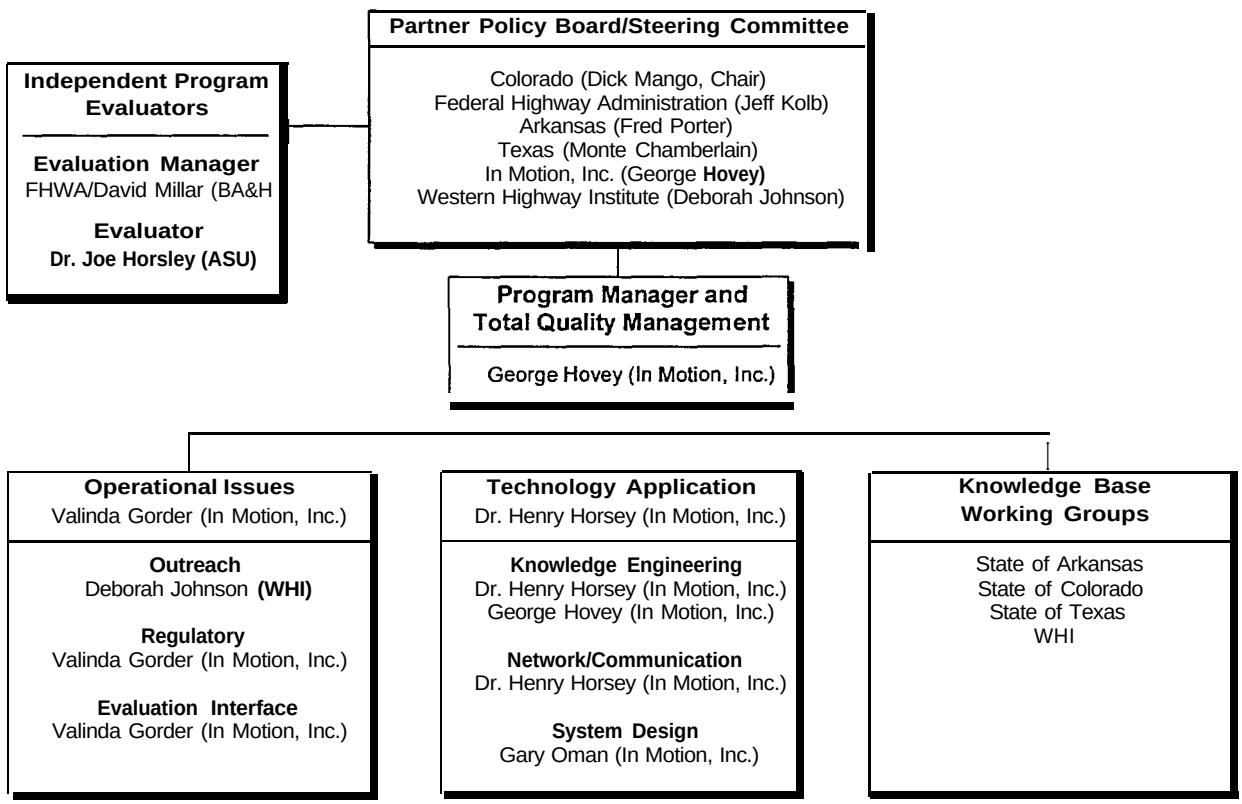
- Both the limited number of state agencies, seven, and the limited types of credentials, three, limited the test's ability to generate a sufficient quantity of data adequate to establish any statistical levels of confidence in the test data and evaluation results and suggest any expectations about agencies in general.

- EOSS carrier and agency hardware and operating cost estimates were difficult to quantify for several reasons. Many carriers already had hardware capacity in place, and agencies were furnished hardware for the test. New hardware is most likely to be put to any number of uses, in addition to EOSS registrations. Registration personnel routinely perform other duties not related to credentialling.

3.5 EVALUATION PARTICIPANTS AND ROLES

The EOSS project Steering Committee functioned as an evaluation review team for all evaluation documents and provided executive review and input to the evaluator. FHWA is the evaluation manager and is assisted in this role by Booz-Allen & Hamilton. Arkansas State University conducted the evaluation analysis. A small core of the Steering Committee, including the Colorado Department of Transportation, In Motion, Inc., Arkansas State University, and Western Highway Institute, was assigned to a technical evaluation review team to aid the evaluation efforts. Appendices A, B, and C lists the Steering Committee members, carrier and agency participants respectively in this test. Exhibit 2.2 is an organizational chart for the project. The following section lists the participating groups and defines the evaluation responsibilities and the primary points of contact.

EXHIBIT 2.2
Organizational Chart



Steering Committee – There were several general responsibilities of the Steering Committee. These include providing oversight for all evaluation activities in a proactive manner, reviewing all evaluation documents and providing comments in a timely matter, and monitoring the quality control procedures being used by the evaluators.

Colorado – The Colorado Department of Transportation, specifically Mr. Dick Mango, represented the state in the operational test. CDOTs primary responsibilities were project management and coordination with Colorado state agencies that were involved. They supported

the evaluation through technical review. Carrier selection assistance in Colorado was provided by the Colorado Department of Revenue.

Texas – The Texas Department of Transportation (TxDot), specifically Mr. Monte Chamberlain, represented the state in the operational test, and was responsible for assisting carrier selection and coordination with Texas state agencies. He supported the evaluation through document review.

Federal Highway Administration (FHWA) – Mr. Jeff Kolb, Region 8 ITS Engineer, supported the operational test at the regional level. Mr. Jeff Loftus, Office of Motor Carriers Safety and Technology, supported the operational test at the headquarters level. The FWHA is a special partner that has a national ITS perspective and is the primary sponsor of the effort. Additionally, the FWHA is responsible for approving the Evaluation Plan and providing support for evaluation activities.

Operational Test Evaluation Support Contractor – Booz-Allen & Hamilton is the evaluation support contractor for the FHWA and aided in the management of the evaluation. WHM Transportation Engineering Consultants, Inc. is a subcontractor supporting Booz-Allen in the evaluation support contract. Mr. David Millar is the primary point of contact and worked closely with Arkansas State University in the interest of FHWA. Booz-Allen prepared the data collection instruments and produced the Evaluation Plan and Individual Test Plans.

Arkansas State University (ASU) – Dr. Joe Horsley was the lead in the evaluation analysis. The primary responsibilities of ASU was to conduct the evaluation and prepare the individual test reports. ASU assisted in the preparation of the evaluation plan, individual evaluation test plans including preparation of log, survey, and interview forms, and the final Evaluation Report. ASU was responsible for collecting evaluation data, conducting interviews, performing analyses, and documenting results.

In Motion, Inc. (IMI) – Mr. George Hovey was the project lead for IMI. IMI is the system developer and integrator of the EOSS team. IMI had several evaluation responsibilities. Among the was providing technical review for the evaluation, provide copies of any written documentation prepared for the project regarding identification/ resolution of institutional issues, and support data collection efforts to the extent possible.

Western Highway Institute (WHI) – WHI **is a** research **resource** dedicated to pursuing improvements in the transportation industry, with emphasis on the commercial vehicle industry in Western North America. WHI was responsible for managing the recruitment of the individual carriers that participated in the operational test, acted as a liaison between the carriers and the test, and assisted in the pretest of data collection instruments. Ms. Deborah Johnson represented WHI on the Steering Committee and performed technical evaluation review.

State Motor Carrier Associations (MCA) – The various MCAs assisted WHI with their project and evaluation tasks. Appendix B lists the motor carrier associations and the participating carriers they represented during the test.

3.4 EOSS SYSTEM USE AND EVALUATION TRAINING

In Motion, Inc., in conjunction with WHI, held one-day on-site training sessions on the use of EOSS for participating state agencies. Continuous technical support was provided to all participants throughout the test. IMI maintained a help-line for technical association and made on-site trips to several state agencies, when needed.

