



STATE OF NORTH CAROLINA

INFORMATION SYSTEMS AUDIT

OF

**DEPARTMENT OF TRANSPORTATION
DIVISION OF MOTOR VEHICLES**

SEPTEMBER 2002

**OFFICE OF THE STATE AUDITOR
RALPH CAMPBELL, JR.
STATE AUDITOR**

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State Auditor

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AUDITOR'S TRANSMITTAL

The Honorable Michael F. Easley, Governor
Members of the North Carolina General Assembly
Board of Trustees, Department of Transportation
Mr. Lyndo Tippet, Secretary of Transportation

Ladies and Gentlemen:

We have completed our information systems (IS) audit at The Department of Transportation, Division of Motor Vehicles. The audit was conducted in accordance with *Government Auditing Standards* and *Information Systems Audit Standards*.

The primary objective of this audit was to evaluate controls for the State Titling and Registration System (STARS), the State Automated Drivers License System (SADLS), and the International Registration Plan (IRP) applications. We also followed up on prior DOT information systems access controls audits. The scope of our audit included a review of application controls for the three applications and a determination what corrective actions have been taken to resolve the prior access controls audit findings. Application controls for the application systems include data completeness, data accuracy, table maintenance, user access, processing, and data backup and recovery. The purpose of application controls is to ensure that as data passes through the application, it is complete, accurate, timely and protected from unauthorized access.

This report contains an executive summary that highlights the areas where the Department of Transportation has performed satisfactorily relevant to our audit scope and where improvements should be made.

We wish to express our appreciation to the staff at the Department of Transportation for the courtesy, cooperation, and assistance provided to us during this audit.

North Carolina General Statutes require the State Auditor to make audit reports available to the public. Copies of audit reports issued by the Office of the State Auditor may be obtained through one of the options listed in the back of this report.

Respectfully submitted,

A handwritten signature in cursive script that reads 'Ralph Campbell, Jr.'.

Ralph Campbell, Jr.
State Auditor

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EXECUTIVE SUMMARY

We conducted an information system (IS) audit at the Department of Transportation (DOT), Division of Motor Vehicles (DMV) from January 10, 2002 through May 15, 2002. The primary objective of this audit was to evaluate controls for the State Titling and Registration System (STARS), the International Registration Plan (IRP), and the State Automated Drivers License System (SADLS) applications. We also followed up on prior DOT information systems access controls audits to determine what corrective actions have been taken to resolve the prior access controls audit findings. Based on our objective, we report the following conclusions.

APPLICATION CONTROLS REVIEW

The critical application controls that should be tested in an application review are: (a) data completeness, (b) data accuracy, (c) table maintenance, (d) user access, (e) processing, and (f) data backup and recovery. Our conclusions for the application review of the three applications are organized into these six categories.

Data completeness controls are designed to ensure that all transactions are entered into the system once and only once, that all errors are corrected without any being lost, duplicated or added, that all transactions are processed, that databases are updated completely, and that all output reports are complete. Our audit did not identify any significant weaknesses in completeness controls for the STARS and IRP applications. However, we identified a weakness in the completeness controls for SADLS Motor Vehicle Records (MVR) online customer component. This component was designed to only track one payment per customer each calendar month. Consequently, multiple payments in the same month by a customer must be manually calculated and posted to the database, overwriting the previous amount posted by the system. See Audit Finding 1, *Completeness of MVR Online Customer Transactions*.

Data accuracy controls ensure that the details of transactions are entered and processed correctly, and that printed output is not distributed to the user until it is checked for reasonableness. Our audit did not identify any significant weaknesses in accuracy controls for the STARS and IRP applications. However, we identified a weakness in the accuracy controls for SADLS MVR request. We found weaknesses in the controls over the payments received for mail-in Motor Vehicle Report (MVR) requests. Controls do not ensure that all payments received are entered into the system. See Audit Finding 2, *Accuracy of MVR Cash Receipt Collections*.

