City and County of San Francisco
Airport Commission
P.O. Box 8097
San Francisco, California 94128

Agreement between the City and County of San Francisco and

TransCore, LP

Contract No. 8841R

This Agreement is made this 28th day of August, 2012, in the City and County of San Francisco, State of California, by and between: **TransCore, LP, 9440 Carroll Park Drive, Suite 150, San Diego CA, 92121**, hereinafter referred to as "Contractor," and the City and County of San Francisco, a municipal corporation, hereinafter referred to as "City," acting by and through its Airport Commission or the Commission's designated agent, hereinafter referred to as "**Commission.**"

Recitals

WHEREAS, the Commission wishes to hire an Integrator to design, build and maintain a Ground Transportation & Taxi Management System (GTMS/TMS) hereinafter referred to as the "NEW SYSTEM"; and,

WHEREAS, the NEW SYSTEM will replace the Automated Vehicle Identification System (AVI) and the Taxi Revenue System (TRS) and upgrade the Airport's current ground transportation and taxi management hardware and software, hereinafter referred to as the "EXISTING SYSTEM"; and,

WHEREAS, the City will contract separately for the construction and infrastructure upgrades to support this contract; and,

WHEREAS, Commission is authorized to enter into all contracts which relate to matters under its jurisdiction; and

WHEREAS, a Request for Proposal ("RFP") was issued on June 24, 2011, and City selected Contractor as the highest qualified scorer pursuant to the RFP; and

WHEREAS, Commission awarded this contract to Contractor on August 28, 2012 pursuant to Resolution No. 12-0188 and

WHEREAS, Contractor represents and warrants that it is qualified to perform the services required by City as set forth under this Contract; and,

WHEREAS, approval for this Agreement was obtained when the Civil Service Commission approved Contract number PSC No. 4099-10/11 on April 18, 2011;

Now, THEREFORE, the parties agree as follows:

1. Certification of Funds; Budget and Fiscal Provisions; Termination in the Event of Non-Appropriation. This Agreement is subject to the budget and fiscal provisions of the City's Charter. Charges will accrue only after prior written authorization certified by the Controller, and the amount of

City's obligation hereunder shall not at any time exceed the amount certified for the purpose and period stated in such advance authorization. This Agreement will terminate without penalty, liability or expense of any kind to City at the end of any fiscal year if funds are not appropriated for the next succeeding fiscal year. If funds are appropriated for a portion of the fiscal year, this Agreement will terminate, without penalty, liability or expense of any kind at the end of the term for which funds are appropriated. City has no obligation to make appropriations for this Agreement in lieu of appropriations for new or other agreements. City budget decisions are subject to the discretion of the Mayor and the Board of Supervisors. Contractor's assumption of risk of possible non-appropriation is part of the consideration for this Agreement.

THIS SECTION CONTROLS AGAINST ANY AND ALL OTHER PROVISIONS OF THIS AGREEMENT.

2. Term of the Agreement. Subject to Section 1, the term of this Agreement shall be from August 28, 2012 to June 28, 2015.

3. Effective Date of Agreement. This Agreement shall become effective when the Controller has certified to the availability of funds and Contractor has been notified in writing.

4. Services Contractor Agrees to Perform. The Contractor agrees to perform the services provided for in Appendix A, "Services to be Provided by Contractor," Appendix C, "Project Schedule and Progress Reports," and its Attachments, attached hereto and incorporated by reference as though fully set forth herein. If Appendix A includes as-needed services, such services shall be requested by City through the issuance of a written task order signed by City and Contractor, which task order shall be made a part of and incorporated into the Agreement as though fully set forth herein without the need for a formal amendment to the Agreement. The task order shall include a description of the as-needed services, the deliverables, schedule for performance, cost, and method and timing of payment. In addition, the Contractor agrees to fully warrant its products and services for a period of one (1) year following the notice of completion; and to enter into a five (5) year maintenance agreement at the conclusion of this Agreement, for the amount set forth in Paragraph 5.b herein.

5. Compensation

a. **Work Subject to This Agreement.** Compensation shall be tied to completion of work and milestone ID performed in one of three phases, as more fully described in Appendices B and C hereto. No more than one invoice a month may be submitted for work completed and invoices must indicate work and milestone ID completed.

In no event shall the amount of this Agreement exceed Eight Million, Two Hundred and Sixty-One Thousand, Two Hundred and Twenty Seven Dollars **($8,261,227).** In the event the Airport determines, in the sole discretion of the Director or his designee, that it will not deploy the Interim Solution referenced in Appendix A to this Agreement, then the amount of this Agreement shall not exceed Seven Million, Nine Hundred and Twenty Thousand, Two Hundred and Twenty-Seven Dollars **($7,920,227).**

No charges shall be incurred under this Agreement nor shall any payments become due to Contractor until reports, services, or both, required under this Agreement are received from Contractor and approved by Airport Commission as being in accordance with this Agreement. City may withhold payment to Contractor in any instance in which Contractor has failed or refused to satisfy any material obligation provided for under this Agreement. In no event shall City be liable for interest or late charges for any late payments.

The Contractor agrees to pay each subcontractor under this Agreement for satisfactory performance of its contract no later than thirty (30) days from the receipt of each payment the prime contractor receives from the City. The Contractor agrees further to return retained payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced timeframe may occur only for good cause following written approval of the City.

The Controller is not authorized to pay invoices submitted by Contractor prior to Contractor's submission of HRC Progress Payment Form If Progress Payment Form is not submitted with Contractor's invoice, the Controller will notify the department, the Director of HRC and Contractor of the omission. If Contractor's failure to provide HRC Progress Payment Form is not explained to the Controller's satisfaction, the Controller will withhold 20% of the payment due pursuant to that invoice until HRC Progress Payment Form is provided. Following City's payment of an invoice, Contractor has ten days to file an affidavit using HRC Payment Affidavit verifying that all subcontractors have been paid and specifying the amount.

In no event shall the City be liable for interest or late charges for any late payments.

b. **Maintenance Contract.** Within 90 days of the end of the Warranty Period, Contractor shall enter into a five (5) year maintenance agreement with the City in the form attached as Appendix F at the cost of Two Hundred Forty Eight Thousand Nine Hundred Seventy Three dollars ($248,973) per year to be paid in monthly invoices. At a minimum, Contractor shall provide the following services in the Maintenance Agreement:

1) Level 3 maintenance for all non-software components.

2) Error, defect or malfunction correction within (6) hours of notification; and

3) Hotline support; and

4) Qualified personnel

6. Guaranteed Maximum Costs. The City's obligation hereunder shall not at any time exceed the amount certified by the Controller for the purpose and period stated in such certification. Except as may be provided by laws governing emergency procedures, officers and employees of the City are not authorized to request, and the City is not required to reimburse the Contractor for, Commodities or Services beyond the agreed upon contract scope unless the changed scope is authorized by amendment and approved as required by law. Officers and employees of the City are not authorized to offer or promise, nor is the City required to honor, any offered or promised additional funding in excess of the maximum amount of funding for which the contract is certified without certification of the additional amount by the Controller. The Controller is not authorized to make payments on any contract for which funds have not been certified as available in the budget or by supplemental appropriation.

7. Payment; Invoice Format. Invoices furnished by Contractor under this Agreement must be in a form acceptable to the Controller, and must include a unique invoice number. All amounts paid by City to Contractor shall be subject to audit by City. Payment shall be made by City to Contractor at the address specified in the section entitled "Notices to the Parties."

8. Submitting False Claims; Monetary Penalties. Pursuant to San Francisco Administrative Code §21.35, any contractor, subcontractor or consultant who submits a false claim shall be liable to the City for the statutory penalties set forth in that section. The text of Section 21.35, along with the entire San Francisco Administrative Code is available on the web at http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:sanfrancisco_ca. A contractor, subcontractor or consultant will be deemed to have submitted a false claim to the City if the contractor, subcontractor or consultant: (a) knowingly presents or causes to be presented to an officer or employee of the City a false claim or request for payment or approval; (b) knowingly makes, uses, or causes to be made or used a false record or statement to get a false claim paid or approved by the City; (c) conspires to defraud the City by getting a false claim allowed or paid by the City; (d) knowingly makes, uses, or causes to be made or used a false record or statement to conceal, avoid, or decrease an obligation to pay or transmit money or property to the City; or (e) is a beneficiary of an inadvertent submission of a false claim to the City, subsequently discovers the falsity of the claim, and fails to disclose the false claim to the City within a reasonable time after discovery of the false claim.

9. Disallowance. Left blank by agreement of the parties.

10. Taxes

a. Payment of any taxes, including possessory interest taxes and California sales and use taxes, levied upon or as a result of this Agreement, or the services delivered pursuant hereto, shall be the obligation of Contractor.

b. Contractor recognizes and understands that this Agreement may create a "possessory interest" for property tax purposes. Generally, such a possessory interest is not created unless the Agreement entitles the Contractor to possession, occupancy, or use of City property for private gain. If such a possessory interest is created, then the following shall apply:

1) Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that Contractor, and any permitted successors and assigns, may be subject to real property tax assessments on the possessory interest;

2) Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that the creation, extension, renewal, or assignment of this Agreement may result in a "change in ownership" for purposes of real property taxes, and therefore may result in a revaluation of any possessory interest created by this Agreement. Contractor accordingly agrees on behalf of itself and its permitted successors and assigns to report on behalf of the City to the County Assessor the information required by Revenue and Taxation Code section 480.5, as amended from time to time, and any successor provision.

3) Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that other events also may cause a change of ownership of the possessory interest and result in the revaluation of the possessory interest. (see, e.g., Rev. & Tax. Code section 64, as amended from time to time). Contractor accordingly agrees on behalf of itself and its permitted successors and assigns to report any change in ownership to the County Assessor, the State Board of Equalization or other public agency as required by law.

4) Contractor further agrees to provide such other information as may be requested by the City to enable the City to comply with any reporting requirements for possessory interests that are imposed by applicable law.

11. Payment Does Not Imply Acceptance of Work. The granting of any payment by City, or the receipt thereof by Contractor, shall in no way lessen the liability of Contractor to replace unsatisfactory work, equipment, or materials, although the unsatisfactory character of such work, equipment or materials may not have been apparent or detected at the time such payment was made. Materials, equipment, components, or workmanship that do not conform to the requirements of this Agreement may be rejected by City and in such case must be replaced by Contractor without delay.

12. Qualified Personnel. Work under this Agreement shall be performed only by competent personnel under the supervision of and in the employment of Contractor. Contractor will comply with City's reasonable requests regarding assignment of personnel, but all personnel, including those assigned at City's request, must be supervised by Contractor. Contractor shall commit adequate resources to complete the project within the project schedule specified in this Agreement.

13. Responsibility for Equipment. City shall not be responsible for any damage to persons or property as a result of the use, misuse or failure of any equipment used by Contractor, or by any of its employees, even though such equipment be furnished, rented or loaned to Contractor by City.

14. Independent Contractor; Payment of Taxes and Other Expenses

a. **Independent Contractor.** Contractor or any agent or employee of Contractor shall be deemed at all times to be an independent contractor and is wholly responsible for the manner in which it

performs the services and work requested by City under this Agreement. Contractor or any agent or employee of Contractor shall not have employee status with City, nor be entitled to participate in any plans, arrangements, or distributions by City pertaining to or in connection with any retirement, health or other benefits that City may offer its employees. Contractor or any agent or employee of Contractor is liable for the acts and omissions of itself, its employees and its agents. Contractor shall be responsible for all obligations and payments, whether imposed by federal, state or local law, including, but not limited to, FICA, income tax withholdings, unemployment compensation, insurance, and other similar responsibilities related to Contractor's performing services and work, or any agent or employee of Contractor providing same. Nothing in this Agreement shall be construed as creating an employment or agency relationship between City and Contractor or any agent or employee of Contractor. Any terms in this Agreement referring to direction from City shall be construed as providing for direction as to policy and the result of Contractor's work only, and not as to the means by which such a result is obtained. City does not retain the right to control the means or the method by which Contractor performs work under this Agreement.

b. **Payment of Taxes and Other Expenses.** Should City, in its discretion, or a relevant taxing authority such as the Internal Revenue Service or the State Employment Development Division, or both, determine that Contractor is an employee for purposes of collection of any employment taxes, the amounts payable under this Agreement shall be reduced by amounts equal to both the employee and employer portions of the tax due (and offsetting any credits for amounts already paid by Contractor which can be applied against this liability). City shall then forward those amounts to the relevant taxing authority. Should a relevant taxing authority determine a liability for past services performed by Contractor for City, upon notification of such fact by City, Contractor shall promptly remit such amount due or arrange with City to have the amount due withheld from future payments to Contractor under this Agreement (again, offsetting any amounts already paid by Contractor which can be applied as a credit against such liability). A determination of employment status pursuant to the preceding two paragraphs shall be solely for the purposes of the particular tax in question, and for all other purposes of this Agreement, Contractor shall not be considered an employee of City. Notwithstanding the foregoing, should any court, arbitrator, or administrative authority determine that Contractor is an employee for any other purpose, then Contractor agrees to a reduction in City's financial liability so that City's total expenses under this Agreement are not greater than they would have been had the court, arbitrator, or administrative authority determined that Contractor was not an employee.

15. Insurance

a. Without in any way limiting Contractor's liability pursuant to the "Indemnification" section of this Agreement, Contractor must maintain in force, during the full term of the Agreement, insurance in the following amounts and coverages:

1) Workers' Compensation, in statutory amounts, with Employers' Liability Limits not less than $1,000,000 each accident, injury, or illness; and

2) Commercial General Liability Insurance with limits not less than $1,000,000 each occurrence Combined Single Limit for Bodily Injury and Property Damage, including Contractual Liability, Personal Injury, Products and Completed Operations; and

3) Commercial Automobile Liability Insurance with limits not less than $1,000,000 each occurrence Combined Single Limit for Bodily Injury and Property Damage, including Owned, Non-Owned and Hired auto coverage, as applicable.

4) Professional liability insurance, applicable to Contractor's profession, with limits not less than $1,000,000 each claim with respect to negligent acts, errors or omissions in connection with professional services to be provided under this Agreement.

b. Commercial General Liability and Commercial Automobile Liability Insurance policies must be endorsed to provide:

1) Name as Additional Insured the City and County of San Francisco, its Officers, Agents, and Employees.

2) That such policies are primary insurance to any other insurance available to the Additional Insureds, with respect to any claims arising out of this Agreement, and that insurance applies separately to each insured against whom claim is made or suit is brought.

c. Regarding Workers' Compensation, Contractor hereby agrees to waive subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City for all work performed by the Contractor, its employees, agents and subcontractors.

All policies shall provide thirty days' advance written notice to the City of reduction or nonrenewal of coverages or cancellation of coverages for any reason. Notices shall be sent to the City address in the "Notices to the Parties" section. The City shall provide the Contractor with a valid e-mail address, as this shall be the method of notification.

d. Should any of the required insurance be provided under a claims-made form, Contractor shall maintain such coverage continuously throughout the term of this Agreement and, without lapse, for a period of three years beyond the expiration of this Agreement, to the effect that, should occurrences during the contract term give rise to claims made after expiration of the Agreement, such claims shall be covered by such claims-made policies.

e. Should any of the required insurance be provided under a form of coverage that includes a general annual aggregate limit or provides that claims investigation or legal defense costs be included in such general annual aggregate limit, such general annual aggregate limit shall be double the occurrence or claims limits specified above.

f. Should any required insurance lapse during the term of this Agreement, requests for payments originating after such lapse shall not be processed until the City receives satisfactory evidence of reinstated coverage as required by this Agreement, effective as of the lapse date. If insurance is not reinstated, the City may, at its sole option, terminate this Agreement effective on the date of such lapse of insurance.

g. Before commencing any operations under this Agreement, Contractor shall furnish to City certificates of insurance and additional insured policy endorsements with insurers with ratings comparable to A-, VIII or higher, that are authorized to do business in the State of California, and that are satisfactory to City, in form evidencing all coverages set forth above. Failure to maintain insurance shall constitute a material breach of this Agreement.

h. Approval of the insurance by City shall not relieve or decrease the liability of Contractor hereunder.

i. If a subcontractor will be used to complete any portion of this agreement, the Contractor shall ensure that the subcontractor shall provide all necessary insurance and shall name the City and County of San Francisco, its officers, agents and employees and the Contractor listed as additional insureds.

