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2 Contractor Profile

2.1 Applus+ Overview

Owned by the Washington, D.C.-based Carlyle Group, Applus+ is an international company with offices in numerous countries around the globe. In the U.S. market, however, Applus+ manages all contracts from its Chicago headquarters. To retain the greatest control over the processes used to develop and engineer its client offerings, Applus+ maintains on staff a dedicated team of programmers, web developers, and IT professionals all located within the United States. This team works full time to develop and support Applus+ products, services, and programs.

Since the company's founding in 1996 by Inspection and Maintenance (I/M) industry pioneers Tom Fournier and Ron Lancaster, **Applus+ Technologies, Inc.** (formerly Keating Technologies, Inc.)* has been an innovator. Applus+ industry advances have focused on test systems, fraud prevention, training, and digital recordkeeping, all with the goal of ensuring the quality and integrity of inspection programs. Applus+ I/M "firsts" include:

- Pioneering the first use of **electronic fingerprint scanning** to authenticate inspectors in a centralized emissions testing program (Washington State);
- Initiating the first use of **electronic iris scanning** to authenticate inspectors in a decentralized emissions testing program (Connecticut);
- First use of **web-cam video interactive systems** to coach vehicle inspectors (Massachusetts); and
- First contractor to implement **digital image capture for inspection records** in an emissions testing program (Connecticut).
- First vendor to roll out **self-service testing kiosks** (Washington State).

To add to its already impressive history of innovation, in 2006 Applus+ acquired AutoLogic, LLC, an industry leader in the design and production of advanced automotive aftermarket diagnostic equipment and software. As a subsidiary of Applus' parent company, Applus+ AutoLogic, Inc. provides customized products and services to the automotive industry in more than 47 states and 29 countries. The company handles every aspect of the product development cycle, from concept realization through manufacture, delivery, and maintenance/support. The company has extensive experience working with the complexities of Windows operating systems and supporting rapidly changing software and hardware configurations for today's PC and handheld PC technology.

The Applus+ Technologies maintains a corporate staff of 33, with the majority of the management team operating from the Corporate Headquarters in Chicago and the Applus+ Technology Center in nearby Wood Dale, Illinois. Including satellite staff for Applus+ Illinois, Washington State, Massachusetts, Connecticut, and Georgia contracts and subcontracts, Applus+ Technologies employs a total of 540 industry professionals.

Based in the Greater Milwaukee Metropolitan area, Applus+ AutoLogic maintains an onsite team of 17 engineering, development, manufacturing, and administrative specialists.

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* In late 2000, Keating was acquired by the Agbar Group to operate under the name Agbar Technologies, Inc. In 2004, as part of a global strategic realignment to quality, testing, and certification, the Applus+ brand was introduced and with it, the **Applus+ Technologies, Inc**. company name.

2.2 Applus+ Industry Experience and References

As an experienced I/M contract manager, Applus+ understands the importance of solidly crafted and engineered vehicle inspection equipment and databases. By adding Applus+ AutoLogic to its family of companies and employing the certified database, network, and systems developers at its Wood Dale, Illinois, Technology Center, Applus+ is able to provide the highest quality equipment and data management systems in the I/M market.

The following summaries demonstrate a high-level overview of Applus+' experience and expertise in decentralized, centralized, and hybrid I/M programs.

Washington Emissions Check Program. Applus+ successfully transitioned Washington State's centralized I/M program from the incumbent contractor to a new program. The full I/M program transition, which included new equipment, a new program database, and training for all inspection personnel, was accomplished with no interruption of service or convenience to motorists or Washington State.

Washington Emissions Check Program

Applus+ and Washington Department of Ecology

Contract Term and Responsibilities	Program Data	Type Of Tests Performed	Data Management Technology Employed
July 1, 2002 through June 30, 2012 Operate and manage centralized network of stations; employ and train all management and Inspectors	1,183,140 annual vehicle inspections (2007) 16 centralized facilities with 70 lanes 250 inspectors	ASM-2 + TSI + OBDII + Gas Cap + LD & HD Diesel Opacity	VID: SQL database on MS.NET platform Station communications: Wide Area Network; Website: www.emissiontestwa.com

Emissions test protocols were established during Applus+ and Ecology Joint Application Development (JAD) sessions. Prior to program launch, extensive acceptance testing was performed on all equipment and software. Subsequent software releases undergo updated, detailed acceptance testing conducted jointly by Applus+ and Washington Department of Ecology personnel.

Applus+ provides and maintains all software and inspection equipment. Applus+ is solely responsible for the Washington State I/M program and program enhancements. This new flexibility has enabled Applus+ to showcase new products to Washington, including a new reporting tool and a new Applus+ self-service kiosk, which was demonstrated at the 2007 I/M Solutions conference.

As the state's I/M management contractor, Applus+ maintains 16 centralized inspection facilities comprising 70 total lanes. Applus+ conducts between 980,000 and 1,200,000 emissions tests annually.

For more information...

For information on Applus+ performance in Washington State, contact:

Phyllis Bass
Manager, Data Management

Stuart A. Clark
Program Manager

State of Washington Department of Ecology
Air Quality Program
300 Desmond Drive SE
Olympia, WA 98504
Tel: 360-407-6822

Applus+ conducts thorough training seminars including a custom specialized management course, a State Automotive Emissions Specialist course, lane operations training, and staffing/succession planning. Applus+ also employs an I/M program-dedicated QA/QC Manager to coordinate QMS audits, perform unannounced facility audits, and process database inquiries based on anomaly triggers that identify potential fraud.

In addition, Applus+ has designed and implemented an I/M program website as well as a standard complaint resolution system. This system processes an average of 12 inquiries per month.

Connecticut Emissions Testing Program. In Connecticut, Applus+ successfully transitioned a centralized I/M program to a decentralized private-facility network.

Connecticut Emissions Testing Program

Applus+ and Connecticut Department of Motor Vehicles

Contract Term and Responsibilities	Program Data	Type Of Tests Performed	Data Management Technology Employed
October 12, 2003 through May 12, 2010, with potential extension through 2011 Program management; vendor analyzer and software; analyzer maintenance; software ATP; overt and covert auditing; training; reporting; and finance	1,125,058 annual vehicle inspections (2007) ~300 stations 1,200 inspectors	ASM-2 + TSI + OBDII + LD Diesel Opacity + Gas Cap	VID: SQL database on .NET platform; station communication network Comm: Dial-up to VPN via TCPIP; real time to DMV and Applus+ backup data management system Reporting VID: SQL database on Windows platform; Analyzer applications: IE browser interface in MS Windows XP based on .NET development platform Website: www.ctemissions.com

Applus+ provides private inspection facilities with the customized equipment, quality training, and consumables needed to perform more than 1.1 million vehicle inspections each year. In addition, Applus+ provides equipment service and maintenance and operates a facility call center.

Applus+ operates and maintains a "miniVID" system that connects all test facilities; receives inspection, repair, and calibration data; and allows facilities to order test authorizations through the test equipment. (The inspection equipment uses a custom-designed application to interface with financial institutions, allowing Applus+ to debit test facility accounts for payment.) The inspection network operates on dial-up phone lines and via DSL communication.

Applus+ routinely performs overt equipment audits to ensure proper equipment functionality. Applus+ and the Connecticut DMV also jointly review trigger audits and analyze data and SPC reports to monitor the inspection

For more information...

For information on Applus+ performance in Connecticut, contact:

Kenneth F. Nappi
Bureau Chief

Gregg Kelly
Emissions Division Manager

State of Connecticut Department of Motor Vehicles
Roland State Government Center
55 W. Main Street
Waterbury, CT 06702
Tel: 203-805-0644 *or* Tel: 203-805-6239.

data to ensure that inspections are properly performed or investigations and corrective actions taken.

Prior to startup of the Applus-managed program, extensive acceptance testing was performed on all equipment and software. Subsequent software releases receive updated, detailed acceptance testing by Applus+ and DMV personnel. Trained Applus+ technicians perform sub-assembly repairs/replacement in the field, if necessary.

Massachusetts Enhanced Safety & Emissions Testing Program. Inspecting 4.6 million vehicles annually, the Massachusetts Enhanced Safety & Emissions Testing Program is the nation's largest decentralized I/M program using contractor-supplied equipment. Within the program, Applus+ provides consumables, inspector training, industry outreach, and highly affective public information campaigns.

Massachusetts Enhanced Emissions and Safety Test Program

Massachusetts Registry of Motor Vehicles

Contract Term and Responsibilities	Program Data	Type Of Tests Performed	Data Management Technology Employed
October 1, 1999 through September 30, 2008 Program management; vendor analyzer and software; software ATP; overt and covert auditing; repair monitoring; training; reporting and finance	4,900,000 vehicle inspections (2007) 1,600 stations 7,500 inspectors	VMAS + TSI + OBDII + LD& HD Diesel + Gas Cap + Safety Inspections	VID: Oracle 9i database (MCI) connected via modem banks in real time to e-VID at RMV ALARS system Comm: TCPIP communications to VPN Management applications: custom applications on Windows platform, Reporting and statistical process control (SPC); Access database with HTML browser interface Website www.vehicletest.st.ma.us

When an equipment manufacturer's workstations consistently failed to meet field audit requirements, Applus+ managed a major equipment transition while the program was in full operation. Underperforming workstations in the network were replaced or retrofitted with minimal downtime for facilities and no loss of motorist convenience. Applus+' dedicated Quality Assurance staff continues to perform overt and covert audits for each station in the network.

Applus+ utilizes vendor-purchased (SPX Corporation) inspection workstations for the Mass 99 program and performs field service and maintenance. Applus+ has modified the software protocols to meet customer and industry needs throughout the life of the I/M program. Inspection data is stored on the VID and is communicated to the Mass RMV's Automated Licensing and Registration System database (ALARS).

For more information...

For information on Applus+ performance in Massachusetts, contact:

Paul Davis
Bureau Chief

Mark LaFrance

Massachusetts Dept. of Environmental Protection
Registry of Motor Vehicles
One Winter Street, 9th Floor
Boston, MA 02108
Tel: 617-348-4080 or 617-352-9329

Prior to program startup, extensive acceptance testing was performed on all equipment and software. Prior to its deployment, subsequent software releases receive updated, detailed acceptance testing by Applus+ personnel.

Applus+ was awarded two single-year contract extensions to bring the program's end date to September 30, 2008.

Illinois Vehicle Emissions Testing Program. Launched in May 2008 as the only fixed-fee, large scale hybrid program in the country, the Applus+ Illinois Vehicle Emissions Testing Program transitioned from the previous contractor with the design, development, and installation of new Applus+ inspection equipment and an Applus+ created enhanced Vehicle Information Database (the *e*-VID™). Applus+ also provides training for its centralized staff (inspectors and customer service reps), decentralized inspectors, and state agency representatives. Applus+ Service Technicians provide equipment repairs and maintenance for all centralized and decentralized locations.

Prior to program startup, extensive acceptance testing was performed on all equipment and software. Subsequent software releases receive updated, detailed acceptance testing by Applus+ personnel.

For more information...

For information on Applus+ performance in Illinois, contact:

Chris Demeroukas
Manager
Division of Mobile Resources

Illinois Protection Agency
1021 N. Grand Avenue, East
Springfield, IL 62794
Tel: 217-524-4369

Illinois Vehicle Emissions Testing Program

Illinois Environmental Protection Agency

Contract Term and Responsibilities	Program Data	Type Of Tests Performed	Data Management Technology Employed
May 1, 2008 through April 31, 2013 Program management; testing equipment; analyzer maintenance; ATP; VID design, development, and maintenance	1,800,000 vehicle inspections Hybrid program 17 centralized stations 38 private inspection facilities	OBDII + BAR97 (TSI) + Gas Cap	VID: Applus+ designed, developed, and managed *e*-VID™ (Oracle RDBMS on .NET platform) Reporting Applications: Web-based Applus+ Reporting Dashboard, Automated notification systems, Change Management Tool Comm: High-speed station communication network Website: www.applusillinoisairteam.com

Georgia's Clean Air Force. As subcontractor to Parsons and Verizon/MCI, Applus+ has been a proud partner in Georgia's Clean Air Force, serving state motorists for nearly 12 years. Beginning in October 1996 under Parsons, Applus+ began administering the program's waivers. In 2007 under the state's new contract with Verizon, the scope of Applus' work significantly increased to include inspector training and auditing.

Georgia presently tests approximately 2.4 million vehicles each year. As waiver administrator, Applus+ staff issue approximately 5,000 senior exemptions, repair waivers, and military and student extensions. The Applus+ team also responds to motorist inquiries about the emissions program.

Applus+ annual auditing responsibilities include performing nearly 1,700 complete overt equipment audits (five-gas) and station certifications; 8,300 overt limited audits (administrative audits and station decertifications); 1,500 covert remote audits; and nearly 3,000 covert onsite audits. Applus+ training tasks include providing initial certification training for new inspectors, re-certification training for existing inspectors, and ad-hoc re-training at the state agency's request.

For more information...

For information on Applus+ performance in Georgia, contact:

Pam Earl
Program Manager

Georgia Department of Environment Protection
4244 International Parkway, Suite 136
Atlanta, GA 30354
Tel: 404-362-2780

Georgia Clean Air Program

Georgia Department of Environmental Protection, Public Affairs Unit

Contract Term and Responsibilities	Program Data	Type Of Tests Performed	Data Management Technology Employed
October 2, 1996 through September 30, 2007 Administer exemption, referee, and waiver program	653,974 annual vehicle inspections (2007) 5 waiver and referee centers issuing 5,000 annual waivers	OBD, TSI, ASM, Gas Cap	VID: Oracle (Parsons) Reporting applications: Oracle 9 interface with VID; Visual Basic on MS Windows platform.
October 1, 2007 through December 31, 2013 Administer exemption, referee, and waiver program; provide inspector training; conduct station audits			VID: Oracle 9 (Verizon) Reporting applications: Oracle 9 interface with VID; Visual Basic on MS Windows platform.

Rhode Island Emissions and Safety Testing Program. From 2000 through 2006, Applus+ managed the Rhode Island Emissions and Safety Testing Program as prime contractor, providing custom equipment, equipment service and maintenance, inspector training, recruitment seminars, and consumables to the decentralized network.

Applus+ dedicated Quality Assurance staff performed quarterly overt facility audits and two annual covert visual audits for each station. Digital trigger audit reports and covert vehicle audit activities were directed by the state. As part of overt audits, Applus+ staff collected and reconciled voided windshield compliance stickers.

Applus+ established and carried out a comprehensive inspector training program that combined classroom and hands-on instruction. Applus+ also administered certification examinations to trainees. More than 1,100 inspectors were trained by Applus+.

For more information...

For information on Applus+ performance in Rhode Island, contact:

Joyce Fiore
Air Quality Specialist

Frank Stevenson
Senior Air Quality Specialist

Office of Air Resources
State of Rhode Island
Dept. of Environmental Management
235 Promenade Street
Providence, RI 02908
Tel: 410-222-2808, ext. 7108 or 7021

Rhode Island Emissions and Safety Testing Program

Rhode Island Department of Motor Vehicles
and Department of Environmental Management, Office of Air Resources

Contract Term and Responsibilities	Program Data	Type Of Tests Performed	Data Management Technology Employed
January 1, 2000 through December 31, 2006 Program management; vendor analyzer and software; software ATP; overt and covert auditing; training; reporting; and finance	375,493 vehicle inspections (2006) 300 stations 1,100 inspectors	VMAS + TSI + OBDII + Diesel Opacity + Gas Cap + Safety Inspections	VID - SQL database on Windows NT platform; Reporting Applications: Crystal Reports Analyzer applications: dial-up interface Website www.riinspection.com for Program

Applus+ utilized vendor-purchased workstations for the RI2000 I/M program and modified software protocols to meet state and industry needs throughout the life of the I/M program. Prior to program startup, extensive acceptance testing was performed on equipment and software. Prior to its deployment, subsequent software releases received updated, detailed acceptance testing by Applus+ and DEM/DMV personnel.

Rhode Island tests approximately 365,000 vehicles annually through its nearly 300 privately operated inspection facilities. Throughout its tenure as program manager, Applus+ performed contracted services without incident and the I/M program was regarded by the state as an extremely successful Region 1 contributor to New England's clean air.

notes:

3 Summary of Contractor Qualifications

Per instructions on the proposal format provided in Attachment C of the RFP for Projects CM-STP-9409 (94) and (82), the following table compiles and summarizes the information provided in Section 2.2 above.

