

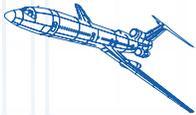
# World Leader in AVI-based GTMS Systems

9 of the top 10 busiest North American  
airports use TransCore's AVI systems

> 1,500 lanes of installed AVI equipment

> 250,000 transponders

> 1 million AVI transactions per month



TransCore is recognized worldwide as the leader in AVI systems and is the world's largest company solely dedicated to the design, implementation and support of transportation management and revenue collection systems.

**A**utomatic Vehicle Identification (AVI) has changed the way airports all over the world manage their business.

When integrated with your Ground Transportation Management System (GTMS), AVI can monitor, track, control and manage commercial vehicle operations, and ultimately improve landside operations, reduce pollution and congestion, and generate a consistent revenue stream through usage fee collection.

We take a Regional Interoperability approach, integrating AVI transponders from regional toll authorities into the airport's landside operations – parking and ground transportation management. Moreover, our innovative approach to landside management leverages proven technologies that enable your airport to track, manage and bill non-traditional transportation providers, such as ride-sharing partners or Transportation Network Companies (TNCs).

## Aviation Market Leader

For more than 75 years, TransCore has supported the commercial aviation business, bringing real-world technology and superior project management skills.

We are a corporate partner to the American Association of Airport Executives (AAAE) and the Airports Council International (ACI), and we are an associate member of the Airport Consultants Council (ACC) and the Airport Ground Transportation Association (AGTA).



## Key Benefits

Improve Airport Revenue/Cut Costs  
Tracks and bills more efficiently

Produces accurate data for billing, management and audit trail

Creates report summaries for regulatory reporting, staffing and traffic flow analysis

Eliminates manual procedures

Improve Landside Operations  
Improves curbside use and space management through time-regulating traffic patterns

Improved relationship with operators through usage-driven billing

Provides tracking, management and audit of TNCs and ride-sharing partners

Improve Customer Service  
Reduces congestion during peak travel times

Reduces unnecessary trips through exception pricing structures

Enhances passenger safety and security

## Industry Milestones

1989

First Airport AVI Ground Transportation Management System (GTMS) at LAX

1995

First AVI automated vehicle dispatching system (along with our strategic technology partner, Gatekeeper Systems)

1999

First transaction processing facility exclusively dedicated to AVI fare collection and customer service

2000

First regionally interoperable airport/toll road AVI system at DFW International

2001

First wide-area, wireless network used for AVI fee collection at Las Vegas McCarran

2006

First state-wide deployment of airport parking payment systems integrated with toll road transponders and back office payment processing with Florida DOT

2010

First Airport/Seaport interoperable GTMS in Miami

2012

First GTMS using mobile RFID readers and cloud-based software at Monterrey, CA

2015

First "virtual" hold lot and dispatching operation deployed using mobile computing technology



A leader in the transportation industry for more than 75 years, TransCore provides innovative, technical solutions and engineering services for Ground Transportation Management, Electronic Toll Collection, Traffic Management and RFID systems.



Our strategic partner GateKeeper Systems is a pioneer in integrated, real-time computer systems for airport vehicle access control. They were among the first to use AVI technology to develop software that supports commercial vehicle operations and parking.

TransCore and GateKeeper have successfully teamed to deliver ground transportation solutions at 20 domestic airports.

### For more information:

**Contact**  
**Forrest Swensen**

Associate Vice President Airport Systems & Services  
214.461.6473

**Email**  
forrest.swensen@transcore.com

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# Denver International Airport

Denver International Airport (DIA) installed a new AVI GTMS when they opened in February 1996. DIA uses the system to monitor, track and bill all commercial vehicle operators accessing DIA.

The TransCore AVI system interfaces to DIA's parking and revenue control system, to manage employee parking. The system originally interfaced to a third-party billing system from Durasys.

The initial deployment consisted of 32 lanes of equipment and 2,200 tags. In the ensuing years, airport growth has led to an expansion of the system to 55 lanes of equipment and more than 8,000 tags. The system averages more than 8,500 AVI transactions per day or approximately 3.1 million transactions annually.

TransCore and GateKeeper Systems Inc., our strategic software development partner, were selected in April 2004 to perform a multi-year contract at DIA to replace the Durasys system software with our CVMS solution, and change out the entire tag and reader infrastructure at the airport.

This was a complex process that required the phasing in of the replacement tags and readers over time with a transition plan that minimized any impact to revenue for the airport.

The system servers and software were installed and placed in operation late in 2007 and the build-out of the new lane equipment was completed in 2008.

Today, this upgrade allows interoperability with the E470 toll road in the greater Denver area, as well as increases the number of AVI lanes for both ground transportation and parking at DIA.