16. Indemnification

a. **General.** To the fullest extent permitted by law, Contractor shall assume the defense of (with legal counsel subject to approval of the City), indemnify and save harmless the City, its boards, commissions, officers, and employees (collectively "Indemnitees"), from and against any and all claims,

loss, cost, damage, injury (including, without limitation, injury to or death of an employee of the Contractor or its subconsultants), expense and liability of every kind, nature, and description (including, without limitation, incidental and consequential damages, court costs, attorneys' fees, litigation expenses, fees of expert consultants or witnesses in litigation, and costs of investigation), that arise out of, pertain to, or relate to, directly or indirectly, in whole or in part, the negligence, recklessness, or willful misconduct of the Contractor, any subconsultant, anyone directly or indirectly employed by them, or anyone that they control (collectively, "Liabilities").

b. **Limitations.** No insurance policy covering the Contractor's performance under this Agreement shall operate to limit the Contractor's Liabilities under this provision. Nor shall the amount of insurance coverage operate to limit the extent of such Liabilities. The Contractor assumes no liability whatsoever for the sole negligence, active negligence, or willful misconduct of any Indemnitee or the contractors of any Indemnitee.

c. **Copyright infringement.** Contractor shall also indemnify, defend and hold harmless all Indemnitees from all suits or claims for infringement of the patent rights, copyright, trade secret, trade name, trademark, service mark, or any other proprietary right of any person or persons in consequence of the use by the City, or any of its boards, commissions, officers, or employees of articles or services to be supplied in the performance of Contractor's services under this Agreement. Infringement of patent rights, copyrights, or other proprietary rights in the performance of this Agreement, if not the basis for indemnification under the law, shall nevertheless be considered a material breach of contract.

17. Incidental and Consequential Damages. Contractor shall be responsible for incidental and consequential damages resulting in whole or in part from Contractor's acts or omissions. Nothing in this Agreement shall constitute a waiver or limitation of any rights that City may have under applicable law.

18. Liability of City. CITY'S PAYMENT OBLIGATIONS UNDER THIS AGREEMENT SHALL BE LIMITED TO THE PAYMENT OF THE COMPENSATION PROVIDED FOR IN SECTION 5 OF THIS AGREEMENT. NOTWITHSTANDING ANY OTHER PROVISION OF THIS AGREEMENT, IN NO EVENT SHALL CITY BE LIABLE, REGARDLESS OF WHETHER ANY CLAIM IS BASED ON CONTRACT OR TORT, FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT OR THE SERVICES PERFORMED IN CONNECTION WITH THIS AGREEMENT.

19. Liquidated Damages. By entering into this Agreement, Contractor agrees that in the event the Services, as provided under Table 1 in this paragraph 19 and referenced herein, are not operational or otherwise do not perform as required, at time of final acceptance, the City will suffer actual damages that will be impractical or extremely difficult to determine. Contractor further agrees that liquidated damages shall be triggered when all of the following circumstances exist: (a) the contractor has completed installation of the system; (b) the system has been accepted by the City; (c) the system is non-operational during the warranty and maintenance period referred to in Appendix A; and (d) the system's non-operational status, in the Director's sole discretion, is not attributed to the City's infrastructure failure. Contractor further agrees that the sums listed in Table 1 in the paragraph 19 are not a penalty, but are a reasonable estimate of the loss that City will incur based on the system being unavailable, established in light of the circumstances existing at the time this contract was awarded. City may deduct a sum representing the liquidated damages from any money due to Contractor. Such deductions shall not be considered a penalty, but rather agreed monetary damages sustained by City.

Table 1		
Critical Function	**Performance Measure**	**Liquidated Damages Amount**
Airport Revenue Collection	Unable to accept Smart Card payments through CID or TMS application; AVMs fail to add value to smart cards; Connection to Billing Software is unavailable; Trip data cannot be processed	$125 per Hour (or part thereof)
A-Card Issuance and Management	Unable to view, issue, or revoke any Smart A-card, including remotely through hand-held device	$100 per Hour (or part thereof)
Driver Web Portal Access	Web site is, in part or whole, down for any reason other than upgrades or maintenance	$100 per Hour (or part thereof)
Handheld Reader Connectivity & Function	Inability to maintain access, upload/download and utilize the full functionality of the handheld units, assuming a fully charged handheld.	$50 per Hour (or part thereof)
SFMTA Access and Functionality	SFMTA unable to fully access the GTMS/TMS	$50 per Hour (or part thereof)

20. Default; Remedies

a. Each of the following shall constitute an event of default ("Event of Default") under this Agreement:

1) Contractor fails or refuses to perform or observe any term, covenant or condition contained in any of the following Sections of this Agreement:

8.	Submitting False Claims; Monetary Penalties.	37.	Drug-free Workplace Policy
10.	Taxes	53.	Compliance with Laws
15.	Insurance	55.	Supervision of Minors
24.	Proprietary or Confidential Information of City	57.	Protection of Private Information
30.	Assignment	58.	Graffiti Removal

2) Contractor fails or refuses to perform or observe any other term, covenant or condition contained in this Agreement, and such default continues for a period of ten days after written notice thereof from City to Contractor.

3) Contractor (a) is generally not paying its debts as they become due, (b) files, or consents by answer or otherwise to the filing against it of, a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency or other debtors' relief law of any jurisdiction, (c) makes an assignment for the benefit of its creditors, (d) consents to the appointment of a custodian, receiver, trustee or other officer with similar powers of Contractor or of any substantial part of Contractor's property or (e) takes action for the purpose of any of the foregoing.

4) A court or government authority enters an order (a) appointing a custodian, receiver, trustee or other officer with similar powers with respect to Contractor or with respect to any substantial part of Contractor's property, (b) constituting an order for relief or approving a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency or other debtors' relief law of any jurisdiction or (c) ordering the dissolution, winding-up or liquidation of Contractor.

b. On and after any Event of Default, City shall have the right to exercise its legal and equitable remedies, including, without limitation, the right to terminate this Agreement or to seek specific performance of all or any part of this Agreement. In addition, City shall have the right (but no obligation) to cure (or cause to be cured) on behalf of Contractor any Event of Default; Contractor shall pay to City on demand all costs and expenses incurred by City in effecting such cure, with interest thereon from the date of incurrence at the maximum rate then permitted by law. City shall have the right to offset from any amounts due to Contractor under this Agreement or any other agreement between City and Contractor all damages, losses, costs or expenses incurred by City as a result of such Event of Default and any liquidated damages due from Contractor pursuant to the terms of this Agreement or any other agreement.

c. All remedies provided for in this Agreement may be exercised individually or in combination with any other remedy available hereunder or under applicable laws, rules and regulations. The exercise of any remedy shall not preclude or in any way be deemed to waive any other remedy.

21. Termination

a. **Termination for Cause.** In the event Contractor fails to perform any of its obligations under this Agreement, this Agreement may be terminated and all of Contractor's rights hereunder ended. Termination will be effective after ten days written notice to Contractor. No new work will be undertaken after the date of receipt of any notice of termination, or five days after the date of the notice, whichever is earlier. In the event of such termination, Contractor will be paid for those services performed under this Agreement to the satisfaction of the City, up to the date of termination. However, City may offset from any such amounts due Contractor any liquidated damages or other costs City has or will incur due to Contractor's non-performance. Any such offset by City will not constitute a waiver of any other remedies City may have against Contractor for financial injury or otherwise.

b. **Termination for Convenience.** City may terminate this Agreement for City's convenience and without cause at any time by giving Contractor thirty days written notice of such termination. In the event of such termination, Contractor will be paid for those services performed, pursuant to this Agreement, to the satisfaction of the City up to the date of termination. In no event will City be liable for costs incurred by Contractor after receipt of a notice of termination. Such non-recoverable costs include, but are not limited to, anticipated profits on this Agreement, post-termination employee salaries, post-termination administrative expenses, or any other cost which is not reasonable or authorized under this section. This section shall not prevent Contractor from recovering costs necessarily incurred in discontinuing further work under the contract after receipt of the termination notice.

c. **Obligations upon Termination.** Upon termination of this Agreement, Contractor will submit an invoice to City for an amount which represents the value of its work or services actually performed prior to the effective date of termination for which Contractor has not previously been compensated, except that with respect to reimbursement for Contractor's services, in no event will the compensation paid for the month in which termination occurs be greater than the scheduled monthly fee multiplied by a fraction, the numerator of which will be the days in the month elapsed prior to the termination and the denominator of which shall be 31. Upon approval and payment of this invoice by City, City shall be under no further obligation to Contractor monetarily or otherwise.

22. Rights and Duties upon Termination or Expiration

This Section and the following Sections of this Agreement shall survive termination or expiration of this Agreement:

8. Submitting False Claims; Monetary Penalties	27. Works for Hire
9. Disallowance	28. Audit and Inspection of Records
10. Taxes	31. Non-waiver of Rights
11. Payment Does Not Imply Acceptance of Work	48. Modification of Agreement
13. Responsibility for Equipment	49. Administrative Remedy for Agreement Interpretation
14. Independent Contractor; Payment of Taxes and Other Expenses	50. Agreement made in California; Venue
15. Insurance	51. Construction
16. Indemnification	52. Entire Agreement
17. Incidental and Consequential Damages	56. Severability
18. Liability of City	57. Protection of Private Information
24. Proprietary or Confidential Information of City	69. Property Rights of the Parties
26. Ownership of Results	70. Warranty

Subject to the immediately preceding sentence, upon termination of this Agreement prior to expiration of the term specified in Section 2, this Agreement shall terminate and be of no further force or effect. Contractor shall transfer title to City, and deliver in the manner, at the times, and to the extent, if any, directed by City, any work in progress, completed work, supplies, equipment, and other materials produced as a part of, or acquired in connection with the performance of this Agreement, and any completed or partially completed work which, if this Agreement had been completed, would have been required to be furnished to City. This subsection shall survive termination of this Agreement.

23. Conflict of Interest. Through its execution of this Agreement, Contractor acknowledges that it is familiar with the provision of Section 15.103 of the City's Charter, Article III, Chapter 2 of City's Campaign and Governmental Conduct Code, and Section 87100 et seq. and Section 1090 et seq. of the Government Code of the State of California, and certifies that it does not know of any facts which constitutes a violation of said provisions and agrees that it will immediately notify the City if it becomes aware of any such fact during the term of this Agreement.

24. Proprietary or Confidential Information of City. Contractor understands and agrees that, in the performance of the work or services under this Agreement or in contemplation thereof, Contractor may have access to private or confidential information which may be owned or controlled by City and that such information may contain proprietary or confidential details, the disclosure of which to third parties may be damaging to City. Contractor agrees that all information disclosed by City to Contractor shall be held in confidence and used only in performance of the Agreement. Contractor shall exercise the same

standard of care to protect such information as a reasonably prudent contractor would use to protect its own proprietary data.

25. Notices to the Parties. Unless otherwise indicated elsewhere in this Agreement, all written communications sent by the parties may be by U.S. mail, e-mail or by fax, and shall be addressed as follows:

To City: Mr. Abubaker Azam,
Assistant Deputy Director
San Francisco International Airport
PO Box 8097
San Francisco CA, 94128
Abubaker.Azam@flysfo.com

To Contractor: Mr. Chris Hall
TransCore, LP
9440 Carroll Park Drive, Suite 150
San Diego CA, 92121
Chris.Hall@transcore.com

Any notice of default must be sent by registered mail.

26. Ownership of Results. In addition to the ownership rights described in paragraph 69 herein, any interest of Contractor or its Subcontractors, in drawings, plans, specifications, blueprints, studies, reports, memoranda, computation sheets, computer files and media or other documents prepared by Contractor or its subcontractors in connection with services to be performed under this Agreement, shall become the property of and will be transmitted to City. However, Contractor may retain and use copies for reference and as documentation of its experience and capabilities.

27. Works for Hire. If, in connection with services performed under this Agreement, Contractor or its subcontractors create artwork, copy, posters, billboards, photographs, videotapes, audiotapes, systems designs, reports, diagrams, surveys, blueprints, or any other original works of authorship, such works of authorship shall be works for hire as defined under Title 17 of the United States Code, and all copyrights in such works are the property of the City. If it is ever determined that any works created by Contractor or its subcontractors under this Agreement are not works for hire under U.S. law, Contractor/subcontractor hereby assigns all copyrights to such works to the City, and agrees to provide any material and execute any documents necessary to effectuate such assignment. With the approval of the City, Contractor/subcontractor may retain and use copies of such works for reference and as documentation of its experience and capabilities.

With regard to software and source codes, Contractor and its subcontractor shall place all software applications designed for the GTMS/TMS, including all sources codes and all associated libraries and other tools, in escrow with the intent to enable the City to use all GTMS/TMS applications, source codes, tools and libraries in the event the Contractor and/or its subcontractor is unable or unwilling to maintain the GTMS/TMS software applications, or Contractor and/or its subcontractor ceases to exist. In addition, Contractor and its subcontractor grant the City a royalty-free, non-exclusive, and irrevocable license to install and use, translate, reproduce, modify, adapt and create derivative works from, and to license third parties for such purposes, GTMS/TMS specific application software, including its source code and source code documentation. The license for GTMS/TMS application specific software shall be for ongoing operation of the GTMS/TMS and any future interfaces with City agencies. Any sub licenses to third parties shall be subject to Contractor or its subcontractor's approval, which shall not unreasonably be withheld. To the extent modifications or changes to the GTMS/TMS software application are made by third parties, Contractor and/or its subcontractor shall be relieved of any professional liability as to those modifications only. All other professional liability shall remain in full force and effect.

28. Audit and Inspection of Records. Contractor agrees to maintain and make available to the City, during regular business hours, accurate books and accounting records relating to its work under this Agreement. Contractor will permit City to audit, examine and make excerpts and transcripts from such books and records, and to make audits of all invoices, materials, payrolls, records or personnel and other data related to all other matters covered by this Agreement, whether funded in whole or in part under this Agreement. Contractor shall maintain such data and records in an accessible location and condition for a period of not less than five years after final payment under this Agreement or until after final audit has been resolved, whichever is later. The State of California or any federal agency having an interest in the subject matter of this Agreement shall have the same rights conferred upon City by this Section.

29. Subcontracting. Contractor is prohibited from subcontracting this Agreement or any part of it unless such subcontracting is first approved by City in writing. Neither party shall, on the basis of this Agreement, contract on behalf of or in the name of the other party. An agreement made in violation of this provision shall confer no rights on any party and shall be null and void.

30. Assignment. The services to be performed by Contractor are personal in character and neither this Agreement nor any duties or obligations hereunder may be assigned or delegated by the Contractor unless first approved by City by written instrument executed and approved in the same manner as this Agreement.

31. Non-Waiver of Rights. The omission by either party at any time to enforce any default or right reserved to it, or to require performance of any of the terms, covenants, or provisions hereof by the other party at the time designated, shall not be a waiver of any such default or right to which the party is entitled, nor shall it in any way affect the right of the party to enforce such provisions thereafter.

32. Earned Income Credit (EIC) Forms. Administrative Code section 12O requires that employers provide their employees with IRS Form W-5 (The Earned Income Credit Advance Payment Certificate) and the IRS EIC Schedule, as set forth below. Employers can locate these forms at the IRS Office, on the Internet, or anywhere that Federal Tax Forms can be found. Contractor shall provide EIC Forms to each Eligible Employee at each of the following times: (i) within thirty days following the date on which this Agreement becomes effective (unless Contractor has already provided such EIC Forms at least once during the calendar year in which such effective date falls); (ii) promptly after any Eligible Employee is hired by Contractor; and (iii) annually between January 1 and January 31 of each calendar year during the term of this Agreement. Failure to comply with any requirement contained in subparagraph (a) of this Section shall constitute a material breach by Contractor of the terms of this Agreement. If, within thirty days after Contractor receives written notice of such a breach, Contractor fails to cure such breach or, if such breach cannot reasonably be cured within such period of thirty days, Contractor fails to commence efforts to cure within such period or thereafter fails to diligently pursue such cure to completion, the City may pursue any rights or remedies available under this Agreement or under applicable law. Any Subcontract entered into by Contractor shall require the subcontractor to comply, as to the subcontractor's Eligible Employees, with each of the terms of this section. Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Section 12O of the San Francisco Administrative Code.