Applus+ I/M Management Contracts At a Glance			
Currents Contracts	**Program Data**	**Type of Tests Performed**	**Data Management Technology Employed**
Connecticut Program management, analyzer and software; analyzer maintenance; software ATP; overt and covert auditing; training; reporting;d finance	1,352,328 vehicle inspections (2005) 300 stations 1,200 inspectors	ASM TSI OBDII LD Diesel Opacity Gas Cap	⊕ Applus+ management VID accounting functions and reporting applications ⊕ SQL database on .NET platform; station communication network ⊕ Dial-up to VPN via TCP/IP communications and connected in real time to DMV and to Applus+ backup data management system ⊕ Reporting VID – SQL database on Windows platform; ⊕ Analyzer applications – IE browser-based interface in MS Windows XP based on .NET development platform ⊕ Website www.ctemissions.com
Massachusetts Program management, vendor analyzer and software; software ATPs; overt and covert auditing, repair monitoring; training, reporting and finance	4,978,090 vehicle inspections (2005); manage 1,600 stations and 7,500 inspectors	VMAS TSI OBDII LD& HD Diesel Gas Cap Safety Inspections	⊕ Oracle 9i database (MCI) connected via modem banks in real time to VID at RMV ALARS system ⊕ Management applications – custom applications on Windows platform ⊕ Web reporting and statistical process control (SPC) ⊕ Website www.vehicletest.st.ma.us (program)
Illinois Hybrid Program management, testing equipment; Analyzer maintenance, software ATPs; VID	1,800,000 vehicle inspections; manage 17 centralized stations and 41 decentralized stations	OBDII BAR97 Gas Cap	⊕ Applus+ VID development and management ⊕ Dashboard-based reporting applications ⊕ Automated notification systems ⊕ QA and auditing applications ⊕ Oracle RDBMS on .NET platform; highspeed station communication network ⊕ Data migration ⊕ Website www.applusillinoisairteam.com/
Georgia Operate exemption, referee and waiver program	2,269,039 vehicle inspections (2005); operate waiver and referee centers; perform audits and inspector training	OBD TSI ASM Gas Cap	⊕ VID – Oracle 9 (Verizon) ⊕ Management and reporting applications ⊕ Oracle 9 interface with VID ⊕ Custom management and reporting applications ⊕ Visual Basic on MS Windows platform.
Washington State Operate and manage centralized network of stations; employ and train all management and inspectors; provide equipment and VID	1,139,140 vehicle inspections (2005); operate 16 centralized facilities with 70 lanes; employ 250 inspectors	ASM TSI OBDII Gas Cap LD & HD Diesel Opacity	⊕ VID - SQL database on MS.NET platform ⊕ Station communications – highspeed Wide Area Network; ⊕ Website www.emissiontestwa.com ⊕ Queue cameras onsite

3.1 Staff Qualifications

As stated in Applus' Quality Policy Statement, Applus+ is dedicated to "developing highly qualified personnel." The Applus+ Memphis equipment and database teams exemplify the words "highly qualified." With a long list of educational accomplishments, certifications, and – most importantly – real-world industry experience, the Applus+ team that provided the tools for a successful May 2008 Illinois startup is ready for its next challenge.

Applus+ staff considered key to Memphis equipment and database delivery are introduced in the following pages. Detailed resumes are available upon request.

Summary of Applus+ Team Members' Credentials	
+ ASE certified Master Automotive Technician	+ Certificate in Web Development, The Illinois Institute of Art
+ Associate Degree in Science, College of Dupage	+ Cisco CCNA, Boston University Corp Ed Center
+ Associate of Applied Science in Electronics Engineering Technology, Taylor Business Institute	+ CISSP (Certified Information Systems Security Professional)
+ Avionics School and various Air Force training certificates: Keesler AFB, Castle AFB, Wright-Patterson AFB	+ Computer Career Program, DePaul University
+ B.A., Western Illinois University	+ Graduate Studies, Northern Illinois University, Geographic Information Systems
+ B.S., Computer Science	+ HTML 3.2 Certification
+ B.S., Computer Science, Elmhurst College	+ L1 Advanced Level Engine Performance certification
+ B.S., Computer Science, Illinois Institute of Technology	+ M.S., C.I.S., University of Michigan
+ B.S., Electrical Engineering, University of the Philippines	+ M.S., Computer Science, Illinois Institute of Technology
+ B.S., European History, Northern Illinois University	+ Master of Science, Computer & Information Science, Brennan School of Business, Dominican University
+ B.S., Information Technology, University of Massachusetts at Lowell	+ Mastering Microsoft Visual Basic (Certificate), TeKnowlodgy Education Centers
+ B.S., Network and Communications Management, DeVry University	+ Mastering Microsoft Visual C++ (Certificate), TeKnowlodgy Education Centers
+ B.S., Technical Management, DeVry University	+ MCDBA (Microsoft Certified Database Administrator)
+ Bachelor of Engineering, Information Technology, R.M.C.E.T., Mumbai University	+ MCP (Microsoft Certified Professional)
+ Bachelor of Fine Arts, Multimedia & Web Design, The Illinois Institute of Art	+ MCSD (Microsoft Certified Systems Developer)
+ Brainbench Project Management Certification	+ MCSE (Microsoft Certified Systems Engineer Windows 2000)
+ CCIE (Cisco Certified Internetworking Expert)	+ MCSE (Microsoft Certified Systems Engineer)
+ CCNA (Cisco Certified Network Associate)	+ Microsoft Certified Application developer in .Net Technologies (MCAD)
+ CCNP (Cisco Certified Network Professional)	+ Microsoft Certified Solution Developer in .Net Technologies (MCSD)
+ Certificate in Digital Graphic Design, The Illinois Institute of Art	+ Oracle DBA 8i Certification
+ Certificate in Flash Action Scripting, The Illinois Institute of Art	+ Oracle DBA OCA (Database Administrator Oracle Certified Associate)

The Applus+ A-Team

Jonathan Donado
Chief Executive Officer & Treasurer, Applus+ Technologies, Inc. • Chief Executive Officer, Applus+ AutoLogic, Inc.

Jonathan Donado is responsible for planning, budgeting, directing, and organizing all management and operational activities for Applus+ North America. He establishes overall strategic initiatives and growth goals for the company, including managing mergers and acquisitions. He is a focused leader with an accomplished record of optimizing profit and revenue while providing the firm with a competitive and technological edge. Prior to joining Applus+, Jonathan was a Business Unit director for Automatic Data Processing (ADP). He has more than ten years experience providing government services and has demonstrated expertise in international markets.

Jonathan has a Bachelor of Science in Business Administration and an MBA from the University of Navarra, Spain. He is a member of the board of directors for the Spanish-USA Chamber of Commerce.

Andrew Jones
Director of Technology

Andrew Jones shares with Applus+ more than ten years of experience in information technology (IT) department management and operations, with emphasis on the development, deployment, upgrade, and optimization of integrated networks according to organizational policies and program goals.

Primary infrastructure architect for the newly deployed Applus+ Illinois *e*-VID™, Andrew's current responsibilities also include managing Applus+ corporate office LAN/WAN, program operation sites, and customer networks. He has considerable experience managing web and data communications, network hardware, and software configuration, integration, and maintenance. Before assuming the role of director at Applus+, Andrew was responsible for maintaining and troubleshooting the corporate-wide network and its servers as well as for managing file server storage, system backups, the company-wide email system, system security, and access control.

Andrew is a Microsoft Certified Systems Engineer (Windows NT 4.0 and IIS 4.0, TCP/IP, Windows 2000 with multiple electives, Cisco Certified Network Associate 2.0, and Cisco Certified Network Professional 2.0).

Nitin Oberoi
Software Development Manager

Nitin is a Microsoft Certified Programmer (MCP) and a graduate from the University of Michigan. With more than seven years of software development experience in all phases of the software development life cycle, Nitin has consistently expanded his skill set to include C#, VB.NET, Visual Basic/VBA, C++ (MFC), ASP.NET 1.0/2.0, ASP, Web Services, ADO.NET, SOAP, WSE, Web Parts, JavaScript, VBScript, Cold Fusion, HTML, DHTML, CSS, XML and XSL, MS SQL Server 2005/2000/7.

Nitin led the team of Applus+ developers who built the Applus+ Illinois *e*-VID™. He also concepted and developed the Applus+ Reporting Dashboard, a web-based, user-friendly interface that provides authorized users with easy access to real-time program data and on-demand reports.

Prior to joining Applus+, Nitin developed vehicle diagnostic software for Delphi, SPX, and General Motors.

The Applus+ A-Team

Moosung Son
Network Security Specialist

As one of only 517 individuals in the world with a double Certified Cisco Internetwork Expert (CCIE) certification, Moosung Son configures and manages Applus' network systems for LAN/WAN, telecommunications, and voice systems for optimal security. He also provides support for secure VPN and network routing. As Applus' primary Network Security Engineer, Moosung is responsible for designing, executing, and monitoring the security of corporate and program networks to ensure that best practices are applied to each and every system design.

In addition to receiving a double CCIE in Routing & Switching and Security, Moosung is a Microsoft Certified Systems Engineer (2000 and NT), a Microsoft Certified Professional, and a Cisco Certified Network Associate (CCNA).

Ali Ahmed
Database Architect

Working in all capacities from UNIX Administrator to lead DBA Architect, Ali Ahmed has more than 15 years of solid experience working with Oracle and SQL server databases. Prior to joining Applus+, he worked with major technology companies such as Forsythe Technology, Inc.; Datasoft Corporation; IBM; and ComEd. His skill set includes Oracle (9i, 8i,7.x), Financials 11.5.9 iAS, Oracle 9.2.0 (RAC, Replication, Data Guard), E-Business Suite (Oracle 11i), Oracle Application Server 10G, Teradata, Sybase (10.02), SQL Server (7.0, 2000), PeopleSoft, SAP, ERwin, S-designer, Oracle Designer 2000, Oracle Forms, Oracle Developer 2000 UNIX Shell, C, C++, Pro*C, SQL, PL/SQL, JAVA, Transact SQL, and Visual Basic.

Ali graduated from the Illinois Institute of Technology with both a Bachelor and Masters degree in Computer Science.

Yusuf Shaik
Programmer Analyst

Yusuf Shaik is a Microsoft Certified Solution Developer (MCSD), Microsoft Certified Database Administrator (MCDBA), and a Microsoft Certified Application Developer (MCAD) with more than four years of application development experience. As part of the Applus+ *e*-VI™ development team, he is responsible for testing, maintaining, and monitoring computer programs and systems as well as coordinating hardware and software installation.

Prior to joining Applus+, Yusuf worked for Scott Trade and EWAY solutions. His skill set includes C#, VB.NET, C, C++, ASP.NET 1.0/2.0, AJAX, SQL Server 2005/2000, XML, XSLT, XSD, Crystal Reports, and ASP.

Dan Sandiko
Programmer Analyst

Dan Sandiko is an Oracle Certified Application Developer and an Oracle Certified Internet Application Developer with more than 20 years of experience developing programming solutions that focus on ASP/ASP.NET, Visual Basic, VB.NET, C#.NET, HTML, VBScript, JavaScript, XML/XSLT, and relational database design. As part of the Applus+ *e*-VID™ and Reporting Dashboard development team, Dan creates web services and web pages using Microsoft.NET 2.0.

Dan graduated from the University of Philippines with a degree in Computer Sciences.

Adeyinka Adeyanju
Database Administrator

Adeyinka Adeyanju is an Oracle-certified Professional database administrator with a Bachelor's degree in Computer Science. As part of the Applus+ *e*-VID™ development team, Adeyinka creates Oracle and SQL server databases and installs Oracle software and databases. Her skill set includes Oracle, PL/SQL, and UNIX. She has five years experience optimizing, administering, and performance-tuning relational database management systems, including the Applus+ Illinois *e*-VID™.

The Applus+ A-Team

Andy Scaife
Database Integration Specialist / Software Developer

With more than eight years of SQL Server programming and integration experience, Andy Scaife utilizes his SQL knowledge to replicate testing data from Oracle to a SQL Server for reporting within the Applus+ Massachusetts Emissions and Safety Test Program. He also has extensive experience with data recovery and backup as well as the repair of corrupted databases. He creates multiple database structures that seamlessly integrate client data into a complicated data system for dialing and reporting purposes. As part of the Applus+ Illinois e-VID™ development team, Andy helped defined the process for updating external agency databases to allow enforcement of registration denial for noncompliance with inspection law.

Andy has a Bachelor's degree in Fine Arts. He is currently working toward his Microsoft Certification for IT Professionals.

Bhavesh Patel
Software Developer & Database Analyst

Bhavesh Patel started his career at Applus+ as an intern just two years ago, but his contributions to the company's custom .NET web driven applications are already in use and well-received by Applus+ clients. Bhavesh's professional responsibilities include extensive work with portal applications that incorporate n-tier architecture and C# design patterns. He also creates interactive web pages involving ASP.NET Server Controls, validation controls, user controls, data readers, data sets, and data adapters. His skill set includes AJAX, SQL Server, and ASP.NET.

Bhavesh developed the Applus+ Reporting Dashboard interface and its associated reporting applications for the Applus+ Illinois and Washington Programs. He has a Master's degree in Computer & Information Science from Brennan School of Business as well as a Bachelor's degree in Information Technology from Mumbai University.

Prem Rajadattan
Software Developer

Prem offers proven experience in reporting and Client/Server applications, both back-end server development as well as front-end GUI development using Webforms and Winforms C#.NET and VB.Net. Additionally, Prem offers her experience in developing data-driven web sites using ASP.NET, Web Matrix, CSS and AJAX. At Applus+, Prem's responsibilities include maintaining, troubleshooting, and managing corporate-wide network LAN-WAN and servers as well as managing file server storage, backup systems, and software installations.

Prem earned a Master of Science degree from Brennan School of Business as well as a Bachelor's degree in Information Technology from Mumbai University.

Ramesh Ganesan
Software Developer

Part of the Applus+ Illinois e-VID™ development team, Ramesh Ganesan is a .NET developer with expertise in C#, ASP.net, SQL Server and Oracle 10g.

Putting his University of Ohio Masters in Computer Science, Ramesh helped defined the process for updating external agency databases to allow enforcement of registration denial for noncompliance with inspection law.

Allen Panakal
Web Developer/Administrator

Allen Panakal's background and education in Web Design and Development have been instrumental in the design and development of the company's revolutionary Applus+ Reporting Dashboard. Allen also designed and maintains the Applus+ Intranet and other associated business sites. His skills are routinely utilized by the company's Marketing department for online marketing strategy, graphic design, and assistance with public outreach campaigns.

Allen has his Bachelor's degree from DeVry University. He is also an advanced user of Adobe Photoshop and Illustrator, Macromedia Flash, and Dreamweaver.

The Applus+ A-Team

William Nicholson
President, Applus+ AutoLogic, Inc.

Bill Nicholson brings to Applus+ extensive experience in the design and manufacture of inspection and maintenance equipment as well as software development for vehicle inspection programs. As TSI and OBDII hardware team leader, Bill enjoys returning to his roots as a hardware and software engineer and actively participating in the creation of next-generation projects involving Windows CE-based PC and Pocket PC hardware and software and other electronic products for the I/M industry.

Bill is a long-standing member of the Society of Automotive Engineers (SAE) and the Institute of Electrical and Electronics Engineers, Inc. (IEEE). He is founder and President of AutoLogic, Inc., a recent Wisconsin-based Applus+ acquisition. Applus+ AutoLogic, Inc. is a member of the Equipment and Tools Institute (http://www.etools.org) and the Automotive Aftermarket Industry Association (AAIA, http://www.aftermarket.org/Home.asp). The company also is an AAIA iShop participant.

Mark Werner
Executive Vice President, Applus+ AutoLogic, Inc.

With 18 years of professional software, product, and project design experience, Mark Werner leads the inspection software development process for all of Applus+ AutoLogic's PC-, PDA-, and microprocessor-based OBDII, ASM, TSI, and safety solutions, creating modular software design structures and developing system documentation and goals.

Skilled in C++, Visual Basic, Visual Studio.NET, Mark also holds a Bachelor of Science in Electrical Engineering from the University of Wisconsin.

Dave Comeau
Vice President, Business Operations, Applus+ AutoLogic, Inc.

Dave Comeau oversees Applus+ AutoLogic activities directly related to the making products or the providing services. He monitors client services to ensure that the company efficiently and effectively provides needed services. He also reviews Applus+ AutoLogic operations, conferring with technical or administrative staff to resolve any production or processing problems.

Focused on growing the Applus+ AutoLogic business, Dave currently supports organizational implementations from a corporate perspective, implementing best practices, developing cost-saving initiatives, overseeing contract compliance, and aiding in the management of both client and vendor relationships. Both an electrical engineer and manager with more than two decades of relevant work history, Dave shares experience gained in implementing numerous major government technology programs to guarantee accountability and oversight during roll out.

Greg Werner
Production and Facilities Manager, Applus+ AutoLogic, Inc.

In his nine years at Applus+ AutoLogic, Greg Werner as been responsible for managing the overall equipment production process. He manages projects, schedules, and production personnel while imparting Applus' quality control procedures by validating that Applus+ AutoLogic products meet both international and domestic quality assurance standards and maintaining product testing records.

Prior to joining Applus+ AutoLogic, Greg worked with W.O.W. Distributing Company as a Merchandiser.

Tim Schwantes
Software Engineer, Applus+ AutoLogic, Inc.

With eight years of direct experience at Applus+ AutoLogic, Tim Schwantes plays an instrumental role in designing and modifying inspection software for OBDII implementations on Pocket PC, Windows CE, and Windows 95, 98, 2000, and XP platforms. He is currently responsible for ensuring that Applus+ AutoLogic software products provide proper operating speed, portability, and relatively low maintenance detail.

Tim is a graduate of the University of Wisconsin with a Bachelor's degree in Computer Science. For the Applus+ Illinois implementation, Tim served as Lead Lane Software Engineer.

The Applus+ A-Team

Tim Raml
Software Engineer, Applus+ AutoLogic, Inc.

As Applus+ AutoLogic's Software Engineer, Tim Raml leads the team in developing I/M applications used around the world Having created tools used in the United States, Canada, South America, Europe, and Asia, Tim currently spends his workdays modifying existing Applus+ AutoLogic software for adaptation to new hardware, upgrading interfaces, and improving overall application performance.

With more than 12 years of experience in software engineering, Tim also offers guidance to troubleshoot and resolve system design issues. He holds a Bachelor's degree in Computer Science from the University of Wisconsin. For the Applus+ Illinois implementation, Tim served as Lead OBD Software Engineer for inspection equipment applications.

Victor McCartney
Hardware Development Manager, Applus+ AutoLogic, Inc.