While all evaluation data documents were designed to be self-explanatory, with directions for use embodied in the document, separate instruction sheets were prepared. IMI reviewed these documents in their training visits and explained the purpose and need for agencies to complete them.

3.7 PILOT TESTS

Pilot tests were conducted to verify that test participants were familiar with their roles and responsibilities, and understood the data collection documents, techniques, and methodology. Once the system hardware and software were set up and made operational, the evaluator and personnel at two motor carrier sites in Colorado conducted a one day data collection effort consistent with the procedures used for the full-scale data collection effort. Motor carrier personnel entered credential application data, submitted the applications through the system, and simulated completing transaction logs. State agencies were then asked to provide analysis for these pilot tests.

The surveys and questionnaires used for the collection of user perception and acceptance data were tested by administering them to the users involved in the pilot test. The data collected was analyzed and the users were interviewed to determine whether any changes of clarifications to the data collection instruments were necessary prior to the distribution for full testing, and the data collection instruments amended as required.

3.8 DATA ANALYSIS METHODOLOGY

The Evaluation Plan was developed to provide an analysis consistent with the set of common goals and objectives recommended and used by three independent one-stop operational tests. These goals were identified in a joint meeting of participants of all three operational tests held April 21-23, 1995, in Denver, Colorado. These goals and objectives were subsequently adopted for this EOSS test on August 3, 1995. These goals and their relevant objectives are described in detail in Section 3.1 of this document.

The basic technique used to evaluate these goals and objectives began with the development of basic items of information specific to this operational test. These evaluation measures must be quantifiable or "measurable" and relevant to the expected behavior or activity of the actual test participants and relate directly to one or more specific objectives associated with each project goal.

Hypotheses were designed for each quantifiable measure where appropriate. However, the test did not generate the critical mass of data required to statistically test the validity of these

hypotheses. Therefore, the interpretations are strictly suggestive in nature and lack statistical validation.

All open-ended survey and interview question responses were compiled and sorted to match the relevant measure for that particular data cell or measure. Trends or patterns in these responses were then identified and interpreted in the analysis.

Measure Data Summaries tables were designed that allowed the collection and tabular presentation of all available data for each goal, objective, and measure used in this evaluation. These tables include all the survey opinion scores, interview and open-ended response comments and quantifiable information collected during the test for each measure to be evaluated. A finding section at the beginning of each table summarizes the supporting data for each measure. These measures Data Sumrnaries are found in Appendix E and present a comprehensive and detailed investigation of the step-by-step analytical process that forms the basis of this Motor Carrier Test report.

3.9 TEST AND EVALUATION SCHEDULE

Listed below in chronological order is a compilation of the significant meetings, trips, and events occurring during the operational test and evaluation.

EXHIBIT 2.3
Evaluation Timetable

DATE	LOCATION	ACTIVITY
1994		
Sept. 22-23	Denver	Attend first EOSS Operational Test Project meeting
Nov. 2-4	Denver	Attend Colorado DOT EOSS Research Grant organizational meeting
Nov. 27-30	Little Rock	Attend Arkansas EOSS Test Project meeting
1995		
Apr. 21-23	Denver	Attend joint meeting of the three electronic credential operational test and develop common goals
Aug. 2-3	Santa Fe	Attend EOSS project Evaluation Team meeting and discuss project progress and status
Sept. **18-22**	Little Rock	Attend meeting of Arkansas EOSS Task Force **and** project team members.
1996		
Jan. 10-11	Little Rock	Attend Project Managers and Evaluation Team pre-test

		meeting
April 23	Jonesboro	Mailed carrier profiles, logs and instructions to Colorado carriers
May 2	Jonesboro	Mailed Colorado and Arkansas agency logs and instructions
May 3	Jonesboro	Mailed Arkansas carrier profiles, logs and instructions to Arkansas carriers
June	Washington, D.C./ Jonesboro	Final version of the evaluation plan completed
July	Washington, D.C./ Jonesboro	Final version of the evaluation plan and motor carrier individual test plan completed.
June 3-14	Colo./Arkansas	EOSS installed by In Motion, Inc. at various carrier and agency locations.
Nov. 25-27	Texas	EOSS installed by In Motion, Inc. at various carrier and agency locations.
Aug. 15-16	Little Rock	Meet with Arkansas Evaluation Team and pre-test baseline surveys
Aug. 23	Jonesboro	Mailed baseline surveys to Arkansas and Colorado carriers and agencies
Nov. 16-22	Denver	Attend Colorado EOSS Project meeting and presented interim findings; conducted personal interview pre-tests with carriers and agencies
Nov. 25	Jonesboro	Mailed carrier profile, logs, instructions, and baseline surveys to Texas participants
1997		
Feb. 12-14	Denver	Conducted personal interviews with all Colorado participants
Feb. 19-2 1	Little Rock/Fort Smith/Harrison	Conducted personal interviews with all Arkansas participants
Feb. 26-28	Dallas/Houston/ Austin	Conducted personal interviews with all Texas participants
May 1	Jonesboro	Terminated data collection activities and began final evaluation analysis

Aug. 20	Jonesboro	Final evaluation draft forwarded to evaluation team members for review

3.10 TEST PLAN CHANGES AND DEVIATIONS

Several research and data collection activities were changed after the finalization of the State Agency Test Plan. These changes were required principally due to unexpected events or features of EOSS not being available to users during the test. A brief discussion of these test variances and the effected measures and objectives follows.

3.10.1 Log Data Collection

The use of log data to evaluate measures was essentially eliminated due to the very low number of logs returned by carriers and agencies. A total of eight carrier logs and four agency logs were returned. Of these logs, none were completed and all were of little analytical value. Where comments were included, these were transferred to the interview/comment sections of other portions of the test.

This low level of log-generated data occurred for several reasons. First, there are only approximately fifteen documented attempts by all carriers to actually obtain a credential. Some of these attempts were also duplicate efforts. But, just as importantly, maintaining logs was never a priority for carriers or agencies. Logs were lost, set aside for later completion, or never even initiated. These results are not entirely the fault of the carriers. Logs were rather complex, required several follow-ups to complete, and might have taken several weeks to complete. Therefore, this complex and lengthy process did not lend itself to casual participation and probably could have been more properly designed.

3.10.2 Simulation

The evaluation of EOSS deployment potential called for multiple simulation runs on various personal computer configurations or platforms in order to evaluate various hardware capabilities. Very early in the evaluation it was determined through interviews and other carrier and agency comments that processing time variances were a non-issue since every test participant had existing personal computer capabilities that, except for two modem purchases, met or exceeded the minimum configuration required to operate EOSS. System or hardware speed was never documented as a participant concern.

3.10.3 Agency Records Research

It was evident during interviews that state agencies had no historical records that allowed an analysis of costs or labor efforts associated with processing credentials. Therefore, there were no records available to research. At best, state agencies only had some intuitive notion of how much time it took to process credentials, and this amount of time was a very small portion of their total credentialling and other duties.

3.10.4 Evaluation Measures Modifications

- References to EDI were eliminated in Measures 1.3.3 (Potential for reduced credential processing manpower requirements based on user responses) and 1.6.1 (Satisfactory ease of use based on state agency user responses) since EDI was not available in Arkansas or Colorado.

- Evaluation of the credential module in Objective 6.1 (Assess the performance of the credential module) was deleted from this analysis since this module was intended only for motor carrier use.

4 GOAL ASSESSMENT AND CARRIER EVALUATION FINDINGS

Through a series of meetings with this project's steering committee and other one-stop project members in April and May 1995, the evaluation team was provided input and guidance that resulted in the establishment of six goals for this test and evaluation. These goals are generally common to the three current one-stop operational tests and directly support the ITS National Program goal to enhance transportation productivity. These six goals are:

Goal 1: Determine changes in productivity related to EOSS system.