Systems use tables to make computations and to verify valid codes during data entry. **Table maintenance** controls ensure that tables used in processing include correct and timely values. Our audit did not identify any significant weaknesses in the Table maintenance for the STARS and IRP applications. However, we identified a weakness in the table maintenance for SADLS Duplicate Driver License Internet Web interface application. See Audit Finding 3, *Knowledge of Web Interface Application*.

EXECUTIVE SUMMARY (CONCLUDED)

User access controls ensure that only authorized persons are able to inquire about, record, change, or delete data, that electronic signatures used to approve transactions are valid, that only authorized users receive printed reports, and that blank negotiable instruments are protected. We identified several conditions related to user access for STARS, IRP and SADLS applications, which should be addressed to improve user access controls. Due to the sensitive nature of the conditions found, we have conveyed these findings to management in a separate letter pursuant to the provision of North Carolina G.S.147-64.6(c)(18).

Processing includes all of the activities associated with running productions jobs. Our audit did not identify any significant weaknesses in processing for the STARS, IRP, and SADLS applications.

Data Backup and Recovery procedures ensure that the system can be restored if a disaster destroys the primary data files. To be effective, the backup data files must be stored in a secure offsite location, and all essential files should be included. The backup tapes should be stored in an environmentally safe facility far enough away from the computer center so that the backups and the center cannot be both destroyed by a single disaster. The STARS, IRP, and SADLS application run on the state's mainframe computer. Transactions for these applications are entered and processed as real time updates to the databases. In the event the mainframe has a disruption in service, DOT has not established alternative procedures or provisions to recover these transactions for the STARS, IRP, or SADLS applications. See Audit Finding 4, *Data Backup and Disaster Recovery*.

INFORMATION SYSTEMS ACCESS CONTROLS

The access control environment consists of access control software and information security policies and procedures. We followed up on prior year access control findings for DOT to determine corrective actions that have been taken to resolve the prior audit issues. We found that many of the same conditions we observed in the prior audit still exist. DOT is currently in the process of resolving the majority of these access control findings from the prior year. Until all findings are resolved, the DOT access control environment is still not adequate to protect the critical and sensitive information from unauthorized access.

AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY

OBJECTIVES

Under the North Carolina General Statutes Chapter 147-64.6, the State Auditor is responsible for examining and evaluating the adequacy of operating and administrative procedures and practices, systems of accounting, and other elements of State agencies. This IS audit was designed to ascertain the effectiveness of application controls at the Department of Transportation Division of Motor Vehicles.

SCOPE

Application controls govern whether the design of the critical application control supports management's financial statement assertions and that the controls are functioning effectively. The scope of our IS application controls audit was to review application controls which directly affect the Division of Motor Vehicles applications, the State Titling and Registration System (STARS), the International Registration Plan (IRP) applications, and the State Automated Drivers License System (SADLS). Other IS access control topics were reviewed as considered necessary.

METHODOLOGY

We audited policies and procedures, interviewed key administrators and other personnel, examined system configurations, toured the computer facility, tested on-line system controls, reviewed appropriate technical literature, reviewed computer generated reports, and used security evaluation software in our audit of application controls. We conducted our audit in accordance with the standards applicable to performance audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States and *Information Systems Audit Standards* issued by the Information Systems Audit and Control Association.¹

¹ In 1992 the State created the Information Resource Management Commission to provide statewide coordination of information technology resources planning. The IRMC provides state enterprise IT leadership including increased emphasis and oversight for strategic information technology planning and management; policy development; technical architecture; and project certification. Pursuant to North Carolina General Statute 147-33.78 numerous state officials serve on the IRMC including four members of the Council of State who are appointed by the Governor. The State Auditor has been appointed a member of the IRMC and elected as chair of the IRMC by its members.