33. Local Business Enterprise Utilization; Liquidated Damages

a. **The LBE Ordinance.** Contractor, shall comply with all the requirements of the Local Business Enterprise and Non-Discrimination in Contracting Ordinance set forth in Chapter 14B of the San Francisco Administrative Code as it now exists or as it may be amended in the future (collectively the "LBE Ordinance"), provided such amendments do not materially increase Contractor's obligations or liabilities, or materially diminish Contractor's rights, under this Agreement. Such provisions of the LBE Ordinance are incorporated by reference and made a part of this Agreement as though fully set forth in this section. Contractor's willful failure to comply with any applicable provisions of the LBE Ordinance is a material breach of Contractor's obligations under this Agreement and shall entitle City, subject to any

applicable notice and cure provisions set forth in this Agreement, to exercise any of the remedies provided for under this Agreement, under the LBE Ordinance or otherwise available at law or in equity, which remedies shall be cumulative unless this Agreement expressly provides that any remedy is exclusive. In addition, Contractor shall comply fully with all other applicable local, state and federal laws prohibiting discrimination and requiring equal opportunity in contracting, including subcontracting.

b. **Compliance and Enforcement.** If Contractor willfully fails to comply with any of the provisions of the LBE Ordinance, the rules and regulations implementing the LBE Ordinance, or the provisions of this Agreement pertaining to LBE participation, Contractor shall be liable for liquidated damages in an amount equal to Contractor's net profit on this Agreement, or 10% of the total amount of this Agreement, or $1,000, whichever is greatest. The Director of the City's Human Rights Commission or any other public official authorized to enforce the LBE Ordinance (separately and collectively, the "Director of HRC") may also impose other sanctions against Contractor authorized in the LBE Ordinance, including declaring the Contractor to be irresponsible and ineligible to contract with the City for a period of up to five years or revocation of the Contractor's LBE certification. The Director of HRC will determine the sanctions to be imposed, including the amount of liquidated damages, after investigation pursuant to Administrative Code §14B.17. By entering into this Agreement, Contractor acknowledges and agrees that any liquidated damages assessed by the Director of the HRC shall be payable to City upon demand. Contractor further acknowledges and agrees that any liquidated damages assessed may be withheld from any monies due to Contractor on any contract with City. Contractor agrees to maintain records necessary for monitoring its compliance with the LBE Ordinance for a period of three years following termination or expiration of this Agreement, and shall make such records available for audit and inspection by the Director of HRC or the Controller upon request.

34. Nondiscrimination; Penalties

a. **Contractor Shall Not Discriminate.** In the performance of this Agreement, Contractor agrees not to discriminate against any employee, City and County employee working with such contractor or subcontractor, applicant for employment with such contractor or subcontractor, or against any person seeking accommodations, advantages, facilities, privileges, services, or membership in all business, social, or other establishments or organizations, on the basis of the fact or perception of a person's race, color, creed, religion, national origin, ancestry, age, height, weight, sex, sexual orientation, gender identity, domestic partner status, marital status, disability or Acquired Immune Deficiency Syndrome or HIV status (AIDS/HIV status), or association with members of such protected classes, or in retaliation for opposition to discrimination against such classes.

b. **Subcontracts.** Contractor shall incorporate by reference in all subcontracts the provisions of §§12B.2(a), 12B.2(c)-(k), and 12C.3 of the San Francisco Administrative Code (copies of which are available from Purchasing) and shall require all subcontractors to comply with such provisions. Contractor's failure to comply with the obligations in this subsection shall constitute a material breach of this Agreement.

c. **Nondiscrimination in Benefits.** Contractor does not as of the date of this Agreement and will not during the term of this Agreement, in any of its operations in San Francisco, on real property owned by San Francisco, or where work is being performed for the City elsewhere in the United States, discriminate in the provision of bereavement leave, family medical leave, health benefits, membership or membership discounts, moving expenses, pension and retirement benefits or travel benefits, as well as any benefits other than the benefits specified above, between employees with domestic partners and employees with spouses, and/or between the domestic partners and spouses of such employees, where the domestic partnership has been registered with a governmental entity pursuant to state or local law authorizing such registration, subject to the conditions set forth in §12B.2(b) of the San Francisco Administrative Code.

d. **Condition to Contract.** As a condition to this Agreement, Contractor shall execute the "Chapter 12B Declaration: Nondiscrimination in Contracts and Benefits" form (form HRC-12B-101) with supporting documentation and secure the approval of the form by the San Francisco Human Rights Commission.

e. **Incorporation of Administrative Code Provisions by Reference.** The provisions of Chapters 12B and 12C of the San Francisco Administrative Code are incorporated in this Section by reference and made a part of this Agreement as though fully set forth herein. Contractor shall comply fully with and be bound by all of the provisions that apply to this Agreement under such Chapters, including but not limited to the remedies provided in such Chapters. Without limiting the foregoing, Contractor understands that pursuant to §§12B.2(h) and 12C.3(g) of the San Francisco Administrative Code, a penalty of $50 for each person for each calendar day during which such person was discriminated against in violation of the provisions of this Agreement may be assessed against Contractor and/or deducted from any payments due Contractor.

35. MacBride Principles—Northern Ireland. Pursuant to San Francisco Administrative Code §12F.5, the City and County of San Francisco urges companies doing business in Northern Ireland to move towards resolving employment inequities, and encourages such companies to abide by the MacBride Principles. The City and County of San Francisco urges San Francisco companies to do business with corporations that abide by the MacBride Principles. By signing below, the person executing this agreement on behalf of Contractor acknowledges and agrees that he or she has read and understood this section.

36. Tropical Hardwood and Virgin Redwood Ban. Pursuant to §804(b) of the San Francisco Environment Code, the City and County of San Francisco urges contractors not to import, purchase, obtain, or use for any purpose, any tropical hardwood, tropical hardwood wood product, virgin redwood or virgin redwood wood product.

37. Drug-Free Workplace Policy. Contractor acknowledges that pursuant to the Federal Drug-Free Workplace Act of 1989, the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited on City premises. Contractor agrees that any violation of this prohibition by Contractor, its employees, agents or assigns will be deemed a material breach of this Agreement.

38. Resource Conservation. Chapter 5 of the San Francisco Environment Code ("Resource Conservation") is incorporated herein by reference. Failure by Contractor to comply with any of the applicable requirements of Chapter 5 will be deemed a material breach of contract.

39. Compliance with Americans with Disabilities Act. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a contractor, must be accessible to the disabled public. Contractor shall provide the services specified in this Agreement in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under this Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns will constitute a material breach of this Agreement.

40. Sunshine Ordinance. In accordance with San Francisco Administrative Code §67.24(e), contracts, contractors' bids, responses to solicitations and all other records of communications between City and persons or firms seeking contracts, shall be open to inspection immediately after a contract has been awarded. Nothing in this provision requires the disclosure of a private person or organization's net worth or other proprietary financial data submitted for qualification for a contract or other benefit until and unless that person or organization is awarded the contract or benefit. Information provided which is covered by this paragraph will be made available to the public upon request.

41. Public Access to Meetings and Records. If the Contractor receives a cumulative total per year of at least $250,000 in City funds or City-administered funds and is a non-profit organization as defined in Chapter 12L of the San Francisco Administrative Code, Contractor shall comply with and be bound by all the applicable provisions of that Chapter. By executing this Agreement, the Contractor agrees to open its meetings and records to the public in the manner set forth in §§12L.4 and 12L.5 of the Administrative Code. Contractor further agrees to make-good faith efforts to promote community membership on its Board of Directors in the manner set forth in §12L.6 of the Administrative Code. The Contractor acknowledges that its material failure to comply with any of the provisions of this paragraph shall constitute a material breach of this Agreement. The Contractor further acknowledges that such material breach of the Agreement shall be grounds for the City to terminate and/or not renew the Agreement, partially or in its entirety.

42. Limitations on Contributions. Through execution of this Agreement, Contractor acknowledges that it is familiar with section 1.126 of the City's Campaign and Governmental Conduct Code, which prohibits any person who contracts with the City for the rendition of personal services, for the furnishing of any material, supplies or equipment, for the sale or lease of any land or building, or for a grant, loan or loan guarantee, from making any campaign contribution to (1) an individual holding a City elective office if the contract must be approved by the individual, a board on which that individual serves, or the board of a state agency on which an appointee of that individual serves, (2) a candidate for the office held by such individual, or (3) a committee controlled by such individual, at any time from the commencement of negotiations for the contract until the later of either the termination of negotiations for such contract or six months after the date the contract is approved. Contractor acknowledges that the foregoing restriction applies only if the contract or a combination or series of contracts approved by the same individual or board in a fiscal year have a total anticipated or actual value of $50,000 or more. Contractor further acknowledges that the prohibition on contributions applies to each prospective party to the contract; each member of Contractor's board of directors; Contractor's chairperson, chief executive officer, chief financial officer and chief operating officer; any person with an ownership interest of more than 20 percent in Contractor; any subcontractor listed in the bid or contract; and any committee that is sponsored or controlled by Contractor. Additionally, Contractor acknowledges that Contractor must inform each of the persons described in the preceding sentence of the prohibitions contained in Section 1.126. Contractor further agrees to provide to City the names of each person, entity or committee described above.

43. Requiring Minimum Compensation for Covered Employees

a. Contractor agrees to comply fully with and be bound by all of the provisions of the Minimum Compensation Ordinance (MCO), as set forth in San Francisco Administrative Code Chapter 12P (Chapter 12P), including the remedies provided, and implementing guidelines and rules. The provisions of Sections 12P.5 and 12P.5.1 of Chapter 12P are incorporated herein by reference and made a part of this Agreement as though fully set forth. The text of the MCO is available on the web at www.sfgov.org/olse/mco . A partial listing of some of Contractor's obligations under the MCO is set forth in this Section. Contractor is required to comply with all the provisions of the MCO, irrespective of the listing of obligations in this Section.

b. The MCO requires Contractor to pay Contractor's employees a minimum hourly gross compensation wage rate and to provide minimum compensated and uncompensated time off. The minimum wage rate may change from year to year and Contractor is obligated to keep informed of the then-current requirements. Any subcontract entered into by Contractor shall require the subcontractor to comply with the requirements of the MCO and shall contain contractual obligations substantially the same as those set forth in this Section. It is Contractor's obligation to ensure that any subcontractors of any tier under this Agreement comply with the requirements of the MCO. If any subcontractor under this Agreement fails to comply, City may pursue any of the remedies set forth in this Section against Contractor.

c. Contractor shall not take adverse action or otherwise discriminate against an employee or other person for the exercise or attempted exercise of rights under the MCO. Such actions, if taken within 90 days of the exercise or attempted exercise of such rights, will be rebuttably presumed to be retaliation prohibited by the MCO.

d. Contractor shall maintain employee and payroll records as required by the MCO. If Contractor fails to do so, it shall be presumed that the Contractor paid no more than the minimum wage required under State law.

e. The City is authorized to inspect Contractor's job sites and conduct interviews with employees and conduct audits of Contractor

f. Contractor's commitment to provide the Minimum Compensation is a material element of the City's consideration for this Agreement. The City in its sole discretion shall determine whether such a breach has occurred. The City and the public will suffer actual damage that will be impractical or extremely difficult to determine if the Contractor fails to comply with these requirements. Contractor agrees that the sums set forth in Section 12P.6.1 of the MCO as liquidated damages are not a penalty, but are reasonable estimates of the loss that the City and the public will incur for Contractor's noncompliance. The procedures governing the assessment of liquidated damages shall be those set forth in Section 12P.6.2 of Chapter 12P.

g. Contractor understands and agrees that if it fails to comply with the requirements of the MCO, the City shall have the right to pursue any rights or remedies available under Chapter 12P (including liquidated damages), under the terms of the contract, and under applicable law. If, within 30 days after receiving written notice of a breach of this Agreement for violating the MCO, Contractor fails to cure such breach or, if such breach cannot reasonably be cured within such period of 30 days, Contractor fails to commence efforts to cure within such period, or thereafter fails diligently to pursue such cure to completion, the City shall have the right to pursue any rights or remedies available under applicable law, including those set forth in Section 12P.6(c) of Chapter 12P. Each of these remedies shall be exercisable individually or in combination with any other rights or remedies available to the City.

h. Contractor represents and warrants that it is not an entity that was set up, or is being used, for the purpose of evading the intent of the MCO.

i. If Contractor is exempt from the MCO when this Agreement is executed because the cumulative amount of agreements with this department for the fiscal year is less than $25,000, but Contractor later enters into an agreement or agreements that cause contractor to exceed that amount in a fiscal year, Contractor shall thereafter be required to comply with the MCO under this Agreement. This obligation arises on the effective date of the agreement that causes the cumulative amount of agreements between the Contractor and this department to exceed $25,000 in the fiscal year.

44. Requiring Health Benefits for Covered Employees

Contractor agrees to comply fully with and be bound by all of the provisions of the Health Care Accountability Ordinance (HCAO), as set forth in San Francisco Administrative Code Chapter 12Q, including the remedies provided, and implementing regulations, as the same may be amended from time to time. The provisions of section 12Q.5.1 of Chapter 12Q are incorporated by reference and made a part of this Agreement as though fully set forth herein. The text of the HCAO is available on the web at www.sfgov.org/olse . Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Chapter 12Q.

a. For each Covered Employee, Contractor shall provide the appropriate health benefit set forth in Section 12Q.3 of the HCAO. If Contractor chooses to offer the health plan option, such health plan shall meet the minimum standards set forth by the San Francisco Health Commission.

b. Notwithstanding the above, if the Contractor is a small business as defined in Section 12Q.3(e) of the HCAO, it shall have no obligation to comply with part (a) above.

c. Contractor's failure to comply with the HCAO shall constitute a material breach of this agreement. City shall notify Contractor if such a breach has occurred. If, within 30 days after receiving City's written notice of a breach of this Agreement for violating the HCAO, Contractor fails to cure such breach or, if such breach cannot reasonably be cured within such period of 30 days, Contractor fails to commence efforts to cure within such period, or thereafter fails diligently to pursue such cure to completion, City shall have the right to pursue the remedies set forth in 12Q.5.1 and 12Q.5(f)(1-6). Each of these remedies shall be exercisable individually or in combination with any other rights or remedies available to City.

d. Any Subcontract entered into by Contractor shall require the Subcontractor to comply with the requirements of the HCAO and shall contain contractual obligations substantially the same as those set forth in this Section. Contractor shall notify City's Office of Contract Administration when it enters into such a Subcontract and shall certify to the Office of Contract Administration that it has notified the Subcontractor of the obligations under the HCAO and has imposed the requirements of the HCAO on Subcontractor through the Subcontract. Each Contractor shall be responsible for its Subcontractors' compliance with this Chapter. If a Subcontractor fails to comply, the City may pursue the remedies set forth in this Section against Contractor based on the Subcontractor's failure to comply, provided that City has first provided Contractor with notice and an opportunity to obtain a cure of the violation.

e. Contractor shall not discharge, reduce in compensation, or otherwise discriminate against any employee for notifying City with regard to Contractor's noncompliance or anticipated noncompliance with the requirements of the HCAO, for opposing any practice proscribed by the HCAO, for participating in proceedings related to the HCAO, or for seeking to assert or enforce any rights under the HCAO by any lawful means.

f. Contractor represents and warrants that it is not an entity that was set up, or is being used, for the purpose of evading the intent of the HCAO.

g. Contractor shall maintain employee and payroll records in compliance with the California Labor Code and Industrial Welfare Commission orders, including the number of hours each employee has worked on the City Contract.

h. Contractor shall keep itself informed of the current requirements of the HCAO.

i. Contractor shall provide reports to the City in accordance with any reporting standards promulgated by the City under the HCAO, including reports on Subcontractors and Subtenants, as applicable.

j. Contractor shall provide City with access to records pertaining to compliance with HCAO after receiving a written request from City to do so and being provided at least ten business days to respond.

k. Contractor shall allow City to inspect Contractor's job sites and have access to Contractor's employees in order to monitor and determine compliance with HCAO.

l. City may conduct random audits of Contractor to ascertain its compliance with HCAO. Contractor agrees to cooperate with City when it conducts such audits.

m. If Contractor is exempt from the HCAO when this Agreement is executed because its amount is less than $25,000 ($50,000 for nonprofits), but Contractor later enters into an agreement or agreements that cause Contractor's aggregate amount of all agreements with City to reach $75,000, all the agreements shall be thereafter subject to the HCAO. This obligation arises on the effective date of the

agreement that causes the cumulative amount of agreements between Contractor and the City to be equal to or greater than $75,000 in the fiscal year.

45. First Source Hiring Program

a. **Application of Administrative Code Provisions by Reference.** The provisions of Chapter 83 of the San Francisco Administrative Code apply to this Agreement. Contractor shall comply fully with, and be bound by, all of the provisions that apply to this Agreement under such Chapter, including but not limited to the remedies provided therein. Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Chapter 83.

b. **First Source Hiring Agreement.** As an essential term of, and consideration for, any contract or property contract with the City, not exempted by the FSHA, the Contractor shall enter into a first source hiring agreement ("agreement") with the City, on or before the effective date of the contract or property contract. Contractors shall also enter into an agreement with the City for any other work that it performs in the City. Such agreement shall:

1) Set appropriate hiring and retention goals for entry level positions. The employer shall agree to achieve these hiring and retention goals, or, if unable to achieve these goals, to establish good faith efforts as to its attempts to do so, as set forth in the agreement. The agreement shall take into consideration the employer's participation in existing job training, referral and/or brokerage programs. Within the discretion of the FSHA, subject to appropriate modifications, participation in such programs maybe certified as meeting the requirements of this Chapter. Failure either to achieve the specified goal, or to establish good faith efforts will constitute noncompliance and will subject the employer to the provisions of Section 83.10 of this Chapter.