Goal 2: Determine user impacts of EOSS system.

Goal 3: Assess the requirements and potential for EOSS deployment,

Goal 4: Document and assess the impacts and solutions of institutional issues.

Goal 5: Determine EOSS systems suitability.

Goal 6: Assess system component performance.

The EOSS Evaluation Plan identified four major evaluation focus areas that are generally consistent with the ITS goals listed above. A detailed discussion of the findings relating to each objective associated with these focus areas follows. Each discussion ends with an assessment for each relevant goal. Appendix D contains a more detailed compilation of the specific data obtained from the test that supports the analysis of every measure associated with each objective. Each objective discussion contains a list highlighting the most significant data supporting the findings for that objective. Survey opinion scores for specific measures are indicated in ( ) throughout the discussion and are based on the following opinion scale:

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
-2	**-1**	**0**	1	2

4.1 SYSTEM PRODUCTIVITY IMPACTS (Goal 1)

This portion of the evaluation determined the changes in productivity state agencies may realize through the use of the EOSS system. Querying the users as to the ability of the system to effectively provide them accurate application submittals provided sufficient insights that enabled conclusions to be drawn regarding the EOSS productivity effects. There are three objectives associated with this portion of the test:

4.1.1 **Objective 1.1** Determine improvements in state agency credential administrative process with EOSS

Agencies do not expect any dramatic administrative processing gains in their activities as a direct result of EOSS. Without EDI capability, an agency's processing procedures remain

essentially unchanged. Agencies indicated that fee calculation variation was not a problem for them, either manually or with EOSS. Agencies strongly agreed that their processing is satisfactory (1.3) and agreed that variations are not a problem (0.9) EOSS does little to improve accuracy in processing applications (0.3). The most frequently-mentioned EOSS benefit to agency productivity was from typed or printed applications that are easier for processors to read. Texas was the only state with EDI capability and was strongly enthusiastic about its potential to improve productivity. Most other agencies with any opinion about EDI potential did expect significant benefits, also. The key findings supporting these conclusions are:

- State Agencies indicated in baseline surveys that their current process is accurate (1.3) and fee variations are not a problem (0.9).
- Four of the seven state agencies did mention in interviews that printed applications are more desirable and help processing accuracy.
- The one agency with EDI capability gave strong indications that EOSS with EDI will improve administrative processes.

4.1.2 Objective 1.3 Determine state agency productivity improvements due to the use of EOSS.

State agencies do not expect any significant productivity improvements to result from the use of EOSS. Incomplete or inaccurate applications are not normally rejected but followed up in various ways (phone calls, faxes, etc.) to correct problems. Two agencies indicated that most errors are not EOSS "solvable" or related to EOSS. Two agencies indicated that EDI might help, if available.

Most state agency personnel performed various duties and EOSS could not improve their error rates or efficiency (1.4) Five of seven agencies said in interviews that EOSS would not reduce staffing needs. Neither would EOSS reduce time spent answering carriers requests for information (-1.4). the majority of state agencies (57%) indicated in interviews that EOSS would not improve other administrative duties. Two state agencies saw some limited potential and just one state agency expected any significant positive administrative efficiency gains under full deployment. State agencies generally expect little, if any, productivity improvements to result from EOSS. Key findings supporting this conclusion are:

- State agencies slightly disagreed that EOSS will enhance other duties (-0.1) and did not agree that EOSS would make more time available for other duties (0.0).
- State agencies indicated in interviews and opinion statements that current processing methods are not disruptive to other duties (0.9) and EOSS did little to improve other administrative functions (-0.1).
- State agencies indicated in follow-up opinions that they slightly disagreed that EOSS would reduce office costs (-0.3) and expected no significant gain in time available for other duties (0.0).

4.1.3 Objective 1.6 Assess EOSS user-friendliness (user interface) from a state agency perspective.

State agencies found EOSS easy to learn and use, but no easier than current procedures. Key findings supporting this conclusion are:

- State agencies indicated in opinion statements that EOSS is easy to learn (0.7), but disagreed that EOSS is easier to learn than current methods (-0.1).
- Six of seven state agencies responded with an unqualified "Yes" when asked if EOSS is easy to use.
- Two agencies without EDI did indicate some marginal potential productivity gains if EDI were available. The one agency with EDI was strongly supportive of EOSS's potential.

4.1.4 Goal 1 Assessment Summary

State agencies do not expect any significant changes in productivity due to the implementation of EOSS, primarily because existing processing procedures will change. Once an electronic application is received, it is processed like any other with the same administrative review and recording procedures. Therefore, there is little potential for productivity benefits. The greatest benefit to state agencies will result primarily from improved accuracy and legibility of printed electronic applications or from the future implementation of EDI.

4.2 USER ACCEPTANCE (Goal 2)

This portion of the test determined the extent to which the EOSS system satisfies the requirements and suits the preferences of individual state agency users. Surveys and interviews with state agency personnel responsible for credential submittal were used to collect the information necessary to address the following objectives:

4.2.1 **Objective 2.1** Assess state agency acceptance of EOSS.

State agencies in both interviews and opinion statements generally agreed that EOSS is not disruptive to their duties. All seven agencies indicated in interviews that EOSS is compatible with existing operations. However, they also indicated no clear preference between EOSS or current procedures. Six of the seven agencies indicated without prompting in the interviews that the greatest potential benefits **from** using EOSS will accrue to carriers, and this reason is cited as their primary reason to support deployment of EOSS. State agencies most often cited increased legibility and accuracy as their primary benefits from EOSS. Key findings supporting this conclusion are:

- State agencies were neutral in opinion statements about preferring EOSS (0.0) and supporting adoption of EOSS (0.0).
- State agencies slightly disagreed that their office would prefer EOSS (-0.4), although they generally found EOSS procedures satisfactory (0.1).

- All seven agencies indicated in interviews that EOSS was compatible with other activities.

- Five of seven agencies cited in interviews that "easier to read" or more accurate applications are the most significant benefit to them.

- Four of seven agencies indicated in interviews that providing additional services to carriers is the primary reason for continuing to use EOSS.

4.2.2 Goal 2 Assessment Summary

State agencies do not expect any significant impact on their activities as a result of EOSS. To the state agencies' general credit, their strongest reason to accept EOSS and support its adoption is to provide a system that significantly benefits their carriers and other applicants, while providing relatively few significant benefits for themselves. Their position is reinforced by the fact that EOSS is effectively impact-neutral. While agencies expect few benefits directly related to EOSS implementation, neither do they expect any significant problems or disruptions in their activities if EOSS were deployed.

4.3 SYSTEM DEPLOYABILITY (Goals 3 and 4)

The goal of this portion of the test assessed the degree to which the EOSS system provides a viable platform for deployment of a nationwide electronic one-stop credential system, and to estimate the capital and operating costs state agency can expect to encounter in becoming part of the system. Data gathered during research, and through observations and interviews of and with state agency personnel were used to address the following objectives:

4.3.1 Objective 3.2 Determine minimum system configuration required to make EOSS available to all state agency operations.

State agencies' hardware was adequate in all cases but one where a modem purchase was required. While the test did furnish agencies the hardware to be used in the test, all agencies did have their own adequate equipment. The minimum system requirement, according to the designers, In-Motion, Inc., is:

- 486 IMB compatible personal computer
- 8 MB RAM
- Windows 3.1 or higher
- 9600 baud modem
- graphics-capable printer
- EOSS software

4.3.2 Objective 3.3 Estimate state agency deployment capital costs.

As indicated in the previous section, agencies generally owned adequate hardware. No agency indicated in interviews that having or making adequate hardware available is a barrier to EOSS deployment by their agency. An informal shopping inquiry indicated that the minimum

required system could be purchased today for approximately $1000.00. Key findings supporting this conclusion are:

- Agencies indicated in interviews and comments that they already have existing hardware capability. Once agency did need to purchase a modem ($190.00)
- Any required purchase of hardware anywhere in the United States should not exceed $1000.00.
- While capital costs are nominal, there is some potential for agencies to expect to absorb some staff activity costs in implementing EOSS.
- EOSS software costs, if any, have not been determined.

