Southwest Electronic One-Stop Shopping (EOSS)

Field Operational Test

Final Evaluation Report

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Introduction

The Southwest Electronic One-Stop Shopping System (EOSS) Operational Test was selected for funding by the Federal Highway Administration (FHWA) in 1994. Though it was selected as one of the field operational tests (FOTs) directed by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, it was actually submitted to FHWA several years earlier as an unsolicited proposal offered by representatives from the Colorado Department of Transportation (CDOT).

The basic concept was to provide motor carriers and state agencies with an alternative to the paper-based credentialing processes. Using a personal computer (PC) based software application, it was anticipated that efficiencies could be gained that would significantly improve the speed with which these credentials could be obtained.

Once the proposal was accepted and funded, CDOT managers moved to identify and involve key state agencies and motor carriers to form a partnership to develop and implement the EOSS concept. The project partners consisted of:

- Colorado DOT
- In-Motion, Inc
- Arkansas Highway & Transportation Department
- Texas Department of Transportation (TxDOT)
- Western Highway Institute / American Trucking Associations Foundation (WHI / ATAF)
- Texas Motor Transportation Association (TMTA)
- Colorado Motor Carrier Association (CMCA)
- Arkansas Motor Carriers Association (AMCA)
- Intelligent Decision Technologies, Inc. (IDT)
- Arkansas Office of Motor Vehicles
- Federal Highway Administration
- Arkansas State University

In-Motion managed the project, and IDT was tasked with the design of the EOSS system. Arkansas State University was contracted to evaluate the EOSS system. Booz, Allen & Hamilton was asked by FHWA to supplement and manage the evaluation, in part because of the limited funding available for evaluation.

The careful selection of project team partners and evaluators served the project well. The diverse ideas and years of different types of commercial vehicle operations (CVO) experience helped to create a user-driven system that

remained true to the original vision for EOSS. The technical concept initially conceived changed very little during the development of the operational test—an indication that the initial concept was well developed and consistent with the perceived needs of the project partners. As a result, motor carrier and state agency personnel that participated in the FOT reacted positively to the final product.

While the technical feasibility of, and to a lesser degree, the benefits to be gained from EOSS were successfully demonstrated, several issues arose during the course of the project that represent challenges should such a system be fully deployed. Motor carrier participants expressed concerns regarding the collection of proprietary information, and the use of electronic funds transfer (EFT) for the payment of fees. Other issues were precipitated by statutory requirements that presently can only be satisfied through the submittal and retention of paper-based documentation. However, none of these issues is considered an insurmountable barrier.

Perhaps one of the most challenging issues encountered was sustaining the carriers' interest throughout the duration of the test. Each carrier volunteered their time to participate. Due to system development delays, the overall project schedule extended longer than anticipated. As a result, some carriers discontinued their involvement and additional carriers had to be recruited to complete the test.

Two individual test reports were developed and distributed by the evaluator. These reports, titled "Southwest Electronic One-Stop Shopping: Motor Carrier Test Report," and " Southwest Electronic One-Stop Shopping: State Agency Test Report," were completed and released in December 1997. As discussed in each of these reports, and in the subsequent sections of this evaluation report, the EOSS operational test offered stakeholders within the CVO community an opportunity to both experience and influence a part of the future of commercial vehicle operations. The result was an effective, practical demonstration that yielded several lessons learned about the application of technology to CVO administrative processes. By implementing a functional electronic one-stop shopping system, through a collaborative effort between participating agencies and carriers, new opportunities for improvements in efficiency were explored, with some favorable outcomes, and the identification of priorities for future efforts.

The remaining sections of this report provide information about the system that was developed, the processes employed to evaluate it, and some of the more significant findings. Insights into its impacts, both measured and expected, and significant lessons learned, are also provided. The implications of

the evaluation findings are also offered, and are intended as a means to provoke thoughtful dialogue, and promote sound deployment planning.

This report is intended to provide a brief summary of the more substantive findings from the EOSS FOT evaluation. Readers interested in a more exhaustive compilation of evaluation results are encouraged to review the individual evaluation test reports cited above.

System Description

The EOSS system consisted of a personal computer-based software application that helped interstate carriers identify required commercial vehicle credentials, and provided for their electronic application and issuance. Carrier and state users could access and use the system from their own desk using a personal computer. To ensure ease of use, the system was designed on a windows platform in a way that users only had to enter data once. Further, the system only requested required data from the user and allowed users to enter and save incomplete information.