In his role at Applus+, Victor McCartney coordinates the installation, testing, and calibration of facility test equipment during construction and implementation phases. Victor also oversees the centralized and decentralized equipment installation process and equipment quality-assurance processes. Victor's responsibility level has recently been increased to include electrical engineering for design, development and testing of hardware products. During equipment design and development for the Applus+ Illinois Vehicle Emissions Testing Program, Victor served as Applus+ AutoLogic's Lead Electrical Engineer.

Victor has more than ten years of professional engineering experience. He holds a degree in Computer Science from Hiram College.

Steven Rohrer
Senior Project Engineer, ASI Technologies

Steve Rohrer shares more than 27 years of successful mechanical design and project management skills with Applus+ AutoLogic. As a contract equipment engineer, he manages installation of Applus+ AutoLogic products. Most recently, he served as Lead Mechanical Engineer for equipment developed for the new Applus+ Illinois program.

At ASI Technologies, Steve is primarily responsible for the custom design, manufacture, and successful startup of the Air Seal product line. He also provides ongoing in-house and field product support. Prior to joining ASI and Applus+ AutoLogic, he provided small local manufacturing companies with on-site consulting services for electrical product development.

Steven holds Bachelor's degree in Industrial Technology from the University of Wisconsin.

3.2 Anticipated Problems in Transitioning to New Equipment and VID

Applus+ experience in transitioning programs suggests that the biggest obstacles involve data migration from the incumbent VID and construction delays due to local permitting.

Data Migration Challenges. Data migration from the incumbent's system to any new VID is always a challenge. The smoothest transitions stem from cooperation between the new and existing vendor.

Although the Applus+ Memphis *e*-VID™ schematics will be different from the existing VID's, the core content of the two databases will be the same. Time will be required to decipher the incumbent contractor's data mappings and define the procedures and packages that can be used to transfer existing program data to the Applus+ Memphis *e*-VID™. To best manage this process, Applus+ will work with the City to set up a data migration Integrated Project Team (IPT) comprising allied technology staff. Within this IPT, the intricacies of the field mappings can be accomplished and a schedule for incremental data extracts determined so that Applus+ can perform data migration in parallel with development.

Applus+ has successfully migrated program data from VIDs designed and/or maintained by other vendors. In transitioning the Connecticut and Washington I/M programs – as well as the Illinois program implemented in May 2008 – Applus+ has migrated and managed program data acquired by the other contractors without delays to new-program startup.

Construction Permits. Should construction permits be required for installation of the wait-time systems, Applus+ may request the Motor Vehicle Bureau's assistance in obtaining such permits in a timely manner.

4 Work Plan

4.1 Task 1: Provide and Install New Inspection Equipment

Applus+ will provide its own proven high-quality inspection equipment, custom designed and engineered to meet the program's vehicle data collection and retrieval needs, even in the harshest environmental conditions.

Supplied as standard components, the Applus+ waterproof touch-screen monitors and keyboards are built to stand up to an open-air, garage environment, while rugged and reliable fingerprint scanners share the proven inspector-authentication technology used in Applus' Washington State centralized I/M program. An industrial PC housed in a durable enclosure provides the computing power needed to reliably analyze and store vehicle inspection data, and the Applus-supplied barcode scanner outperforms the industry standard and has a top environmental rating. With fast print speed and a good toner lifecycle, the Applus+ standard printer has a proven record of exceptional performance in I/M programs across the country.

Specification for each required and optional equipment component are provided for the City's review.

Above: The Applus+ analyzer system undergoes real-world environmental testing at the Sussex, Wisc., manufacturing facility. Full system functionality is achieved even in a driving rainstorm.

4.1.1 Standard Components

Applus+ will provide and install the following required vehicle inspection equipment in each inspection facility and Mobile Testing Van.

Test Lane Equipment

Inspection Processor. The OBDII workstation incorporates an industrial PC (HP rp5000 - C 2.5 GHz).

Applus+ Memphis Inspection Processor	
General	
Built-in Devices	Speaker
Depth	15.1 in
Height	3.9 in
Product Form Factor	Desktop
Weight	22 lbs
Width	13.3 in
Audio Output	
Compliant Standards	AC '97, SoundMAX
Type	Sound card - integrated

Cache Memory	
Cache Per Processor	128 KB
Installed Size	128 KB
Type	L2 cache
Environmental Parameters	
Humidity Range Operating	10 - 90%
Max. Operating Temperature	95 F
Min. Operating Temperature	50 F
Expansion / Connectivity	
Expansion Bays Total (Free)	1 (0) x front accessible - 5.25" x 1/2H 1 (1) x front accessible - 3.5" x 1/3H 1 (0) x internal - 3.5" x 1/3H
Expansion Slots Total (Free)	2 (1) x memory - DIMM 184-pin 1 (0) x processor - Socket 478 2 (2) x PCI - half-length, full-height
Interfaces	2 x Hi-Speed USB - 4 pin USB Type A 3 x PoweredUSB 2.0 (12 V) - 4 pin USB Type A 1 x PoweredUSB 2.0 (24 V) - 4 pin USB Type A 1 x audio - line-out - mini-phone stereo 3.5 mm 1 x display / video - VGA - 15 pin HD D-Sub (HD-15) 1 x keyboard - generic - 6 pin mini-DIN (PS/2 style) 1 x mouse - generic - 6 pin mini-DIN (PS/2 style) 1 x network - Ethernet 10Base-T/100Base-TX - RJ-45 1 x parallel - IEEE 1284 (EPP/ECP) - 25 pin D-Sub (DB-25) 4 x serial - RS-232 - 9 pin D-Sub (DB-9)
Graphics Controller	
Graphics Processor / Vendor	Intel Extreme Graphics
Type	Integrated
Video Memory	Shared video memory (UMA)
Mainboard	
Chipset Type	Intel 845GV
Data Bus Speed	400 MHz
Standards Compliance	
Compliant Standards	ACPI, EPA Energy Star, Blue Angel
Networking	
Data Link Protocol	Ethernet, Fast Ethernet
Features	Remote Wakeup, Wake on LAN (WoL)
Networking	Network adapter - integrated
Operating System / Software	
OS Provided	Microsoft Windows XP Professional
Software	Drivers & Utilities
Optical Storage	
Read Speed	48x
Type	CD-ROM - IDE
Power	
Device Type	Power supply

Power Consumption Stand by / Sleep	3 Watt
Power Provided	185 Watt
Voltage Required	AC 120/230 V (50/60 Hz)
Processor	
Type	Intel Celeron 2.5 GHz
RAM	
Form Factor	DIMM 184-pin
Installed Size	512 MB / 2 GB (max)
Memory Specification Compliance	PC2700
Memory Speed	333 MHz
Technology	DDR SDRAM - non-ECC
Storage	
Hard Drive	1 x 40 GB - standard - ATA-100 - 7200 rpm
Storage Controller	
Controller Interface Type	ATA-100
Type	1 x IDE - integrated

For added durability and resistance to the elements, Applus+ workstation use a Hoffman-brand enclosure (pictured at left).

Workstations are configured with an inaccessible operating system to prevent inspectors or motorists from accessing the file system to alters test results, inspection software, or other data files (e.g., system related databases, lookup tables, etc.).

Tamper switches further secure workstations by preventing physical access to the PC and the OBDII interface.

Data Entry Panel. For acquiring vehicle and inspector data, Applus+ will provide the RFP-required barcode reader, data entry terminal with touch-screen monitor, and biometric scanner. Applus+ also will provide a spill-proof USB-compatible keyboard. The Applus+ provided VID and inspection software will be compatible with the City-licensed Polk VIN decoder.

Touch-Screen Monitor. Applus+ workstations are equipped with a 15-inch flat-screen NEC panel with capacitive touch screen that serves as a fast, intuitive interface. Its transreflective light bonding allows readability even in bright sunlight.

Specifications for the waterproof touch-screen monitor (screen image at right) are presented in the following table.

Waterproof Touch-Screen Monitor	
Size	15-inch panel
Field Testing	One year of Applus+ kiosk field testing yielded no problems or need for replacement due to damage from daily use in varying weather extremes or changes
Surface Scratch Hardness	Functionality unaffected by server abrasion per MIL-C675-C, exceeding number of specified cycles; Functionality unaffected by 10,500 grams of force per Balance Beam Scrape Adhesion Mar Tester with loop stylus; A Mohs pick with a hardness rating of 7 or higher is required to induce a scratch that causes a functional failure
Surface Obstructions	Touch screen operation withstands surface contaminants such as dirt, dust, and grease
Chemical Resistance	ClearTek™ II; highly resistant to a variety of solvents, acids, and household chemicals in accordance with ASTM-D-1308-02e1 and ASTM-F-1598-95 (reapproved 2002)
Liquid Resistance	Liquids on screen do not impede performance of the touch screen
Operating Temperature	-15°C to 70°C for the touch screen (5°F to158°F)
Humidity	Up to 90% RH from 0°C to +35° C (32°F to 95°F)

Barcode Reader. The Applus-proposed 2-D Handheld 4800i (wired or equivalent) scanner reads VINs as well as any other barcoded data from registration or related documents. The rugged 2-D scanner out-performs the Symbol scanner in successful scans for all vehicle makes and models, but the difference is especially significant with the often difficult to capture VINs on GM vehicles. Applus+ AutoLogic conducted field tests to weigh performance of the industry-standard Symbols scanner against the proposed Handheld barcode reader. Of the 83 vehicles sampled from GM lots, the Handheld scanner provided a 99% successful scan rate; the Symbols scanner successfully captured only 93% of the GM VINs.

The Handheld scanner is compatible with PDF417, MicroPDF417, MaxiCode, Data Matrix, QR Code, Aztec, Aztec Mesas, Code 49, and EAN•UCC Composite barcode formats. In addition, its IP54 environmental rating is among the best in the industry.

Workstation software will generate a user interface containing extensive graphical assistance and instruction for barcode scanner use (shown at right). An example of a screen used to instruct the inspector with scanning the vehicle VIN demonstrates the high quality of the digital picture. User interfaces for scanning vehicle inspection reports and test notices will be similar.

Fingerprint Scanner. For the Memphis I/M program, Applus+ proposes the same proven biometric technology as used in its Washington State inspection program.

User identity authentication via the U-are-U® fingerprint scanner uses network information tables to the identify users and in turn, provide the appropriate level of access to inspection system features and functions.

Features of the proposed fingerprint scanner include:

- Rugged design;
- Unaffected by dry, moist, or rough fingerprints;
- Small form factor;
- History of extensive, successful use in the Applus+ Washington State I/M program

Safety Inspection System. Custom-designed to meet program specifications, Applus+ AutoLogic safety inspection software will accommodate all RFP-defined safety checks, visual inspections, and functional inspections, prompting inspectors to follow and record data for each Bureau-defined safety inspection protocol.

On Board Diagnostic II (OBDII). The Applus+ AutoLogic compiled OBD communications module meets EPA, ETI, and state standards. It uses combines the industry-standard Multiplex Engineering OBD communications module with widely used Applus+ AutoLogic OBD communications software and a standard OBD connector.

The Applus+ AutoLogic industry-standard OBD testing solution provides its clients with the advantage of lessons learned. Leveraging hardware and software commonalities among different state programs and multiple I/M vendors, the Applus+ AutoLogic OBD offering can share communications information from the hundreds of thousands of completed vehicle inspections across programs and throughout the entire I/M industry. When a vehicle communication problem is detected and resolved for one program, Applus+ can deploy the resolution to benefit all common device users in other programs.

The Applus+ AutoLogic OBD communications module can resolve numerous communications problems when automatically downloaded and installed. The Illinois Vehicle Emissions Testing Program now uses this system, and the recently awarded Wisconsin Vehicle Inspection Program is due to implement the tool in July 2009. As additional programs adopt the same routinely updated system, it becomes more powerful. As the rate of real world testing via the Applus+ AutoLogic OBD testing solution increases, vehicle communications failure rates continue to fall.

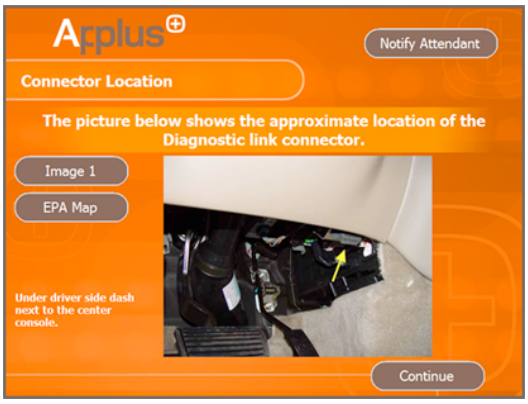
Features of the Applus+ AutoLogic OBD solution include:

- **A standard connector** (as described in SAE J 1978, SAE J 1979, or SAE HS-3000/99). The interface reads RPM signal, readiness monitors, fault codes, MIL command status, and other required information from the vehicle. This scan tool is currently used in numerous inspection programs throughout the United States.
- **Compliance with the federal OBD test equipment requirements** contained in 40 CFR 85.2231. It also complies with the ETI flowchart and state requirements across the U.S.
- **Compatibility with all OBD II communication protocols**, including (but not limited to) ISO, PWM, VPW, CAN, and KWP.

- **Ability to capture VINs when available**. Through a joint effort, Applus+ collaborated with Snap-On in Pennsylvania to formally certify that the Applus+ OBDII interface is consistent with the same OBDII system deployed in the Pennsylvania program. Pennsylvania is unique in that they are one of the only states requiring a certification test and specified success level of VIN capture and verification. (Vendors who are not certified in Pennsylvania typically seem to have a lower VIN success rate; the City of Memphis may elect to verify that any potential bidder is a supplier of certified VIN communication rates in the PA emissions program.
- **Ability to capture PID counts and PCM IDs**. The interface also accesses many of the newer OBDII commands, such as miles driven since check-engine light cleared and miles driven with the check engine light illuminated. By applying configuration settings, the system requests these parameters without a change in the lane software. (The Applus+ *e*-VID™ configures which parameters are requested in addition to the basic OBDII commands.) These new commands can help identify attempts at fraud. (Note: Requesting too many OBDII parameters may affect test duration and in turn, wait times. As such, Applus+ will work conduct adequate testing before reconfiguring the system to capture additional OBD parameters.)
- **A 5-meter cable just outside of the inspector's workstation**. The cable and inspection lane will be configured to prevent the OBD cable from being used to test a vehicle other than the subject.

Workstation software lead inspectors through the inspection process (including data entry) using easy-to-understand graphic images. The emissions test can begin when the workstation software displays a user menu integrated with touch-screen buttons for easy logon via the fingerprint scan device.

DLC Locator Guide. Workstation software will utilize a graphical user interface to assist inspectors with identifying and resolving communication problems and other vehicle-specific variations. The workstations will graphically display clear systematic instructions. For example, if a vehicle is unable to communicate via the OBD connection, monitors to reconnect the DLC connector and try again will alert the inspector. These features will maximize vehicle communication rates for OBD-equipped vehicles.



To provide the best and most comprehensive Diagnostic Link Connector (DLC) database available in the I/M industry, Applus+ has completed a strategic partnership with a leading OBD consulting firm to share DLC location diagrams and photographs. Each company adds its new DLC location images to a common database, and the system automatically incorporates the new diagrams into software updates. An sample an image from the industry's first self-learning DLC picture database is shown at right.

Readiness Status. Workstation software determines a vehicle's test readiness status at the beginning of each OBD test. Accessing the Applus+ Memphis *e*-VID™ databases, the inspection application indicates whether the vehicle meets established readiness requirements or if its make, model, and year are on the readiness exception list.

If readiness does not meet program standards, the workstation retrieves OBD information on the distance traveled since diagnostic trouble codes were cleared. This information is extremely useful in detecting fraud and as an automatic measurement of vehicle repairs. While not all vehicles currently support this parameter, use is increasing as the vehicle population modernizes.

Finally, workstation software determines if, upon retest, the catalyst monitor is set to "ready" for vehicles that failed the OBD inspection with catalyst-related trouble codes (P0420 – P0439). Workstations retrieve vehicle trouble codes and automatically make pass/fail determinations.

Printer (VIR and Barcode Stickers). Applus+ will provide Memphis inspection workstations with an Okidata B4450 laser printer. The printer's predecessor (the Okidata B4200) proved to be deliver the reliability required by busy Applus+ I/M programs. With a fast initial-page print time and exceptional page-per-minute rate once warm, the new model has a replaceable drum and good toner lifecycle.

As printing technology continues to rapidly advance, hardware obsolescence is always a consideration. To mitigate such risk, Applus' robust software is designed to allow its use with virtually any Windows-compatible printer.

Miscellaneous Facility Equipment

Exhaust Removal System. Applus+ personnel will inspect the exhaust removal systems in the inspection facilities and upgrade the systems as required.

Digital Video Recorder/Camera. To allow video monitoring, Applus+ will provide cameras to fully monitor facility offices, waiting areas, test lanes, and queue lanes. Such video will be available for live review via the Applus+ Reporting Dashboard (Section 4.2.3).

Video will be saved to the DVR for 90 days. If the City elects, Applus+ can capture and associate inspection lane video with each test record stored on the Applus+ Memphis *e*-VID™. Additional information and pricing on this added optional service can be presented during contract negotiations.

Applus+ currently provides streaming and record-archived video to its Illinois client.

Inspection Booths

Applus+ will outfit the Memphis I/M inspection booths with new inspection equipment. Should modifications to the booths be required to accommodate the new equipment, Applus+ will accept responsibility for such work.