2) Set first source interviewing, recruitment and hiring requirements, which will provide the San Francisco Workforce Development System with the first opportunity to provide qualified economically disadvantaged individuals for consideration for employment for entry level positions. Employers shall consider all applications of qualified economically disadvantaged individuals referred by the System for employment; provided however, if the employer utilizes nondiscriminatory screening criteria, the employer shall have the sole discretion to interview and/or hire individuals referred or certified by the San Francisco Workforce Development System as being qualified economically disadvantaged individuals. The duration of the first source interviewing requirement shall be determined by the FSHA and shall be set forth in each agreement, but shall not exceed 10 days. During that period, the employer may publicize the entry level positions in accordance with the agreement. A need for urgent or temporary hires must be evaluated, and appropriate provisions for such a situation must be made in the agreement.

3) Set appropriate requirements for providing notification of available entry level positions to the San Francisco Workforce Development System so that the System may train and refer an adequate pool of qualified economically disadvantaged individuals to participating employers. Notification should include such information as employment needs by occupational title, skills, and/or experience required, the hours required, wage scale and duration of employment, identification of entry level and training positions, identification of English language proficiency requirements, or absence thereof, and the projected schedule and procedures for hiring for each occupation. Employers should provide both long-term job need projections and notice before initiating the interviewing and hiring process. These notification requirements will take into consideration any need to protect the employer's proprietary information.

4) Set appropriate record keeping and monitoring requirements. The First Source Hiring Administration shall develop easy-to-use forms and record keeping requirements for documenting compliance with the agreement. To the greatest extent possible, these requirements shall utilize the

employer's existing record keeping systems, be nonduplicative, and facilitate a coordinated flow of information and referrals.

5) Establish guidelines for employer good faith efforts to comply with the first source hiring requirements of this Chapter. The FSHA will work with City departments to develop employer good faith effort requirements appropriate to the types of contracts and property contracts handled by each department. Employers shall appoint a liaison for dealing with the development and implementation of the employer's agreement. In the event that the FSHA finds that the employer under a City contract or property contract has taken actions primarily for the purpose of circumventing the requirements of this Chapter, that employer shall be subject to the sanctions set forth in Section 83.10 of this Chapter.

6) Set the term of the requirements.

7) Set appropriate enforcement and sanctioning standards consistent with this Chapter.

8) Set forth the City's obligations to develop training programs, job applicant referrals, technical assistance, and information systems that assist the employer in complying with this Chapter.

9) Require the developer to include notice of the requirements of this Chapter in leases, subleases, and other occupancy contracts.

c. **Hiring Decisions.** Contractor shall make the final determination of whether an Economically Disadvantaged Individual referred by the System is "qualified" for the position.

d. **Exceptions.** Upon application by Employer, the First Source Hiring Administration may grant an exception to any or all of the requirements of Chapter 83 in any situation where it concludes that compliance with this Chapter would cause economic hardship.

e. **Liquidated Damages.** Contractor agrees:

1) To be liable to the City for liquidated damages as provided in this section;

2) To be subject to the procedures governing enforcement of breaches of contracts based on violations of contract provisions required by this Chapter as set forth in this section;

3) That the contractor's commitment to comply with this Chapter is a material element of the City's consideration for this contract; that the failure of the contractor to comply with the contract provisions required by this Chapter will cause harm to the City and the public which is significant and substantial but extremely difficult to quantity; that the harm to the City includes not only the financial cost of funding public assistance programs but also the insidious but impossible to quantify harm that this community and its families suffer as a result of unemployment; and that the assessment of liquidated damages of up to $5,000 for every notice of a new hire for an entry level position improperly withheld by the contractor from the first source hiring process, as determined by the FSHA during its first investigation of a contractor, does not exceed a fair estimate of the financial and other damages that the City suffers as a result of the contractor's failure to comply with its first source referral contractual obligations.

4) That the continued failure by a contractor to comply with its first source referral contractual obligations will cause further significant and substantial harm to the City and the public, and that a second assessment of liquidated damages of up to $10,000 for each entry level position improperly withheld from the FSHA, from the time of the conclusion of the first investigation forward, does not exceed the financial and other damages that the City suffers as a result of the contractor's continued failure to comply with its first source referral contractual obligations;

5) That in addition to the cost of investigating alleged violations under this Section, the computation of liquidated damages for purposes of this section is based on the following data:

(a) The average length of stay on public assistance in San Francisco's County Adult Assistance Program is approximately 41 months at an average monthly grant of $348 per month, totaling approximately $14,379; and

(b) In 2004, the retention rate of adults placed in employment programs funded under the Workforce Investment Act for at least the first six months of employment was 84.4%. Since qualified individuals under the First Source program face far fewer barriers to employment than their counterparts in programs funded by the Workforce Investment Act, it is reasonable to conclude that the average length of employment for an individual whom the First Source Program refers to an employer and who is hired in an entry level position is at least one year;

Therefore, liquidated damages that total $5,000 for first violations and $10,000 for subsequent violations as determined by FSHA constitute a fair, reasonable, and conservative attempt to quantify the harm caused to the City by the failure of a contractor to comply with its first source referral contractual obligations.

6) That the failure of contractors to comply with this Chapter, except property contractors, may be subject to the debarment and monetary penalties set forth in Sections 6.80 et seq. of the San Francisco Administrative Code, as well as any other remedies available under the contract or at law; and

Violation of the requirements of Chapter 83 is subject to an assessment of liquidated damages in the amount of $5,000 for every new hire for an Entry Level Position improperly withheld from the first source hiring process. The assessment of liquidated damages and the evaluation of any defenses or mitigating factors shall be made by the FSHA.

f. **Subcontracts.** Any subcontract entered into by Contractor shall require the subcontractor to comply with the requirements of Chapter 83 and shall contain contractual obligations substantially the same as those set forth in this Section.

46. Prohibition on Political Activity with City Funds. In accordance with San Francisco Administrative Code Chapter 12.G, Contractor may not participate in, support, or attempt to influence any political campaign for a candidate or for a ballot measure (collectively, "Political Activity") in the performance of the services provided under this Agreement. Contractor agrees to comply with San Francisco Administrative Code Chapter 12.G and any implementing rules and regulations promulgated by the City's Controller. The terms and provisions of Chapter 12.G are incorporated herein by this reference. In the event Contractor violates the provisions of this section, the City may, in addition to any other rights or remedies available hereunder, (i) terminate this Agreement, and (ii) prohibit Contractor from bidding on or receiving any new City contract for a period of two (2) years. The Controller will not consider Contractor's use of profit as a violation of this section.

47. Preservative-treated Wood Containing Arsenic. Contractor may not purchase preservative-treated wood products containing arsenic in the performance of this Agreement unless an exemption from the requirements of Chapter 13 of the San Francisco Environment Code is obtained from the Department of the Environment under Section 1304 of the Code. The term "preservative-treated wood containing arsenic" shall mean wood treated with a preservative that contains arsenic, elemental arsenic, or an arsenic copper combination, including, but not limited to, chromated copper arsenate preservative, ammoniacal copper zinc arsenate preservative, or ammoniacal copper arsenate preservative. Contractor may purchase preservative-treated wood products on the list of environmentally preferable alternatives prepared and adopted by the Department of the Environment. This provision does not preclude Contractor from purchasing preservative-treated wood containing arsenic for saltwater immersion. The term

"saltwater immersion" shall mean a pressure-treated wood that is used for construction purposes or facilities that are partially or totally immersed in saltwater.

48. Modification of Agreement. This Agreement may not be modified, nor may compliance with any of its terms be waived, except by written instrument executed and approved in the same manner as this Agreement. Contractor shall cooperate with Department to submit to the Director of HRC any amendment, modification, supplement or change order that would result in a cumulative increase of the original amount of this Agreement by more than 20% (HRC Contract Modification Form).

49. Administrative Remedy for Agreement Interpretation. Should any question arise as to the meaning and intent of this Agreement, the question shall, prior to any other action or resort to any other legal remedy, be referred to Purchasing who shall decide the true meaning and intent of the Agreement.

50. Agreement Made in California; Venue. The formation, interpretation and performance of this Agreement shall be governed by the laws of the State of California. Venue for all litigation relative to the formation, interpretation and performance of this Agreement shall be in San Francisco.

51. Construction. All paragraph captions are for reference only and shall not be considered in construing this Agreement.

52. Entire Agreement. This contract sets forth the entire Agreement between the parties, and supersedes all other oral or written provisions. This contract may be modified only as provided in Section 48, "Modification of Agreement."

53. Compliance with Laws. Contractor shall keep itself fully informed of the City's Charter, codes, ordinances and regulations of the City and of all state, and federal laws in any manner affecting the performance of this Agreement, and must at all times comply with such local codes, ordinances, and regulations and all applicable laws as they may be amended from time to time.

54. Services Provided by Attorneys. Any services to be provided by a law firm or attorney must be reviewed and approved in writing in advance by the City Attorney. No invoices for services provided by law firms or attorneys, including, without limitation, as subcontractors of Contractor, will be paid unless the provider received advance written approval from the City Attorney.

55. Supervision of Minors: Left Blank by Agreement of the Parties.

56. Severability. Should the application of any provision of this Agreement to any particular facts or circumstances be found by a court of competent jurisdiction to be invalid or unenforceable, then (a) the validity of other provisions of this Agreement shall not be affected or impaired thereby, and (b) such provision shall be enforced to the maximum extent possible so as to effect the intent of the parties and shall be reformed without further action by the parties to the extent necessary to make such provision valid and enforceable.

57. Protection of Private Information. Contractor has read and agrees to the terms set forth in San Francisco Administrative Code Sections 12M.2, "Nondisclosure of Private Information," and 12M.3, "Enforcement" of Administrative Code Chapter 12M, "Protection of Private Information," which are incorporated herein as if fully set forth. Contractor agrees that any failure of Contactor to comply with the requirements of Section 12M.2 of this Chapter shall be a material breach of the Contract. In such an event, in addition to any other remedies available to it under equity or law, the City may terminate the Contract, bring a false claim action against the Contractor pursuant to Chapter 6 or Chapter 21 of the Administrative Code, or debar the Contractor.

58. Graffiti Removal. Graffiti is detrimental to the health, safety and welfare of the community in that it promotes a perception in the community that the laws protecting public and private property can be disregarded with impunity. This perception fosters a sense of disrespect of the law that results in an increase in crime; degrades the community and leads to urban blight; is detrimental to property values, business opportunities and the enjoyment of life; is inconsistent with the City's property maintenance

goals and aesthetic standards; and results in additional graffiti and in other properties becoming the target of graffiti unless it is quickly removed from public and private property. Graffiti results in visual pollution and is a public nuisance. Graffiti must be abated as quickly as possible to avoid detrimental impacts on the City and County and its residents, and to prevent the further spread of graffiti. Contractor shall remove all graffiti from any real property owned or leased by Contractor in the City and County of San Francisco within forty eight (48) hours of the earlier of Contractor's (a) discovery or notification of the graffiti or (b) receipt of notification of the graffiti from the Department of Public Works. This section is not intended to require a Contractor to breach any lease or other agreement that it may have concerning its use of the real property. The term "graffiti" means any inscription, word, figure, marking or design that is affixed, marked, etched, scratched, drawn or painted on any building, structure, fixture or other improvement, whether permanent or temporary, including by way of example only and without limitation, signs, banners, billboards and fencing surrounding construction sites, whether public or private, without the consent of the owner of the property or the owner's authorized agent, and which is visible from the public right-of-way. "Graffiti" shall not include: (1) any sign or banner that is authorized by, and in compliance with, the applicable requirements of the San Francisco Public Works Code, the San Francisco Planning Code or the San Francisco Building Code; or (2) any mural or other painting or marking on the property that is protected as a work of fine art under the California Art Preservation Act (California Civil Code Sections 987 et seq.) or as a work of visual art under the Federal Visual Artists Rights Act of 1990 (17 U.S.C. §§ 101 et seq.).

Any failure of Contractor to comply with this section of this Agreement shall constitute an Event of Default of this Agreement.

59. Food Service Waste Reduction Requirements. Effective June 1, 2007, Contractor agrees to comply fully with and be bound by all of the provisions of the Food Service Waste Reduction Ordinance, as set forth in San Francisco Environment Code Chapter 16, including the remedies provided, and implementing guidelines and rules. The provisions of Chapter 16 are incorporated herein by reference and made a part of this Agreement as though fully set forth. This provision is a material term of this Agreement. By entering into this Agreement, Contractor agrees that if it breaches this provision, City will suffer actual damages that will be impractical or extremely difficult to determine; further, Contractor agrees that the sum of one hundred dollars ($100) liquidated damages for the first breach, two hundred dollars ($200) liquidated damages for the second breach in the same year, and five hundred dollars ($500) liquidated damages for subsequent breaches in the same year is reasonable estimate of the damage that City will incur based on the violation, established in light of the circumstances existing at the time this Agreement was made. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with this provision.

60. Slavery Era Disclosure: Left Blank by Agreement of the parties.

61. Cooperative Drafting. This Agreement has been drafted through a cooperative effort of both parties, and both parties have had an opportunity to have the Agreement reviewed and revised by legal counsel. No party shall be considered the drafter of this Agreement, and no presumption or rule that an ambiguity shall be construed against the party drafting the clause shall apply to the interpretation or enforcement of this Agreement.

62. Dispute Resolution Procedure: Left blank by agreement of the parties.

63. Airport Intellectual Property. Pursuant to Resolution No. 01-0118, adopted by the Airport Commission on April 18, 2001, the Airport Commission affirmed that it will not tolerate the unauthorized use of its intellectual property, including the SFO logo, CADD designs, and copyrighted publications. All proposers, bidders, contractors, tenants, permittees, and others doing business with or at the Airport (including subcontractors and subtenants) may not use the Airport intellectual property, or any intellectual property confusingly similar to the Airport intellectual property, without the Airport Director's prior consent.

64. Labor Peace / Card Check Rule. Without limiting the generality of other provisions herein requiring Contractor to comply with all Airport Rules, Contractor shall comply with the Airport's Labor Peace / Card Check Rule, adopted on February 1, 2000, pursuant to Airport Commission Resolution No. 00-0049 (the "Labor Peace / Card Check Rule"). Capitalized terms not defined in this provision are defined in the Labor Peace/Card Check Rule. To comply with the Labor Peace/Care Check Rule, Contractor shall, among other actions: (a) Enter into a Labor Peace/Care Check Rule Agreement with any Labor Organization which requests such an agreement and which has registered with the Airport Director or his / her designee, within thirty (30) days after Labor Peace/Care Check Rule Agreement has been requested; (b) Not less than thirty (30) days prior to the modification of this Agreement, Contractor shall provide notice by mail to any Labor Organization or federation of labor organizations which have registered with the Airport Director or his / her designee (registered labor organization"), that Contractor is seeking to modify or extend this Agreement; (c) Upon issuing any request for proposals, invitations to bid, or similar notice, or in any event not less than thirty (30) days prior to entering into any Subcontract, Contractor shall provide notice to all registered Labor Organizations that Contractor is seeking to enter into such Subcontract; and (d) Contractor shall include in any subcontract with a Subcontractor performing services pursuant to any covered Contract, a provision requiring the Subcontractor performing services pursuant to any covered Contract, a provision requiring the Subcontractor to comply with the requirements of the Labor Peace/Card Check Rule. If Airport Director determines that Contractor violated the Labor Peace/Card Check Rule, Airport Director shall have the option to terminate this Agreement, in addition to exercising all other remedies available to him / her.

65. Security Deposit, Secured Guarantee. Contractor guarantees the work of itself and all subcontractors, and covenants that the work shall be completed and operational consistent with the terms of this Agreement and all of its Appendices. Contractor shall secure its guarantee in the full amount of the contract Seven Million Nine Hundred Twenty Thousand dollars Two hundred Twenty Seven ($7,920,227) with a Letter of Credit in the amount of Three Million Dollars ($3,000,000) issued in the form set forth in Appendix D; and a bond in the amount of Four Million Nine Hundred Twenty Thousand dollars Two hundred Twenty Seven ($4,920,227) issued in the form set forth in Appendix E. In the event the interim solution is deployed as described in Appendix A, Contractor shall obtain an additional bond in the amount of Three Hundred and Forty-One Thousand Dollars ($341,000).