TransCore expanded the system in 2012 to include taxi driver tracking and automated payment and taxi management system. The DIA system will also be expanded to include employee parking by mid-2014 and provisions are now being made for the reconfiguration of the roadway to accommodate new airport expansion scheduled to be completed in mid-2016.

## Project Scope

Design, furnish, and install AVI system hardware and lane controllers (original CY 1996 subcontract)

Perform software and reader hardware replacement to existing AVI system (new CY2004 prime contract)

Perform installation and integration of additional lanes for Mod4 garage projects, new surface lots and South Terminal project

Baseline contract value: \$2.3M

## Locations

Denver, Colorado

## Contact Info

Mr. Mike Percy  
Mike.percy@diadenver.net  
8500 Pena Boulevard  
Denver, CO. 80249  
303.342.2030

## Notable Project Highlights

Turn-key system responsibility

TransCore prepared the detailed design documents for DIA and assisted the airport in managing the civil construction portion of our new contract.

Team project with GateKeeper systems

Multi-year system support obligation

Significant upgrade project to existing system – replacing software while system is in revenue service

# San Diego International Airport



TransCore installed the initial AVI system at San Diego International Airport in 1997 to provide GTMS to the single operational terminal. The system was composed of six lanes of equipment and approximately 2,000 tags -- all interoperable with the other Southern California airports' operating AVI systems.

Beginning in 2000, the AVI system was expanded to address the new commuter terminal and relocated taxi hold lot, expanding the system size to 14 lanes of equipment supporting more than 5,000 active tags.

At the end of 2003, the TransCore/GateKeeper team performed complete software and computer hardware upgrade/change-out to the existing older VAX/VMS-based software system. At the same time, we furnished and installed new AVI equipment to support a relocated taxi lot. The system was upgraded to our newer, browser-based version in mid-2010.

From 2012 to 2014, the Green Build terminal expansion created a significant change in the airport roadway layout. To avoid system shutdown, TransCore worked with the airport to relocate and reconfigure the system on an as-required basis during the construction. We are now working with the airport to conduct a complete roadway equipment upgrade to our latest E5 readers, the newest version of the CVMS software and expand the system to accommodate the new Rental Car Center. This work will be completed in early 2016.

## Project Scope

Designed, furnished, and installed an AVI hardware and software system; provided warranty and maintenance (original project)

Design, furnish, and install a complete software upgrade to the existing AVI system (new contract)

Baseline contract (including modifications): \$1.5M

## Locations

San Diego, California

## Contact Info

Mr. Dave Boenitz  
San Diego International Airport  
P.O. Box 82776  
San Diego, CA. 92138-2776  
619.400.2690  
dboenitz@san.org

## Notable Project Highlights

TransCore turn-key AVI system

GateKeeper software

Ongoing system support and warranty

Significant upgrade project to existing system -- replacing software while system in revenue service

# Las Vegas International Airport



In April 2003, the TransCore/GateKeeper team completed installation of a major new AVI system at Las Vegas McCarran International Airport (LAS). The system layout has 12 reader locations with more than 20 TransCore model AI1200 readers and antennas. The system operates on both fiber optic and 2.45 GHz, long-haul, wireless LAN communication lines. Approximately 6,000 transponders are on vehicles using the system to track all categories of commercial vehicles, and charge trip and dwell time fees. The system includes a web interface where commercial vehicle operators can access their trip charge information at their convenience without causing additional overhead work for landside staff.

McCarran is one of the busiest dispatching and management systems in the world, with well over 350,000 AVI transactions per month. LAS experienced a significant increase in commercial vehicle revenue immediately after going live with the system; accordingly, the system return on investment (ROI) was realized in about the quarter of the projected time.

TransCore and GateKeeper recently completed a significant expansion of the McCarran AVI system as part of the Terminal 3 expansion completed in early 2013 -- essentially doubling the size and footprint of the system.

## Project Scope

Designed, furnished, and installed an AVI hardware and software system; provided warranty and maintenance

## Locations

Las Vegas, Nevada

## Contact Info

Mr. Dan Busch  
Landside Operations Manager  
P.O. Box 11005  
Las Vegas, NV. 89111-1005  
702.261.5321  
DANB@mccarran.com

## Notable Project Highlights

Multi-year system support obligation

TransCore/GateKeeper team

Implemented taxi management system

Hardwired and wireless communications network

# Phoenix Sky Harbor International Airport

In April 2005, Phoenix Sky Harbor International Airport (PHX) awarded TransCore the contract to design and install an AVI system. The first phase was comprised of a complete hardware, software and documentation design effort, including a complete civil and electrical drawing package. This phase included detailed AVI system functional design and needs analysis/validation with PHX end users to arrive at the final system design specification for implementation.