4.3.3 **Objective** 3.4 Estimate state agency deployment operating costs

No agency indicated any additional operating costs associated with EOSS deployment other than the possibility of having to install a dedicated phone line. Existing personnel and existing hardware could be used to operate EOSS. If any additional costs were to be incurred by agencies, it is likely that some type of fee charged to motor carriers would absorb it. Key findings supporting this conclusion are:

- Agencies in their interviews and written comments identified no additional operating costs from implementing and using EOSS.
- EOSS subscription or transaction fees, if any, will likely be borne by carriers.

4.3.4 **Objective** 3.7 Estimate state agency training efforts required for deployment.

Training and technical support was provided by the system developers, In-Motion, Inc. and IDT. Agencies indicated in opinion statements that EOSS was easy to learn (0.7) but slightly disagreed that it was easier to learn than current methods (-0.1). The consensus among agencies was that new users could be trained on the job in approximately one hour. Several agencies installed their own software and self-taught themselves with little time or effort. Key findings supporting this conclusion are:

- All agencies receiving training considered it adequate, with EOSS easy to learn. Three agencies cited in interviews the good technical support provided by the EOSS developers, In-Motion, Inc. and IDT.

4.3.5 **Objective 4.1** Assess state agency position on deployment of EOSS.

Agencies indicated in their interview and opinion responses that they were neutral concerning the adoption of EOSS. However, the majority (4 of 7) did supporting continuing to use EOSS due to the significant benefits they perceive accruing to motor carriers and other applicants. Any agency preference for carriers to use EOSS for agency benefit was due primarily to application legibility and accuracy. Key findings supporting this conclusion are:

- Agencies indicated in opinion statements that they are neutral in strongly supporting adoption of EOSS (0.0)

- Two agencies in one state did express concern in interviews about multiple or proprietary systems and felt they probably would oppose them.

- Three agencies noted in interviews that electronic funds transfer (EFT) and electronic data interchange (EDI) are necessary for EOSS to achieve its full potential.

- Agencies were slightly negative about preferring EOSS over their current process (-0.1)

- Four of seven agencies indicated in interviews that their primary reason to continue to use EOSS would be to support motor carriers.

4.3.6 Objective 4.3 Maintain a library of contracts, agreements and documents which address successful and unsuccessful solutions to legal, societal, jurisdictional and privatization issues.

Although some carriers did indicated their concerns about certain regulatory or legal issues that might present possible impediments to deploying EOSS, many of their comments focused more on operational test accommodations rather than deployment issues. The one central them of agency concerns involves the manner of fee payment and potential use of EFT. Fee payment methodology is a very complex deployment issue for state agencies and is addressed in a more detailed discussion of significant institutional issues associated with EOSS that appears in section 5.1 of this report.

4.3.7 Goal 3 Assessment Summary

From a state agency perspective there are few, if any, technical or operating barriers to the nation-wide deployment of EOSS. Capital and operating costs are nominal, if any. However, they see few, if any, direct benefits for themselves and are quick to recognize that most of the gains or benefits resulting from EOSS deployment would accrue to motor carriers or other applicants. But state agencies, to their credit, generally feel that supporting motor carriers is sufficient justification to deploying EOSS nation-wide.

4.3.8 Goal 4 Assessment Summary

Institutional barriers identified by state agencies focused on the need to develop electronic funds transfer (EFT) and electronic data interchange (EDI) systems in order to full benefit from EOSS. In additional, regulatory changes or revisions (SSRS was mentioned several times in interviews) could have a negative effect on long-term deployment potential. Since credentials and legal and accountable documents that are often subject to fee collection or tax laws, and access to electronic files is perceived to be more difficult to control and subject illegal access, most states may have to amend regulations or statutes to accommodate an electronic credentialling environment.

4.4 SYSTEM SUITABILITY AND PERFORMANCE (Goals 5 and 6)

This portion of the test assessed the degree to which the EOSS system meets the performance, availability, compatibility, and applicability requirements of the participating state agencies. Surveys and interviews with state agency personnel responsible for credential submittal were used to collect the information necessary to address the following objectives:

4.4.1 Objective 5.1 Determine compatibility of EOSS system with existing agency credential approval criteria.

By EOSS's very nature (installed in-house, on-line to agencies and carriers 24 hours a day via an electronic mailbox) EOSS was always available. No state agency indicated ever discovering EOSS "down" when checking their electronic mailbox, but several agencies did mention that a prompt to alert them of mail (applications) awaiting delivery would be a desirable feature. Both carriers and agencies generally indicated in interviews that EOSS will be compatible with current credential approval criteria. Key findings supporting this conclusion are:

- The number of EOSS transactions and resulting log information was insufficient to draw any conclusions concerning the percentage of appropriate responses to actual applications.
- Agencies indicated in interviews and in post test opinion statements that EOSS is compatible with other agency activities and generally not disruptive.
- All seven state agencies indicated that EOSS is compatible with existing operations.

4.4.2 Objective 6.3 Assess the functionality of the EDI.

While only state agency had EDI capability during the operational test, several other agency officials were generally familiar with EDI and had formed some general opinions about its desirability or potential. Those officials with any opinion about EDI generally felt it **necessary** for EOSS to achieve its full potential for both motor carriers and state agencies, reduced keystrokes, streamlined administrative processes, improved accuracy, less paperwork and fewer paper requirements were mentioned. In addition, while CVISN program development is outside the scope of this evaluation, EDI's role in supporting CVISN deserves mention here. It is the opinion of this evaluator that EDI is essential to bring an electronic credential process into CVISN programs. Key findings supporting this conclusion are:

- Only one state agency had EDI capability during the test and it opinion as expressed in interviews and opinion statements was that EDI was very accurate (2.0) and would improve the accuracy of credential applications processing (2.0).
- Only one state agency had EDI capability during the test and its opinion as expressed in opinion statements was that EDI would allow staff to have significantly more time available for other work (2.0)

- One agency with EDI and two agencies without EDI indicated in interviews that EOSS with EDI offered some potential to improve application processing productivity compared to EOSS without EDI.

4.4.3 Goal 5 Assessment Summary

Compatibility with existing activities is not an issue with state agencies. There was no mention in any evaluation activity of any conflicts or disruptions occurring during the test as a result of EOSS. In addition, no agencies identified any potential conflicts or disruptions. Although state agencies see little direct benefit to them from EOSS, they do not foresee any meaningful administrative disruptions occurring as a result of using EOSS.

4.4.4 Goal 6 Assessment Summary

The one agency with EDI capability was strongly supportive of EDI's potential benefits when used in conjunction with EOSS. EDI is the single greatest opportunity for state agencies to significantly benefit from EOSS credential processing. Based on one agency's actual experience and several intuitive opinions, EDI should be seriously considered for inclusion with any fully-deployed electronic credentialling system.

5 INSTITUTIONAL/LEGAL ISSUES

A number of significant institutional, or non-technical, barriers arose during both the design and test phases of the project. These issues typically took on two levels of concern. First, temporary operational test accommodations, or agreements, were used to allow the test to run for its duration. Second, these solutions were often agency- or carrier-specific, and may not offer optimal solutions for permanent EOSS deployment. There is an inherent danger in suggesting that any issue resolution developed for this test will have significant potential for national deployment.

The roots of many barriers or issues are found in various state legal/regulatory procedures, either statutory, administrative or even constitutional in nature. Eliminating many of these barriers will require states to legislatively or politically amend laws and procedures currently in place that affect many entities outside the motor carrier industry.