Should contractor fail to perform the work as guaranteed, the full amount of the Letter of Credit shall be immediately paid to City, followed by the full amount of the bond.

66. Software Development and Implementation

a. **Program Development.** Subject to the terms and conditions of this Agreement Contractor agrees to ensure the following: requirements gathering, design, development, testing, and implementation of the software. Specific requirements are specified in Appendix A. System completion occurs after Acceptance Testing to verify conformity with the Design Specifications.

b. **Interpretation of the Specifications.** The City hereby acknowledges that the Functional Specifications will, upon acceptance by the City, provide the basis for the Design Specifications, and that the Design Specifications will, upon acceptance by the City, provide the basis for the coding and installation of the Programs. In the event of a variance between the written proposal Contractor submitted in response to City's request for the services to be performed under this Agreement (the "Proposal") and the Functional Specifications, the Functional Specifications shall be determinative. In the event of a variance between the Functional Specifications and the Design Specifications, the Design Specifications shall be determinative.

c. **Interpretive Differences.** In the event City and Contractor differ in their interpretations of the Proposal, Functional Specifications, Design Specifications, or Acceptance Tests, City's interpretation, if reasonable, shall be determinative.

d. **Change Order Requests.** All change order requests by the City shall be made in writing by the City's Project Manager. Within 7 calendar days following its receipt of a change order request, Contractor will submit to City a written cost estimate, which shall include any adjustments to the project price, the Project Schedule, and the Acceptance criteria. Additional services by Contractor made necessary by the City's change order request shall be billed at Contractor's then current consulting rates. City will notify Contractor in writing if it wishes to proceed with the change order within 7 calendar days.

67. Acceptance Procedure

a. **Acceptance of Phases 1 and 2.** Upon completion of Phases 1 and 2 of Program development, City shall, within the Review Period, review and give notice to Contractor of City's acceptance or rejection of the specifications of each completed phase of Work. Should City reject either the Phase 1 or 2 Work, then City is entitled to another Review Period upon receipt from Contractor of the revised Phase 1 or 2 specifications. In the event that Contractor fails to provide Phase 1 or 2 Work which meets the Acceptance Criteria of this Agreement during the Acceptance Window, City may, at its option, assess Liquidated Damages per Section 19 of this Agreement and/or terminate this Agreement under Paragraph 21 (c) Termination for Cause.

b. **Final Acceptance of System.** City and Contractor shall conduct Acceptance Testing of the System in accordance with the approved CDRL 26 Acceptance Test Plan. City will not be deemed to have accepted any Program or the System until Contractor receives written notice of Acceptance from City.

c. **Contractor's Assistance in Acceptance Tests.** Contractor must furnish all materials, equipment, and technical assistance necessary to conduct the Acceptance Tests. Test Equipment provided by Contractor for performance of the Acceptance Tests shall be currently certified as "calibrated" by the test equipment manufacturer, or its authorized calibration service agent.

d. **Failure to Pass Acceptance Tests.** In the event that City determines that the System fails to meet the standards set forth in the Acceptance Test Plan, City shall promptly report to Contractor each deficiency, and Contractor will correct the reproducible aspects of the problem or failure within **30** days from date of Contractor's receipt of notice of the problem or failure. Problems or failures that do not re-occur or cannot be repeated by Contractor, or by the City in Contractor's presence, shall not be considered a failure. In the event that Contractor cannot achieve System Acceptance within **23 months**, Contractor shall be in default under this Agreement and, in addition to those remedies set forth in Section 6 entitled "Termination," City is further entitled to invoke the letter of credit and bond.

e. **Parallel Processing.** The parties may use parallel processing if necessary and approved by Airport Project Manager, in order to complete the transition from EXISTING SYSTEM to NEW SYSTEM.

68. Documentation Delivery and Training

a. **Documentation Delivery.** Contractor will deliver the completed Documentation for the NEW SYSTEM in accordance with CDRL 32 Documentation List and the Project Schedule, Appendix C. The City may withhold its issuance of the notice of final Acceptance until City receives the completed Documentation.

b. **City Training.** Contractor will provide training to City personnel at City's premises in accordance with CDRL 29 Training Program Plan. Upon request by the City, Contractor will provide additional training at its then prevailing rates.

69. Property Rights of the Parties. TransCore's development and delivery of the NEW SYSTEM will involve providing the City with licensed, commercially available software ("Licensed Software") and software developed exclusively for the NEW SYSTEM ("Custom Software"). The property rights of the parties regarding Licensed and Custom Software are as follows:

a. **Licensed Software.** Upon receipt of final payment for all services rendered by Contractor under this Agreement, Contractor hereby grants to City, in perpetuity, an irrevocable, nonexclusive, right and license to use for internal purposes only a machine readable copy of the Programs and Documentation.

b. **Custom Software.** Upon receipt of final payment for the NEW SYSTEM, Contractor will convey to City good and marketable title to the Custom Software free and clear of all liens, claims and encumbrances. Under this marketable title the City retains the right to expand, share or modify at its sole discretion.

c. **City's Data.** Any data or other materials furnished by the City for use by Contractor under this Agreement shall remain the sole property of the City and will be held in confidence in accordance with Section 24 of this Agreement. Such materials shall be returned to City upon Acceptance of the Programs.

d. **Ownership of Modifications and Enhancement.** Contractor hereby grants to City an exclusive perpetual license to use for internal purposes only the Programs contained in the modifications and enhancements to the software package licensed hereunder to City.

e. **Competition.** Nothing in this Agreement shall be construed so as to preclude Contractor from developing, using, or marketing software that is competitive with that prepared for City hereunder, irrespective of whether such software is similar in functionality or design or is otherwise related to the Programs developed by Contractor for City pursuant to this Agreement.

70. Third Party Certification Requirements

a. PA - DSS Compliance. The Airport is required to adhere to the Payment Card Industry Data Security Standard Requirements ("PCI DSS"). Contractor agrees to implement and maintain any systems that are developed for the Airport that store, transmit, or process credit card information in a manner that is consistent with Payment Application Data Security Standard ("PA-DSS") guidelines as applicable under the Airport's PCI - DSS Certification requirements.
Contractor agrees that in order to be fully accepted, the components of the NEW SYSTEM that store, transmit, or process credit card information must be certified compliant with all applicable requirements to be considered PA-DSS compliant, and that it has performed the necessary steps to validate its compliance with the PCI Standards Council through is PA-DSS Certification. Contractor will supply the current status of Contractor's PA-DSS compliance status, and evidence of its most recent validation of compliance, upon execution of this Contract and at least annually thereafter. Contractor will immediately notify the Airport if it learns that it is no longer PA- DSS compliant and will immediately provide the Airport, in writing, with the steps being taken to remediate the non-compliance status. In no event should Contractor 's notification to the Airport be later than seven (7) calendar days after Contractor learns it is no longer PA-DSS compliant. Contractor's failure at any time during the term of this Contract to remain PA-DSS compliant will be considered an act or omission for purposes of Contractor's indemnification obligations and will represent a material breach of this Contract.

b. 5.9 GHz DSRC Protocol, IEEE 802.11P Standard Certification. Contractor agrees to implement and maintain a taxi short monitoring solution that uses 5.9 GHz Dedicated Short Range Communication technology in a manner that is consistent with the latest IEEE 802.11P standard. Contractor agrees that acceptance of its work is contingent on certification by OmniAir Certification Services (OCS) ,based on the Airports Requirements, Contractors Designs and as applicable under the Airport's Certification requirements.

c. ISO 18000-6C RFID Communication Protocol, Standard Certification. Contractor agrees to implement and maintain a Ground Transportation Management System that uses ISO 18000 6C Communications technology in a manner that is consistent with the latest ISO standard. Contractor agrees

that acceptance of its work is contingent on certification by OmniAir Certification Services (OCS) based on the Airports Requirements, Contractors Designs and as applicable under the Airport's Certification requirements.

71. Warranty

a. Warranty of Title and Indemnification. Contractor warrants that the Programs developed pursuant to this Agreement will, prior to its transfer to City, be the sole and exclusive property of Contractor. If notified promptly in writing of any judicial action brought against City based on an allegation that City's use of the Programs infringes a patent or copyright, or any rights of a third party, or constitutes misuse or misappropriation of a trade secret or any other right in intellectual property (infringement), Contractor will hold City harmless and defend such action at its expense. Contractor will pay the costs and damages awarded in any such action or the cost of settling such action, provided that Contractor shall have sole control of the defense of any such action and all negotiations or its settlement or compromise. If notified promptly in writing of any informal claim (other than a judicial action) brought against City based on an allegation that City's use of the Programs constitutes Infringement, Contractor will pay the costs associated with resolving such claim and will pay the settlement amount (if any), provided that Contractor shall have sole control of the resolution of any such claim and all negotiations for its settlement. In the event that a final injunction shall be obtained against City's use of the Programs by reason of Infringement, or in Contractor's opinion City's use of the Programs is likely to become the subject of Infringement, Contractor may at its option and expense (a) procure for City the right to continue to use the Programs as contemplated hereunder, (b) replace the Programs with non-infringing, functionally equivalent substitute Programs, or (c) suitably modify the Programs to make its use hereunder non-infringing while retaining functional equivalency to the unmodified version of the Programs. If none of these options is reasonably available to Contractor, then this Agreement may be terminated at the option of either party hereto and Contractor shall refund to City all amounts paid under this Agreement.

b. Warranty Period. TransCore shall provide the recommended maintenance, services, parts, respective quantities and usage items for the operation of the NEW SYSTEM at no additional cost for one calendar year from the completion of the Approved Acceptance Test Plan (CDRL 26).

c. Scope of Warranty

1) TransCore hereby warrants to SFO that all of the equipment, computer systems and software, including firmware as warranted by third party suppliers, furnished under this Contract shall be free from defects in material and workmanship under normal operating use and service.

2) TransCore warrants that it is the owner of the equipment and licensor of the proprietary (non-third party) software included in the NEW SYSTEM, and that the NEW SYSTEM will be free and clear of any lien or encumbrance on the final acceptance date.

3) TransCore will provide the Commission nontransferable fully paid licenses to use all software that TransCore furnishes with the NEW SYSTEM, under the written terms established by the software manufacturers. TransCore will provide the Commission with copies of all applicable licenses. TransCore warrants that it has a right to grant such licenses.

4) TransCore warrants that the software, when used properly, will be free from reproducible defects that materially vary from its specifications. Any reproducible bugs or defects shall be remedied by TransCore. SFO's exclusive remedy shall be for TransCore, at no charge to SFO, either to repair or replace nonconforming software, at TransCore's option.

5) TransCore warrants that replacement or repaired equipment and/or software furnished hereunder will be in accordance with current industry standards and that all labor will be in accordance with industry standards.

d. Warranty Plan. TransCore shall develop a Warranty Plan outlining the processes and procedures to be implemented in order to meet the requirements set forth herein. TransCore shall provide a one year warranty for the solution. The warranty period starts upon Completion of the Acceptance Test Plan, CDRL 26. A draft of the Warranty Plan shall be submitted as part of the PDR and again at the FDR and a revised final version shall be provided a minimum of 90 days prior to the start of any warranty period (CDRL 45, "Warranty Plan"). At a minimum, the Warranty Plan shall provide:

1) **Warranty Coverage.** Any programming, software, electrical, electronic, and mechanical or system malfunction shall be corrected, replaced, or repaired promptly by TransCore. TransCore shall assure that the Original Equipment Manufacturer (OEM) warranties which extend beyond one year of Project Acceptance will continue to the benefit of the Commission for the full term of those warranties. The warranty shall include preventative maintenance and repair replacement, as required, for all new hardware and software components of the NEW SYSTEM, which extend beyond one year. The Warranty Period shall not end until completed documentation is provided by TransCore and approved by SFO.

2) **Updates during Warranty**. During the course of the warranty, TransCore shall provide software updates as they are available and shall verify the proper operation of the entire common use installation after the incorporation of each software and /or firmware update. TransCore shall also fully document each software and /or firmware update.

3) **Spare Parts**. At no additional cost to the Airport, TransCore shall maintain on-site spare parts and components for quick replacement of mission critical equipment of a minimum of 10% in accordance with Spare Parts and Modules List (CDRL 46). An onsite storage space shall be provided by the Airport. Based upon the maintenance experience of the warranty period, TransCore shall recommend, at the end of the warranty period, any changes in spare component and small part stores that may prove to be appropriate. The spare component store shall be turned over to the Airport's designated representative at the end of the warranty period.

4) **Warranty and Maintenance Log**. TransCore shall keep a maintenance log book (Log) of all preventative maintenance and corrective repair services performed during the warranty period. The Log shall be in an Airport approved format and shall be available for inspection by the Airport at any time during the warranty period and shall be turned over at the completion of the warranty period. The Log shall be kept on a component-by-component (equipment number) basis, with separate sections or volumes, as appropriate, for each component. The Log shall itemize the history of preventative maintenance and corrective repair activities, stating the character, duration, cause, and cure of all malfunctions and the individual's name that completed the repair. The Log shall record all software and hardware updates, Spare Components and Parts Replacement.

e. **Warranty Personnel.** Prior to the completion of acceptance testing, Transcore shall designate warranty personnel dedicated to performing TransCore's warranty obligation and provide SFO's Project Manager with the names and contact information of all warranty personnel. TransCore shall provide all support equipment necessary to assist the warranty personnel in performing the warranty work in the San Francisco region. On completion of warranty period, the Airport's maintenance personnel that have been permanently assigned to maintain the SFO equipment shall be trained by TransCore to take over the repair and maintenance of equipment for level I and level II maintenance as defined in the CDRL 35 Maintenance Manual and the CDRL 49 Maintenance Plan. In the event warranty work has not been completed by the end of the Warranty Period, TransCore's Warranty Personnel shall be required to work a minimum of eight (8) hours per day, five (5) days per week on the warranty and repair of the equipment provided under this Contract. In addition, a person with the capabilities to make programming changes shall be available either on-site or via remote help desk to support TransCore's warranty personnel.

f. **Warranty Conditions.** SFO will operate and maintain the equipment and software in accordance with the TransCore's specific instructions in order to maintain this warranty. However, SFO

shall be held harmless for operating the equipment and computer systems improperly if TransCore fails to provide adequate or ineffective training, and/or fails to complete operating manuals, maintenance manuals, electrical and electronic schematics, mechanical diagrams and complete computer program documentation which includes full source codes.

g. **Negligence.** The warranty shall not apply to any equipment which has been damaged through accident or negligence, or which has been subjected to other than normal use. Temperature, humidity and ambient electrical conditions described in these Technical Specifications shall be considered normal operating conditions for this system.

h. **Consumable Items.** The warranty shall not cover the replacement of normal consumable items or items which are replaced in usual and scheduled preventative maintenance programs, such as light bulbs and wear-related items. TransCore shall provide an ordering process for replacing consumables, such as receipt paper, transponders, taxi on board units and smart card stock.

i. **Hardware Defects.** If during the Warranty Period the rate of failure of any part or component, from any one cause or from various causes, exceed ten (10) percent of the mean quantity of such item delivered to SFO, then the entire quantity of such item shall be considered to have failed, and shall be repaired, corrected, or replaced as hereinafter provided. After correcting the defect, TransCore shall undertake and complete a work program reasonably designed to prevent the occurrence of the same defect in all other equipment purchased under this Contract. The work program shall include inspection and correction of the defective or potentially defective parts in all of the equipment.

72. Maintenance and Repair during Warranty Period

a. **Repairs.** During the Warranty Period TransCore shall be responsible for all costs associated with the repair of components and/or subsystems, and the shipping charges to and from TransCore's repair facilities, and the costs associated with their re-installation. TransCore shall be responsible for meeting with SFO to determine the schedule of repairs. TransCore may perform, at its option, the required repairs. The cost of necessary personnel, tools and materials shall be borne solely by TransCore. TransCore shall provide on-site personnel to support SFO with preventive and troubleshooting maintenance for a period of 120 days after system acceptance. "Troubleshooting" means power, connectivity, and supporting infrastructure; field repair, remove and replace defective parts, returning the NEW SYSTEM to service.

b. **Repair Time and Liquidated Damages.** Warranty repair shall be performed in accordance with repair response times listed below. Warranty repairs deemed critical for operation shall commence as soon as possible from the time of reporting. TransCore shall make available sufficient resources, replacement and spare modules, and components to assure one hundred percent (100%) NEW SYSTEM availability during warranty repair. If, in the sole discretion of SFO, TransCore fails to provide adequate resources to support one hundred percent (100%) NEW SYSTEM and data collection availability as a result of defects in materials, workmanship, or function under the terms of the warranty, TransCore shall be required to pay liquidated damages as required in paragraph 19 of the Contract.

c. **Repair Response Times.** Any sign of programming, software, electrical, electronic, and mechanical or system malfunction shall be corrected, replaced, or repaired promptly by the TransCore upon notification of SFO personnel. Response times shall comply with the following:

1) **Scheduled non-emergency service**. This shall include, but not be limited to, new additions, modifications, repairs, adjustments, and general routine preventative maintenance during normal on-site work hours (i.e. between the hours of 8:00 AM and 5:00 PM, Monday – Friday). When the Airport requests non-emergency service before 11:00 AM (Monday – Friday), TransCore proposer shall prioritize the service request(s) in light of scheduled work for that day and provide the service that same day.