In addition, TransCore provided a complete, Professional Engineer-stamped, infrastructure design package to be used by PHX civil and electrical contractors for installing necessary communications and power for the AVI system. Included in the design was a complete wireless curbside network for utilizing handheld data capture devices for taxi dispatching and curbside enforcement. Phase I was completed in November 2005.

The second Phase began a month later and included furnishing and installing TransCore eGo™ AVI equipment and transponders, a clustered server network, as well as installation and configuration of the GateKeeper GTMS software. The completed system will provide ground transportation vehicle tracking, management and billing functions, Rental Car Center (RCC) bus tracking, and automated taxi dispatching.

TransCore initially installed 10 lanes of AVI equipment, servers and software under a very tight schedule to support the opening of Sky Harbor's RCC project in mid-January 2006. The project was completed in late 2006.

The system includes more than 40 lanes of AVI equipment and enrollment for more than 4,000 commercial operators who serve Sky Harbor Airport. In 2012 the system was again expanded to include PHX's 44th street intermodal transit center and remote taxi dispatching operations. Additional system expansion is anticipated through the end of 2016 to accommodate roadway expansion at the airport.

## Project Scope

Automated vehicle identification and tracking system design and installation project (AVI)

Two-phased design/build project with TransCore managing and delivering both phases to PHX

Design, furnish, and install AVI system, including hardware, software, and servers

Perform ongoing contract maintenance and support (upon completion of system installation)

Baseline contract: \$2.3M

## Locations

Phoenix, Arizona

## Contact Info

Ms. Tracey L. Rivas  
Aviation Superintendent,  
Operations Division  
3400 Easy Sky Harbor Boulevard  
Suite 3300  
Phoenix, AZ. 85034-4420  
602.683.4847  
fax 602.683.2651  
tracey.rivas@phoenix.gov

## Notable Project Highlights

Turn-key system responsibility

Design/build effort

TransCore prepared the detailed design documents for PHX to assist the airport in managing the civil construction portion of the project.

# Ronald Regan Washington National Airport

In April 2003, the TransCore/GateKeeper team completed installation of a major new AVI system at Ronald Regan Washington National Airport (DCA).

The system was designed and installed to allow the airport to manage the tracking and fee collection for their tax fleet that operates at the airport. Entries and exits to the taxi hold area are used to queue vehicles and collect trip fees. Approximately 3,000 transponders installed on taxis are used to track drivers and payments.

Using Microsoft Dynamics (formerly Great Plains) software, balance tracking and account replenishment is managed within the system. Drivers receive up-to-the minute status on their account each time they enter the hold lot so they can add funds to their account, if needed. TransCore works very closely with DCA and their operations contractor, TAPS, to assist in managing the system.

TransCore and GateKeeper worked with DCA to upgrade the readers currently installed to allow for use the regional Virginia DOT "Smart Tag" toll transponders, as well as TransCore's new generation of AVI sticker tag transponders. This upgrade was completed in 2008.

TransCore supplies onsite system support from its local Washington D.C. area offices with remote software support provided by GateKeeper.

In late 2010, TransCore was awarded a contract for additional system functionality to include open road AVI readers for tracking and billing of other commercial vehicle operators such as courtesy vans and shuttle buses – significantly expanding the systems size and capabilities. This work was completed in mid-2011.



## Project Scope

Designed, furnished, and installed AVI hardware and software system; provided warranty and maintenance

Baseline contract and additions: \$1.2M

## Locations

Washington, D.C

## Contact Info

Mr. Gary Myers  
Manager Contract Management Division  
Ronald Reagan Washington  
National Airport  
Washington, D.C. 20001-4901  
703.417.8024  
gary.myers@mwaa.com

## Notable Project Highlights

Multi-year system support obligation

TransCore/GateKeeper team

Implemented taxi charging and trip fee management system

Use Microsoft Dynamics accounting package

# Washington Dulles International Airport

In March 2007, the TransCore/GateKeeper team was awarded a contract for a new AVI commercial vehicle management system at Washington Dulles International Airport (IAD). The system is designed to manage IAD's commercial vehicle curbside, as well as do complete, automated taxi dispatch and management.

The system layout has 8 reader locations with 10 TransCore Encompass® 5 reader systems, and is designed to read both the existing VDOT "Smart Tag" toll transponders, as well as TransCore's sticker tags.

In addition to the AVI equipment, the system utilizes Daktronics variable messaging signage to communicate to the taxi vehicles in the hold lot, a text-to-speech function for automated voice announcements, and wireless handheld computers at the curbside for vehicle tracking and compliance management.

Reporting and financial management is accomplished via the Microsoft Great Plains software system and an interface to the Metropolitan Washington Airport Authority's (MWAA) enterprise-wide accounting system.