Documentation

Prior to equipment design, Applus+ will meet with the City for a Joint Application Development (JAD) session. System details will be determined to ensure that work proceeds on schedule and in the right direction. Applus+ will develop detailed system specifications for review and approval by the City. Once the system has been fully acceptance tested, installed, and operational in the production environment, Applus+ will provide a System Requirements Specification that documents all system components.

Warranty

Applus+ and Applus+ AutoLogic warrant contract-required inspection equipment for five years with an option for an additional five-year extension. Applus+ and Applus+ AutoLogic agree to provide the requisite operation and maintenance documentation as well as adequate spare parts provision, and a qualified local technical contractor to support equipment operations and maintenance.

Applus+ agrees to the City's downtime limits and anticipates no problems exceeding equipment reliability expectations.

Training

Applus+ will coordinate and deliver four days of on-site training for inspectors and provide four days of off-site training for inspection technicians using an Applus-prepared curriculum approved by the City.

General System Design Requirements

Applus+ and Applus+ AutoLogic equipment is designed and manufactured to comply with safety requirements and local building codes.

4.1.2 Optional Equipment

Exhaust Gas Analysis System

The Applus+ AutoLogic Bar97-Approved Gas Analyzer for the City of Memphis I/M program offers heavy-duty sampling and water filtration. With a large, durable pump for rapid flow rates and sample delivery, the system is engineered to handle high throughput found in centralized inspection lanes.

Calibration to BAR97 accuracy standards should be conducted every 3 days (or as otherwise specified), with calibration and lockout intervals configurable via the *e*-VID™. (Software will lock out inspections if calibration has not been conducted or completed successfully.) Each analyzer includes 7.5 PSI calibration regulators and BAR97 calibration gas.

Applus+ Memphis Exhaust Gas Analyzer Specifications	
Measurement Method	NDIR (non-dispersive infrared) for HC, CO, CO2, electrochemical cell for O2
Measured Gases	HC, as either n-hexane or propane CO, carbon monoxide: CO2, carbon dioxide O2, oxygen
Measurement Range	HC: 0 to 30,000 pp, (n-hexane) CO: 0 to 15% CO2: 0 to 20% O2: 0 to 25%
Operating Environment	0º to 50ºC (32º to 122ºF) to 95% humidity -300 to 2,500 m (-1,000 to 8,000 ft)
Measurement Resolution	HC: 1 ppm CO: 0.001% CO2: 0.01% O2: 0.1%
Measurement Accuracy	Meets or exceeds BAR97 and ASM accuracy standards. Back purge of sample system when not in use enabled reliable, continuous service and high throughput. Works with local pass/fail standards tables to make an automatic selection of the proper emission standard and automatic pass/fail determinations for each vehicle tested. Standards tables are updatable through the e-VID™. Automatic HC hang-up check with purging to begin upon completion of each test. Back purge is conducted using compressed air to eliminate HC hang-up problems. Configurable calibration and leak checks intervals with two-point gas calibration and vacuum decay leak detection. Testing is locked out due to failed or incomplete calibration or leak checks. Dual sample probes for testing vehicles with dual exhaust pipes.

Pressurized Gas Cap (PGC) Test Equipment

Integrated into a test lane via an external rs232 cable, the Applus-supplied Waekon WAE-FPT27EX1 gas cap tester meets all applicable California BAR97, UL, and USEPA guidelines for evaporative emissions testing. Compared to previous gas cap testing options, it also represents significant steps forward in reliability and ease of use.

With automated pumping, BAR97 communications, and pushbutton operation, the Waekon PGC tester has become the new standard for such testing in emissions inspection programs across the country. It includes a daily calibration check tool and fuel cap adapters effective for at least 95% of the testable vehicle population. A 20-foot coil hose and shoulder strap to allow portable or stationary operation. It is compatible with BAR-97 emission analyzers and includes 110V and 12V power adapters.

Applus+ Memphis PGC Test Equipment Specifications	
Measurements	12" l x 9" h x 3" w 76 oz. (4.75 lbs.) without adapters
Enclosure	ABS thermoplastic (black)
Coil Hose	20' (15' usable) retracts to 3'
Inspector Interface	Red/green/yellow LEDs, 1 push button
I/O Receptacle	RJ45 female 8 contact
Air Filter	100 micron - upstream of internal orifice
Durability:	6' drop/oil and gasoline resistant
Communications	RS232C fixed @ 2400 baud ,N,8,1
Input Voltage:	11-14 VDC, supplied by host computer
Operating Current	300 mA. Maximum
Over Voltage Protection	20 VDC surge suppressor
Over Current Protection	Resetable polyfuse 0.5A
Flow Rate Method	Comparative reference (US Patent #6,298,712)
Test Duration	5-20 seconds
Test Pressure Regulation	30" H20 gauge +/- 1"
Flow Rate Pass/Fail Point	60 cc/minute +/- 3 cc/min.
Temperature Range	15-110°F
Humidity Range	0-100% (non-condensing)
PASS/FAIL Adapter	Pass Setting Flow Range: 52–56 cc/min. Fail Setting Flow Range: 64–68 cc/min.

Applus+ PGC Quality Assurance for Memphis

Virtually every I/M vendor can provide gas cap adapters to test for evaporative leaks, but few offer the gold standard. Or the blue. Or the green. Or the white….

Applus' Gas Cap Quality Assurance Testing Kit is a set of known "good" gas caps, that are color-coded to match adapter test sets. These caps, provided in their own easily transportable case, allow the inspector to verify the integrity of gas cap adapters used to test vehicles on a routine basis. Quality assurance efforts like these, along with Applus' bar-coded test adapters, can protect programs from public relations disasters like the recent gas cap accuracy issues raised in Nashville.

Wait Time System

Should the City elect to implement a wait time system, Applus+ will provide greeter-based system that not only meets but exceeds RFP requirements. The proposed system has proved effective in obtaining wait time data in the Applus+ Illinois I/M program.

Upon entering the inspection facility property, motorists be greeted by an employee with a portable greeter Tablet PC. The greeter enters the vehicle's license plate number on the touch-screen monitor and prints a barcoded ticket containing license plate and arrival time information. This action starts an automated wait time calculation.

When the vehicle enters the inspection bay, the inspector retrieves the ticket from the motorist and scans the barcode. Workstation software decodes the entrance time, subtracts it from the current time, and arrives at the actual wait time. All three times -- the time the property was entered, the time the vehicle arrived in the bay, and the interval of difference between the two -- are entered and saved in the test record. Additionally, the actual wait time for each vehicle is used in calculations that determine the estimated wait time for the facility as a whole.

Estimated facility wait times will be displayed at all locations on an Applus-provided pedestal sign installed to face the motorway. Signs will have a large LED display that can be clearly seen from a distance both during the night and in bright daylight. Estimated wait times also will appear on the public web site to allow motorists the best opportunity to make an informed choice about when and where they bring their vehicle for testing. As a further service to motorists, queue cameras also can be configured to provide video feeds to the public website, providing not only a digital display of estimated wait times but also a physical view of the vehicles currently in line awaiting inspection.

For ease of use, the greeter PC will have an intuitive user interface that is similar to the workstation's. Additional Tablet PC features include long battery life, Bluetooth connection to a wireless printer, and security features to prevent tampering with the operating system or application software.

4.1.3 Quality Assurance

To assist City technicians in monitoring equipment for continued quality performance, Applus+ workstations incorporate a self-contained auditing application that quickly creates and captures an audit record with minimal data entry. Pass/fail decisions based on previously entered gas cylinder values and given tolerances are automatically calculated. Role-based authentication will allow Memphis and Applus+ technicians access to the auditing application via a top-tier workstation menu.

Data fields are programmed to self-initialize, and validation checks are included to verify data entered (as well as the final record) before the audit is completed and the record uploaded to the *e*-VID™. A fully formatted report with print capability also is available once the audit record has been saved to the Applus+ Memphis *e*-VID™. Via the web-based Applus+ Reporting Dashboard (Section4.2.3), City administrators can view, print, and compile data from auditing reports for any lane in the inspection network.

OBD Auditing

Upon technician login and selection of the OBD Audit menu item, the auditor follows user prompts to connect the OBD cable. The workstation's built-in Multiplex T22 OBD protocol replicator then self-audits the inspection system by cycling through each OBDII communication protocol.

The workstation auditing application automatically creates an audit record to capture data on:

- OBD Communications Protocol
- Power To Run
- Cable Integrity
- Date/Time and Auditor/Technician ID

The audit record is automatically stamped with the date, time, and technician ID and uploaded to the Applus+ Memphis *e*-VID™, where it is available for immediate review by authorized personnel via the Applus+ Reporting Dashboard.

Auditing Functions for Additional Equipment Options

Should the City elect to implement gas-cap and idle testing in its new program, the Applus+ inspection workstations will be engineered to include related auditing functions.

Gas Audit. Workstation auditing software captures actual bottle values for the bottle in use as well as the tolerances applied to the bottle (as specified by the City). Data captured through this audit include:

- HC Value / Tolerance
- CO Value / Tolerance
- CO2 Value / Tolerance
- O2 Value / Tolerance
- Cyl. / BAR Number
- Lot Number
- Expiration Date

The workstation Gas Audit uses stored bottle values from to apply low- and high-limit tolerance fields for each channel. Once the workstation obtains its values, built-in software calculates the pass/fail and saves it to the audit record that is uploaded to the *e*-VID™.

Gas Cap Audit. The Gas Cap Audit captures workstation data on:

- Adapters Present
- Pass Master Cap for each gas cap adapter utilized
- Fail Master Cap for each gas cap adapter utilized

- Adapter guide present

4.2 Provide New Vehicle Information Database

In accordance with Project CM-STP-9409(82) requirements, Applus+ will develop and execute its fully accessible *e*-VID™ to serve as the foundation for the entire Memphis Vehicle Inspection Program. With the web-based Applus+ Reporting Dashboard, authorized personal will have each access to all program data and easy accessibility to on-demand reporting capabilities.

The Applus+ *e*-VID™

Applus *e*-VID™ provides real-time communication of test results and related administrative transactions. Highlights of the secure, redundant database system include:

- **A Single Data Store**. The e-VID™ will be the single data store for all transactional inspection data. Applus+ workstations for the new program will include a built-in communication module for connection to the e-VID™.
- **Real-Time Recording**. All transactions between inspection workstations and the e-VID™ will be completed in real-time (i.e., with ~1.5 seconds).
- **Invalid Record Management**. The e-VID™ will maintain an invalid records data table, which includes records that do not conform to appropriate XSD files. The e-VID™ will store these records in their entirety and provide administrators with options for their data logging and review.

4.2.1 VID Details

Applus+ will use Microsoft SQL Server as its back-end database. Highly qualified Applus+ Certified Information Systems Security Professionals (CISSP) and Cisco Certified Internetwork Engineers (CCIE) will design and deploy the requisite servers and systems for optimal performance and reliability. The Applus+ *e*-VID™ also will be configured to communicate with the external Shelby County Clerk's computer system to facilitate registration denials.

Each Applus+ workstation will be equipped with a custom communication module that performs all data collection and retrieval transactions between inspection equipment and the *e*-VID™. Developed on a Microsoft .NET framework, this module will provide a mechanism for the workstation to access custom XML-based .NET web services to interact with the *e*-VID™.

Each inspection workstation in the Memphis network will communicate with the main station server through an Ethernet LAN testing network. Through the City's secure T1 Internet connection, Applus+ workstation software will automatically initiate contact with the *e*-VID™ during each online inspection, obtaining vehicle, inspection, and other relevant information. Upon completion of each online inspection, the workstation will transmit results to the *e*-VID™.

When a workstation establishes communication with the *e*-VID™, a series of parameters are verified with several data sources. To ascertain and appropriately store the correct vehicle identification number, the system validates the vehicle information with a VIN Cross Reference (XRef) table.

Applus+ will work with the City to develop and implement the business rules and reference tables for inspection software to indicate the type of inspection(s) and sequence of inspection procedures for each vehicle presented for testing. During the design process, Applus+ will develop and submit all *e*-VID™ data elements to the City of Memphis for review and approval.

Each inspection workstation will have its own local SQL Server 2005 Express database to store the data tables that automatically determine test procedures and parameters. Authorized program administrators

will have the ability to configure data table values through the Applus+ Reporting Dashboard using SOAP-based, web-service data transfer.

Applus+ builds all data systems with multiple-level redundancy to protect against downtime. Configured servers comprise redundant power supplies, RAID arrays for system drives, and SANs (Storage Area Networks) to hold critical data. With hardware load balancers at the server cluster level, authorized personnel can review of large segments of data without compromising station access to the *e*-VID™. This system design also eliminates the need for downtime during server hardware maintenance, additions, or replacements.

Applus+ will ensure that the Applus+ *e*-VID™ and the legacy VID remain fully synchronized during the transition process (i.e., the current Memphis VID will continue to operate, and its data will remain dynamic until full Applus+ *e*-VID™ implementation). Additionally, the Applus+ *e*-VID™ will be designed to accommodate the City's Polk VIN Decoder data and to provide connection and communications to the external Shelby County Clerk's computer system. Communications with external databases will use web services based on Data Exchange with XML (DEXML) and City-defined schemas. Applus+ will build individual web service functions that can accept, validate, and process XML files. In the event of unsuccessful communication or if an error is encountered, an XML file will be returned with the appropriate error code listed in one of its nodes. As warranted, Applus+ will develop functions that accept XML input and based on the parameters in the XML file, execute stored procedures against the back-end database. Also used to perform all data collection and retrieval functions between the workstations and the *e*-VID™, the Applus-developed web services will be consumable through a custom .NET DLL.

Although facility-based inspection workstations will upload records to the *e*-VID™ in real time, the Applus+ *e*-VID™ will be configured to also accept batch files from mobile and Department of General Services (GSA) tests systems.

Applus-Developed Web Services

Applus-developed web services lend the following functionality to the I/M equipment and databases.

- **Submit inspection results to the e-VID™**. Data are sent as encrypted XML files that are verified, decrypted, and inserted into the *e*-VID™. If the data in the file or the file itself is not valid (or in the unlikely event that the *e*-VID™ is not available), an XML file is returned to the workstation with an error code identifying the problem encountered. Applus-provided workstations incorporate automated procedures to handle such error messages. In addition, the Applus+ application server includes a custom logger object to record the event for review or investigation as needed IT personnel.

- **Remotely configure local workstation database values** via the web-based Applus+ Reporting Dashboard. With a web-enabled computer and administrator permissions, authorized users can easily modify the business rules for the vehicle inspection program.

- **Send XML inputs to the workstation to update local tables** via changes made through the Applus+ Reporting Dashboard. If errors occur during the transaction, the application returns the appropriate error code to the Dashboard in an XML file; a custom logger also records the error.

- **Test workstation connectivity to the e-VID™**. A function call from the workstation to the *e*-VID™ will receive either a "1" or a "0" as a return result, indicating whether a connection was made ("1") or the attempt was unsuccessful ("0"). The Applus+ Reporting Dashboard's communication module has built-in error-code handling to account for workstation to *e*-VID™ communication failures. As such, Applus+ can configure the total number of retry attempts for the workstations to the City's specifications.

- **Update facility server and workstation software**. From the Applus+ Reporting Dashboard, authorized users can configure the system to provide updated software to all inspection facility servers and workstations. Users can make incremental or comprehensive updates to local databases, tables, system software, and configuration files. The user has the ability to select the date and time the updates will be sent and applied, and an update status notification of successful or unsuccessful is sent back to the *e*-VID™.

- **Retrieve vehicle information from e-VID™ to workstations.** At the beginning of each inspection, the workstation creates and sends an XML file containing the station ID, lane, and VIN to the *e*-VID™ with a request for information (previous tests results, OBD information, exempt from testing, etc.). The file includes a function call to the *e*-VID™ that returns either a "1" (successful) or a "0" (unsuccessful). Once the request has been completed, the *e*-VID™ returns the requested information to the lane so the test can resume.

4.2.2 Required Databases

Vehicle Inventory/Database

In its experience managing centralized and decentralized emission programs, Applus+ has gained extensive knowledge of not only I /M data but also how to store the data within a relational database for optimal performance. For the Memphis program, Applus+ will build its data tables to accommodate all information identified in the RFP's Attachment G as well as any additional collection needs identified in detailed design meetings with the City.

The Applus+ *e*-VID™ will include a dedicated table for tracking vehicle, owner, and vehicle characteristics for each vehicle registered in the test area. Data collected and stored will include each vehicle's VIN, make, model, year, engine size, number of cylinders, transmission, odometer readings, communication protocol (if available), Vehicle Reference Table (VRT) row ID, date/time of record update, and any other information identified as pertinent by the City. Records will be maintained and available regardless of the vehicle's inspection status.

As vehicles return for testing, some previously stored parameters may have changed (e.g., odometer reading). When the system captures (or an examiner enters) updated vehicle information data, the Vehicle Table will create a new record; the previous record remains unaltered but is transferred to a vehicle history table. The Vehicle Table will maintain a 1:M (one-to-many) relationship with the Vehicle History Table, meaning the Vehicle Table will have only one record for each vehicle while the Vehicle History Table may have multiple records.

Transaction Data. Data transmission between the workstations and the *e*-VID™ will occur through secure XML-based .NET web services. Applus+ will design its VID web services to accept XML file formats compatible with VID and local workstation schematics. Applus+ will develop appropriate XML schema definition (XSD) files to validate the data within these files. This system will support communication sessions and data transfers from workstations, mobile test vans, and the GSA inspection equipment.

Each XML file will incorporate a header node containing data related to the identity of the workstation/facility transmitting the file. It will include credential information and hash values to ensure the file has not been tampered with or corrupted.

Information exchanges between inspection workstations and the Memphis e-VID™ are summarized in the accompanying table.