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BACKGROUND INFORMATION

In July 2000, the DOT Information Systems Technology and the DOT Division of Highways Engineering Technology Services section were reorganized to form one centralized unit named DOT Information Technology (IT). The Chief Technology Officer in the IT section reports directly to the Secretary of DOT. Under the supervision of the Chief Technology Officer several units exist that are responsible for the areas reviewed.

Enterprise Program Office (EPO) – The security administrator reports to the director of this unit. This unit provides a centralized focus for IT project management, and computer security. The EPO performs enterprise strategic business planning, manages enterprise-level risk, establishes, communicates, and implements common methodologies, processes, procedures, and a system development life cycle (SDLC) for defining and improving standard software practices. The EPO is also responsible for working with the business areas to identify changing business requirements and their associated risks, and for researching methods for continuously improving quality and ensuring quality objectives are included in the design of deliverables.

DMV and Business Systems – DMV and Business Systems has two distinct groups. The first group is the Division of Motor Vehicles (DMV) application support organization. This group is responsible for implementing and supporting systems including the STARS, SADLS, IRP, and Web enabled Registration Renewal systems among others. The DMV group provides a complete range of technology applications development/implementation and support to the entire Division Of Motor Vehicles. The DMV includes Vehicle Registration, International Registration Plan, Driver License, Enforcement, Crash Records, School Bus and Traffic Safety Education, and Citizens Affairs Sections. This software development and support includes all mainframe, client server, and Internet applications.

The second group, The Information Technology Business Systems (ITBUS), primarily supports the following systems throughout DOT: Payroll, Personnel, Fiscal, Purchasing, Permits, Equipment, and Inventory. ITBUS also supports other systems used in various DOT units. These systems are Design Services, Roadway Maintenance, Highway Beautification, Materials and Tests, and Public Transportation. Contractors maintain all systems, except Payroll and Personnel. State employees maintain the Payroll and Personnel systems.

State Titling and Registration System Application

The State Titling and Registration System (STARS) is a real-time, mainframe system, which facilitates the processing of vehicle titling and registration services for the Division of Motor Vehicles. STARS was implemented on December 2, 1996. It automated all vehicle registration and titling processes and placed the data entry in the field at the point of contact with the customer. STARS automatically calculate all fees collected by vehicle registration and titling, with the exception of an overweight citation penalty.

BACKGROUND INFORMATION (CONCLUDED)

State Automated Drivers License System Application

The North Carolina State Automated Driver License System (SADLS) is a computer system designed for the Division of Motor Vehicles. In 1995, a group of related programs was developed to automate the collection of fees for Drivers License transactions such as, obtaining, renewing, and duplicating driver's licenses. These programs run on a mainframe computer. Terminals at Driver License/DMV offices across the state are linked to the mainframe via special high-speed telephone lines to place data entry in the field at the point of contact with the customer.

International Registration Plan Application

The International Registration Plan (IRP) is a federally mandated registration program between all states, Canada and Mexico. The purpose of the program is to collect all fees from a commercial trucking firm or independent trucker for all states in which the trucks log mileage. The collection of the fees is based on the estimated mileage and past history mileage submitted by the trucker or trucking firm at the time of registration. Along with weight, mileage, and other related data, the IRP system calculates the amount of fees due a state by accessing the calculation formula for that state. The IRP system has to maintain the individual formulas from every state, Canada, and Mexico. Once the fees are collected, they are distributed to all of the states for which the fees were collected.

AUDIT RESULTS AND AUDITEE RESPONSES

The following audit results reflect the areas where The Department of Transportation has performed satisfactorily and where recommendations have been made for improvement.

APPLICATION CONTROLS

Application reviews consist of determining whether the design of the critical application control supports management's financial statement assertions and that the controls are functioning effectively. These reviews are performed when the auditor intends to rely on an application system control to reduce the amount of substantive testing of details required before rendering an opinion on the financial statements.

DATA COMPLETENESS

Data completeness controls are designed to ensure that all transactions are entered into the system once and only once, that all errors are corrected without any being lost, duplicated or added, that all transactions are processed, that databases are updated completely, and that all output reports are complete.