Dulles has transitioned to the operations/warranty phase. System contract support is provided out of our Washington D.C. offices on a contract basis. In 2014, we expanded the system to allow tracking of upper level drop-off trips.

TransCore and MWAA are now working on Phase II of the project to deploy additional system enhancements and reporting capabilities, expand AVI to employee parking and develop a patron parking program that is interoperable with Dulles Tollroad and other VDOT systems. This work will progress through the end of 2016.



## Project Scope

Designed, furnished, and installed AVI hardware and software system; provided warranty and maintenance

Baseline contract and additions: \$1.2M

## Locations

Herndon, Virginia

## Contact Info

Mr. William S. Lanham

Landside Operations Manager

Metropolitan Washington Airports Authority

Washington Dulles International Airport

P.O. Box 17045

Washington, D.C. 20041-0045

703.572.4626

William.Lanham@mwaa.com

## Notable Project Highlights

Multi-year system support obligation

TransCore/GateKeeper team

Implemented commercial vehicle management and taxi dispatching system

Hardwired and wireless communications network

Daktronics variable message signs

Interface to airport financial enterprise system

# John Wayne Airport



TransCore installed the GTMS at John Wayne Airport (SNA) in 1991. Revenue collection has more than doubled over the previous honor system revenues. The airport identified more than 50 previously unknown commercial operators. TransCore installed 10 lanes of equipment that track approximately 2,500 commercial ground transportation vehicles accessing the airport. Approximately 6,500 tags have been issued. The system monitors the lanes for fee collection and ground transportation management. In the first month of operation, the airport experienced a fourfold increase in revenue collections compared to the system previously used. The system also uses the tag base already in place at the LAX, Ontario, San Diego, and Burbank airports. TransCore continues to provide on-call support for the system out of its Orange County, California offices.

In mid 2007, the TransCore/GateKeeper team performed complete software and computer hardware upgrade/change-out to the existing older VAX/VMS-based software system. This project implemented the new Windows-based GateKeeper CVM software. In late 2013 TransCore upgraded the readers at SNA to our latest generation Encompass® 5 units. These delivered a dual tag protocol capability allowing the airport to read legacy CalTrans FasTrak Title 21 AVI tags used at LAX and allow John Wayne to use our lower-cost sticker tags. This work was completed while the system remained in revenue service with no data or revenue loss to the airport.

## Project Scope

Automated vehicle identification and tracking system design and installation project (AVI)

Baseline contract: \$400K

## Locations

Costa Mesa, California

## Contact Info

Mr. Scott Hagen  
Deputy Director Operations  
John Wayne Orange County Airport  
3160 Airway Avenue  
Costa Mesa, CA. 92626  
949.252.5241  
shagen@ocair.com

## Notable Project Highlights

Turn-key system responsibility

TransCore/GateKeeper team

Financial Management software via  
Microsoft Great Plains

Commercial vehicle management,  
revenue collection and automated taxi  
dispatching functionality

Ongoing system support contract

# Philadelphia International Airport



In August 2008, the TransCore/GateKeeper team completed installation of a major new AVI system at Philadelphia. The fiber optic system has six reader locations utilizing TransCore Encompass® 5 readers and antennas. Approximately 4,000 transponders are on vehicles, and there are 1,300 companion taxi driver tags in the system to track all categories of commercial vehicles, all taxi drivers, and to charge trips and dwell time fees. The system averages 16,000 transactions per day or 5.8 million annually.

The Philadelphia system has three innovative features. First, it tracks taxi drivers through a separate tag presented simultaneously with the taxi vehicle tag at entry and exit. The system alerts the airport to a mismatch between entering and exiting taxi drivers/taxi vehicles. Second, all ground transportation operators use pre-paid accounts, and a real-time balance tracking system allows or denies entry based on the operator's balance. Third, dynamic variable message signs, lights and gates are linked together to communicate messages and allow or deny entry, as appropriate.

TransCore provides ongoing maintenance and support from our Harrisburg, Pennsylvania offices. Additional system expansion occurred when the 2nd phase of the PHL system, allowing for open road commercial vehicle billing, was completed in late 2012. In 2015, TransCore and GateKeeper systems completed a significant upgrade to the overall back-end system to include credit card processing, PCI-DSS compliance and expanded reporting capabilities.



## Project Scope

Designed, furnished, and installed AVI hardware and software system; provided warranty

Baseline contract: \$1.3M

## Locations

Philadelphia, Pennsylvania

## Contact Info

Mr. Charles Newkirk  
District Manager – Ground Transportation Management  
Philadelphia International Airport  
Terminal A Baggage Claim  
Philadelphia, PA. 19153  
215.937.4352

## Notable Project Highlights

TransCore/GateKeeper team

Dual tag credentials required for taxis

Real-time balance tracking

Interactive VMS, lights and gates

On-call service and maintenance for hardware and software

# Salt Lake City International Airport

Westinghouse was awarded a contract for an Amtech AVI system at Salt Lake City International Airport in December 1991. Installation of the system included more than 15 lanes and was completed in May 1992.