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 certain IRP, IFTA, or SSRS credentials for participating states.

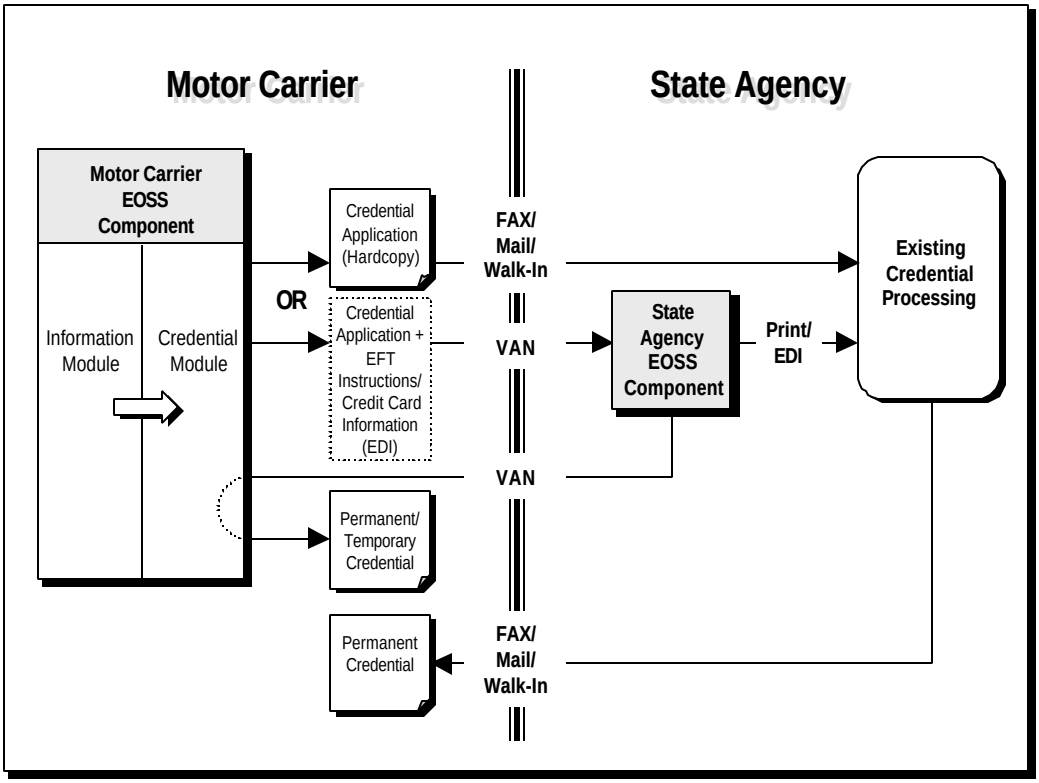
Exhibit 1 contains a flow chart illustration of the EOSS conceptual process.

The Information Module was designed for users who were unfamiliar with credential requirements in all or some of the states in which they travel. The system asked the user a series of questions regarding the states traveled, the commodities hauled, the vehicles used, and the 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 could then directly enter the Credential Module and apply for the credentials that were 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 application for certain types of IFTA, IRP, and SSRS credentials. Upon indicating the desired credential type, the user was led through a series of screens which requested 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 ad SSRS credentials.

EXHIBIT 1 – EOSS Conceptual Credentialing 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, an application could be saved by the user, or submitted to the state computer, using EDI via a modem-to-modem dial-up connection across 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 instantaneously. The credential could then be printed at the carrier's printer or faxed to any fax number specified by the applicant.

The credential review and approval process actually consisted of two stages. Upon receipt of an electronic application, the state system compared the applicant identification information to a list of pre-approved carriers. Provided the carrier's name was present on the list, which was limited to carriers to whom the state was comfortable issuing credentials without a full review of applications, the application was approved. Understandably, only certain carriers were permitted to participate. The second stage consisted of a traditional manual review of applications, and issuance of permanent

credentials. Dual credential processing was essential to the completion of the test in order to comply with statutory requirements.