Applus+ will work with the City to construct valid XML schemas for all the transactions described as well as XSD files to validate all data within the XML files. An XSD designates a specific type of XML document, defining its elements, attributes, constraints, relationships to each other, and the type of data contained. XSD files will be stored locally on inspection workstations, ensuring that the data submitted to the *e*-VID™ is only valid data. This approach will prevent the transmission of incorrectly formatted data to the *e*-VID™.

In the event that data does not conform to its XSD parameters, the *e*-VID™ will automatically lockout the inspection workstation assuming file tampering occurred. (Applus+ and the City will determine during joint application development sessions the number of such occurrences required to initiate a lockout.) Authorized Applus+ and City personnel can unlock workstations as needed via the secure, web-based Applus+ Reporting Dashboard.

The *e*-VID™ will have a custom logger object used by all modules to define and log events such as errors encountered, suspected fraudulent activity, file tampering, workstation business rules update, table modifications, and any other activities that require an audit trail. A priority setting will be associated with

each logged event. By means of a web service, the logger object will be available for use by inspection workstations. Each workstation will have its own logger object to record activity at the local level.

Other Required Databases. Consistent with RFP requirements, Applus+ will create *e*-VID™ data tables to store information required by the City on Facility Quality Assurance, Equipment Maintenance and Calibration (Section 4.1.3), Inspector Training and Certification, and Motorist Complaints and Damage Claims, and Repair Facilities. Data collected will be determined during Applus+ Joint Application Development sessions with the City.

Vehicle Data Record Access. The Applus+ *e*-VID™ an return vehicle information based on license plate number,m VIN, and or VIR number imputs. Such information is available to authorized personnel through the workstation or the Applus+ Reporting Dashboard.

To accommodate license plate transfer between vehicles, the *e*-VID™ will trigger a workstation or Dashboard alert to notify users to the existence of multiple records. To ensure that the notice isn't missed, it will require an acknowledgement action (such as a click, touch(screen), or keystrike entry) on the part of the user before it returns the list of records.

Data Exchange Summary

Inspection Equipment to *e*-VID™

Through Applus-developed XML web services, the workstations will transmit the following input parameters (at minimum) to the *e*-VID™:

- Vehicle identification request (e.g., VIN, license plate, sticker number); Applus+ will design this transaction to ensure license plate duplications and errors are correctly transmitted to the Memphis VID as requested by the City.
- Inspection results (pass, fail, voided, rejected, aborted, etc.)
- Exemptions
- Record deletions
- Video images of vehicle under test, linked to inspection record
- Repair information
- Certification and licensing information
- Update requests (e.g., data file refresh, reprints, inspector list, facility information, workstation info, etc.)
- Acknowledgements

e-VID™ to Inspection Equipment

Similarly, Applus+ will develop XML web services to respond to workstation requests. Such web services will return the following information (at minimum) to requesting workstations:

- Vehicle ID response
- Vehicle-specific recall information (if available)
- Local workstation table updates (if changes to business rules were made)
- Reference table updates (if changes to business rules were made)
- Software updates (if any)
- Broadcasted messages (if any)
- Workstation-specific lockout information (if applicable)
- Transaction acknowledgements

The record list will display a summary of relevant vehicle data so the user can properly identify the vehicle it seeks.

If the user selects a vehicle with a record flagged as exempted or deleted, the e-VID™ will prompt the workstation to abort the inspection.

VIN Error Identification/Correction

Applus+ software will retrieve all VINs associated with a license plate. Returned VINs will be compared to the VIN scanned from the actual vehicle presented for testing. If an exact match is found, the inspector will verify results with a visual inspection of the vehicle make, model, and year.

If a VIN cannot be verified, the workstation will prompt the inspector to manually enter and confirm the VIN. The workstations will incorporate a double-blind entry method to prevent an inspector from accidentally typing in a wrong VIN. Once the VIN is manually entered into the workstation, that VIN will be queried against the *e*-VID™ for a matching data record. The scanned VIN will then be compared to the *e*-VID™-returned VIN, and all non-matching characters will be identified.

A VINcharacterErrors field in the test record will contain this data structured as 1S5,2EF,32Z, with the first digit representing the VIN error location, the second character representing the scanned data, and the third character representing the original inaccurate data.

If VINs are not the same length due to missing leading or trailing characters, software will shift the VIN spacing in an attempt to align VINs as accurately as possible. If this is feasible, the software will identify missing characters in the VINcharacterErrors field. If this is not possible due to inconsistencies, the system will prompt the inspector to manually enter and compare VIN data.

The Applus+ system will have the capability of identifying almost all VIN entry errors and will document error occurrence. This data will be flagged and the record stored in a table for record correction. If the City elects, the system can be configured to print this data on the VIR to alert motorists to VIN documentation errors.

Administrative Application

Authorized City personnel will be able to perform all database content maintenance and administration using the Applus+ Reporting Dashboard, an all-encompassing web portal for data reporting and network management activity. Through this secure interface, authorized personnel can modify inspection-related data to correct errors, configure the business rules that govern the overall inspection process, and set up the data tables that will be refreshed on each workstation.

Through the portal's administrative module, which is only accessible to authorized personnel, users can:

- Add or remove inspectors
- Configure OBD pass/fail criteria, DTCs as a cause for failure, and the number and types of readiness monitors (including exclusions)

The Applus+ *e*-VID™:

Configurable Business Rules Provide Dynamic Program Control

The web-based, user-friendly **Applus+ Reporting Dashboard** will provide the City of Memphis with an effective tool for controlling and configuring every facet of its vehicle inspection program. This interface, **used in the Applus+ Illinois and Washington State I/M programs**, provide users with access to specific web modules according to defined role-based permissions.

Through the Dashboard, authorized City and Applus+ personnel can access a custom module for configuring the business rules that govern the inspection program. Through this single web portal, **data parameters may be changed and updated to all (or individual) workstations** in the network upon a subsequent data file refresh. Accessible through any web-enabled computer at any time of day or night, the Applus+ Reporting Dashboard requires only an authorized username and password and a secure HTTPS session.

When an authorized user makes a business rule change through this interface, a confirmation box appears on screen prior to committing the transaction. A popup dialogue box asks the user to double check and then confirm, edit, or cancel the action(s). As each business rule is changed, the event, the user ID of the individual performing the change, and **any information pertinent to the rule change is logged and time-stamped** to provide an audit trail.

- Configure idle and other tests standards
- Change compliance due dates
- Modify facility and workstation information
- Add or modify Registered and Recognized Repair Facility information
- Add or remove lockouts on individual workstations
- Configure workstation OBD-fingerprint capture settings
- Define waiver cost limits

A configuration table that the workstations access will reflect data updated through this module. Based on this table's flag settings, the workstations will download either new data sets or entire data tables from the *e*-VID™. This cost-effective, automated process eliminates the need to dispatch technicians, who would manually update each workstation's database tables.

Web-Based Reporting In Action

To view a demo of the **Applus+ Reporting Dashboard** created based on the Applus+ Illinois Vehicle Emissions Testing Program:

(1) Visit to www.airteamilaccess.com

(2) For "UserName," enter: TESTING

(3) For "Password," enter: xyz123

(4) Explore the customizable home page, Management Reporting options, and a vehicle-look-up demonstration module

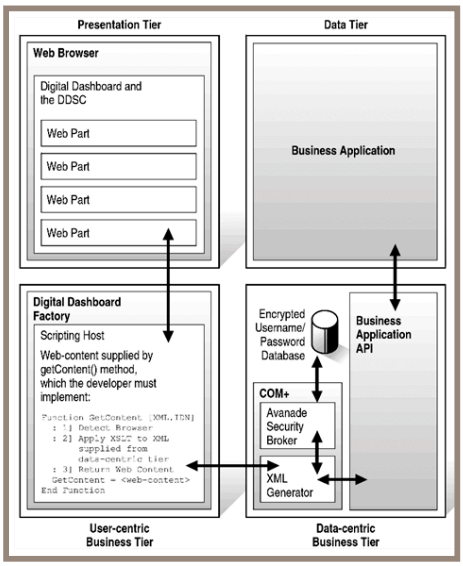
Additional configurability may be requested during the Applus+ JAD sessions with the City.

The Applus+ IT team uses a modular development model to allow constant maintenance of the program's business rules along with checks for rule consistency or collision. If the City elects to implement the option for software engineering time, Applus+ can add new rules at the City's request or simply modify existing rules without recompiling and redeploying the entire Dashboard application. Each module can be independently developed, unit tested, and then deployed.

4.2.3 Reporting Requirements

The browser-based, customizable Applus+ Reporting Dashboard will serve as the interface for the program databases. Using role-based authentication and a secure HTTPS session, this web portal allows authorized personnel to review and report on program data and administer the entire program from any web-enabled computer. As the main point of entry for all reporting and administration features/functions of the program, the Applus+ Reporting Dashboard will not only allow authorized City personnel access to emissions and safety inspection data; it also permits simple point-and-click report generation.

Web Parts Architecture: Dashboard-Style Reporting Suite



Source: Microsoft.com

The Applus+ standard reports module allows users to generate reports based on the data filters entered (e.g., date/time ranges; station, lane, or inspector; vehicle make, model, or year; failing DTC). Resulting reports can represent the requested data in a grid-based tabular format or as a graphical layout. Built-in features deliver printer-friendly reports and the ability to export data to CSV and/or PDF files.

Similar to Yahoo! and Google offerings, the Applus+ reporting solution allows users to customize the look and

feel of their personal program home page through their individual user profile. With the flexibility afforded through ASP.NET 2.0 web parts, users can place their most-used modules on the homepage screen in the exact order they prefer.

An overview of Applus+ Reporting Dashboard features and functions appear on the following pages. Additionally, Applus+ invites the City to view a demonstration of the Dashboard prepared by Applus+ for its Illinois I/M client. To access the demo, which includes the Applus+ custom management reporting module, visit www.airteamilaccess.com and login with username "TESTING" (no quotes) and password "xyz123" (no quotes). Please note that dashboard login is case-sensitive.

The Applus+ Reporting Dashboard: Standard Modules

Emissions Inspection Data

A group of standard reports with custom data filters allows users to limit data sets to a particular. Range. Standard emissions-inspection reports include:

- Network-wide Failure Analysis Report
- Network-Wide Pass Analysis Report
- Offline Testing Report
- Off-Hour Testing Alerts
- Station-Analyzer Report
- Calibration Reports
- Compliance Status Reports
- EPA Reports
- OBD Exception Reports
- Auditing Reports
- Maintenance Reports

Network Management Data

Accessible through the Applus+ Reporting Dashboard, Applus+ will create a user control that allows authorized personnel to manage the entire network of inspection workstations via detailed activity reports. Standard reports include:

- **Network Daily Activity Report**, summarizing network-wide testing activity by hour and date selected (default to current day). Data includes the number of vehicles presented for testing; the number and percentage of vehicles rejected; the number and percentage of vehicles passing; the number and percentage of vehicles failing; network utilization rates; the number of waiver actions; and the number of waiver denials.
- **Network Monthly Activity Report**, summarizing network-wide testing activity described above by day and for the month selected (default to current month).
- **Inspection Facility Daily Activity Report**, summarizing station-specific activities by facility number or ID by hour and for the day selected (default to current day). Data includes the number of vehicles presented for testing; the number and percentage of vehicles rejected; the number and percentage of vehicles passing; the number and percentage of vehicles failing; inspection Facility utilization rate; the number of waiver actions; and the number of waiver denials.
- **Inspection Facility Monthly Report**, summarizing station-specific information described above by day and for the month selected (default to current month).
- **Inspection Facility/Operational Report**, summarizing station-specific activity for each facility or lane by 10 minute increments for the specified date (default to current day). Data includes inspection facility operational status (i.e., open, closed, reason closed); lane operational status (e.g., testing, standby, not ready for testing, closed, down for scheduled maintenance, down for unscheduled maintenance, etc.); and utilization rate.
- **Compliance Reports**, summarizing:
  - Passes and waivers for the selected date and month (default to current month). Data includes the number of vehicle passes and waivers by test date and for the month.
  - Accumulated testing activity by selected date and month (default to current month). Data includes the number of vehicles presented for testing (passes and fails) by test date and for the month.

The Applus+ Reporting Dashboard: Standard Modules *(continued)*

Repair Data

Accessible from the Reporting Dashboard, Applus' repair data module's functional components can be reused for the public website and to create a web service that can be consumed by the workstation(s).

The application consists of ASPX pages that allow authorized repair personnel, inspectors, and program administrators to add repair information, add/edit/remove repair stations, request repair history, calculate the Repair Effectiveness Index (REI) for all stations, and perform distance calculations to emission repair facilities (ERF).

Adding Repair Information. An ASPX page will collect and supply to the *e*-VID™ repair data from motorists or repair technicians as entered via the Applus+ Reporting Dashboard. Using this same interface, repair data can be sorted by cost of repairs or date as well as by vehicle make or year to detect trends that may be important to motorists and repair technicians.

Repair data can be matched to re-inspection pass/fail results to determine repair facility success rates. To help motorists identify effective repair facilities, the resulting REI scores will be made available via the public website and as part of failing vehicles' printed inspection documentation. An XML file will contain all parameters for display on the web form interface. All dropdown and textbox values will be supplied via XML file, which can be modified as necessary to reflect changing values on the repair data form. An XSLT file will be used to read the XML values and display them on the page in the appropriate format. The web form will include a "submit" button responsible for generating a new XML file – named as REPAIR-VIN-DATE.XML – in which "VIN" represents the 17-digit identifier of the repaired vehicle and "DATE" represents the date and time of the record creation (e.g.REPAIR-1B3AA46KXSF 534447-041120070950.XML). Once the XML file is generated, it will be supplied to a repair information upload web service and through the web service inserted into the *e*-VID™.

Vehicle History Record (VHR) Page. Designed using ASP.net and C#, an ASPX page will allow viewing or monitoring of repair data submitted to the *e*-VID™. Users simply submit the vehicle's 17-digit VIN, and the resulting page will show two columns, the date of repair data submission and a link to view the repair data in an XML format. This data can be viewed or stored at user discretion.

REI Calculation Function. Applus' REI calculation function will automatically generate an Emission Repair Shop Rating (ERSR) for each ERF. Using a five-star rating system, this calculation will help motorists identify top-performing shops at a glance. This rating is used to measure the success of a test centers attempt at fixing failed emission test vehicle before it passed.

Using a C# file, the ERSR is calculated using the formula (RP – WD) / CWO = ERSR, with "RP" representing the Repair points, "WD" the Waiver demerits, and "CWO" the total number of cars worked on. Inputs for the formula will be queried and received from the *e*-VID™.

Repair Shop Report Card. This page will consist of a report designed to assist the repair shop with tracking the repairs performed. This page will be designed using asp.net and c#. It will consist of a textbox control to enter the repair shop number and a submit button. When the button is clicked, the request will be submitted to the database. The result will be displayed in the tabular format with columns for VIN and ERSR points.

Shop Locator Module. This application provides motorists with an interface that allows them to select their nearest repair shops based on a specific ZIP code. Shops are displayed along with a list of their individual performance rating.

Results, displayed on the page in a tabular format, include the repair shop address, rating (based on a possible five stars), and a link to a web service used to calculate driving distances to and from the displayed repair shop(s).

The Applus+ Reporting Dashboard: Standard Modules *(continued)*

Waiver Data

The Applus+ Reporting Dashboard will include a built-in user control that allows authorized personnel to issue waivers on qualifying vehicles. Accessible from the Reporting Dashboard, the application will have a graphical user interface that accepts either VINs or certificate numbers to query the *e*-VID™ for matching test records. Based on configured business rules, the *e*-VID™ will determine vehicle waiver eligibility. The waiver module's user control will be designed using ASP.NET and AJAX and will include date filters to display lists of vehicles receiving waivers within the selected date range.

Safety Data

A user control dedicated to reporting safety test data will use ASP.NET and C# to provide safety data with drill-down capabilities, summaries, and statistical analyses.

Consumer Problem Resolution

The Applus+ Reporting Dashboard will include motorist comment tracking application that allows Applus+ Customer Service Representatives to enter information for tracking motorist comments, complaints, and damage claims. Such data will be recorded to the *e*-VID™ in tables linked to other key data fields (e.g., damage claims will be linked to the individual test records and stations and/or workstations). Reports on motorist complaints and damage claims will be viewable via the Applus+ Reporting Dashboard.

Duplicate Inspection Report Module

This Applus+ Reporting Dashboard module allows printing of duplicate inspection reports. Because the application is web-based and updated in real time, authorized users can print a duplicate VIR from Applus+ headquarters, an agency office, or any inspection facility.

Vehicle Failure Statistics and Lookup Reports

Similar to the report Applus+ offers motorists served by its Massachusetts program, this web-based report details pass/fail statistics for OBDII-eligible vehicles using comparative analysis of failure rates for vehicle type by specific Diagnostic Trouble Code (DTC). Available via the Applus+ Reporting Dashboard and through the public website, this utility also is part of the Applus+ 2008 Illinois program.