Institutional issues will probably take on a life of their own when critically evaluating national deployment potential. The limited experience in this test suggests that a much broader-based investigation of institutional barriers will be necessary before electronic credentialling can be successfully deployed.

The evaluation team compiled a list of institutional issues by interviewing and soliciting the opinions and experience of Steering Committee members, project partners in each state, and the various agency and carrier participants. Practically all institutional issues resulted from current state laws or agency administrative procedures pertaining to individual identity assurances and methods for verification and payment of fees. Several larger carriers did mention there might be some internal policy or accounting problems involving funds control management or access to certain electronic financial records within their office. Otherwise, institutional issues and their resolutions are primarily state agency or other regulatory issues beyond the control of individual carriers. The major institutional issues arising during this test were:

- Guaranteed fee payment
- Support documents
- Original signatures
- Fee calculations
- Audit capabilities

A discussion of these issues and their resolution potential follows:

5.1 GUARANTEED FEE PAYMENT

States typically require guaranteed payment prior to issuing any credential or license. Accordingly, EOSS attempted to accommodate fees payment three different ways: Electronic Funds Transfer (EFT), credit cards, or debit cards. None of these methods could be immediately guaranteed and satisfy all state requirements. In no case could states guarantee that funds existed for transfer, and carriers could not guarantee that correct amounts, or correct accounts, were

charged by agencies. Any verification activity delays EOSS application issuances. For EOSS to achieve its optimum potential, some fee payment method must be established that does not materially impede the nearly instantaneous EOSS credential issuance capability.

To accommodate this test, participating carriers in Colorado and Arkansas signed temporary filing agreements that contractually guaranteed payment during the test. Texas. however, constitutionally prohibits extending any form of credit to any taxpayer. This prohibition has been interpreted to include all state licenses, including motor carrier credentials. To accommodate this test and the Texas constitution, Texas carriers either set up bank debit accounts or used guaranteed Visa or Master Charge accounts issued by one cooperating bank in Texas.

Temporary filing agreements in Colorado and Arkansas provided a very restrictive and selective temporary solution. Carriers were approved only if state agencies had a favorable opinion, based on past history. Many carriers, smaller or less financially sound ones especially, would be excluded from using permanent filing agreements. Carriers in Texas were dissatisfied with losing control of funds and interest earnings on debit accounts. Large carriers using approved bank cards had to make multiple applications due to a $10,000 per transaction limit placed on these cards.

The overall fee payment process is critical to any full deployment of electronic credentialling and may be the most significant institutional barrier to overcome. From this limited test experience, fee payment concerns of many types can be anticipated from other states, also. These barriers could require very complex legislative, or even constitutional, resolutions.

There are a number of potential methods currently available to facilitate fee payment: use of American Clearing House services, credit/debit systems, automated credit/debit card verification systems, wire transfers, or escrow accounts. But each will present a variety of concerns to both state agencies and carriers and will require analysis and planning beyond the scope of this study.

5.2 SUPPORT DOCUMENTS

A variety of “original” support documents or “original” signature documents are required to be submitted with many credential applications. For example, vehicle title documents, heavy vehicle use tax payment, and various state property tax payments are required for IRP applications. Insurance coverage verification and process agent contracts are required on SSRS forms. Electronic transmissions cannot currently satisfy these document requirements without delaying credential issuance.

During this test carriers were required to fax or mail hard copy support documents within 24-48 hours of application submittal. Colorado and Arkansas immediately issued credentials and then verified the support documents upon receipt. Texas waited until after receiving and verifying support documents, thereby delaying issuance of credentials for several days, at least.

Eliminating hard documents that legally attest to certain conditions is a complex issue for the states. Electronic databases must be created and shared by the various states, federal

agencies, and insurance industries in order to accommodate an EOSS scheme. These data bases must be legally accepted as evidence of title, insurance, emissions testing, tax payments. etc.

5.3 ORIGINAL SIGNATURES

Many applications typically require the original signature of a principal in the company. Participating carriers signing an electronic filing agreement for this test were provided a unique Personal Identification Number (PIN) that served and was temporarily accepted as an original signature.

The same approach could be used for full deployment, but carrier eligibility will depend on the terms and conditions the various states include in their electronic filing agreements. New carriers, smaller carriers, or ones with unacceptable compliance or financial histories could possibly be precluded if they were found ineligible to qualify for electronic tiling, and therefore not allowed a PIN identifier.

5.4 FEE CALCULATIONS

Prior to issuing many permanent annual credentials, states require evidence of accurate and timely payment of the annual vehicle registration fees. EOSS software could accurately calculate IFTA and SSRS fees for the test. However, IRP credentials are more complex and supporting fees change frequently. As a result, EOSS could issue only temporary IRP credentials. States subsequently issued permanent ones after verifying the accuracy of fees, and their payment. Carriers were then required to replace the temporary issue with the permanent one.

A functional system must be capable of calculating accurate permanent credential fees at the time of an EOSS application. Such a system will require a full set of formula for calculating fees for all weight classes of vehicles in all states. Because this system will require constant updating with the distribution of any fee and administrative changes made available to all effected carriers or EOSS users, this system is likely to be expensive to create and externally maintain. Fee calculation must occur within the framework of EOSS's near-instantaneous ability to otherwise issue credentials if EOSS's optimum potential is to be realized.

5.5 AUDIT CAPABILITY

The legal status of electronic records, or hard copies printed from them, to satisfy various state and federal audit requirements is unclear. This issue is not addressed in EOSS, but several federal and state agencies must **resolve** the audit status requirements for all types of electronic records and electronic fee payment methods for all types of industries and fees before electronic credentialling can achieve optimum results.

5.6 ROADSIDE ACCEPTANCE

EOSS electronically-produced credentials may conflict with several states' regulations that were originally established to prevent fraudulent credentials from circulating. These regulations typically require original copies, sometimes embossed original signatures, notarized documents or other conditions that make reproducing credentials difficult. Full deployment of EOSS will require that some states modify such restrictions and that EOSS credentials be produced is a manner that prevents unauthorized duplication.

6 QUALITY ASSURANCE

Several quality assurance procedures activities were conducted during the test and evaluation. These activities insured the integrity and protection of the data used in the evaluation. Although the extremely low quantity of raw data and the relatively short duration of time in which it was collected did not require rigorous interim analysis and compilation, several activities were conducted throughout the test and evaluation to insure the data's accuracy and protect its existence. A description of these activities follows.

6.1 DATA COLLECTION AND DOCUMENT REVIEW

Each returned data collection document (interviews, questionnaires, logs, etc.) was reviewed upon receipt for completeness, usefulness, and overall validation. Incomplete or questionable returns were followed up with phone calls or inquiries in order to clarify the data or improve its usefulness. Returned collection documents were entered into data bases only after validation of their usefulness. The primary purpose of this review was to insure that the respondents were thoughtful and knowledgeable in reporting and that they generally followed instructions. Given the very low number of participants (seven agencies), every effort was made to encourage all participants to complete and return data documents and avoid rejecting any response . Numerous phone calls were made and follow-up mailings of duplicate documents sent to replace lost or misplaced items.

6.2 RECORDS MAINTENANCE

Upon receipt, duplicate copies of all collection documents were made and maintained in separate and secure locations. All original data collection documents were maintained in a secured hard copy document file and working copies were used for all analysis activities. Electronic files and back-up copies of all data bases were created and maintained in two separate and secure locations. All these records and original data collection documents will be made available to the Project Manager as soon as they are no longer needed for evaluation purposes.