The system currently monitors more than 600 commercial vehicles for airport usage billing, taxi dispatch, and compliance scheduling. TransCore conducted design efforts to update and expand this system with an additional 11 lanes for the Salt Lake City Winter Olympics.

In late 2005, TransCore was awarded a competitive contract to provide a complete hardware and software upgrade to the existing AVI system. This was done to accommodate significant physical changes in the airport roadway structure and to coordinate a significant deployment of AVI equipment for the airport's new PARCS system, installed by Scheidt & Bachmann.

Under this contract, TransCore expanded the system to more than 30 lanes and conducted a complete software and server migration to the GateKeeper CVMS application.

This was a very complex project as we were required to transition to the system with minimal impact to airport operations or system revenue.

The system includes a full Microsoft Great Plains accounting software package and interface to SLC's accounting system for consolidated financial reporting.

We are now working with SLC to implement a system-wide hardware and software refresh to the latest versions of our products. Phase I of that effort for the software upgrade was completed in mid-2013. AVI roadway hardware upgrades have begun in coordination with the new SLC terminal project and will be ongoing through 2017.



## Project Scope

Designed, furnished, and installed AVI hardware and software system; provided warranty and maintenance

Baseline contract: \$1.1M

## Locations

Salt Lake City, Utah

## Contact Info

Mr. Larry Bowers  
Landside Operations Manager  
Salt Lake City International Airport  
AMF P.O. Box 22084  
Salt Lake City, UT. 22084  
801.575.2788  
larry.bowers@slcgov.com

## Notable Project Highlights

Multi-year system support obligation

TransCore/GateKeeper team

Microsoft Great Plains financial software

Hardwired and wireless communications network

eGo® sticker tag implementation

# Raleigh-Durham Airport

In March of 2007, the TransCore/GateKeeper team completed installation of a major new AVI system at RDU. The system includes 22 AVI readers covering the commercial roadways and hold lots for approximately 500 registered commercial vehicles.

The RDU system tracks all categories of commercial vehicles, monitors headway and transit time between RDU's various terminals, and charges trips and dwell time fees. The system provides the capability for drivers and companies to check the status of their accounts and charges at any time via a secure website, which significantly reduces RDU landside staff workload by automating the inquiry process. The system averages 22,000 per week.

In late 2008, the system was upgraded to include an automated taxi dispatching system using the same readers and tags already deployed for the commercial vehicle management system. This was a pre-planned incremental improvement to the system.

The RDU dispatching system utilizes our handheld devices at the curbside which allow starters to verify and validate a vehicle's status via a wireless network. In addition, we use a text-to-speech capability to provide audible call-up and queuing for cabs in the holding lot, prior to dispatch.

Prior to the commercial vehicle management system project, TransCore furnished and installed 19 lanes of AVI equipment for use by public parkers. Going operational in mid-2004, the AVI readers were interfaced with the Scheidt & Bachmann installed Parking and Revenue Control System (PARCS) to provide a "frequent parker" program as part of the new garage project.

The system utilizes the same TransCore Encompass® series readers and our innovative eGo® sticker tag technology as the ground transportation system, making the two systems fully interoperable.

As part of the contract, RDU technical staff are factory trained as first responders to system technical issues, backed up by TransCore service staff on an as-needed basis.

## Project Scope

Designed, furnished, and installed AVI hardware and software system with taxi dispatch; provided warranty and system support

Provided AVI public parking subsystem for Revenue Control operations

Baseline contract: \$1.1M

## Locations

Raleigh, North Carolina

## Contact Info

Mr. Steven M. Pittman  
Deputy Airport Director, Facilities  
Raleigh-Durham Airport Authority  
1000 Trade Drive  
RDU Airport, N.C. 27623  
919.840.7007  
email: Steve.Pittman@rdu.com

## Notable Project Highlights

TransCore/GateKeeper team

eGo® sticker tag technology

Interoperable ground transportation, taxi dispatch and AVI parking systems

Wireless hand-held device for curbside management

Secure website for customer interface to account and billing data

Ongoing system support contract

# Boston Logan International Airport



TransCore and GateKeeper worked with Massport to conduct a complete redesign of the Limo and Taxi hold lots at BOS in mid-2011.

An older, manual, coin accepting system that used paper tickets was converted to an automated system utilizing the EZ-Pass toll transponders for vehicle ID and tracking.