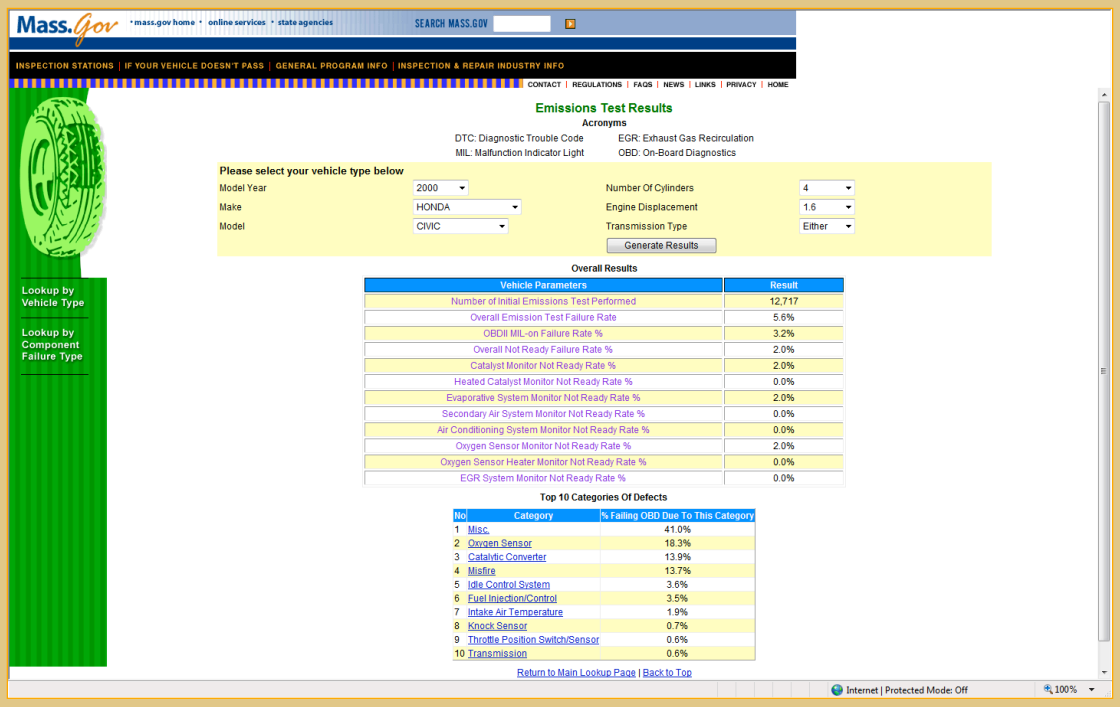
Samples of this custom application in use for Massachusetts motorists appear on the following page.

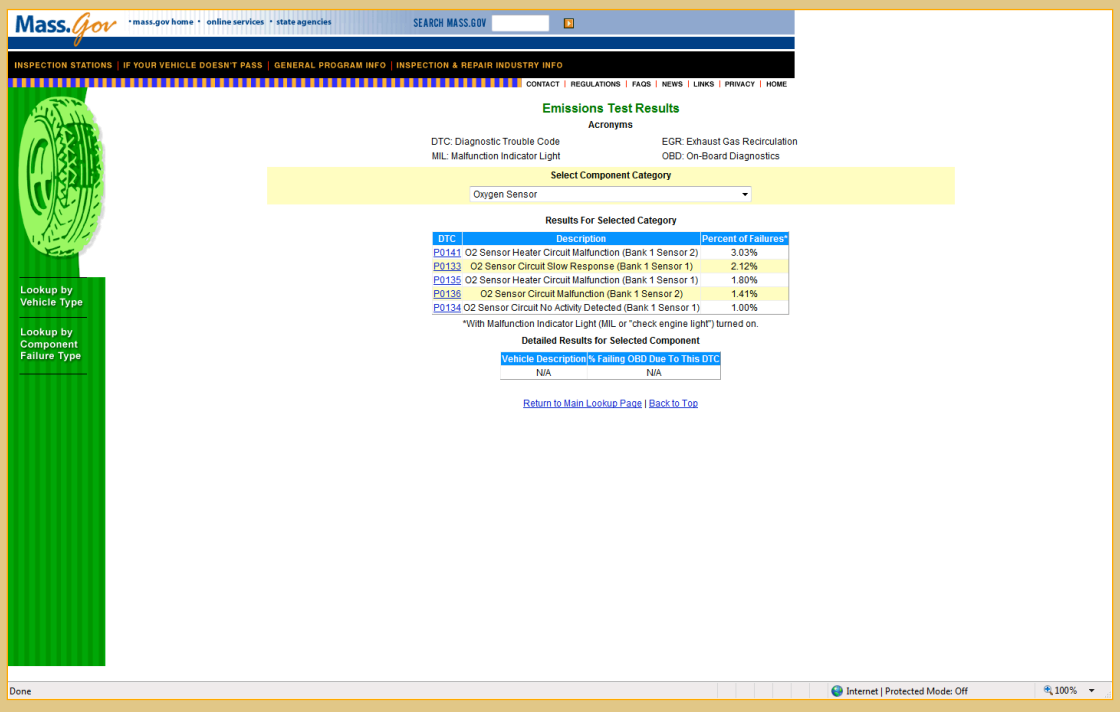
EPA Compliance Reports

Compiling program data from the *e*-VID™, the Applus+ Reporting Dashboard will provide point-and-click EPA Compliance Reports that meet all federal reporting requirements for government vehicle inspection and maintenance programs.

Applus+ Web-Based Vehicle Failure Statistics and Lookup Reports

Sample Screens from the Applus+ Massachusetts Enhanced Emissions and Safety Test Program





The Applus+ Reporting Dashboard: Standard Modules *(continued)*

Quality Control Data and Reporting

An Applus-developed control will link the various quality-control applications that govern the overall *e*-VID™ application. Hyperlinks to ASPX pages accessible through the Applus+ Reporting Dashboard will provide reports on equipment audits as well as SPC charting.

Statistical Process Control Charting. Through these web-based reports, program personnel can view and download control charts and reports that present statistical data such as excessive rejection and failure rates by station, lane, or inspector. Reports will be automatically updated to a server accessible via the web-based Applus+ Reporting Dashboard.

Equipment Audits. Applus' equipment audit software features an easy-to-use Applus+ Reporting Dashboard interface for efficiently and accurately performing equipment audits with minimal interruption to stations. Through the Dashboard, auditor/technicians can enter audit data and determine audit pass/fail status. Key features of the proprietary software include:

- EZEntry, which allows an auditor to select and enter all relevant station information with minimal effort while maintaining strict control over the station data entered.
- An audit overview "print report" mechanism to provide to service personnel if an audit finds a workstation is performing outside of specifications. The report will include readings, cut-points, and standard values used.
- Soundboard buttons that allow the auditor to customize the audit record.
- Color-coded buttons and flags to provide a clear trail of completed and incomplete steps.
- All values used for the audit are saved into a configuration file eliminating redundant steps each time the software is used.

Fraud Detection/Prevention

To ensure the continued integrity of the Memphis Vehicle Inspection Program, Applus+ will build real-time, automated fraud-prevention capabilities into its software, preventing unauthorized inspectors from performing a test and eliminating cases of clean piping.

The Applus+ *e*-VID™ will be configured to support three levels of fraud prevention:

- **SEVERE** – the inspection is halted instantly and authorized program representative(s) are immediately notified.
- **MODERATE** -- a prompt appears to alert the inspector of a potential problem and require a review test procedures before continuing. If test procedures are identified as questionable, the inspection must be aborted, and the inspector is informed that the test will be reviewed by Applus+/state quality assurance (QA) auditors.
- **LOW** – testing is allowed to continue, but the record suspected of fraud is flagged for review via the Applus+ Reporting Dashboard. Images of the vehicle's test also will be available to QA auditors via the Reporting Dashboard.

Applus+ has considerable experience in fraud prevention methods and will work with the state to define the specific triggers applied each level of fraud described above as well as the actions to be taken, both within the software and operationally.

The Applus+ Reporting Dashboard: Standard Modules *(continued)*

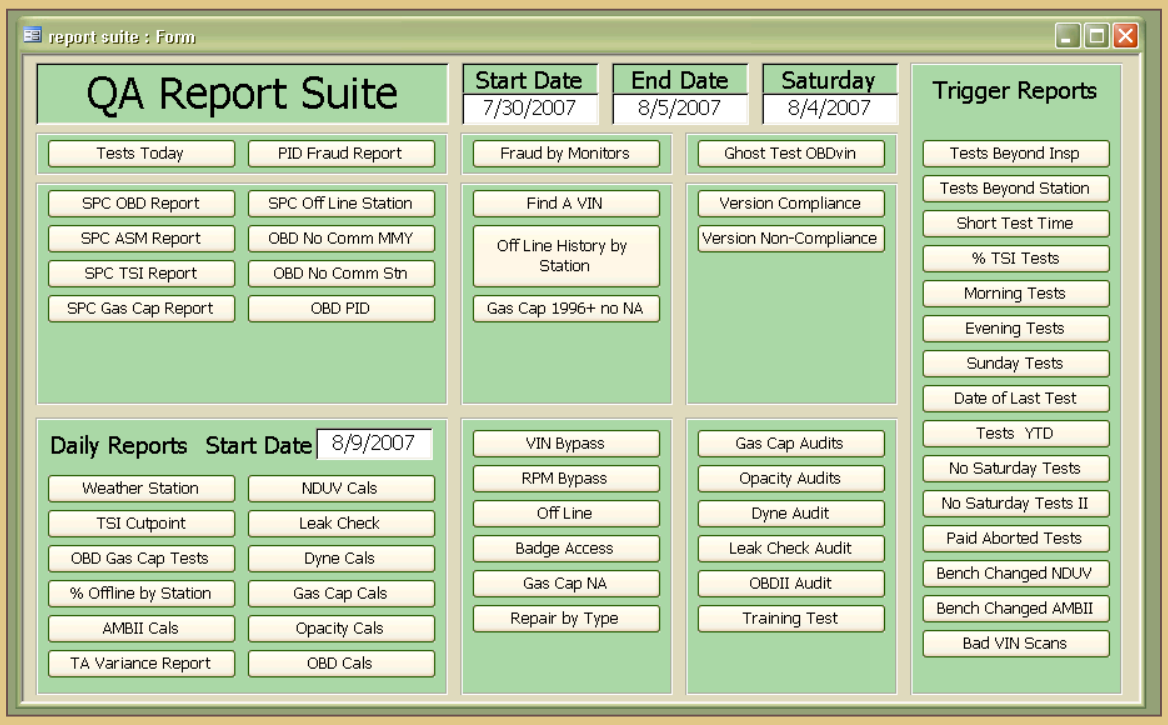
Trigger and Quality Assurance Reporting

Available via the Applus+ Reporting Dashboard, Applus+ digital trigger reports provide a reliable, unbiased, and completely automated mechanism for monitoring anomalies in datasets and identifying possible attempts at fraud. Used with resounding success in other Applus+ inspection programs, trigger reports enable Applus+ and its state clients to more efficiently direct station auditing resources. Applus' experienced IT team will design and develop the reporting tools that City administrators need to make objective, data-based decisions to guide and protect the integrity of its highly public inspection program.

Sample Applus+ Digital Triggers and Their Functions	
Total tests/day beyond a mathematic possibility, by tech and station	Tests that exceed the "normal" test time based on average time per test; Total hours of possible testing divided by total tests
Time between sequential tests too short	Test numbers sequential in the record with a short test time indicate possible improper testing and/or fraudulent activity
Initial test and retest start time too close.	To be determined
Retest at station "B" = overall pass within a set time period	Initial test (#1), Station A = Overall Fail, Retest (#2), Station B = Overall Pass within a specific (tbd) time period
Emission fail rate too low by station/inspector, based on network average	Possible "clean piping" and/or improper testing
Emission fail rate too high by station/inspector, based on network average	Indicates possible fraudulent activity; also used for consumer protection
Gas cap failure too low by station/inspector, based on network average	Indicates possible fraudulent activity; also used for consumer protection
Gas cap failure too high by station/inspector, based on network average	Indicates possible fraudulent activity; also used as EPA compliance tool
Offline inspections too high, based on network average by inspector and station number	Number tbd; consumer protection for retest issues
Network contact with more than X number of test records	Eliminates the station that connects only for authorizations and ensure accurate test data; also used for consumer protection on retest issue
TSI tests with no "RPM" signal by inspector and station number	Indicates possible "clean piping" and/or improper testing; also used for consumer protection
Emission sample with readings within +/- 3% of previous tests – HC, CO, CO2	Indicates possible "clean piping" and/or improper testing; also used for consumer protection
Incomplete tests too high based on network average by tech and station; Test incomplete (aborted) after emissions	Indicates possible improper testing and/or fraudulent activity; also used as EPA compliance tool
Incomplete tests too high based on network average by tech and station; Test incomplete (aborted) after safety, before emissions	Indicates possible improper testing and/or fraudulent activity; also used for consumer protection

Applus+ Web-Based Trigger Reporting Interface

Sample Screen from the Applus+ Connecticut I/M Program



In addition to on-demand Dashboard-based reporting, Applus+ will provide the City with Open Database Connectivity and a licensed copy of Microsoft Access for performing user-friendly custom ad-hoc queries.

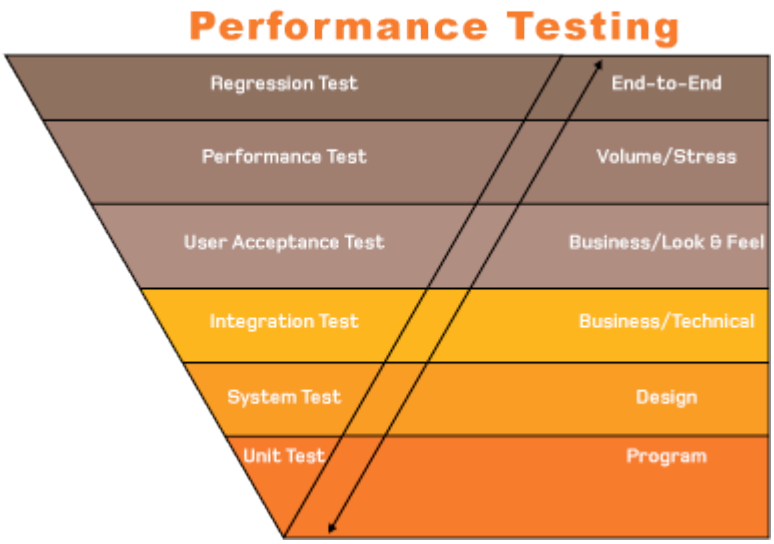
4.2.4 Option 1: Engineering Time for Software Modifications

Should the City elect, the qualified Applus+ information technology team described in Section 3.1 (pages 5 through 9) will remain available to modify, upgrade, or expand inspection system data-management capabilities. Applus+ acknowledges that these hours commence after three months of operations under the new program.

4.2.5 Acceptance Tests of Equipment and VID

Consistent with both Applus' development methodology and Memphis RFP requirements, Applus+ will perform internal acceptance tests of the Memphis *e*-VID™ and inspection equipment prior to delivery to the City. Applus+ affirms its commitment to complying the RFP-defined project schedule and acknowledges its ability to correct within the first three months of new program operation any database or equipment errors that arise after initial acceptance. Such efforts are included in the initial cost of the equipment and VID.

To ensure smooth integration and client satisfaction, Applus' technology offerings undergo consistent testing throughout their design and development. This approach is referred to as the "V-Method."



The V-Method specifies a testing level for each level of design and development. Testing efforts proceed simultaneously at different levels: Code is verified as it is produced, and components as they are integrated.

Under the V-Method, development staff perform lower-level **unit tests** to ensure the components they are responsible for function as promised; the testing team verifies that unit tests have been properly performed and executes **system tests** to ensure that components interact properly and allow the entire system to function as specified by the architecture. **Integration tests** are executed to determine if individual components and business objects are functioning according to design specifications. **User acceptance testing** demonstrates that business requirements are met, key risks mitigated, and crucial production windows accommodated.

In addition, **performance tests** occur at multiple levels to ensure that peak user and transaction loads can be accommodated, crucial production windows can be met, and end-to-end response time is adequate. In this way, Applus+ ensures that both individual components and the entire integrated system are performing to specification. If software modifications are introduced, **regression testing** ensures that functionality is not compromised as a result of software upgrades or other changes.

A sampling of the numerous acceptance testing scripts that Applus+ runs on its systems appears in the following table.