6.3 ACTIVITY JOURNAL AND CORRESPONDENCE FILE

Throughout this test and evaluation, a journal has been maintained that included all significant activities and reflected the status of the various data collection efforts. These records include the mailing or delivery dates of all data collection documents and the date of their return to the evaluator. Dates and method of receipt were placed on each individual return. Records include journals of follow-up phone calls and copies of fax or mail correspondence to test participants. These records will be retained until no longer needed to support this evaluation.

7 CONCLUSIONS AND RECOMMENDATIONS

Three general conclusions can be made from this evaluation that summarize the results of the operational test and provide significant executive, or policy making, insight into the potential of fully deployed electronic credential systems. These three general conclusions are summarized below.

7.1 AGENCY EXPECTATIONS

Although agencies expect few direct benefits from electronic credentialling as experienced in this test, they do strongly support the further development of such systems due primarily to the significant benefits and strong expectation in the motor carrier industry. State agencies do expect some direct benefits from the more legible and accurate applications they expect EOSS to provide. EDI is very attractive to state agencies, and they do expect significant direct benefits to accrue from electronic credential systems with this capability.

7.2 EOSS TECHNICAL CAPABILITY

Existing computer and communications technology is not only capable of providing and supporting a fully-deployed electronic credentialling system, but is already in place in a significant number of both carrier offices and state agencies for credentials used in this test. All test participants owned personal computers that were both adequate and available for use in this test. This test did include agencies in both large urban and rural states with significantly different organizational patterns among the agencies responsible for issuing credentials. All participants found this system easy to learn and use, very inexpensive to accommodate, and easy to incorporate in their overall activities. There are practically no technical barriers to EOSS deployment.

7.3 STATE REVENUE/FEE PAYMENT ISSUES

The greatest single barrier to a fully deployed electronic credential system is likely to be its impact on current credential payment methods. Credentials are required of carriers for numerous reasons such as insuring and protecting the safety of the traveling public, or protecting the environment. But the vast majority of credentialling activity involves collecting funds from highway users that support in some way highway construction and maintenance, typically the second largest expenditure item for state governments. The amounts of these funds and the efforts expended to collect them are significant.

Methods to collect these funds and strictly insure that all highway users do pay and are in compliance with state laws were developed long before today's electronic computer and communications technology was ever envisioned. And these systems were developed by the various states with little interest in nationwide uniformity. Many of these controls are inflexible or difficult to change and mandated by state statutes or

constitutions. These regulations exist primarily to guarantee that motor carriers pay all fees owed in a timely manner.

Unfortunately, most of the methods (such as obtaining or receiving original documents, receiving original signature, or, especially, receiving guaranteed, or certified, payment) used to insure these obligations or payments are time consuming, complex, and inconsistent with electronic communications. The length of time required of carriers to comply with these requirements greatly exceeds EOSS potential to receive, process, and issue electronic credentials. For EOSS to achieve its optimum potential, fee payment methods must conform to the more instantaneous cycle times possible with EOSS.

Participating carriers and agencies are aware of these conflicts and the complex issues involved in resolving them. A significant number of both carrier and state agency representatives suggested that the Federal Highway Administration should take the lead in resolving these issues and promoting the development of an electronic method of both obtaining and paying for commercial vehicle credentials.

7.4 RECOMMENDATIONS

The development of electronic credentialling is not a matter of if, but when and by whom. The primary objective of vehicle registration and credentialling - the collection of fees and various taxes - that support these activities are, and will continue to be, a significant matter of important public policy at both state and federal levels. Therefore, state and federal agencies are, and will continue to be, actively involved in determining equitable and efficient methods to register and license vehicles.

The findings of this evaluation strongly support the recommendation that the Federal Highway Administration, in conjunction with state agencies, continue to support and promote the development of electronic credential systems. This support should take into consideration:

- The public sector role in determining policy and setting guidelines and standards for full deployed electronic credential systems.
- The private sector role in the technological design, development and continuing administration of electronic credential systems that are consistent with public policy.
- Long term effect on the motor carrier industry, taking into consideration the industry benefits and its obligations to pay fair value for them.

8 LESSONS LEARNED

The most significant lesson learned from this evaluation involves the insight gained regarding the complexity of operational tests requiring the long term and very active participation of motor carrier industry and state agency representatives. The issues and problems associated with active participation are dramatically different than studies involving the passive observation of individual behavior where individuals are essentially unaware of their role and involvement in the data collection process.

The issues of active participant involvement extend far beyond the biases introduced by the non-random nature of selective carrier participation. Future operational tests requiring the active and complex participation must take in thoughtful consideration the nature of the industry and the normal behavior typical of individual carriers. These considerations should include, for example:

- The volatile nature of the industry. Large numbers of carriers enter the industry, and exit it, every day. In addition, carriers are very mobile and change locations – city and/or state – very easily and often. These characteristics did have an adverse impact on this test. Several participating carriers did cease to exist or change locations.

- State agencies are subject to changes in political offices, especially gubernatorial ones. Many state agency officials are politically appointed by governors and projects extending beyond one election period are at risk from dramatic state policy shifts. The experience with New Mexico first agreeing to participate in this project and then being forced to withdraw is a case in point.

- Carrier ownership and management patterns. Many carriers are family-owned, first generation small businesses with very capable, but unstructured; management styles. Organizational structure is often informal, at best. Duties and responsibilities are informally shared among management members and owners. Ownership changes are common. Management and ownership changes did impact this test and evaluation.

- Volunteers for this test tended to underestimate the effort required to support the evaluation or assign it any priority. These carriers were expected to significantly modify their behavior and routines in order to support the evaluation. They were asked, and expected to make, a considerable effort with logs, surveys, and interviews. Future tests may wish to consider a possible contractual arrangement between the project managers and participants. This arrangement would define the roles and activities expected of participants. As with any contractual arrangement, some method of compensation for carriers' time and effort should be considered.

APPENDIX A

Project Partners

Colorado Department of Transportation
1325 S. Colorado Blvd.
Denver, Colorado 80222
Contact: Richard Mango

In-Motion, Inc.
1444 Wazee Street, Ste. 350
Denver, Colorado 80202
Contact: George Hovey

Ark. Highway & Transportation Dept.
P.O. Box 2261
Little Rock, AR 72203
Contact: Alan Meadors

Texas Department of Transportation
125 E. 11th Street
Austin, Texas 78701
Contact: Monte Chamberlain

Western Highway Institute/American
Trucking Associations Foundation
4060 Elati Street
Denver, Colorado 802 16
Contact: Deborah Johnson

Texas Motor Transportation Association
700 E. 11th Street
Austin, Texas 78701
Contact: Bill Webb

Colorado Motor Carrier Association
4060 Elati St.
Denver, Colorado 802 16
Contact: Greg Fulton

Arkansas Motor Carriers Association
P.O. Box 2798
Little Rock, Arkansas 72203-2798
Contact: Lane Kidd

Intelligent Decision Technologies, Ltd.
3308 Fourth Street
Boulder, Colorado 80304
Contact: Henry R. Horsey

Arkansas Office of Motor Vehicles
P.O. Box 1272
Little Rock, AR 72203
Contact: Fred Porter

Federal Highway Administration
Office of Motor Carriers
400 7th Street SW
Washington, D.C. 20590
Contact: Jeff Loftus

Federal Highway Administration Region 8
555 Zang Street Suite 400
Lakewood, CO 80228
Contact: Lloyd Rue

Arkansas State University
P.O. Box 59
State University, AR 72467
Contact: Dr. Joe Horsley

WHM Transportation Engineering
Consultants, Inc.
and
Booz-Allen & Hamilton, **Inc.**
8201 Greensboro Drive, Suite 609
McLean, VA 22102-3812
Contact: Mr. David Millar

APPENDIX B

Participating Carriers

Arkansas

Silica Transports, Inc.
232 West Market Street
Guion, AR 72540
Contact: Joe Knight

Arkansas Best Corporation
P.O. Box 10048
Fort Smith, AR 72917
Contact: Don Christian