2) **Non-Scheduled emergency service**. During normal on-site working hours, emergency service requests shall be responded to immediately. Emergency service requests occurring outside normal on-site working hours shall be provided within a two (2) hour period after such service has been requested, twenty-four (24) hours per day, seven (7) days per week.

3) **Emergency system failures (those requiring emergency response)**. A system failure is considered an emergency if any of the key components are inoperative to the extent the system cannot function in a normal manner. Emergency services shall include inspections and necessary tests to determine the causes of equipment or software malfunction or failure. The emergency services shall include: software and configuration changes in addition to the furnishing and installation of components and parts required to replace malfunctioning system elements. The TransCore shall notify the airport of the maximum expected amount of time to get the system 'up and operational' and functioning normally in the event of an emergency failure. This time period may be subject to Liquidated Damages in accordance with this agreement.

d. **Compensation for Unresponsiveness.** In the event TransCore fails to comply promptly with its obligations under the agreed upon CDRL 45, Warranty Plan, or with a request by SFO to repair, replace or correct the failed components, subsystems, equipment and/or materials, SFO shall upon written notice to TransCore, have the right to asses liquidated damages listed in paragraph 19 Table 1 AIR 500.

e. **Access to Equipment in Revenue Service.** TransCore shall follow the proper SFO security procedures for gaining access to the field equipment and locations. TransCore shall not modify or repair any equipment in revenue service without prior written approval of SFO's Project Manager or a SFO authorized representative.

f. **Repair Reporting.** During the entire warranty period, any and all repairs and/or adjustments of equipment by TransCore shall be documented by TransCore. A repair report shall be submitted at the end of each week. Each repair report shall provide time, day, type of equipment, equipment number, type of failure, type of repair or adjustment, date and time service personnel were notified of an issue, and the name of the repair technician.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day first mentioned above.

CITY AIRPORT COMMISSION CITY AND COUNTY OF SAN FRANCISCO	**CONTRACTOR**
By: _____ John L. Martin, Airport Director	By signing this Agreement, I certify that I comply with the requirements of the Minimum Compensation Ordinance, which entitle Covered Employees to certain minimum hourly wages and compensated and uncompensated time off. I have read and understood paragraph 35, the City's statement urging companies doing business in Northern Ireland to move towards resolving employment inequities, encouraging compliance with the MacBride Principles, and urging San Francisco companies to do business with corporations that abide by the MacBride Principles.
Attest: By _____ Jean Caramatti, Secretary Airport Commission	_____ Authorized Signature Christopher E. Hall Printed Name Vice President Title
Resolution No: **12-0188** Adopted on: Aug. 28, 2012	_____ TransCore, LP 80789 City Vendor Number
Approved as to Form: Dennis J. Herrera City Attorney	9440 Carroll Park Drive, Suite 150 Address San Diego, California 92121 City, State, ZIP
By _____ Stacey Lucas Deputy City Attorney	(858) 736-8200 Telephone Number 25-1730334 Federal Employer ID Number

Appendices

A: Services to be provided by Contractor
B: Calculation of Charges
C: Payment and Project Schedule and Progress Reports
D: Irrevocable Letter of Credit
E. Performance Bond
F: Software and Equipment Maintenance Agreement and Warranty Requirements

Appendix A
Services to be Provided by Contractor

I. INTRODUCTION

The Contractor ("Contractor" or "TransCore") will be the System Integrator for the Ground Transportation Management System & Taxi Management System ("GTMS/TMS" or "NEW SYSTEM") and will be responsible for all phases of work, ensuring that all of its employees and sub-contractors on the project team are focused and working to achieve timely and successful results. The completed NEW SYSTEM will entirely replace the Airport's Automated Vehicle Identification System (AVIS") and its Taxi Revenue System ("TRS") with upgraded system hardware and software.

The NEW SYSTEM will facilitate the changing business processes, prevent cheating and evasion, as well as provide more reliable data, and richer features and functionalities. A critical element of this project is a system design that fully addresses operational security. Through structure and redundancies, the GTMS/TMS will detect and prevent evasion of vehicle tracking and associated fees.

The NEW SYSTEM will use next generation technology to give SFO the ability to track commercial ground transportation in real time with absolute accuracy. The NEW SYSTEM must encompass:

- Transponder management;
- Operator billing/Fee payment;
- Vehicle inspections and tracking;
- Policy enforcement;
- Online account management; and
- Commercial vehicle environmental compliance reporting

The TMS will modernize the process for taxi licensing, inspection, and airport fee payment operations.

The GTMS Requirements Specification and the TMS Requirements Specifications are located in Attachments 1 and 2, respectively. The Contract Data Requirements List (CDRLs) must be reviewed and accepted by the City as a condition of the project being deemed complete. TransCore shall deliver each CDRL as indicated in Attachments 1 and 2, and at and within such other time periods as may be specified.

II. LIST OF DEFINITIONS

The following terms shall have the meanings given to them below unless a contrary intention is expressly indicated in a specific provision of the Agreement (in which case such contrary intention shall be limited to and only apply to that specific provision and no other parts of the Agreement):

- Central System: All parts of the NEW SYSTEM, other than the Equipment (hardware) installed in driver accessible areas, including software installed on such equipment. The NEW SYSTEM Software that will consist of the functions necessary to operate the NEW SYSTEM. This software will allow authorized users fluid access to the roadway reader system, trip details, reporting, data storage and collection, calculations. The Central System will also provide interface for SFMTA and Airport staff should the NEW SYSTEM Web Portal be unavailable.
- EXISTING SYSTEM: XCI Automated Vehicle ID, Ground Trans Information System, Taxi Revenue System and Taxi Automated Vehicle ID.
- Ground Transportation Management System (GTMS): The AVI antennas/readers and software application that facilitate permitting, vehicle management, trip/vehicle/environmental data collection, reporting and billing, including hardware and software requirements to be integrated with the TMS.

Appendix A
Services to be Provided by Contractor

- GTMS/TMS Communications Network: The communications network, including all hardware, software and communications media required for interconnection and for the transmission of data between all parts of the TMS, including LAN segments within all SFO and SFMTA facilities and the GTMS/TMS WAN.
- GTMS/TMS Local Area Network: This includes all hardware and software necessary to support data communications between all GTMS and other components as part of the GTMS within a specific geographic facility such as a parking lot or the Central System, as well as all communications equipment necessary to interface with the GTMS WAN for support of data communications between all parts of the GTMS.
- GTMS/TMS Wide Area Network: Includes communications media necessary to interconnect all segments of TMS LANS servicing data communications between all parts of the GTMS.
- GTMS/TMS Hardware: The GTMS/TMS Hardware will consist of all hardware required to support the GTMS/TMS which is not directly involved with the roadway. This includes the GTMS/TMS servers, network components, handheld devices, workstations, and point of sale terminals, taxi office terminal, and any other hardware that may be required to support the GTMS/TMS.
- GTMS/TMS Integration: The Integration component will allow seamless interaction between existing and future systems, as well as integration of the total GTMS/TMS. The integration component will include, but not be limited to integration with the PMBS, integration with the Airport's Data Warehouse, and providing a fully integrated system between the GTMS/TMS Web Portal, GTMS/TMS Central System, and the GTMS/TMS roadway hardware.
- GTMS/TMS Roadway Hardware: The GTMS/TMS Roadway hardware will consist of all hardware and components necessary for the roadway, including, but not limited to, readers, antennae, transponders, LED visual indicators, lane loop detectors, surveillance cameras, license plate recognition cameras, dynamic message displays, card interface devices, AVMs, handheld devices, global positioning system (GPS) equipment and any other hardware that may be required to support the GTMS/TMS and to connect the roadway equipment to the Airport infrastructure.
- GTMS/TMS Web Portal: The Web Portal will be the central data entry and user interface system for both the GTU staff and the Taxi/GT Operators. This component of the system will give the Taxi/GT Operators the ability to perform self-service via computer/mobile device for operations that currently require in-person interaction at the GTU offices. Web Portal will have a standard and mobile version. Future mobile applications may be provided by TransCore or developed separately.
- Interim Solution: An in-vehicle GPS device that communicates via cellular modem to the system's network operation center where relevant location and event data is processed. (See " ROVR™ System.") The Interim Solution is a temporary solution to be used , at the Airport's sole discretion, during the transition from the EXISTING SYSTEM to the NEW SYSTEM.

- NEW SYSTEM: GTMS and TMS, the replacement for all existing system components and the addition of all functionalities described herein
- Payment Management and Billing System (PMBS): The Airport's system for invoicing tenants at the Airport.
- ROVR™ System: An in-vehicle GPS device that communicates via cellular modem to the system's network operation center where relevant location and event data is processed. (See "Interim

Solution." The ROVR System is a temporary solution to be used , at the Airport's sole discretion, during the transition from the EXISTING SYSTEM to the NEW SYSTEM.

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- San Francisco International Airport (SFO): The contracting authority or "Owner" of the GTMS/TMS system being procured.
- San Francisco Municipal Transit Authority (SFMTA): The transit agency of the City and County of San Francisco.
- Taxi Management System (TMS): The taxi portion of the system, which handles the driver/A-card management and fee collection portion, including hardware, software, smart card medium and SFMTA requirements to be integrated with the GTMS.

III. PROJECT OVERVIEW

A. System Integrator

TransCore will serve as the integrator, working closely with the key stakeholders to create a system that meets the needs of the Airport, and supports the future business processes of the Airport and SFMTA. TransCore will be responsible for all aspects of the project throughout all phases of work including any work performed by suppliers and subcontractors. TransCore will be accountable as the single point of contact on this project for the Airport. TransCore will ensure that the system design provided is a seamlessly integrated system which meets all of the requirements of this Agreement. TransCore will work closely with its team of suppliers and subcontractors, as well as with City staff and third party system suppliers.

TransCore shall provide all of the personnel, facilities, and resources required to complete all of its obligations in this Agreement. All of the individuals in the project office, and those of team companies shall have sufficient availability for this project, based on projected commitments through project completion.

During design, TransCore will provide key subject matter experts in areas such as: SFO's EXISTING SYSTEM, operations, smart card system, License Plate Recognition (LPR), and GPS geo-fencing will be made available to the project team. During implementation and early testing phases, a development lab equipped with test AVI readers/transponders, test DMS sign controllers, test smart card readers, development servers, will be used for unit testing and interface testing. During on-site testing, TransCore will provide support and also participate in the testing exercise.

B. Ground Transportation Management System (GTMS)

1. System Overview

The GTMS facilitates permitting, vehicle management, data collection, reporting and billing for buses, shuttles, limousines and shared ride vans. The work Transcore shall perform is described more fully in the specifications for the GTMS, set forth in Attachment 1 hereto.

2. Transition from EXISTING SYSTEM to NEW SYSTEM

Tracking of all buses, shuttles, limousines and shared ride vans in the EXISTING SYSTEM is accomplished with AVI transponders manufactured by XCI, Inc., all of which will eventually be replaced by Transcore with ISO 18000-6c transponders, consistent with Attachment 1 hereto. Because the Airport has a limited supply of XCI transponders and the parties recognize that some or all of the XCI transponders may fail before the work to be performed by Transcore under this Agreement is complete,

temporary, replacement transponders may be required. In the event the City is unable to secure replacement XCI transponders prior to exhausting the supply of XCI transponders, the City may, at its sole discretion, lease an alternate device from Contractor for use until such time as the ISO 18000-6c transponders are installed and accepted by the City, consistent with the terms of this Agreement.

The temporary, interim devices available from Transcore, along with tracking services, are called the ROVR™ System, or "Interim Solution."

The Interim Solution consists of an in-vehicle GPS device that communicates via cellular modem to the system's network operation center where relevant location and event data is processed. Transcore's Interim Solution will compare vehicle location to map coordinates loaded into the device. The coordinates define a zone or zones and can be thought of as a virtual gantry or reader location to compare to an existing tag-based system. Once a vehicle enters the defined zone, the device records the event with a timestamp and transmits this event data to the Interim Solution network operations center where the information is processed and stored for later retrieval and reporting.

To discourage tampering, the device used by Transcore in providing an Interim Solution will be programmed to transmit a health status message (a message that indicates that the unit is functioning properly) 2-3 times a day to ensure the device is powered and operating correctly. The schedule for status updates these will be unknown to the driver. As an additional deterrent, disconnecting the unit will trigger a message to be transmitted, once power is restored that denotes the unit has been disconnected and reconnected to power.

In the event the City elects to use Transcore's Interim Solution, it shall notify Transcore no less than eight (8) weeks prior to the date the City wished to deploy and use the Interim Solution. Upon notification, Transcore shall promptly perform the following tasks:

- Develop required interface to the ROVR™ System for data retrieval
- Parse and store in a timely manner all ROVR™ vehicle data provided
- Compute the required monthly billing file for ROVR™-based vehicles
- Provide GTMS/TMS users the ability to view daily true up data and monthly billing file for ROVR™ equipped vehicles

Perform integration testing and deploy changes to the production system

C. Taxi Management System (TMS) Smart A-Card Program

The TMS will integrate the A-card program and Airport fee collection system by issuing the A-card on a contactless Smart Card that will also be used for fee payment. The new program will consist of an integration of discrete systems (both new and existing) providing data to a consolidated management system.

Workstations residing at SFMTA will be the primary registration point for drivers entering the A-card program. Drivers will be able to enter the required registration information; an SFMTA clerk will have the ability to verify before information is entered into the database.

SFMTA will have the ability to request and receive information from the DMV driver history list and add it to the driver's cardholder account in the A-card database. As part of the registration process, SFMTA will have the ability to scan drivers' licenses and take photographs of applicants. Both the driver license data and photo will be added to the cardholder's account information in the A-card database.

1. Taxi Short Geo-Fence Solution

Under the NEW SYSTEM, each taxi shall be equipped with a 5.9 GHz Dedicated Short Range Communication (DSRC) unit. This On Board Unit (OBU) shall download GPS data, tracking the location of taxis at all times. This GPS data will be uploaded to corresponding 5.9 GHz DSRC Road Side Units (RSU) when a taxi arrives at the Airport. The NEW SYSTEM will use the date to determine if a taxi has remained within a geographic perimeter or if the taxi has breached the geographic perimeter and staff will be able to view the data as an overlay on a map. This system shall give Airport staff the ability to determine and adjust the geographic perimeter for taxis at its discretion.

The means for providing power to the OBU shall be determined during design phase and is subject to approval by the City's Project Manager.

2. Tracking Non-SF Taxis

Legitimate taxis authorized to operate by Bay Area municipalities/agencies other than the City and County of San Francisco's SFMTA may pick-up passengers at SFO only when prearranged by a passenger. The NEW SYSTEM will provide a method for collecting trip fees of varying amounts from drivers. Curbside Taxi Dispatchers will be able to verify non-SF taxi paid/non-paid status. A non-SF taxi driver will be able to pay online, telephone, mobile or otherwise. All non-SF taxi trips must be included in trip data and statistics and be broken out as a separate report.

D. Roadway/Curbside Surveillance Cameras

TransCore shall provide surveillance cameras for the curbside, curbside management office, AVMs, taxi lots and shared ride van lot to record activity, including license plate numbers of commercial vehicles at curbside, drivers and passengers. Cameras will provide 24 hour video surveillance to monitor ground transportation operations and activities related to personnel interactions at the ground transportation zones.

E. License Plate Recognition Cameras (LPR)

TransCore shall provide License Plate Recognition (LPR) technology as an additional means of enforcing SFO's prohibition against tampering with transponders and to ensure accurate transponder reading. The LPR camera system must be capable of sorting commercial vehicle data from private vehicle data. All LPR collected data must be stored and made available for analysis.

IV. SOFTWARE REQUIREMENTS

A. Use of Non-Restrictive Software

"Restrictive Software" is defined as any custom-designed software, substantially modified versions of available software, or specialized software for which interfaces do not exist or cannot be readily developed by a qualified third party. "Restrictive Software" will not be provided as part of the Work. Software meeting ISO standards or commercially available software is required if available. If Restrictive Software is required, the City must be granted a software license. If Restrictive Software is initially required, and an acceptable non-restrictive alternative becomes available, TransCore shall promptly provide written notice to the City describing the alternative software.