Applus+ VID and Equipment ATP: Sample Scripts*		
Network Communication Diagnostics	+ Calibrate Gas & Perform one Offline inspection + Verify Contents of Cal.DAT and Gas.DAT + Disconnect phone line and run network diagnostics from the workstation. + Reconnect phone line and run network diagnostics from the main menu. + Verify that contents remain in Cal.DAT and Gas.DAT	◆ Incomplete ◆ Pass ◆ Fail
Setting Lockouts for offline testing	+ Perform five vehicle inspections with any result while the workstation is not connected to the *e*-VID™. + Attempt to perform another inspection. + Workstation should lock out after five tests have been stored (the sixth test should not be allowed to proceed). + Verify that TAMPER.DAT is written to the analyzer	◆ Incomplete ◆ Pass ◆ Fail
Validate VIN entry	+ Test against the following invalid VIN inputs: (1) Null or blank value entered (2) Length less than 3 characters (3) Greater than 17 characters (4) Add values of 'I', 'O', 'Q' to the VIN (5) VIN check digit (9th digit) (6) VIN code model year mismatch	◆ Incomplete ◆ Pass ◆ Fail
Validate 'Bad Records' flag set for corrupt files	+ Send a corrupted file (CRC error) from the workstation to the *e*-VID™. + The *e*-VID™ should not accept the file and should request the file again twice. + If it receives two corrupted files, the workstation should be flagged in the *e*-VID™ and locked out from testing.	◆ Incomplete ◆ Pass ◆ Fail
Test vehicle recall script	+ Perform an inspection on a vehicle that is in the recall database. + Check comments section of the VIR; it should display the recall information. + After a successful vehicle match, the vehicle will be cross-checked with the recall database to pull out the necessary information.	◆ Incomplete ◆ Pass ◆ Fail
Test against invalid user	+ Change the user ID and password information on the analyzer and try to perform a data file refresh. + An unauthorized user flag should be set and a lockout should be set on the analyzer	◆ Incomplete ◆ Pass ◆ Fail
Test user authentication	+ Try to login to the Applus+ Reporting Dashboard with an invalid user ID and password. + An invalid Login ID message should be displayed.	◆ Incomplete ◆ Pass ◆ Fail
Verify registration file upload	+ Test communication with City databases by having agencies send a test file to the Applus+ server. + Change the scheduled time of the upload application to the current time and see if the file gets uploaded to the current database.	◆ Incomplete ◆ Pass ◆ Fail
Data file refresh count	+ Select various combinations of files for download. + On the workstation, perform a data file refresh and then see if the correct list of files were received.	◆ Incomplete ◆ Pass ◆ Fail
VIN Mismatch – 16 digit invalid VIN - Completely Offline	+ Verify analyzer is offline from station server + Scan wait-time ticket to initiate test + Enter License Plate	◆ Incomplete ◆ Pass ◆ Fail

	+ Fail Iris Scan + Enter User ID and Password + Abort and retry test with second manual entry. + Verify wait time with stopwatch and enter in table below + After failing to scan vehicle VIN from vehicle or documents, manually enter entire incorrect 16 digit VIN. + Verify software prompt for invalid VIN – Do you want to correct? + Answer Yes. + Verify Mgr Override required. + Complete all tests as PASS. + Verify Lockout Message for Manual VIN entry limit exceeded. + Clear Lockout + Reconnect LAN and perform data file refresh + Verify Offline data sent to HOST.	
Test Type Selection – GVWR Override	+ Initiate test on a LDT2 from vehicle list 4 K (that requires manager GVWR determination). + Complete LPR process + When prompted, scan vehicle VIN. + Verify manager override required to verify GVWR range. + Verify override screen is at top of page. + From the pop up menu choose (8501 or greater). + Verify the test type is Idle. + Verify option for non-OBDII compliant vehicle selection is available + Select non-OBDII compliant – OBDII alternative test + Perform Idle and Gas Cap test + Complete all tests as PASS.	◆ Incomplete ◆ Pass ◆ Fail
Fail MIL-On	+ Perform OBD test. + Configure Ease Verification test to simulate: 0 non-continuous monitors NOT COMPLETE, MIL commanded ON w/ 2 DTC's, COM Protocol = KWP. Ease configuration should match vehicle fingerprint. + Perform complete OBDII test, following all prompts. + Complete Worksheet.	◆ Incomplete ◆ Pass ◆ Fail
Pass OBD:MIL-On, No DTCs	+ Perform OBD test. + Configure Ease Verification test to simulate: 0 non-continuous monitors NOT COMPLETE, MIL commanded ON w/ 0 DTC's, COM Protocol = VPW. Ease configuration should match vehicle fingerprint. + Perform complete OBDII test, following all prompts. + Complete Worksheet. + Pre-fetch protocol = _____EASE protocol =_____	◆ Incomplete ◆ Pass ◆ Fail
Fail MIL-On, Not Ready	+ Perform OBD test. + Configure Ease Verification test to simulate: 3 non-continuous monitors NOT COMPLETE, MIL commanded ON w/ 1 DTC's, COM Protocol = PWM. Ease configuration should match vehicle fingerprint. + Perform complete OBDII test, following all prompts. + Complete Worksheet.	◆ Incomplete ◆ Pass ◆ Fail

Reject Not Ready	+ Perform OBD test. + Configure Ease Verification test to simulate: 3 non-continuous monitors NOT COMPLETE, MIL commanded OFF w/ 1 DTC's, COM Protocol = ISO. Ease configuration should match vehicle fingerprint. + Perform complete OBDII test, following all prompts. + Complete Worksheet.	◆ Incomplete ◆ Pass ◆ Fail
Pass OBD	+ Perform OBD test. + Configure Ease Verification test to simulate: 2 non-continuous monitors NOT COMPLETE, MIL commanded OFF w/ 1 DTC's, COM Protocol = KWP. Ease configuration should match vehicle fingerprint. + Perform complete OBDII test, following all prompts. + Complete Worksheet.	◆ Incomplete ◆ Pass ◆ Fail
Vehicle Reject – Low Idle	+ Initiate test on a vehicle from list 1. + When prompted "Pass Safety Inspection?" Answer YES. Verify Vehicle Safety Check: + Fluid Leaks + Missing tail pipe sections that prevent probe insertion + Missing tail pipe sections that prevent capture of entire exhaust + Pass gas cap + RPM hook-up -- Lighter + Idle Speed Low + Choose Reject reason of IDLE. + Verify vehicle is rejected.	◆ Incomplete ◆ Pass ◆ Fail
Vehicle Fail Gas Cap – Reject High Idle	+ Initiate test on a vehicle from list 1. + When prompted "Pass Safety Inspection?" Answer YES. + Fail gas cap + RPM hook-up -- Lighter + Idle Speed High + Choose Reject reason of IDLE. + Verify vehicle is rejected.	◆ Incomplete ◆ Pass ◆ Fail
Pass Idle, Gas Cap Adaptor not available – Gas cap missing	+ Initiate test on vehicle tested in Idle-2. + When prompted "Pass Safety Inspection?" Answer YES. + RPM hook-up: Lighter + Pass idle + Adaptor not available + Missing gas cap	◆ Incomplete ◆ Pass ◆ Fail
Pass Idle, Gas Cap Adaptor not available – Pass Gas Cap	+ Initiate test on vehicle tested in OBD-22 + When prompted "Pass Safety Inspection?" Answer YES. + Pass visual gas cap inspection + RPM hook-up: Lighter + Pass idle	◆ Incomplete ◆ Pass ◆ Fail

* Representative sample only; list is not all-inclusive

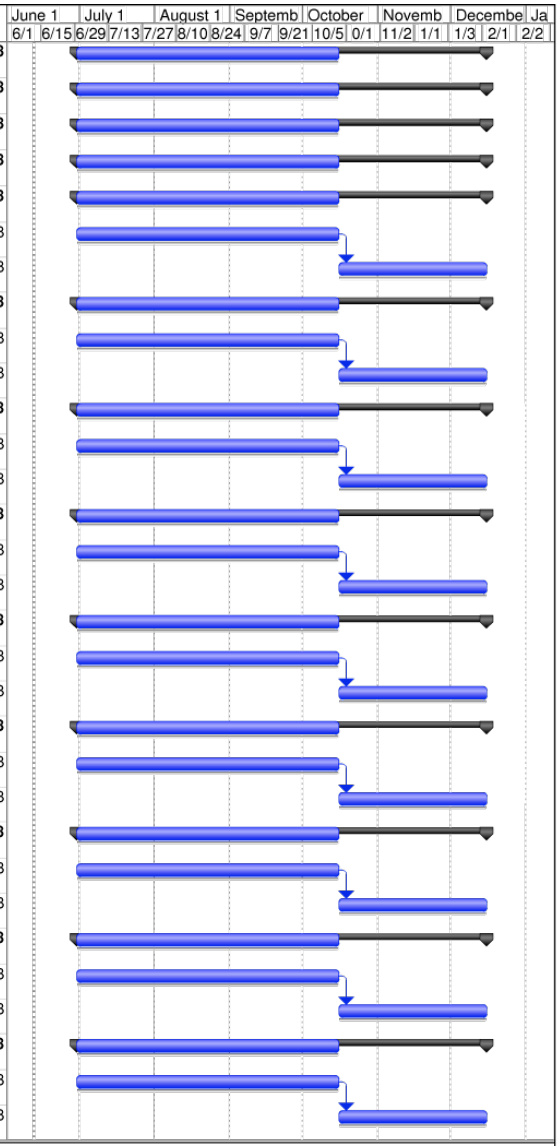
4.3 Data Access Requirements

During the aforementioned data migration IPT meetings (Section 3.2), Applus+ will discuss data access requirements with the Bureau to jointly determine the best approach for acquiring the requisite information. Should data be required, Applus+ IPT team members will assist the City as needed to obtain simple query extracts as CSV or XLS files.

4.4 Proposed Work Schedule

The following Gantt chart provides a draft schedule of milestones and subtasks associated with Applus' delivery of inspection equipment and VID for the City of Memphis' I/M program.

ID	WBS	Task Name	Duration	Start	Finish
1	1	**Project CM-STP-9409(94) Equipment Upgrade**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
2	1.1	**Provide and Install New Inspection Equipment**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
3	1.1.1	**Test Equipment for Existing Lanes and Mobile Test Vans**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
4	1.1.1.1	**Inspection Processor**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
5	1.1.1.1.1	**Exhaust Gas Analysis System**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
6	1.1.1.1.1.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
7	1.1.1.1.1.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
8	1.1.1.1.2	**Probe**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
9	1.1.1.1.2.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
10	1.1.1.1.2.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
11	1.1.1.1.3	**Filters**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
12	1.1.1.1.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
13	1.1.1.1.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
14	1.1.1.1.4	**Automated Zero and Span Checks**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
15	1.1.1.1.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
16	1.1.1.1.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
17	1.1.1.1.5	**Facility span gases**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
18	1.1.1.1.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
19	1.1.1.1.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
20	1.1.1.2	**Data Entry Panel**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
21	1.1.1.2.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
22	1.1.1.2.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
23	1.1.1.3	**Safety Inspection Instructions**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
24	1.1.1.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
25	1.1.1.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
26	1.1.1.4	**Onboard Diagnostic II (OBDII)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
27	1.1.1.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
28	1.1.1.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
29	1.1.1.5	**Vehicle Inspection Report Printer**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
30	1.1.1.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
31	1.1.1.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08



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ID	WBS	Task Name	Duration	Start	Finish
32	1.1.1.6	**Digital Video Recorder/Camera**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
33	1.1.1.6.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
34	1.1.1.6.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
35	1.1.1.7	**Documentation**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
36	1.1.1.7.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
37	1.1.1.7.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
38	1.1.1.8	**Training**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
39	1.1.1.8.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
40	1.1.1.8.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
41	1.1.1.9	**Bar code sticker printers**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
42	1.1.1.9.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
43	1.1.1.9.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
44	1.1.2	**Provide mobile van and stationary inspection system for Memphis Department of General Services (GSA)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
45	1.1.2.1	**Inspection Processor**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
46	1.1.2.1.1	**Exhaust Gas Analysis System**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
47	1.1.2.1.1.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
48	1.1.2.1.1.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
49	1.1.2.1.2	**Probe**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
50	1.1.2.1.2.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
51	1.1.2.1.2.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
52	1.1.2.1.3	**Filters**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
53	1.1.2.1.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
54	1.1.2.1.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
55	1.1.2.1.4	**Automated Zero and Span Checks**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
56	1.1.2.1.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
57	1.1.2.1.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
58	1.1.2.1.5	**Facility span gases**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
59	1.1.2.1.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
60	1.1.2.1.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
61	1.1.2.2	**Data Entry Panel**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**

ID	WBS	Task Name	Duration	Start	Finish
62	1.1.2.2.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
63	1.1.2.2.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
64	**1.1.2.3**	**Safety Inspection Instructions**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
65	1.1.2.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
66	1.1.2.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
67	**1.1.2.4**	**Onboard Diagnostic II (OBDII)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
68	1.1.2.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
69	1.1.2.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
70	**1.1.2.5**	**Vehicle Inspection Report Printer**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
71	1.1.2.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
72	1.1.2.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
73	**1.1.2.6**	**Digital Video Recorder/Camera**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
74	1.1.2.6.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
75	1.1.2.6.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
76	**1.1.2.7**	**Documentation**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
77	1.1.2.7.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
78	1.1.2.7.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
79	**1.1.2.8**	**Training**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
80	1.1.2.8.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
81	1.1.2.8.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
82	**1.1.2.9**	**Bar code sticker printers**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
83	1.1.2.9.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
84	1.1.2.9.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
85	**1.1.3**	**Option 1: Provide idle test equipment in each inspection lane and mobile test van (13 idle test systems total)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
86	1.1.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
87	1.1.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
88	**1.1.4**	**Option 2: Provide pressurized gas cap (PGC) inspection equipment in each existing inspection lanes and mobile test van. (13 PGC systems total)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
89	1.1.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
90	1.1.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08

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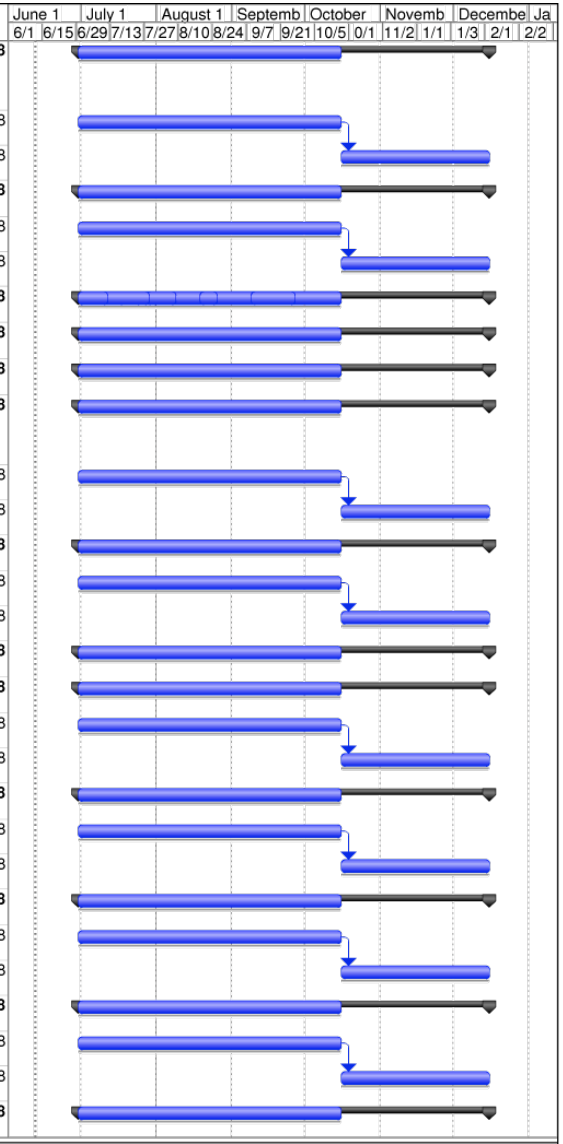
ID	WBS	Task Name	Duration	Start	Finish
91	**1.1.5**	**Option 3: Provide Idle and PGC inspection capabilities for GSA mobile van and stationary Test System (2 systems total)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
92	1.1.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
93	1.1.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
94	**1.1.6**	**Option 4: Provide wait time system**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
95	1.1.6.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
96	1.1.6.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
97	**2**	**Project CM-STP-9409(82) Provide Equipment For New Inspection Station**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
98	**2.1**	**Task 1 – Provide and Install New Inspection Equipment**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
99	**2.1.1**	**OBDII inspection equipmen**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
100	**2.1.1.1**	**Provide OBDII inspection equipment in all new inspection lanes. (6 inspection systems total)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
101	2.1.1.1.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
102	2.1.1.1.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
103	**2.1.1.2**	**Provide software for safety checks**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
104	2.1.1.2.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
105	2.1.1.2.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
106	**2.1.2**	**Inspection Processor**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
107	**2.1.2.1**	**Exhaust Gas Analysis System**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
108	2.1.2.1.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
109	2.1.2.1.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
110	**2.1.2.2**	**Probe**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
111	2.1.2.2.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
112	2.1.2.2.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
113	**2.1.2.3**	**Filters**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
114	2.1.2.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
115	2.1.2.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
116	**2.1.2.4**	**Automated Zero and Span Checks**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
117	2.1.2.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
118	2.1.2.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
119	**2.1.2.5**	**Facility span gases**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**



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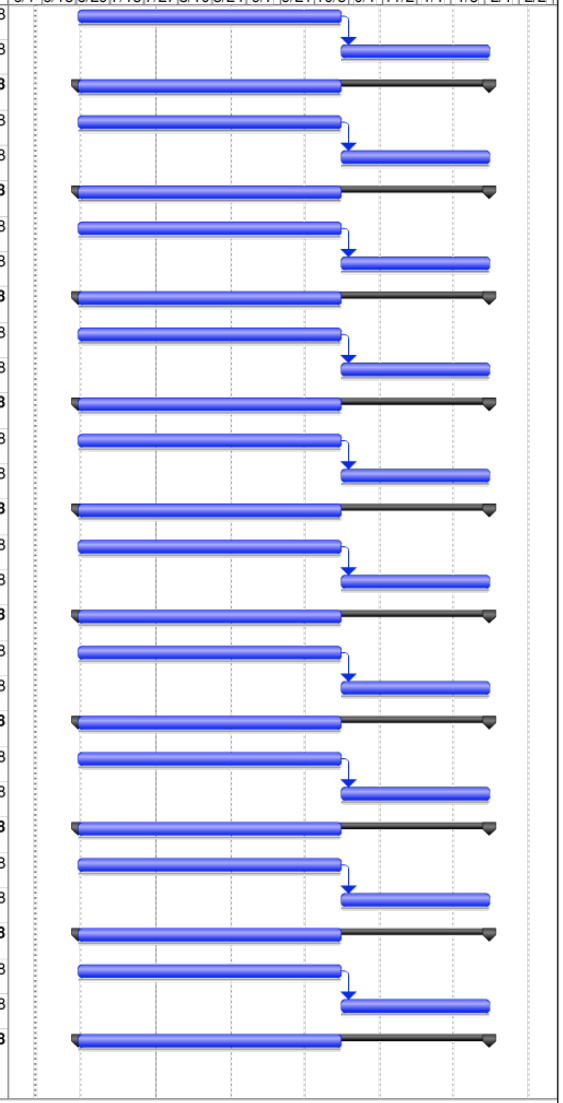
ID	WBS	Task Name	Duration	Start	Finish
120	2.1.2.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
121	2.1.2.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
122	**2.1.3**	**Data Entry Panel**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
123	2.1.3.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
124	2.1.3.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
125	**2.1.4**	**Safety Inspection Instructions**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
126	2.1.4.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
127	2.1.4.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
128	**2.1.5**	**Onboard Diagnostic II (OBDII)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
129	2.1.5.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
130	2.1.5.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
131	**2.1.6**	**Vehicle Inspection Report Printer**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
132	2.1.6.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
133	2.1.6.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
134	**2.1.7**	**Digital Video Recorder/Camera**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
135	2.1.7.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
136	2.1.7.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
137	**2.1.8**	**Documentation**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
138	2.1.8.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
139	2.1.8.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
140	**2.1.9**	**Training**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
141	2.1.9.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
142	2.1.9.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
143	**2.1.10**	**Bar code sticker printers**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
144	2.1.10.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
145	2.1.10.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
146	**2.1.11**	**Option 1: Provide idle test equipment in each inspection lane (6 t**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
147	2.1.11.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
148	2.1.11.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
149	**2.1.12**	**Option 2: Provide pressurized gas cap (PGC) inspection equipment in all existing inspection lanes. (6 PGC systems total)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**