Individual drivers maintain their accounts to pay airport fees via the MASSPIKE Tobin Bridge Customer Service center, which is also run by TransCore.

This allows for a seamless and highly efficient payment and customer service/account management process. The system went live in 2012.

In late 2013 TransCore worked with Massport to relocate and reconfigure both the Limo and Taxi lots to make room for BOS' new Consolidated Rental Auto Center (ConRAC). This was completed in mid-2014.

## Project Scope

Automated Limo Dispatch System and Automated Taxi Dispatch System

Two independent systems developed and implemented at the same time with TransCore managing and delivering both systems to BOS

Design, furnish and install RFID-based systems, including hardware and application software

Perform ongoing contract maintenance/support (upon completion of installation)

Baseline Contract: \$970K

## Locations

Boston, Massachusetts

## Contact Info

Ms. Rita Simonelli  
Title: IT Project Manager  
Massachusetts Port Authority  
One Harborside Drive, S200  
East Boston, MA. 02128  
617.568.5932

## Notable Project Highlights

Turn-key system responsibility

Interface with FASTLANE toll system for trip charge payment

Encompass® 5 readers in both systems

Team project with GateKeeper Systems

Use of existing FASTLANE tags on commercial vehicles

Daktronics VMS signs

# Miami International Airport

MIA was one of the first adopters of AVI for GTMS, deploying the initial system in 1996. The AVI system consisted of Amtech AI1200 readers and battery-powered transponders that interfaced to a third-party billing system from Durasys. The initial deployment consisted of 20 lanes of equipment and 3,500 tags. In the ensuing years, airport growth has led to an expansion of the system to 30 lanes of equipment and more than 10,000 tags.

In 2007, TransCore was awarded a contract to install 14 lanes of SunPass interoperable AVI lanes and interface them to MIA's Parking and Revenue Control System (PARCS). This project was part of a state-wide effort to deploy the SunPass Plus at major Florida airports, allowing SunPass users to pay for airport parking with their Florida turnpike tags.

In late 2013 TransCore received a contract to perform a multi-year upgrade to the MIA system. This included replacement of the Durasys system software with the GateKeeper CVMS solution, and change out of the entire tag and reader infrastructure at the airport.

The new system includes our latest generation Encompass 5<sup>®</sup> readers and our low-cost sticker tags. This was a complex process that required the phasing in of the replacement tags and readers over time with a transition plan that minimized any impact to revenue for the airport. The system servers and software were installed and placed in operation late in 2014 and the build-out of the new lane equipment is scheduled for completion in mid-2015. When completed, this upgrade will provide interoperability with the Miami SeaPort and Fort Lauderdale GTMS systems, which also use TransCore AVI equipment and GateKeeper software. Provisions are now being made for the addition of automated taxi dispatching in calendar 2016.

## Project Scope

Design, furnish, and install AVI system hardware and lane controllers (original CY 1996 subcontract)

Perform software and reader hardware replacement to existing AVI system (new CY2013 prime contract)

Perform installation and integration of additional lanes SunPass interoperable parking

Total contract value: \$3.5M

## Locations

Miami, Florida

## Contact Info

Mark E. Mitros  
Miami Dade Aviation Department  
Landside Operations  
PO Box 025504  
Miami, FL. 33102-5504  
T (305) 876-7096  
F (305) 876-7212  
mmitros@miami-airport.com

## Notable Project Highlights

Turn-key system responsibility

Team project with GateKeeper systems

Multi-year system support obligation

Interoperability with FDOT, Fort Lauderdale airport and Miami SeaPort

Significant upgrade project to existing system – replacing software while system is in revenue service

# Minneapolis-St. Paul International Airport



TransCore installed one of the earliest AVI systems at MSP in the early 1990s. Originally the equipment was designed to operate with the MAC AVI taxi management and commercial vehicle billing software.

In late 2005, MSP awarded a contract to the IBI group to upgrade the entire MSP landside system, which included, Taxi Management, Parking and Commercial Vehicle Ground transportation System. Initially the MSP GTMS Application (MAVIS) was designed to work with the existing TransCore readers that had been installed in various iterations over the previous 15 years. It was decided in mid-2007 that MSP wanted to move a single, standard, transponder and AVI reader, airport-wide. TransCore worked closely with MSP and IBI Group to develop the system design that would be both backward compatible with the existing infrastructure and allow MSP to go forward with the new software system.

In late 2008, TransCore was awarded a contract to work with IBI as the system Integrator, to upgrade and install 81 lanes of AVI readers and migrate the entire MAVIS system to our standard SeGo® sticker tags (approximately 10,000 units). Installation was completed in the 3rd quarter of 2009 and the system is fully operational.