All applications submitted through the EOSS system were essentially applications for permanent (annual) credentials. However, the EOSS system would only issue permanent SSRS credentials. The EOSS system issued temporary credentials for IRP and IFTA. This included IFTA in Colorado and Texas, and IRP in all three states. Permanent IRP and IFTA credentials were processed and delivered through existing processes.

The state agencies responsible for issuing permanent credentials down loaded the applications, printed a copy, 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 EDI.

Evaluation Summary

Purpose

The purpose of the Electronic One-Stop system (EOSS) test was to evaluate a system created to automate portions of the current credentialing process. The system consisted of Windows-based EOSS software that allowed users to prepare, apply for, and obtain certain types of vehicle credentials widely used in interstate motor carrier operations. The test was seen as a means to help evaluate the potential for future national deployment motor carrier electronic credentialing.

The credentials made available for the users of EOSS included certain International Registration Plan (IRP), International Fuel Tax Agreement (IFTA), and the Single State Registration System (SSRS) credential types. Seven state agencies and 15 companies from Colorado, Arkansas and Texas participated in the test.

Approach

The basic evaluation concept was to gather feedback from users regarding their experiences with EOSS, as compared to their current processes and procedures. The evaluation was designed to focus primarily on the impacts the use of EOSS would have on the efficiency and ease with which credentials could be obtained. With this focus in mind, six evaluation goals were identified:

- To determine changes in productivity related to EOSS system
- To determine user impacts of EOSS system
- To assess the requirements and potential for EOSS deployment
- To document and assess the impacts and solutions of institutional issues
- To determine EOSS systems suitability
- To assess system component performance.

The evaluation team, which consisted of staff from the Transportation Management Program at Arkansas State University, and Booz·Allen & Hamilton, developed these six evaluation goals with input from the project's steering committee. Each goal was addressed through both state agency and motor carrier evaluation activities.

The primary data collection tools were surveys and interviews of system users. The participant surveys were used to document opinions about current credentialing methods, and the relative advantages or disadvantages of EOSS versus current systems. On site interviews were conducted with each

participating state agency and each carrier to document opinions about their experience with the project, and to supplement the data collected in the surveys.

The evaluation approach was designed according to the premise that carriers would make significant use of the system, which would allow for a statistically rigorous assessment of system performance and effectiveness. Unfortunately, the level of system use fell well short of that needed to perform such an assessment. Nonetheless, while sufficient quantitative data were not gathered, both the state agency and carrier participants provided valuable insights regarding system usefulness and value.

Evaluation Results

During the course of the operational test, much was learned about the effects of applying technology to automate commercial vehicle administrative processes in an operational environment. As alluded to earlier, detailed findings for each of the six goal areas defined during the evaluation can be found in each of the individual test reports. Some of the findings, however, stood out from the rest, and warrant addressing here. Specifically, these goals dealt with productivity impacts, user impacts, and institutional issues.

Productivity Impacts

The simple definition for productivity is the ratio of output to input. In other words, it is the quantification of the ability to accomplish required tasks efficiently and effectively. Given that the end result of the credentialing process—a specific credential—is a fixed outcome, productivity impacts can be characterized in terms of the amount of time and effort expended to complete the process.

Findings

Based on activities experienced during the operational test, state agency representatives from each of the states were in agreement that they did not expect any significant productivity improvements to result from the use of EOSS. They found that most applications errors would not be solved by use of the system, and only two agencies indicated that EDI might help. State agency users generally expected little, if any, productivity improvements to result from EOSS. Some of the more significant findings are highlighted here.

State agency representatives:

- did not expect any dramatic administrative processing gains in their activities as a direct result of EOSS.
- indicated in baseline surveys that their current process was accurate and fee variation was not a problem
- in four of the seven states indicated that printed applications are more desirable than electronic applications, and facilitate processing accuracy
- indicated that current processing methods were not disruptive to other duties, and that EOSS did little to improve other administrative functions
- indicated that they slightly disagreed that EOSS would reduce office costs and expected no significant gain in time available for other duties
- indicated that EOSS was easy to use but not necessarily easier to use than current methods.

In contrast to state agency responses, carrier users were quite positive regarding their experiences with the system. One of the more significant concerns many carriers have regarding credentialing is the amount of time it takes to receive credentials once an application has been submitted. For some credentials, delays in this cycle may well prevent them from putting a vehicle into service. In fact, half of the carrier users indicated that length cycle-times were their greatest dislike of the current systems.