Our audit did not identify any significant weaknesses in completeness controls for the STARS and IRP applications.

AUDIT FINDING 1: COMPLETENESS OF MVR ONLINE CUSTOMER TRANSACTIONS

The Motor Vehicle Records (MVR) online customer component of the SADLS application was designed to only track one payment per customer each calendar month. Consequently, multiple payments in the same month by a customer must be manually calculated and posted to the database, overwriting the previous amount posted by the system. MVR online customer transactions cannot be traced to specific customer payments when multiple payments have been made. Because of this, DMV staff cannot verify payments totals on daily reports used for posting to DOT revenue accounts, SADLS reports, and data tables. Customer invoices require numerous corrections and manual overwrites before DMV staff can send invoices to customers.

Recommendation: The Department of Motor Vehicles should investigate and correct the system design and programs for the MVR online customer component of the SADLS application to address the above issues.

Agency's Response: The MVR application was originally designed to accept a monthly posting of payment for on-line MVR's as requested by the DOT Fiscal Section; however, companies are allowed to make partial payments. The Driver License Section will submit a change request to DOT-IT to alter the system design and rewrite the business rules to support the improved process.

AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

DATA ACCURACY

Data accuracy controls ensure that the details of transactions are entered and processed correctly, and that printed output is not distributed to the user until it is checked for reasonableness.

Our audit did not identify any significant weaknesses in accuracy controls of STARS and IRP applications.

AUDIT FINDING 2: ACCURACY OF MVR CASH RECEIPT COLLECTIONS

We found potential weaknesses in the accuracy of MVR cash receipt collections. SADLS is not designed to automatically calculate the fees charged for MVR request nor is it designed with detailed data entry screens to collect or create source documentation to support the accuracy of fee calculations or locate disputed customer payments. Currently, DMV clerks manually calculate fees by counting the number of motor vehicle reports printed, and charge the customers for these reports, without creating any source documentation that could support the accuracy of amounts collected and reported as DOT revenue. DMV clerks can incorrectly calculate fees, collect incorrect fee amounts from customers, unintentionally record erroneous MVR cash receipt amounts into SADLS, and are unable to produce detailed source documentation to support the amounts collected from customers for MVR request.

Recommendation: DMV should investigate adding a component to the SADLS application to automate the calculation and posting of fees charged for MVR requests. Management should implement controls over the receipt of cash to ensure that all payments for MVR requests are properly handled and posted to the system.

Agency's Response: We will change the MVR application to provide automated calculation and posting of fees for walk-in and mail-in MVR requests. A complete audit trail is being established to ensure that all receipts are properly handled and posted to the system. Scheduled implementation for this system enhancement is August 26, 2002.

TABLE MAINTENANCE

Systems use tables to make computations and to verify valid codes during data entry. Table maintenance controls ensure that tables used in processing include correct and timely values.

Our audit did not identify any significant weaknesses in STARS and IRP table maintenance.

AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

AUDIT FINDING 3: KNOWLEDGE OF WEB INTERFACE APPLICATION

DMV programming staff has not acquired adequate knowledge of the Duplicate Driver License Internet Web interface application to support the application and maintain its tables. The Duplicate Driver License Internet Web interface and tables was developed and is maintained by a contract programmer. The contractor has not transferred his knowledge of the system or table design to DOT permanent programming staff. In the event the contractor leaves or the position is terminated, DOT does not have anyone who knows how to update the fee table, which is hard-coded in within the web application.

Recommendation: DMV-MIS should develop and implement procedures to ensure that permanent employees have adequate knowledge of systems developed and maintained by contract programmers to allow them to support and maintain the application in the event the contractor position is eliminated. Procedures should also ensure that more than one employee knows the systems maintenance requirements so that any application can be supported and maintained in the event the responsible staff position is eliminated. These procedures should include but not be limited to, ensuring that systems and change requests are adequately documented and in compliance with standards, staff are properly trained in program languages used for systems, and that cross training exist for all functional areas.