B. License to Use Custom Software

To the extent TransCore furnishes Restrictive Software created specifically for the City under this Agreement or Restrictive Software that existed previously and was substantially modified for the City project under this Agreement, effective upon Final Acceptance and payment by the City of all amounts due TransCore for the design and implementation of the GTMS/TMS, TransCore shall grant to the City, and shall require any applicable Subcontractor also to grant, to the City, , a royalty-free, non-exclusive, and irrevocable license to install and use, translate, reproduce, modify, adapt and create derivative works

from, and to license third parties for such purposes, all such software, including its source code and source code documentation, of the Restrictive Software, for the operation of the GTMS/TMS. Any sublicense to third parties by the City shall be subject to TransCore's approval, which shall not be unreasonably withheld. TransCore shall make available to the City, at any time over the term of the Agreement and upon request, the source code and source code documentation for such software.

As an alternative, and only upon written authorization by the City, TransCore may, as an alternative, place the applicable source code for such software in escrow in a location designated by the City, accompanied by detailed source code documentation, including a list of applicable software development tools, subject to review by the City of the sufficiency of such code and documentation, to be released to the City in the event that TransCore is unable or fails, in the City's reasonable judgment, to adequately support and maintain the licensed software. TransCore agrees to update, enhance or otherwise modify any source code held in escrow such that the source code is maintained as corresponding to the newest version of the software.

The City agrees to maintain the confidentiality of all software, code and documentation licensed under this agreement and to require any agents or third party contractors to whom the City discloses such software to execute a non-disclosure agreement, the terms of which will be provided in advance to TransCore for review and comment.

C. License to Use Other Restrictive Software

With respect to any Restrictive Software included as or within a deliverable under this Agreement, or otherwise necessary to the operation of the NEW SYSTEM, upon Final Acceptance and payment by the City of all amounts due to it for the design and implementation of the NEW SYSTEM, TransCore grants, and shall require any applicable Subcontractor also to grant, a license to use the object code form of the software and its manuals and object code documentation in the NEW SYSTEM only.

Notwithstanding any other provision of this Agreement, the testing and acceptance of such Restrictive Software or deliverables that include such Software shall require TransCore to demonstrate that the object code license granted hereunder is sufficient, in the City's reasonable opinion, to support the Operation and Maintenance activities described in this Agreement, without the need for modification, adaptation or translation of the Software.

D. Commercial Software

TransCore shall secure and administer all licenses or sublicenses from third parties for standardized commercially available software and shall provide copies of such licenses to the City, along with any documentation provided by the third party suppliers. TransCore shall not be required to furnish to the City source code to third party software, the right to make copies, the right to modify, or the right to disclose the software to third parties.

At least six (6) months prior to the end of the Operations and Maintenance term, TransCore shall begin efforts either to assign such licenses or sublicenses to the City or the City's designee or, if such assignments are not practicable, to provide the City with sufficient information to enable it to secure the licenses or sublicenses necessary for the continued operation of the NEW SYSTEM.

E. PMBS/ABM Integration

The PMBS is the enterprise financial reporting system for the Airport. The GTMS will be required to create an automated data feed between the GTMS and the PMBS. The frequency of this feed will be determined during the design phase, but at a minimum it will be a nightly batch update. The data feed will be required to use database to database integration. This integration will require close coordination with GCR & Associates, Inc., which is the provider of the PMBS. All costs, work and coordination with GCR

& Associates, Inc. will be covered under this contract. Integrator is responsible for any costs for modifying the PMBS.

Note: the PMBS software, Airport IQ Business Manager (ABM), consists of an Oracle 10g database and an application built on the Microsoft Dot Net platform. The PMBS, GTMS/TMS Integration shall be detailed in CDRL 65 "PMBS Integration Design."

V. HARDWARE REQUIREMENTS

A. TransCore Bill of Materials (BOM)

TransCore shall deliver all equipment listed below in the GTMS and TMS BOM.

GTMS BOM	DESCRIPTION	PART NUMBER	QUANTITY	UM
AVI Readers and Amtech HW				
	E5 Reader w/o enclosure (21/sego	10-5002-033	22	ea.
	E5 Reader w/enclosure T21/sego	10-5001-033	18	ea.
	Check tag accessory kit for E5	13-6000-001	54	ea.
	GPS Synchronization kit for E5	23-5000-001	10	ea.
	E5/E6 Multiplexor	14-6000-001	51	ea.
	Digital I/O OPTO board	77-6000-001	28	ea.
	Hand-Held Reader E1d w GSM/GPRS/WiFi and Bar code reader	20-8686-004	25	ea.
	E1d accessory kit		25	ea.
	Antenna, AA3152, UTA w/o Check Tag, 915Mhz	12-3152-004	71	ea.
OPTO				
	G4 DC Output 5-60 VDC, 5 VDC Logic	G4ODC5	54	ea.
SURG SUPPRESSION				
	POLYPHASER, SURGE PROTECTOR Flange Mount	IS-50NX-C2	36	ea.
	POLYPHASER, SURGE PROTECTOR Bulkhead Mount	IS-50NX	46	ea.
	POLYPHASER RGT SURGE PROTECTOR Replaceable gas tube unit with a frequency range from DC - 2.4GHz	RGT	10	ea.
	Kit, Flange To Bulkhead N Adapter for RGT (Flange bracket to mount PolyPhaser SX filter lightning protectors)	BFN	4	ea.
NEMA				
	36x30 back panel	SPP-3630	8	ea.
	36x30x10 NEMA clamp	SPN4-363010	8	ea.
	42x30x10 NEMA clamp	SPN4-423010	2	ea.
	42x30x10 back panel	SPP-4230	2	ea.
	floor stand 12H 10D	SPFSK-1210	5	ea.
	24x20x10 Nema one door clamp	SPN4-242010	6	ea.
	24x20 back panel	SPP2420	6	ea.
TSI				
	Electrotech LED Tattle Tale		70	ea.
	Manhattan 14 AWG PWR Cable 3 cond	M3847	2913	ft.
	Timer Control Relay	88826135	70	ea
VEHICLE COUNTER				
	224N-TS2 GP7 FOUR CHANNEL DETECTOR MODULE	82-1336-02	1	ea
	222N-TS2 GP7 TWO CHANNEL DETECTOR MODULE	82-1339-01	1	ea.
	NEMA CARD SLOT WITH CONNECTOR FOR LOOP DETECTOR		2	ea
	Microwave Detector	OT50R	4	ea
WIRING				
	I/O COMM CABLES	N/A	18	ea
	PANEL CABLES AND WIRE	N/A	18	ea
	RF patch coax N male to SMA Male 50 OHM, RG223/U DOUBLE SHIELDED (36" long)	PE3519-36	26	ea
	RF patch coax N male to SMA Male 50 OHM, RG223/U DOUBLE SHIELDED (18" long)	PE3519-18	84	ea
	N to N barrel/bulkhead connector	RFN1023	32	ea
Terminal Block				
	DIN RAIL, 18.0" LONG	0801733	16	ea.
	END BRACKET	3022276	32	ea
	FUSE BLOCK	3046032	160	ea.
	TERMINAL BLOCK, GREY	3044102	192	ea.
	TERMINAL BLOCK, GND - GREEN/YELLOW	3044128	96	ea.
	PARTITION PLATE TERMINAL BLOCK	3047167	48	ea.
	END TERMINAL BLOCK	3022276	16	ea.
	FUSE, 5 AMP, TIME DELAY	BP/GDC-5A	160	ea.
	ZACK MARKER STRIP 1-10	1051029:0001	16	ea.
	LABEL STRIP 11-20	1051029:0011	16	ea.
	Single Fiber Panel Wall-Mount Housing	IT-SPH-01P	16	ea.
	6 ST Compatible Composite Adapters, 6 MM 62.5 µm Fibers	CN-CCH-CP06-25	16	ea.
Power Supply				
	Mean Well Power supply	MDR-60-24	56	ea.
Communications				
	Copper to Fiber Converter		2	ea
	18-Ch Isolated D/O Module	ADAM-6056-BE	16	ea.
	ROCKETLINX single port	32021-0	15	ea.
	ROCKETLINX 8 port ES8108F	32057-9	17	ea
UPS				
	Micro 300 150W	017-220-29	6	ea.
	Micro Secure 100 75W	017-221-26	8	ea.
LPR				
	SpikeHD (Mode P362) Compact ALPR Camera with Onboard Summation and integrated ALPR Processor with ALPR/OCR	P382P-810-X-Y	17	ea.
	Urban Highway Quick Release Bracket Kit for SpikeHD	AP382URBCKT	17	ea
	SpikeHD (P382 & P482) Termination Boxes for field installation - NEMA 4 Rated, includes power supply, lightning protector	X3821001	17	ea
Gantry Equipment (3rd Party)				
	RF CABLE LMR600	LMR600	1425	ft
	RF CABLE LMR400	LMR400	3965	ft
	RF CABLE LMR300	LMR300	630	ft
	LMR600 RF Connectors - N-Male Crimp non-solder	3190-1268	17	ea.
	LMR600 RF Connectors - N-Male Right Angle Crimp non-solder	3190-762	17	ea.
	LMR400 RF Connectors - N-Male Crimp non-solder	3190-400	87	ea.

Appendix A
Services to be Provided by Contractor

TMS BOM	DESCRIPTION	PART NUMBER	QUANTITY	U/M
NEMA				
	24x20x10 Nema one door clamp	SPN4-242010	8	ea.
	24x20 back panel	SPP2420	8	ea.
WIRING				
	I/C COMM CABLES	N/A	8	ea.
	PANEL CABLES AND WIRE	N/A	8	ea.
Terminal Block				
	DIN RAIL, 18.0" LONG	0801733	8	ea.
	END BRACKET	3022276	16	ea.
	FUSE BLOCK	3046032	80	ea.
	TERMINAL BLOCK, GREY	3044102	96	ea.
	TERMINAL BLOCK, GND - GREEN/YELLOW	3044128	48	ea.
	PARTITION PLATE TERMINAL BLOCK	3047167	24	ea.
	END TERMINAL BLOCK	3022276	8	ea.
	FUSE, 5 AMP, TIME DELAY	BP/GDC-5A	80	ea.
	ZACK MARKER STRIP, 1-10	1051029:0001	8	ea.
	LABEL STRIP 11-20	1051029:0011	8	ea.
	Single Fiber Panel Wall-Mount Housing	CT-SPH-01P	8	ea.
	6 ST Compatible Composite Adapters, 6 MM 62.5 µm Fibers	CN-CCH-CP06-25	8	ea.
Communications				
	16-Ch Isolated DI/O Module	ADAM-6050-BE	8	ea.
	ROCKETLINX single port	32021-0	8	ea.
	ROCKETLINX 8 port ES8*08F	32057-9	8	ea.
UPS				
	Micro Secure 100 75W	017-22*-26	8	ea.
CCTV				
	Power over Ethernet injector for IP cameras	PSPOE	27	ea.
	Recess ceiling mount kit for use with Indoor Fixed Dome S50xxFD IP Cameras only	IC-S50FD	2	ea.
	Pendant Mount Dome Enclosure for Outdoor Fixed Dome S50xxFDW IP Cameras	PM-S50FDW	25	ea.
	Wall Mount (Gooseneck) Adapter for Outdoor Fixed Dome S50xxFDW IP Cameras. Requires the PM-S50FDW Enclosure	WM-S50FDW	25	ea.
	Wall Mount Arm and Coupler for S5500PTZ-28X/36X	S5500PTZ-WM	3	ea.
	Verint solution with Nextiva IP cameras (indoor)	S5020FD-DN	2	ea.
	Verint solution with Nextiva IP cameras	S5020FDW-DN	25	ea.
	Verint solution with Nextiva IP cameras PTZ (indoor)	S5503PTZ-18ID	3	ea.
	Verint solution with Nextiva IP cameras PTZ	S5503PTZ-36DW	3	ea.
	Nextiva 6.2 Dell Recorder SAS interface using PE R410 server , with Win2008R2, 6G RAM, PERC H800 card use with MD	NEX-6.2-RE-DSAS	1	ea.
	Nextiva 6.2 Dell Master Server using PE R410 server , 6G RAM, Xeon Processor , SQL 2008 R2	NEX-6.2-MS-DELL	1	ea.
	Dell Precision T3500 standard workstation with 22 inch wide screen monitor	NEX-6.2-DWRK-22	1	ea.
	Dell PowerVault MD1200 direct attached storage with 12 drive bays 12 X 2.0 TB, 7.2k SAS drives, storage capacity 22.0 T	NEX-DPVEXT-22.	1	ea.
	One (1) Camera S/W Loense	NEX-6.2-1CAM-S	33	ea.
	One (1) Review/Smart Client License	NEX-6.2-1RV-S	1	ea.
Display				
	Daktronics outdoor display	AF-3500-32x64-20	12	ea.
Other Equipment				
	Desktop Magstripe Reader	HP USB Mini Magr	2	ea.
	Hand held reader carrying case		8	ea.
	Hand held reader horster		8	ea.
	Misc Tools For Installation		1	ea.
	NFC Desktop Reader	OMNIKEY® 5321	2	ea.
	Vaicam Zoom USB camera with flash		2	ea.
	blue cloth backdrop		2	ea.
	Camera tripod.		2	ea.
	ID Card printer	Fargo DTC4500-L	2	ea.
	11x17 scanner	GT20000	1	ea.
	Printer		1	ea.
	AVM		3	ea.
	CID		10	ea.
	5.9 RSU		4	ea.
	Test Bench and hardware for SFO Maintenance Shop		1	ea.

TransCore shall deliver all requirements as set forth within this contract as Attachment #1: GTMS Specifications and Attachment #2 TMS Specifications.

Ground Transportation Management System Specification

San Francisco International Airport

Prepared by SFO Landside Operations

Document Control

Revision	Revision Date	Description	Author
0.01	4/22/11	Initial Draft	Landside Operations SFO
1.0	6/24/11	Final	Landside Operations SFO
2.0	7/01/12	Contract Specification	Landside Operations SFO

TABLE OF CONTENTS

List of Acronyms

ACH	Automated Clearinghouse
ADA	Americans with Disabilities Act, as amended, and all regulations
ADAG	Americans with Disabilities Act Guidelines
API	Application Programming Interface
ASCII	American Standard Code for Information Interchange
ATE	Automated Test Equipment
AVI	Automated Vehicle Identification
CDR	Conceptual Design Review
CDRL	Contract Data Requirements List
CS	Central System
CPU	Central Processing Unit
DES	Data Encryption Standards
DIS	Digital Imaging System
DMS	Dynamic Messaging System
DTE	Diagnostic and Test Equipment
EFT	Electronic Funds Transfer
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMV	Europay Mastercard Visa
EN	European Norm (Standard)
FAT	First Article Testing
FACI	First Article Configuration Inspection
FCC	Federal Communications Commission
FDR	Final Design Review
FRT	Failure Review Team
GTMS	Ground Transportation Management System
GTMSE	Ground Transportation Management System Equipment
GT Operator	Ground Transportation Operator
HR	Handheld Reader
ISO	International Organization of Standards
I^3T	Interface and Integration Inspection and Testing
I^2T	Installation Inspection and Testing
LAN	Local Area Network
LPR	License Plate Reader
MAC	Message Authentication Code
MCBF	Mean Cycles Between Failures
MTBF	Mean Time Between Failures
NDA	Non-Disclosure Agreement
NTP	Notice to Proceed
ODBC	Open Database Connector
PCI	Payment Card Industry
PDR	Preliminary Design Review
PIN	Personal Identification Number
QA	Quality Assurance

QC	Quality Control
SFO	San Francisco International Airport
SNMP	Simple Network Management Protocol
SPU	Smartcard Processing Unit
SQL	Structured Query Language
TMP	Transition Management Plan
TMS	Taxi Management System
UI	User Interface
UPS	Uninterruptible Power Source
WAN	Wide Area Network

LIST OF DEFINITIONS

The following terms shall have the meanings given to them below unless a contrary intention is expressly indicated in a specific provision of the Specification (in which case such contrary intention shall be limited to and only apply to that specific provision and not other parts of the Specification):

1. GTMS Communications Network: The communications network, including all hardware, software and communications media required for interconnection and for the transmission of data between all parts of the TMS, including LAN segments within all SFO and SFMTA facilities and the TMS WAN.
2. GTMS LAN: This includes all hardware and software necessary to support data communications between all GTMS and other components as part of the GTMS within a specific geographic facility such as a parking lot or the Central System, as well as all communications equipment necessary to interface to the GTMS WAN for support of data communications between all parts of the GTMS.
3. GTMS WAN: Includes communications media necessary to interconnect all segments of TMS LANS servicing data communications between all parts of the GTMS.
4. Central System: All parts of the GTMS, other than the GTMSE (hardware) installed in driver accessible areas, including software installed in such GTMSE.
5. Contract Drawing List: List of all drawings to be provided by Contractor to SFO.
6. Contract Document List: List of all documents to be provided by Contractor to SFO.
7. Credit/Debit: "credit/debit" means credit and debit combined, credit only and debit only cards and payment systems including without limitation MasterCard, Visa. Discover and EMV
8. Data Transfer: The process of uploading and downloading
9. Download: The act or process of data passing in the direction from a higher-tiered device toward a lower-tiered device
10. SFO: The contracting authority or "Owner" of the TMS being procured.
11. Driver: Taxi Driver in the SFO Taxi System
12. Operator: A non-taxi Ground Transportation Operator
13. Permit Holder: An Individual or Company that has a permit to operate their commercial vehicle at SFO
14. Schema: For purposes of this Specification, schema means the structure of a database system, described in a formal language supported by the database management system, and in a relational database, the schema also defines the tables, the fields in each table, and the relationships between fields and tables. The schema also includes a graphical depiction of the database structure.
15. Upload: The act or process of data passing in the direction from a lower tiered device towards a higher tiered device
16. City: City and County of San Francisco

17. Trip: The recorded event of the introduction of a Permitted Commercial vehicle onto the Airport property and into the GTMS.