Carrier representatives were impressed with their actual time savings, and expected to measure EOSS cycle times in minutes, when compared to the days or weeks experienced with current systems. Participants identified noticeable productivity improvements, resulting in several administrative and operational benefits, namely reduced application preparation time, fewer errors, better legibility, fewer follow-ups, and better equipment use.

Motor carrier representatives:

- indicated that the time currently required to complete and deliver applications is not excessive. However, the time state agencies take to return credentials is excessive.
- strongly indicated EOSS would substantially reduce all aspects of credential application-to-issuance cycle times, including reducing preparation time from hours to minutes
- at seven out of fifteen carriers indicated that accuracy was a significant benefit of EOSS.

Implications

State agency users did not expect any significant changes in productivity due to the implementation of EOSS, primarily because existing processing procedures did not change. Once an electronic application was received, it was processed like any other with the same administrative review and recording procedures. Therefore there was little potential for productivity benefits.

Under this deployment model, the greatest potential benefit to be gained among state agency operations is improved accuracy and legibility of printed applications. As long as agency staffs are required to manually review each credential application, and apply existing rules for approval or rejection, the potential for significant efficiency enhancements will remain limited.

Carrier users expect a system like EOSS to yield significant productivity improvements in all phases of the credentialing process. They encountered significant time savings using the system, as compared to current processes, and expect to consistently experience similar benefits. In fact, every participating

carrier representative perceived some potential net gain in productivity resulting from the use of EOSS.

The most tangible carrier benefits came in the form of reduced application-to-issuance cycle time and more accurate applications. Implicit in these improvements, however, is the potential for dramatic overall productivity benefits to be gained from improved equipment utilization. It is reasonable to conclude that, based on the results experienced during the FOT, a given carrier applying for temporary registration, for example, can expect to be able to place vehicles in service significantly more quickly with a system like EOSS.

These positive results are tempered by the fact that the operating concept employed for the automated review of applications and issuance of credentials was contingent upon a carrier's inclusion on a list of "pre-approved" applicants. Only carriers deemed acceptable by the participating agencies were allowed to participate in the test. Because it is likely that only a portion of the carrier population in any given state will enjoy such a status, it remains unclear that carriers without a favorable history will experience comparable benefits.

User Impacts

For this evaluation, user impacts were defined in two ways— the effects the system has on the users' ability to complete required duties, and the user friendliness of the system being implemented. Participants were asked their perceptions regarding these issues, and whether they preferred to use EOSS, or continue using existing processes and systems.

Findings

State agency participants agreed that EOSS was not disruptive to their duties, and was compatible with existing operations. However, there was no clear preference between EOSS or current procedures. Further, state users indicated that the greatest potential benefits from using EOSS will be realized by carriers. More specifically:

State agency representatives:

- were neutral in opinion statements about preferring EOSS and supporting adoption of EOSS
- slightly disagreed that their office would prefer EOSS although they generally found EOSS procedures satisfactory
- in five of the seven agencies cited that easier to read or more accurate applications are the most significant benefit to them.

Carrier users found that EOSS was very user-friendly and intuitively understandable. They strongly and consistently indicated that EOSS was very

easy to learn and use, and was preferable to current credentialing systems. They also found EOSS to be much more convenient.

Carrier users:

- fully expected to achieve time savings using a system like EOSS
- were confident that application accuracy would be improved
- considered the system easy to use
- felt use of the system would result in less paperwork
- rated the system's convenience favorably

Carrier users also indicated that EOSS was compatible with their existing operations, and was not disruptive to normal business activities.

Implications

For the most part, state agency participants did not expect the use of EOSS to result in any significant impact on their activities. In spite of a lack of perceived benefits for their operations, agency representatives were accepting of the EOSS concept, and supported its adoption because they were confident such a system would result in significant benefits to carriers. From their perspective, EOSS is effectively impact-neutral—while they expect few benefits directly related to EOSS implementation, neither do they expect any significant problems or disruptions in their activities should it be deployed.

The results clearly indicate that the participating carrier users experienced very little difficulty in accepting and using EOSS. It should be noted, however, that the carriers recruited to participate in the FOT were selected, at least in part, because they were comfortable with PC-based activity. Hence, the technical proficiency of the carrier personnel represented a friendly environment. Because the carrier population includes a large number of small carriers, many of which have limited knowledge of and access to PC-based operations, results can be expected to vary.