Hicks Trucking
P.O. Box 1316
Harrison, AR 72602
Contact: Kristen Eaton

Trux, Inc.
3223 East Broadway
North Little Rock, AR 72 114
Contact: Leon Prickett

Rollins Leasing Corp.
P.O. Box 1791
Wilmington, DE 19899
Contact: Tom George

Colorado

Empire Distribution and Warehouse
3901 Weld County Road 18
Erie, CO 805 16
Contact: Tom Walker

Rollins Truck Leasing
P.O. Box 110489
Aurora, CO 805 16
Contact: Judy Stoffel

JC Trucking, Inc.
5085 **Harlan**
Denver, CO 802 12
Contact: Rosie Scanlon

Texas

Bilbo Transports, Inc.
2722 Singleton Blvd.
Dallas, TX 752 12
Contact: Sue Kammeyer

Five Star Transportation, Inc.
P.O. Box 9670
Houston, TX 77213
Contact: Chuck W. Huckabee

Galaxy Trucking Co.
10422 Vrana Road
P.O. Box 9632
Houston, TX 772 13-6302
Contact: Elouise Randall

HATS, Inc.
10000 Northwest Freeway, Ste. 101
Houston, TX 77092
Contact: Brenda Brown

Ramrod Trucking, Inc.
3009 Hohl Street
Houston, TX 77093
Contact: Neely Kimbrill

Trinity Industries
1358 Motor Street
Dallas, TX 75207
Contact: Chris Sepe

AMSCO Transportation, **Inc.**
6 100 Alameda-Genoa Road
Houston, TX 77048
Contact: Mack Smith

APPENDIX C

Participating Agencies

Arkansas

Department of Finance and Administration
Office of Motor Vehicles/IRP Unit
P.O. Box 8091
Little Rock, AR 72203
Contact: Christy Eamhart

Department of Finance and Administration
Motor Fuel Tax Section
P.O. Box 1752
Little Rock, AR 72203
Contact: Donnie Roberson

Arkansas Highway & Transportation Department
Single State Registration
P.O. Box 2261
Little Rock, AR 72203-226 1
Contact: Hardin Steele

Colorado

Internal Registration Program
Colorado Department of Revenue
188 1 Pierce Street
Lakewood, CO 80214
Contact: Jaki D. Berry, Manager

International Fuel Tax Agreement
Colorado Department of Revenue
188 1 Pierce Street
Lakewood, CO 80214
Contact: Janet Swaney

Single State Registration System
Colorado Department of Regulatory Services
15 80 Logan Street, Office Level 1
Denver, CO 80203
Contact: Ronald Jack

Texas

Texas Department of Transportation – Motor Carrier Division
125 E. 1 1th Street
Austin, TX 78701
Contact: Monte Chamberlain

APPENDIX D

Measures Data Summaries

APPENDIX E

Data Collection Documents

State Agency Activity Log
EOSS State Agency Baseline Questionnaire
EOSS State Agency Post Test Questionnaire
State Agency Post Test Interview Questions

EOSS Agency Baseline Questionnaire

Office (Agency/Section/Division) _____ **Preparer**_____ **Date**_____

Please complete this questionnaire with your best available information. Promptly return the completed questionnaire in the envelope provided. If you have any questions about this questionnaire, please contact Joe Horsley at (501) 972-2097.

I In the table below provide the average number of renewal, initial, and supplemental credential applications your office receives annually. Indicate how many applications were processed without requiring additional action from carriers, how many were rejected or returned to the carrier, and how many required further motor carrier follow-up actions before issuance.

Credential Type Circle One IRP IFTA SSRS	Average Number of Applications Received Annually			
	Renewal	Initial	Supplemental	Total
1. Total applications received				
2. Processed without further motor carrier follow-up				
3. Processed, but required follow-up with motor carrier				
4. Rejected or returned to carrier				

II Indicate the percentage of the total applications indicated above that were processed without any data entry errors made by your staff. _____%

III List all other types and average number of motor carrier credential or permit applications your office processes annually.

Credential/Permit	Number	Credential/Permit	Number
1. _____	_____	3. _____	_____
2. _____	_____	4. _____	_____

IV Indicate the hours when your office is open to offer assistance to motor carriers.

	Hours of Operation				
	Weekdays	Saturday	Sunday	Annual # of Holidays	Notes
Main Office					
Branch Office(s)					
Phone (if different from office hours)					

"800" Help lines or other assistance (explain)_____					

V Indicate the average daily person-hours your office spends responding to carriers' requests for credential information. _____

VI For each of the following opinion statements, circle an "X" which most appropriately indicates your opinion about that statement. "Processing applications" is used in these statements to include receiving and processing IRP, IFTA, or SSRS applications and issuing credentials.

Current Credential Application and Issuance Process Opinion Survey

Opinion Statements	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
1. Our current procedures for processing applications are convenient.	X	X	X	X	X
2. The time between when we receive applications and when we issue credentials is excessive.	X	X	X	X	X
3. Our current procedures for processing applications are easy to use.	X	X	X	X	X
4. Our application processing duties are not disruptive to our other credential related activities (e.g., quarterly reports).	X	X	X	X	X
5. Our office spends a great amount of time responding to carriers' requests for information.	X	X	X	X	X
6. Our current procedures for processing applications are easy to learn.	X	X	X	X	X
7. Our office's overall credential duties are not disruptive to our agency's other activities (e.g., income tax, safety).	X	X	X	X	X
8. Our current procedures allows applications to be processed efficiently.	X	X	X	X	X
9. Our current procedures for processing applications need to be changed.	X	X	X	X	X
10. The percent of applications requiring follow-up actions/ corrections is excessive.	X	X	X	X	X
11. The accuracy of our application processing is satisfactory.	X	X	X	X	X
12. The variations in fee calculations for identical applications are a problem with our current process.	X	X	X	X	X
13. The data entry errors our personnel make when processing applications is excessive.	X	X	X	X	X
14. Our credentialling activities are highly automated.	X	X	X	X	X
15. Our office would be supportive of adopting new computer and electronic technology.	X	X	X	X	X

16.	With greater application processing automation, our office's costs (equipment, labor, overhead, etc.) could be significantly reduced.	X	X	X	X	X
17.	With greater application processing automation, our office's staff would have significantly more time available for other work.	X	X	X	X	X
18.	Our current procedures for processing applications are satisfactory.	X	X	X	X	X

VII Please explain how your opinions expressed about the statements in Item # VI above may be influenced by seasonal variations in credential activities.

VIII Please explain how your opinions expressed about the statements in Item # VI above might differ among initial, renewal, and supplemental credential types.

IX Please list the three things you like most about the current credentialling processes.

X Please list the three things you dislike most about the current credentialling processes.

XI Provide additional comments below. Indicate if your comments are in response to a particular question. Use the back of this page if necessary.

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE! Please return it in the envelope provided.

EOSS State Agency Post Test Questionnaire

Office (Agency/Section/Division) _____ **Preparer**_____ **Date**_____

Please complete this questionnaire based on your participation in the Electronic One-Stop Shopping System (EOSS) project. Promptly return the completed questionnaire in the envelope provided. If you have any questions about this questionnaire, please contact Joe Horsley at (501) 972-2097, or fax (501) 972-3678.

I Indicate how much training you received from In Motion, Inc. on the installation and use of EOSS. _____ Hours

II Indicate how many credential applications you received through the EOSS system. _____

III List capital costs spent for equipment hardware and software that were required for participation in the EOSS operational test. If those costs are only partially attributable to the use of EOSS, assign a percent of the cost to EOSS (e.g., A new modem costing $150 was required, but only 10% of the use of the modem is for EOSS).