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ID	WBS	Task Name	Duration	Start	Finish
150	2.1.12.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
151	2.1.12.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
152	**2.1.13**	**Option 3: Provide 6 additional OBD + Idle + PGC inspection systems for tandem lane operation (12 OBD + Idle + PGC inspection systems total)**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
153	2.1.13.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
154	2.1.13.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
155	**2.1.14**	**Option 4: Provide wait time system in new inspection station**	**121 days**	**Mon 6/30/08**	**Mon 12/15/08**
156	2.1.14.1	Build & Prototype	78 days	Mon 6/30/08	Wed 10/15/08
157	2.1.14.2	Install	43 days	Thu 10/16/08	Mon 12/15/08
158					
159	**2.2**	**Task 2 – Provide New Vehicle Information Database (VID)**	**75 days**	**Mon 6/30/08**	**Fri 10/10/08**
160	**2.2.1**	**Central Databases (DB)**	**58 days**	**Mon 6/30/08**	**Wed 9/17/08**
161	**2.2.1.1**	**Vehicle Inventory/Database**	**36 days**	**Mon 6/30/08**	**Mon 8/18/08**
162	2.2.1.1.1	Customize & Prototype	21 days	Mon 6/30/08	Mon 7/28/08
163	2.2.1.1.2	Deploy	15 days	Tue 7/29/08	Mon 8/18/08
164	**2.2.1.2**	**Digital images of the vehicle**	**58 days**	**Mon 6/30/08**	**Wed 9/17/08**
165	2.2.1.2.1	Build & Prototype	15 days	Mon 6/30/08	Fri 7/18/08
166	2.2.1.2.2	Deploy	43 days	Mon 7/21/08	Wed 9/17/08
167	**2.2.1.3**	**Facility Quality Assurance**	**35 days**	**Mon 6/30/08**	**Fri 8/15/08**
168	2.2.1.3.1	Build & Prototype	20 days	Mon 6/30/08	Fri 7/25/08
169	2.2.1.3.2	Install	15 days	Mon 7/28/08	Fri 8/15/08
170	**2.2.1.4**	**Equipment Maintenance and Calibration**	**40 days**	**Mon 6/30/08**	**Fri 8/22/08**
171	2.2.1.4.1	Build & Prototype	25 days	Mon 6/30/08	Fri 8/1/08
172	2.2.1.4.2	Deploy	15 days	Mon 8/4/08	Fri 8/22/08
173	**2.2.1.5**	**Inspector Certification/Training**	**25 days**	**Mon 6/30/08**	**Fri 8/1/08**
174	2.2.1.5.1	Build & Prototype	15 days	Mon 6/30/08	Fri 7/18/08
175	2.2.1.5.2	Deploy	10 days	Mon 7/21/08	Fri 8/1/08
176	**2.2.1.6**	**Motorist Complaints and Damage Claims**	**25 days**	**Mon 6/30/08**	**Fri 8/1/08**
177	2.2.1.6.1	Build & Prototype	15 days	Mon 6/30/08	Fri 7/18/08
178	2.2.1.6.2	Deploy	10 days	Mon 7/21/08	Fri 8/1/08
179	**2.2.1.7**	**Repair Facilities**	**20 days**	**Mon 6/30/08**	**Fri 7/25/08**

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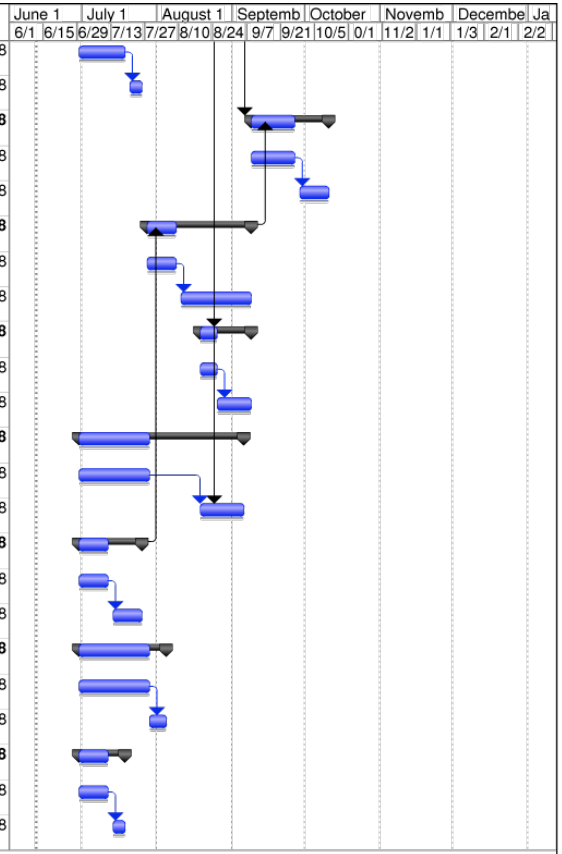
ID	WBS	Task Name	Duration	Start	Finish
180	2.2.1.7.1	Design & Prototype	15 days	Mon 6/30/08	Fri 7/18/08
181	2.2.1.7.2	Deploy	5 days	Mon 7/21/08	Fri 7/25/08
182	**2.2.2**	**Station Server**	**24 days**	**Tue 9/9/08**	**Fri 10/10/08**
183	2.2.2.1	Customize & Prototype	14 days	Tue 9/9/08	Fri 9/26/08
184	2.2.2.2	Install	10 days	Mon 9/29/08	Fri 10/10/08
185	**2.2.3**	**Ethernet LAN (Local Area Network)**	**31 days**	**Mon 7/28/08**	**Mon 9/8/08**
186	2.2.3.1	Design and Diagram	10 days	Mon 7/28/08	Fri 8/8/08
187	2.2.3.2	Install	21 days	Mon 8/11/08	Mon 9/8/08
188	**2.2.4**	**Backup systems/methods**	**15 days**	**Tue 8/19/08**	**Mon 9/8/08**
189	2.2.4.1	Configure	5 days	Tue 8/19/08	Mon 8/25/08
190	2.2.4.2	Test and Install	10 days	Tue 8/26/08	Mon 9/8/08
191	**2.2.5**	**External County Clerk System**	**50 days**	**Mon 6/30/08**	**Fri 9/5/08**
192	2.2.5.1	Build & Prototype	21 days	Mon 6/30/08	Mon 7/28/08
193	2.2.5.2	Install	14 days	Tue 8/19/08	Fri 9/5/08
194	**2.2.6**	**Internet Connection**	**20 days**	**Mon 6/30/08**	**Fri 7/25/08**
195	2.2.6.1	Configure Routers /Firewall	10 days	Mon 6/30/08	Fri 7/11/08
196	2.2.6.2	Install	10 days	Mon 7/14/08	Fri 7/25/08
197	**2.2.7**	**Program Website and Motorists**	**26 days**	**Mon 6/30/08**	**Mon 8/4/08**
198	2.2.7.1	Design and Test	21 days	Mon 6/30/08	Mon 7/28/08
199	2.2.7.2	Deploy	5 days	Tue 7/29/08	Mon 8/4/08
200	**2.2.8**	**VIN Decoder**	**15 days**	**Mon 6/30/08**	**Fri 7/18/08**
201	2.2.8.1	Testing	10 days	Mon 6/30/08	Fri 7/11/08
202	2.2.8.2	Install	5 days	Mon 7/14/08	Fri 7/18/08



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5 Additional Data

5.1 Applus+ ISO-Certified Quality Management System

A proven and respected leader in providing continuous and innovative improvements to the I/M industry, Applus+ is committed to quality across all levels of the organization. Its dedication to delivering innovative solutions, providing excellent customer service, and developing highly qualified personnel continual through training is evident in the references provided by its government clients (Sections 2.2 and 5.3).

Formalizing its commitment to quality, Applus+ created a Quality Management System (QMS) that defines the processes and documentation for verifying that the company's quality objectives are being met. ISO-certified since 2006, the Applus+ QMS provides for continual, companywide monitoring of performance and improvement efforts as well as the augmenting of processes that lead to exceptional customer service and satisfaction. To retain ISO registration, the Applus+ QMS undergoes regular internal and third-party audits for compliance with ISO's continuous improvement standard.

Applus+ is the **only vendor in the I/M industry to obtain ISO certification** for its QMS.

5.2 Applus+ Industry Associations

Applus+ is dedicated to industry innovation and quality management processes. This dedication includes promoting best practices, sharing information, advancing public awareness, and furthering quality research. As such, the Applus+ family is an active member of non-profit associations focused on improving motor vehicle inspections.

The **International Motor Vehicle Inspection Committee (CITA)** comprises more than 90 members representing 47 countries and more than 200 million annual vehicle inspections. As sponsor, member, and chair of CITA's North American Regional Advisory Group, Applus+ fully supports the group's goal of shaping the future of sustainable roadworthiness through inspection and enforcement in all regions of the world.

As an associate member of the **American Association of Motor Vehicle Administrators** (AAMVA), Applus+ lends its support to the non-profit association representing motor vehicle departments in the U.S., Canada, and Mexico by contributing to and participating in regional conferences, international meetings, and AAMVA workshops pertaining to vehicle inspections.

Applus+ AutoLogic maintains an active membership in the **Automotive Aftermarket Industry Association's iShop Standards Group** (*www.aftermarket.org/eCommerce/iShop/iShop.asp*). This industry-leading organization writes the standards that allow various shop equipment components to communicate seamlessly with one another. Because of its affiliation with iShop, Applus+ AutoLogic maintains an open communication line with the integration engineers and manufacturers of adjunctive I/M equipment. As such, Applus+ AutoLogic is uniquely positioned to offer the newest and latest integrated technology to the programs that use its inspection equipment.

5.3 Letters of Reference

STATE OF CONNECTICUT
DEPARTMENT OF MOTOR VEHICLES
Rowland State Government Center, 55 West Main Street, Waterbury, CT 06702-2004
http://dmvct.org
BUREAU OF REGULATORY SERVICES AND EMISSIONS

Seat Belts Do Save Lives

January 26, 2007

Mr. Dave Comeau
Vice President of Operations
Applus Technologies, Inc.
444 N. Michigan Ave.
Suite 1110
Chicago, IL 60611

Dear Dave:

In 2002, the State of Connecticut selected Applus+ Technologies Inc. to be the emission testing contractor for the State of Connecticut's Vehicle Inspection and Maintenance Program. As such they are responsible for program management including software and hardware development and support.

Applus+ has managed the program well beginning with the initial startup which entailed the recruitment, training and equipment outfitting of 275 independent automotive entities that would comprise the 'new' decentralized emission testing network. In coordination with Connecticut's Department of Motor Vehicles, Applus+ ably managed the sensitive public relations aspect of the program's transition from the previous centralized program. Applus+s Connecticut staff continues to provide credible customer service to Connecticut's vehicle owners on a daily basis.

Additionally, Applus+ has responded well to assuring that Connecticut citizens are afforded an emission testing program that is accurate and devoid of inspection fraud through their ongoing technological development of testing software and hardware and the evolving design of 'trigger audit ' fraud detection. These efforts have helped to restore the public's confidence in Connecticut's testing program.

Lastly, I appreciate Applus+s willingness to discuss and implement any suggested changes to the program. Connecticut looks forward to continuing this mutually beneficial working relationship.

Sincerely,

Kenneth F. Nappi
Bureau Chief

X2BW (REV 6-01)

Georgia Department of Natural Resources
Environmental Protection Division – Air Protection Branch
Mobile and Area Sources Program
4244 International Parkway, Suite 136
Atlanta, Georgia 30354
Noel Holcomb, Commissioner
Carol A. Couch, Ph.D., Director
(404) 363-7028

February 22, 2005

Matt Peterson
Applus
Franklin Square Office Park, Suite 106
2141 Kingston Court
Marietta, GA 30067

RE: Management Contractor Recommendation – Applus

This letter is in regard to the performance of Applus in execution of their duties associated with the operation of the Georgia enhanced I/M program. For this evaluation to have proper meaning to someone not familiar with the program, it's important to first understand the structure of Georgia's I/M program and the public/private partnership that makes up "Georgia's Clean Air Force". The Georgia Environmental Protection Division (EPD) signed a multiyear contract with MCI for operation of the enhanced I/M program in metro Atlanta. MCI is responsible for all duties and tasks stipulated by our contract with them. MCI entered into a subcontract with Parsons for performance of some of those tasks. Parsons also subcontracted out some of those tasks to Applus. EPD's management contract with MCI assigns overall responsibility of five major operational tasks. They are as follows:

Task 1 – Data System
Task 2 – Audits, Enforcement, Quality Assurance/Quality Control
Task 3 – Public Information & Education Program
Task 4 – Station and Inspector Licensing, Inspector Training
Task 5 – Waivers, Exemptions and Extensions, Referee Program

Applus' contract with Parsons assigned responsibility to the activities of Task 5. However, it should be noted that there is some overlap of duties and activities between MCI, Parsons and Applus in their performance of each of their respective major tasks.

Applus and their staff have done a good job of operating our five waiver stations. They have always shown a high proficiency at understanding and handling all waiver issues and activities. They continue to interface with the public in a highly professional manner. They have also shown the utmost courtesy and respect in handling very difficult situations, especially when motorists don't meet EPD's criteria for a repair waiver, which often requires the motorist to spend more money on repairs.

Public perception of the I/M program as "Georgia's Clean Air Force" is an important aspect that EPD takes very seriously. Applus has always done a good job at being a team player and not promoting their company or the individual interests of their company.

In closing, it should be noted that MCI, Parsons, Applus and EPD are NOT involved with any type of contract or arrangement to provide, sell, or lease testing equipment to emission inspection station owners. In our decentralized program, the individual business owners that operate inspection stations have their choice of purchasing emission testing equipment from any equipment vendors that developed equipment meeting our Georgia I/M test specification.

Please feel free to contact me should you have any questions, or need further clarification of the structure of our program and the responsibility and performance of Applus and their staff.

Sincerely,

Kent Pierce
Program Manager
Mobile and Area Sources Program

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

January 18, 2007

To Whom It May Concern:

The State of Rhode Island entered into a seven year contract with Applus+ Technologies in 2000-2006. They provided program management and software support services throughout the program to the Rhode Island Emissions and Safety Testing Program.

The State of Rhode Island Emissions and Safety Testing Program is a decentralized program that includes the participation of 293 independently owned service and gas stations. Applus+ Technologies managed and audited (covert/overt) each of these stations, developed and administered the Vehicle Identification Database (VID) used by the State, provided customer service support and training to the station owners/program participants.

The Applus+ staff was dedicated to supporting the Rhode Island Emissions and Safety Program, was efficient, personable, and professional. It has been a pleasure working with a vendor that provided services as proposed and many times not proposed and contracted.

The State of Rhode Island is pleased to recommend Applus+ Technologies, Inc. services to other governments and entities.

Sincerely,

Joyce Flore

Joyce Flore
Air Quality Specialist

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

January 17, 2007

Mr. Dave Comeau
Vice President of Operations
Applus Technologies, Inc.
444 N. Michigan Avenue, Suite 1110
Chicago, IL 60611

Dear Dave:

Per your request, this correspondence is to acknowledge the hard work and effort Applus Technologies has demonstrated in the implementation and ongoing operations of the Washington emissions testing program. The program started on time and has continued to provide service to the citizens of Washington with overall public acceptance. Applus shows a sincere dedication to operating a quality program and quickly responding to and resolving issues that may arise that could negatively impact the program.

I appreciate the cooperative and positive effort Applus has shown in assisting the Department of Ecology in attaining their goals. We are particularly impressed in your willingness to go beyond the contract language and provide us with services that aren't required. The Applus web site for Washington and the OBD kiosks are two fine examples of you providing more than necessary without charging us for the additional services. The citizens of the state benefit from your cooperation and customer service ethic.

Lastly, we are impressed with your ISO certification and feel fortunate that you were willing to seek and attain that high standard. I look forward to working with you throughout the contract in continuing to present a fair, efficient and accurate testing program in Washington for many years to come.

Sincerely,

Stuart A. Clark, Program Manager
Air Quality Program

PB:te