Institutional Issues

Institutional issues encompass all non-technical issues impacting upon or resulting from the implementation of a system or policy. In the case of the EOSS FOT, these issues typically took one of two forms—user concerns regarding system functions, and legal or statutory requirements that were inconsistent with the operations concept.

Findings

A number of institutional issues arose during both the design and test phases of the project. Many were relatively minor, and were quickly resolved with little or no impact on the completion of the test. There were, however, a

handful of more significant and challenging issues experienced, some of which were either left unresolved, or were addressed through temporary solutions. Five such issues are discussed here.

Guaranteed Fee Payment. As discussed earlier, electronic payment, usually referred to as electronic funds transfer (EFT), was necessary to fulfill the performance requirements identified for the test concept. However, the state agencies could not fully accommodate electronic payments. In one instance, the state's constitution prohibited the receipt of electronic payment because it was considered to be a form of credit. To resolve this issue, separate debit accounts were established for participating carriers, and electronic payments were drawn from these pre-existing cash accounts as required.

Supporting Documentation. Current statutory requirements dictate that carriers must, at the time of application, file supporting documentation. This documentation typically includes such items as vehicle titles, and proof of payment of Heavy Vehicle Use Taxes (HVUT). Rather than delay the issuance of credentials until such documentation was received, the state agency participants authorized the immediate issuance of credentials, under the stipulation that actual permanent credentials would not be provided to the carrier applicant until the supporting documentation was received at the issuing agency.

Original Signatures. Some credential applications require that an original signature of an officer of the applicant carrier must be provided on the application. This issue was addressed by assigning each applicant an electronic personal identification number (PIN) that served and was temporarily accepted as an original signature.

Fee Calculations. Prior to receiving credentials, carriers must remit the appropriate registration fees to the state agencies responsible for issuing them. For most credentials, these fees are typically relatively simple to calculate and assess. Fees for IRP credentials, however, are more complex and change more often than those for other credentials. Because EOSS was not capable of accommodating these fee calculation requirements, the system was limited to issuing only temporary IRP credentials.

Audit Capabilities. Registration documents, and the supporting documentation filed to support their issuance, are considered legal documents. However, the legal status of electronic records, and their printed reproductions, remains unclear.

Implications

From a carrier perspective, very few institutional issues exist. Most of the issues raised during the FOT dealt with state requirements. Those few carriers with some concerns about company policy and procedures did, however, mention payment concerns. For example, some smaller companies are distrustful of EFT. Their concerns, well founded or not, involve both the reliability and confidentiality of transactions. Large carriers with five-figure credential fees are more likely to have sophisticated internal review and approval procedures to verify payments involving large amounts of money.

In addition, the accuracy of instantaneous credential billing and payment concerns some carriers. There is some concern about liability or penalties for errors discovered some time after the initial application. The confidentiality of electronic files and their relative ease of reproduction and sharing with other agencies is also a concern to carriers.

Practically all of state agency institutional issues resulted from current state laws or agency administrative procedures, ranging from individual identity assurances to methods for verification and payment of fees. These issues revolved around regulatory requirements beyond the control of individual carriers.

The institutional issues surrounding guaranteed feed payments were the most profound. Some of the larger carriers indicated they had internal accounting policies involving funds control management that restricted access to certain electronic financial records within their office. In an effort to accommodate each state's fee payment requirement, for this test, participating carriers in Colorado and Arkansas signed temporary filing agreements that contractually guaranteed payment during the test. Because Texas state law prohibits extending any form of credit to any taxpayer, carriers based there either set up bank debit accounts or used guaranteed Visa or Master Charge accounts issued by one cooperating bank in Texas.

The temporary filing agreements in Colorado and Arkansas proved to be restrictive and selective, excluding smaller, less financially secure carriers. Carriers in Texas were dissatisfied with losing control of funds and interest earning on debit accounts. Additionally, large carriers using approved bank cards had to make multiple applications due to a $10,000 per transaction limit placed on these cards.

These issues represent the most significant institutional barrier to full deployment of a system like EOSS. While there are a number of electronic means of transferring funds, state agencies and carriers exploring the

possibilities of EOSS will have to evaluate each to determine how each will best serve the state agencies' and carrier's financial needs.