## Project Scope

Designed, furnished and installed an AVI hardware and software system; provided warranty and maintenance

Baseline Contract: \$1.1M

## Locations

Minneapolis, Minnesota

## Contact Info

Mr. Arlie Johnson (Asst Airport Dir/  
Landside Ops.)

612.726.5568

arlie.johnson@mspmac.org

4300 Glumock Dr. Room 3129B

St. Paul, MN. 55111-3010

## Notable Project Highlights

Complex frequency management efforts to support more than 80 deployed readers

Migration plan requiring replacement/ fulfillment of 10,000 existing transponders in "live" system

Lane equipment transition accomplished without service interruption to MAC

# Winnipeg James Armstrong Richardson International Airport

In October of 2009, the Winnipeg Airport Authority (WAA) awarded TransCore the contract to provide and install an Automatic Vehicle Identification (AVI) system with automated taxi dispatch to manage their ground transportation activities for their new terminal infrastructure. Under this project, TransCore was required to install an all-new AVI system and deploy it while the old Mark IV system was still in place and operational. TransCore also provided PE-stamped drawings for the design of the Variable Message Sign (VMS) that was used for taxi dispatch. Additional items included the design and installation of the AVI field infrastructure and the back-end server solution.

Overall, the AVI system consists of five physical locations, monitoring 10 actual lanes for traffic. Two locations consist of a single reader to a single antenna; two locations consist of one reader to two antennas, and the final location consists of one reader to four antennas. This combination of readers to antennas was achieved through the TransCore-patented multiplexing design in which one reader can support up to four lanes of traffic (four antennas).

Three of the new AVI locations were to be installed directly next to the existing AVI equipment. This required careful planning and configuration of the readers to ensure that the two systems could operate correctly without lost revenue.

Immediately following installation, the airport's new terminal -- for which the system was designed -- was not yet open and operational. That allowed TransCore to modify the system configuration to work with the Authority's terminal operations. When the new terminal was opened, the system was re-configured based on the changes in traffic flow. All of the configuration changes were handled remotely and took only minutes to complete.

Overall system acceptance was achieved in October of 2010 and the existing AVI equipment was removed. TransCore provides ongoing maintenance services on the system.



## Project Scope

Provide overall system design, installation and maintenance services for WAA's Ground Transportation Management operations

## Locations

Winnipeg, MB

## Contact Info

Mr. Todd Poltronetti, Project Manager,  
IT Systems  
Winnipeg Airports Authority Inc.  
103-1821 Wellington Ave.  
Winnipeg, Manitoba, R3H 0G4  
204.987.3836 | mobile: 204.612.5122  
tpoltronetti@waa.ca

## Notable Project Highlights

- Turn-key system responsibility
- Design/build effort
- Team project with GateKeeper Systems
- eGo® Plus RFID deployment
- Commercial vehicle management, revenue collection and automated taxi dispatch functionality

# Nashville International Airport

In 2010, TransCore began work on a new Ground Transportation Management system at Nashville International Airport. The system includes 12 AVI readers covering the commercial roadways and hold lots for about 2,500 registered commercial vehicles. It tracks all categories of commercial vehicles and charges trips and dwell time fees. Drivers and companies can now check the status of their accounts and charges any time via a secure website, significantly reducing BNA landside staff workload. Our system includes an MS Dynamics financial module for billing and financial reports.

Our automated taxi dispatching system uses the same readers and tags already deployed for the commercial vehicle management system. The dispatching system uses our handheld devices at the curbside, which allow starters to verify and validate a vehicle's status via a wireless network. We also use a Daktronics variable messaging sign to provide call-up and queuing for cabs in the holding lot, prior to dispatch. The Nashville dispatching system is unique in that we allot spaces in the dispatch lot based on percentage of market share for each of the several cab companies serving the airport, demonstrating our custom programming support.

Prior to this project, TransCore installed 14 lanes of AVI equipment for use by public parkers. Going operational in mid-2007, the AVI readers were interfaced with an Amano - installed Parking and Revenue Control System (PARCS) to provide a "frequent parker" program as part of the new garage project. The system uses the same TransCore Encompass® series readers and our innovative eGo® sticker tag technology as the ground transportation system, making the two systems fully interoperable.

In 2015, we will deploy 30 additional lanes of equipment, supporting a new parking and revenue control project.



## Project Scope

Designed, furnished and installed an AVI hardware and software system with automated taxi dispatch; provided warranty and system support. Provided AVI equipment for public parking subsystem for Revenue Control operations.