Item _____ $ _____ %_____

Item _____ $ _____ %_____

Item _____ $ _____ %_____

IV List direct operating costs spent for equipment hardware and software that were used for participation in the EOSS operational test. If those costs are only partially attributable to the use of EOSS, assign a percent of the cost to EOSS (e.g., A computer maintenance contract cost $500 but only 2% of the computer use is for EOSS).

Item _____ $ _____ %_____

Item _____ $ _____ %_____

Item _____ $ _____ %_____

V For each of the following opinion statements, circle an "X" which most appropriately indicates your opinion about that statement. "Processing applications" is used in these statements to include receiving and processing IRP, IFTA, or SSRS applications and issuing credentials. Note that "EDI" refers to Electronic Data Interchange.

EOSS Credential Application and Issuance Process Opinion Survey

Opinion Statements	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
1. The EOSS procedure for processing applications is convenient.	X	X	X	X	X
2. EOSS procedures for processing applications are more convenient than current methods.	X	X	X	X	X
3. When using EOSS, the time between when we receive applications and when we issue credentials is excessive.	X	X	X	X	X
4. EOSS reduces the time between when we receive applications and when we issue credentials.	X	X	X	X	X
5. EOSS procedures for processing applications are easy to use.	X	X	X	X	X
6. EOSS procedures for processing applications are easier to use than current methods.	X	X	X	X	X

	Opinion Statements	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
7.	EOSS application processing duties are not disruptive to our regular credential processing activities.	X	X	X	X	X
8.	EOSS application processing duties are not disruptive to our other credential related activities (e.g., quarterly reports).	X	X	X	X	X
9.	EOSS application processing duties are less disruptive to our other credential related activities (e.g., quarterly reports) than current methods.	X	X	X	X	X
10.	Our office spends a great amount of time responding to carriers' requests for information about EOSS.	X	X	X	X	X
11.	EOSS reduces the amount of time our office spends responding to carriers' requests for information.	X	X	X	X	X
12.	EOSS procedures for processing applications are easy to learn.	X	X	X	X	X
13.	EOSS procedures for processing applications are easier to learn than current methods.	X	X	X	X	X
14.	Our office's EOSS credential activities are not disruptive to our agency's other activities (e.g., income tax, safety).	X	X	X	X	X
15.	Our office's EOSS credential activities are less disruptive to our agency's other activities (e.g., income tax, safety) than current methods.	X	X	X	X	X
16.	EOSS enhances our performance of other administrative functions.	X	X	X	X	X
17.	EOSS procedures allow applications to be processed efficiently.	X	X	X	X	X
18.	EOSS procedures allow more efficient processing of applications than current methods.	X	X	X	X	X
19.	EOSS procedures for processing applications need to be changed.	X	X	X	X	X
20.	Our office prefers to use EOSS procedures for processing applications.	X	X	X	X	X
21.	The percent of EOSS applications requiring follow-up actions/ corrections is excessive.	X	X	X	X	X
22.	EOSS reduces the percent of applications requiring follow-up actions/ corrections.	X	X	X	X	X
23.	The accuracy of EOSS application processing is satisfactory.	X	X	X	X	X
24.	EOSS improves the accuracy of application processing.	X	X	X	X	X
25.	The accuracy of EOSS with EDI application processing is satisfactory.	X	X	X	X	X

Opinion Statements	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
26. The EDI portion of EOSS improves the accuracy of application processing.	X	X	X	X	X
27. EOSS consistently calculates correct fees.	X	X	X	X	X
28. EOSS eliminates the variations in fee calculations for identical applications.	X	X	X	X	X
29. The data entry errors our personnel make when processing EOSS generated applications is excessive.	X	X	X	X	X
30. EOSS reduces the data entry errors our personnel make when processing applications.	X	X	X	X	X
31. The data entry errors our personnel make when processing EOSS with EDI generated applications is excessive.	X	X	X	X	X
32. The EDI portion of EOSS reduces the data entry errors our personnel make when processing applications.	X	X	X	X	X
33. EOSS is easy to use.	X	X	X	X	X
34. EOSS on-screen instructions are easy to understand and follow.	X	X	X	X	X
35. EOSS screen formats are clear and concise.	X	X	X	X	X
36. Learning how to use EOSS is easy.	X	X	X	X	X
37. It is easy to enter data into EOSS.	X	X	X	X	X
38. It is easy to retrieve data from EOSS.	X	X	X	X	X
39. Downloading applications is easy using EOSS.	X	X	X	X	X
40. Our office would be strongly supportive of adopting EOSS.	X	X	X	X	X
41. Our office would prefer to use EOSS.	X	X	X	X	X
42. I prefer to use EOSS for future credential processing activities.	X	X	X	X	X
43. I prefer motor carriers use EOSS to apply for credentials.	X	X	X	X	X
44. With EOSS, our office's costs (equipment, labor, overhead, etc.) could be significantly reduced.	X	X	X	X	X

Opinion Statements	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
45. With EOSS, our office's staff would have significantly more time available for other work.	X	X	X	X	X
46. Because of the EDI portion of EOSS, our office's staff would have significantly more time available for other work.	X	X	X	X	X
47. EOSS procedures for processing applications are satisfactory.	X	X	X	X	X
48. EOSS procedures for processing applications are better than current methods.	X	X	X	X	X
49. Not having to generate temporary credentials is a significant benefit of EOSS for our office	X	X	X	X	X
50. EOSS reduces the urgency to process applications immediately	X	X	X	X	X
51. EOSS reduces the time needed to process a credential	X	X	X	X	X

VI Please explain how your opinions expressed in Item # V above (opinion survey) might differ if a significant percent of credential applications were submitted through EOSS. _____

_____

_____

_____

VII In order to significantly benefit your agency, what minimal percentage of credential applications you receive should be submitted through EOSS.

_____

VIII Please list the three things you like most about the EOSS credentialling processes.

_____

_____

_____

_____ X

_____

IX Please list the three things you dislike most about the EOSS credentialling processes.

_____

_____

_____

Please list the three greatest advantages to EOSS.

XI Please list the three greatest disadvantages of EOSS.

XII What problems did you encounter due to your participation in this project?

XIII Provide additional comments below. Indicate if your comments are in response to a particular question.

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE1 Please return it in the envelope provided or fax to Joe Horsley at (501) 972-3678.

State Agency Interview Questions

Agency _____ Interviewee _____ Date _____

BACKGROUND

1. Are you the best person to interview about your agency's participation in the EOSS project?
2. Do you think you understand the system well enough to be comfortable with this interview?
3. Are you basing your answers solely on your own experience with EOSS or are you projecting expectations based on your general knowledge of electronic capabilities?
4. How many applications did you receive and process and how many hours did it require?
5. Estimate total training testing and usage time.
6. How "computer literate" do you feel you are?
7. Did your agency have the EDI component of EOSS?

EVALUATION

1. Will EOSS improve your credential related administrative processes? (fee variations, accuracy)
2. Will EOSS improve your application processing productivity (follow-ups, reapplications reductions)?
3. Will EOSS reduce your manpower requirements?
4. Will EOSS improve your office's other administrative activities?
5. Did you find EOSS easy to use?
6. Do you prefer EOSS to the current system?
7. What are EOSS benefits for you?
8. Is EOSS compatible with your other activities?
9. Why would you either continue to use or stop using EOSS?
10. Was EOSS more or less convenient for you to use?
11. Was the hardware provided to you satisfactory?
12. How would you accommodate EOSS if this hardware were removed?
13. Was the training you received adequate? (what would be required for deployment)
14. Would you like to see EOSS fully operational?
15. What institutional/non-technical issues arose during this test?
16. Discuss credential administrative processes improvements specifically related to EDI, if any. (Accuracy, manpower)
17. Discuss impacts on other administrative functions due to EDI?
18. What did you like least about EOSS?
19. What are EOSS's greatest advantages?
20. What are EOSS's greatest disadvantages?
21. Comments?