Since credentials are legal and accountable documents that are often subject to fee collection or tax laws, and access to electronic files was perceived to be more difficult to control, most states will have to amend regulations or statutes to accommodate an electronic credentialing environment. This applies to issues regarding supporting documentation, original signatures, and audit capabilities.

No obvious solution to these concerns was evident, other than the continuing inevitable and evolutionary process that is moving all business activity toward greater use of electronic communications techniques, and their more general acceptance within the legal community.

Lessons Learned

A number of significant lessons were drawn from the experiences of the participants in the EOSS FOT. Foremost among these lessons was that the electronic application for and issuance of commercial vehicle credentials have the potential to significantly impact the processes associated with commercial vehicle administration. The EOSS system demonstrated that the electronic one-stop shopping concept is both technically feasible, and operationally practical.

The results of the test also demonstrated that institutional issues continue to present the most formidable challenge to the full implementation of such systems. None of these issues, however, appear insurmountable. While some statutory restrictions and requirements must be modified or eliminated to facilitate full use of such a system, the increasing acceptance and sophistication of electronic commerce should serve to counter reservations regarding the replacement of traditional processes.

These issues serve to illuminate the underlying necessity for agencies responsible for credential administration to review and reengineer their business processes. Doing so will result in processes that are better suited for automation, further leveraging automation investments, and consequently multiplying positive effects.

With regard to the conduct of operational tests, the most significant lesson learned from this effort was the fact that operational tests requiring active, long term participation of motor carrier industry and state agency representatives pose significant logistical and institutional challenges. Some of the more notable lessons that emerged during the test were:

The Transient Nature of the Motor Carrier Industry. Carriers enter and exit the industry each day. Further, it is common for a portion of the carrier population to relocate to other base states. As a result, carriers that started out participating in the operational test either went out of business, changed ownership, or changed locations before the test was complete.

The Political Restraints of State Agencies. Politically appointed state officials are subject to change with each state election. Likewise, political agendas and related programs often change or are terminated. New Mexico began as an EOSS participant but withdrew when its newly elected administration determined that further participation was no longer desired.

Carrier Ownership and Management Patterns. Several of the participating carriers were family-owned, first generation, small businesses with capable but

unstructured management styles. Typically, responsibilities were informally shared among management members and owners, and relatively little priority was placed on active participation in the FOT.

Underestimated Volunteer Contribution Requirements. Participating carriers were expected to significantly modify their behavior and routines in order to support the evaluation. They were expected to make a considerable effort to complete logs, surveys, and interviews. The magnitude of the carriers' uncompensated contributions was not clearly communicated to the carriers, resulting in less than optimum returns from evaluation data collection efforts.

Underestimated Evaluation Resource Requirements. The planning, execution and reporting duties associated with evaluating the EOSS operational test were grossly underestimated and under-funded. The original evaluation budget was $50,000, which was later augmented with additional funds, and management and technical support from the Booz·Allen & Hamilton operational test evaluation oversight team, under contract to FHWA.

Conclusions

When the concept of electronic one-stop shopping was conceived, it held significant promise for dramatically streamlining the processes by which commercial vehicle credentials were applied for and obtained. With the completion of the Southwest Electronic One-Stop Operational Test, much of the technical groundwork for the implementation of such systems has now been laid.

The system deployed during the FOT successfully demonstrated the feasibility of the concept, and offered motor carriers and state agencies the opportunity to both explore its potential, and influence the eventual deployment of such systems. User response to the system was quite positive, particularly that offered by motor carrier representatives, who expressed enthusiasm regarding the benefits they expect to accrue from the use of such a system. State agency representatives, while less convinced of its value to their operations, nonetheless support its eventual deployment, based primarily on the benefits it offers the carrier industry.

A number of issues remain in need of significant attention and effort before the deployment of such systems can become a reality. Foremost among them is the need for an increase in the acceptance of electronic information as a suitable substitute for traditional paper documentation. While there are certainly statutory complexities that will significantly influence the form any resolution will take, none of the issues identified represent insurmountable obstacles to the deployment and use of systems like EOSS.

Key to the successful implementation of such systems is the recognition that, as with any information technology, the end product is merely another tool organizations can use to enhance their overall operations. However, based on the outcome of this, and other similar efforts nationwide, carriers and state agencies alike can look forward to having a very valuable, and effective tool at their disposal.