Agency's Response: DOT-IT SADLS and DOT-IT STARS e-commerce personnel work together to ensure system integrity and consistency. Each team ensures back-up for the other's application and the teams have cross trained. In addition to cross training, DOT-IT SADLS has assigned a JAVA trained permanent employee to help support all driver license web application development.

USER ACCESS

User access controls ensure that only authorized persons are able to inquire about, record, change, or delete data, that electronic signatures used to approve transactions are valid, that only authorized users receive printed reports, and that blank negotiable instruments are protected.

We identified several conditions related to user access for the STARS, IRP, and SADLS applications, which should be addressed to improve controls. Due to the sensitive nature of the conditions found, we have conveyed these findings to management in a separate letter pursuant to the provision of North Carolina G.S. 147-64.6(c)(18).

PROCESSING

Processing includes all of the activities associated with running productions jobs.

AUDIT RESULTS AND AUDITEE RESPONSES (CONTINUED)

Our audit did not identify any significant weaknesses in processing controls for the STARS, IRP, and SADLS applications.

DATA BACKUP AND RECOVERY

Data backup and recovery procedures ensure that the system can be restored if a disaster destroys the primary data files. To be effective, the backup data files must be stored in a secure offsite location, and all essential files should be included. The backup tapes should be stored in an environmentally safe facility far enough away from the computer center so that the backups and the center cannot be both destroyed by a single disaster.

AUDIT FINDING 4: DATA BACKUP AND DISASTER RECOVERY

The STARS, IRP, and SADLS application run on the state's mainframe computer. Transactions for these applications are entered and processed as real time updates to the databases. In the event the mainframe has a disruption in service, DOT has not established alternative procedures to continue capturing and processing transactions during the period the mainframe is down. In the event of the loss of the state's mainframe and computer center, all transactions processed since the last off-site backup would be lost. DOT does not have provisions to recover these transactions for the STARS, IRP or SADLS applications. Data Backup and Disaster Recovery requires that an agency establish alternative procedures for processing their mission critical transactions until the information services function is able to restore its services after a disaster occurs. Also provisions for backup and recovery should include methods to recover online real time transactions entered since the last off-site backup.

Recommendation: DOT should implement procedures for the recovery of all transactions entered since the last off-site backup for the STARS and SADLS applications in the event of the loss of the state's mainframe and computer center. We recommend that DOT consider mirroring transactions on a separate server located at a different location or implement procedures to identify and reenter the transactions. DOT should develop disaster recovery and business continuity plans for the STARS and SADLS applications. These plans should include procedures for processing significant transactions during an extended disruption of mainframe data processing services.

Agency's Response: All state agencies face the same problems. A disaster is defined as an occurrence causing widespread destruction and distress; a total failure, catastrophe. ITS Daily Transaction Logs are used to recover information that has been lost to a point in time. A mirrored back-up system would cost millions of dollars and would result in performance degradation and high bandwidth network connectivity. According to the DATA Base Analysts, it is not a disaster to lose these log backups. It is an acceptable business risk that has been recognized for at least ten years. If funding were available, we would consider this option.

AUDIT RESULTS AND AUDITEE RESPONSES (CONCLUDED)

INFORMATION SYSTEMS ACCESS CONTROLS

The access control environment consists of access control software and information security policies and procedures. We followed up on prior year access control findings for DOT to determine corrective actions that have been taken to resolve the prior audit issues. We found that many of the same conditions we observed in the prior audit still exist. DOT is currently in the process of resolving the majority of these access control findings from the prior year. Until all findings are resolved, DOT access control environment is still not adequate to protect the critical and sensitive information from unauthorized access.

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DISTRIBUTION OF AUDIT REPORT

In accordance with G.S. § 147-64.5 and G.S. § 147-64.6(c)(14), copies of this report have been distributed to the public officials listed below. Additional copies are provided to other legislators, state officials, the press, and the general public upon request.

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