Contract value \$1.2M

## Locations

Minneapolis, Minnesota

## Contact Info

Operations Contact:

Ms. Jennifer Swallows

Asst. Ops Mgr/Parking & Grnd Trans

Metropolitan Nashville Aviation Authority

One Terminal Drive

Suite 501

Nashville, TN. 37214

615.275.1659

email: [jennifer\\_swallows@nashintl.com](mailto:jennifer_swallows@nashintl.com)

Client Project Manager:

Ms. Christine Vitt

Director of Construction

Metropolitan Nashville Aviation Authority

One Terminal Drive

Suite 501

Nashville, TN. 37214

615.275.1783

email: [christine\\_vitt@Nashintl.com](mailto:christine_vitt@Nashintl.com)

# Sea-Tac International Airport

In 1998, TransCore completed installation of a new GTMS system at SEA, which included AVI equipment and system software designed to track and bill commercial vehicles. A full Y2K update was done to the system in late 1999 which included adding additional reader locations for the upper and lower level tracking.

As part of the Y2K update, SEA was moved onto an updated back-end. Mobile, hand-held and RFID readers were added for curbside enforcement. In late 2008, the port decided to perform a complete upgrade of the 10-year-old system and the TransCore/GateKeeper teams were awarded a competitively selected contract for a complete system upgrade. The project included modernization of the lane equipment but retained the existing TransCore AI1200 readers and battery transponders. Key elements of the project included migrating SEA from the existing battery-powered AVI transponders to our newer, low-cost sticker tags.

From a transition standpoint, the TransCore team worked closely with SEA to port all of the existing account and system data from the old software onto the new platform and servers with no interruption in system revenue service. Other key functionality provided by the upgrade included a direct interface into the port's PeopleSoft accounting system for billing interface, and a forward-looking vendor web-site to allow GT operators to obtain activity reports and a specialized pass generation system for infrequent tour bus operators.

The system went live in late 2011, and the TransCore/GateKeeper team provides annual system software support as part of the contract. SEA technical staff are also factory trained as first responders to system technical issues, backed up by TransCore service staff on an as-needed basis. The system is being expanded in early 2014 to accommodate additional requirements for SEA's new Consolidated Rental Auto Center (ConRAC) and enhanced vehicle tracking system.

## Project Scope

Designed, furnished and installed an AVI hardware and software system.  
Provided warranty and system support.

Total project value: \$1.5M

## Locations

Tacoma, WA

## Contact Info

Operations Contact:  
Ms. Stacy Mattson  
Landside Operations Manager  
Port of Seattle  
Seattle Tacoma International Airport  
17801 Pacific Hwy  
Seattle, WA. 98158  
206.787.5176  
email: Mattson.S@portseattle.org

Port Upgrade Project Manager:  
Mr. David Kaneshiro  
ITS Project Manager  
206.787.3254  
Email: Kaneshiro.D@portseattle.org

## Notable Project Highlights

TransCore/GateKeeper team

eGo® sticker tag technology

Wireless handheld devices for curbside management

Secure website for customer interface to account and billing data

Ongoing system support contract

The Port of Miami GTS system was designed to automate and consolidate a number of manual and disparate systems that the Port of Miami used to permit, manage, track and collect revenue from commercial ground transportation providers at the Port. The system includes an RFID-based vehicle transponder system and RFID readers installed on the causeway, linking the seaport to the City of Miami to identify and record all registered commercial vehicles ingressing and egressing the port. An automated license plate recognition system is also deployed to track violations and verify the capture of all tagged vehicles. The roadway equipment was installed on existing FDOT sign structures on the causeway, and TransCore was responsible for conducting the necessary structural engineering and design work to comply with FDOT standards.

The system includes complete back-end data management and billing collection integrated into the Port's overall IT systems through a series of Application Program Interfaces, developed jointly between the Port, TransCore and GateKeeper Systems.

TransCore was responsible as the system integrator for the entire project. This included the design, deployment and testing of all roadway ID systems, as well as management of all civil/electrical infrastructure installation. TransCore also provided PE-stamped architectural drawings, and managed the design, implementation and testing of the back-end software system and server farm, as well as a system test bed for additional application development and upgrades.

TransCore continues to provide ongoing system support in conjunction with Port staff. In 2014, TransCore completed expansion of the AVI system to accommodate the Port Miami tunnel project. This doubled the the size of the current system and added approximately 5,000 containerized freight trucks to the monitoring system. In mid-2015, TransCore will complete the new AVI GTMS at Miami International Airport, making airport/seaport interoperability a reality in South Florida.



## Project Scope

Designed, furnished and installed an AVI-based GTMS. Includes warranty and system support.

## Locations

Miami, FL

## Contact Info

Elliott Luskin  
Computer Services Manager  
1015 N. America Way  
Miami, FL 33132  
Work (305) 347-4978  
eml@miamidade.gov

## Notable Project Highlights

TransCore/GateKeeper team

eGo® sticker tag technology

LPR-camera-based violation detection system

Secure website for customer interface to account and billing data

Ongoing system support contract