18. Transaction: A transaction is defined as a record created when data is transferred between the Vehicles Transponder and the GTMS. Three types of transactions conducted by the GTMS are:

    a. Assessment/recording of a Trip

    b. Data used to calculate appropriate fee

    c. Event data that triggers an action, such as a violation

1. INTRODUCTION

The City and County of San Francisco Airport Commission is replacing the existing Automated Vehicle Identification (AVI) System with a new and improved Ground Transportation Management System (GTMS) for the Airport's Landside Operations Division (Landside). It will upgrade the Airport's current ground transportation management hardware and software; provide a solution which will facilitate changing business processes, more reliable data and richer features and functionalities. This specification details the automated vehicle identification/management and ground transportation billing requirements of the overall Ground Transportation and Taxi Management System (GTMS/TMS) for San Francisco International Airport.

SFO is coordinating efforts with San Francisco Municipal Transportation Authority (SFMTA) on streamlining taxi operations between both entities. SFO and SFMTA are jointly entering into an effort to modernize the City's A-card program and taxi fare collection environment at the Airport. The Taxi Management System is outlined in the TMS Specification v. 2.0

This new comprehensive system will provide San Francisco International Airport with the ability to more effectively manage critical commercial ground transportation functions, including transponder management, operator billing, vehicle inspections, and vehicle tracking and policy enforcement. Further enhancements include improved service and access to operators through online account management and commercial vehicle environmental compliance monitoring.

As the System Integrator, TransCore will be held accountable for all phases of work and to ensure that all associated members and stakeholders of the project team are focused and working to achieve timely and successful results.

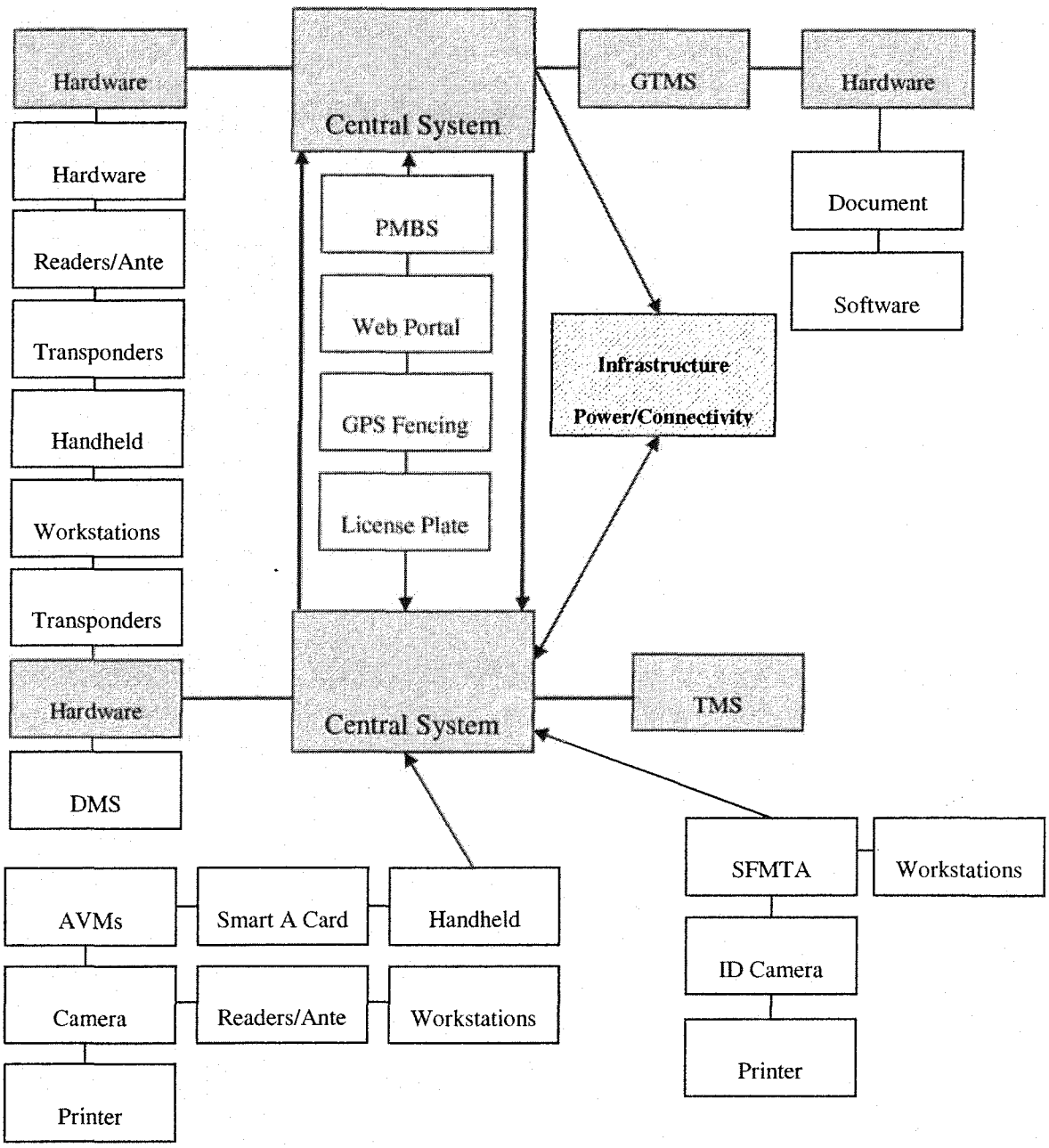


Figure 1 – GTMS/TMS Conceptual Architecture

Where possible, existing devices and infrastructure shall be retained and integrated into the new GTMS.

TransCore will be responsible for ensuring that the user interface through the GTMS/TMS Web Portal, and the other components of the GTMS, are integrated into a single seamless solution. The GTU staff and the GT Operators should not be aware that multiple components are in use to create the GTMS. In order to support this integration, the GTMS/TMS Web Portal will be the presentation layer, providing all user interfaces on a day to day basis. The GTMS Application will be the application layer, providing all of the calculations, data collection, report generation, and the primary integration with external systems. The GTMS File Server shall act as the file

storage for all documents uploaded from GT Operators as well as files that may be loaded into the system by Landside/GTU staff. The File Server will also be the location that the current system documents, both electronic and hard copy, will be stored in the GTMS

The GTMS/TMS web portal shall serve as the primary registration point for drivers during the permitting process. Drivers shall be able to enter the required registration information, which will be verified by SFO GTU personnel before being entered into the database. SFO shall have the ability to request and receive information from the DMV driver history list and add it to the driver's account in the GTMS database.

Workstations residing at SFO shall serve as the primary resolution points for driver disputes. The GTU workstations shall have access to the GTMS database and recent driver histories in order to resolve disputes.

Remote workstations shall serve as access points for system administrators, SFO staff members, and customer service representatives. These access points shall have the ability to manage system functionality, investigate operator/driver history and account information, and report on system usage data.

Specific functionality of each workstation, device, and subsystem is defined in this document.

2. GENERAL REQUIREMENTS2.1 ADA COMPLIANCE

The GTMS, including all its operable components and sub-components, shall comply with all applicable sections of the Federal ADA and the California Title 24 Requirements using the version from the date of the RFP. The equipment shall also meet the requirements of ADAG.

Descriptions and drawings of the ADA, California Title 24, and Proposed ADAG compliant GTMSE shall be submitted for review and approval as part of required documentation (CDRL 01, ADA Compliance Report).

The GTMS, when installed, must as a whole comply with ADA requirements and any state and local jurisdiction requirements for accessibility and use by individuals with disabilities. TransCore shall be responsible for determining which parts of the TMS need to be ADA compliant.

2.2 PAYMENT CARD INDUSTRY COMPLIANCE

All credit and debit card acceptance hardware and software as well as integration of design with the existing SFO network shall be Payment Card Industry Data Security Standard (PCI DSS) compliant and listed on the PCI Security Standards Council's list of Approved PIN Entry Devices. All applications that store, process or transmit credit card information as defined by the PCI Security Standards Council will appear on the PCI Security Standards Council's list of Validated Payment Applications listed at www.pcisecuritystandards.org/security_standards/vpa.

All hardware and software required to meet credit, debit and contactless card acceptance functionality supplied by TransCore shall be PCI DSS certified through an independent third party authorized by a professional organization to conduct such activities (certified QSA auditors). SFO's preference is for a third party to process and store all credit and debit card related information in a secure offsite location and that no credit card data is stored on SFO servers.

TransCore shall provide a Policy and Procedures Manual that addresses PCI compliant operations and how to maintain PCI compliance over time (CDRL 52 – PCI Policies and Procedures).

2.3 BUILDING CODES

The equipment components and their installation shall comply with all laws, ordinances, codes (e.g. OSHA, ADA, NEC), rules, and regulations of public authorities having jurisdiction over this part of the work. It shall be the responsibility of TransCore to meet these and other current technical, performance, and safety standards that are applicable to all components and to the entire system, even when not specifically referenced.

2.4 OPEN SYSTEMS REQUIREMENTS

The GTMS transactional stream of data shall be compiled in a SQL/ODBC compliant database that easily converts the data into common spreadsheet and database formats. SFO shall have the ability to prepare new reports or revise TransCore-provided reports as their reporting standards change and/or are expanded.

All interfaces shall be based on open standards and protocols. Use of any proprietary interfaces shall be approved only by written authorization of SFO. Once approved, TransCore shall provide complete documentation of the proprietary interface for the use of SFO.

2.5 OPERATING ENVIRONMENT

The Ground Transportation Management System and its components shall operate efficiently in the environment described in Table 1 - Operating Environment, Table 2 - Electromagnetic Interference, and Table 3 - Electrical Environment. Devices shall be sealed to prevent entry of rain or dust, and insulated to operate as designed in the following climates and electrical environments. DMS displays shall be visible in all lighting conditions of the installation environment. DMS signs shall be installed in outdoor environments, with various levels of sheltering ranging from significant protection to none. DMS signs shall be designed for exposure to salty air, fog, rain, hail, and other environmental conditions prevalent in the San Francisco Bay Area.

Table 1 - Operating Environment

	DMS
Temperature Range:	+14°F to +120°F, Ambient
Humidity:	5% - 95% RH, non-condensing
Shock:	• 2-horizontal axes: 5g ± 20% • Vertical axis: 1g ± 20% • Duration: 10 ms ± 2 ms (Repeat all 5 times)
Vibration:	• Continuous sinusoidal sweep at 0.5 octave per minute • 5 Hz to 25 Hz to 5 Hz • 0.25g peak vibratory acceleration
EMI:	See **Table 2**
Other—dust, grit, rain/water protection	Maximum 6 inches of rain per day, wind blown Clean to dusty with blown grit and sand
Power supply:	See also **Table 3**
Nominal Voltage:	110 Volts 60 Hz AC or 12 Volts DC
Operating Range:	10 to 18 Volts DC
Maximum Current Draw:	5 Amp
Voltage Fluctuations:	up to 1,000 Volt spikes for 10 milliseconds 9 Volts DC to 25 Volts DC up to 10 minutes

Table 2 - Electromagnetic Interference

Electromagnetic Emission	FCC, Part 15
Conducted Susceptibility	EN 50082-2, EMC Generic Immunity Standard, Part 2 or equivalent North American standards
Radiated Susceptibility	EN 50081-1, EMC Generic Emission Standard, Part 1-Domestic and Light Industries or equivalent North American standards
Electromagnetic Immunity	EN 50082-2 or equivalent North American standards
Electrostatic Discharge Immunity	EN 50082-2 or equivalent North American standards
Radiated Radio Frequency Electromagnetic Field Immunity Test	EN 50082-2 or equivalent North American standards
Electrical Fast Transient/Burst Immunity Test	EN 50082-2 or equivalent North American standards
Surge Immunity Test	EN 50082-2 or equivalent North American standards
Voltage Dips, Short Interrupts and Voltage Variations Immunity	EN 50082-2 or equivalent North American standards

Table 3 - Electrical Environment

Surge	± 15%
Transient Impulse	75V
Common Mode Noise	5V

2.6 BUSINESS RULES

System parameters shall be configurable by SFO administrators at authorized workstations. Parameters to be configurable shall include, but not be limited to:

1. Fee amounts in dollars and cents
2. Time parameters of any/all trip programs
3. Incentive periods and trip quantities for selectable vehicle types or operators

3. GTMS HARDWARE REQUIREMENTS

The GTMS Hardware will, at a minimum consist of the items identified herein.. It will be the sole responsibility of TransCore to ensure that the full set of hardware required to create a successful GTMS is provided to the Airport.

GTMS Servers

The GTMS shall provide redundant servers for the solution. These redundant servers shall be in sync and allow for continuous operations in the event of a primary server failure. Each set of servers shall be clustered to provide this functionality. SFO uses IBM Blade servers, and it is expected that the GTMS will also use IBM Blade servers for all servers required. Transcore shall work with SFO ITT to ensure that the server solution meets the SFO ITT standards. Please see the latest version of the ITT Platform Compatibility Document

Readers/Antennae

The new GTMS/TMS will replace all existing antennae/reader locations with the new antennae/readers, as well as install antennae/readers in new locations as identified in Attachment 3. The Airport desires to install new locations to better cover the traffic into and out of the Airport, as well as provide better management of the taxi hold lot and to identify vehicle fuel type and environmental impact. The Airport currently has the inbound lanes of traffic covered; however, SFO is interested in adding additional roadway locations to capture trip details as the GT Operator vehicles leave the Airport. This additional coverage will allow the Airport to calculate dwell times, times between trips to the Airport, and other metrics that SFO is currently unable to calculate. The Airport also desires to have indicator lights, such as LEDs, related to each lane to visually identify when a valid transponder has been read by an antenna/reader. These indicator lights shall be installed so that they are easily visible by SFO staff responsible for curbside management.

Transponders

The transponders installed under this project will be installed on all permitted commercial ground transportation vehicles including the taxi and GT Operator vehicles. Installation must reduce tampering to the greatest extent possible. The transponders will be designed so that if a transponder is tampered with, it will be rendered inoperable. The Transponders will be ISO 18000-6C Compliant.

License Plate Recognition (LPR)

License Plate Recognition (LPR) technology is desired to address concerns for transponder tampering or misread transponders. Tampering and misreads result in lost trip fee revenue; LPR serves as both a redundant means of fee collection and a tampering mitigation component of the GTMS/TMS. The LPR cameras are intended to capture both commercial and private vehicle information; the GTMS/TMS application will need to filter out commercial vehicle license plate data and manage separately from private vehicle data. All LPR collected data needs to be stored and made available for analysis. This analysis includes but is not limited to:

1. traffic counting
2. environmental impact

3. law enforcement
4. fraud mitigation

Handheld Readers

The new GTMS/TMS will incorporate handheld readers which are capable of reading transponders and Smart A-cards. These handhelds will be used for curbside management, and spot-checking transponders to ensure that they are operational and have not been tampered with by the GT Operators or Taxi drivers. GT Mechanics will also use these handhelds to record inspection results, and assign transponders to vehicles. The handheld readers will communicate back to the GTMS/TMS Application using a WiFi, cellular or otherwise SFO accepted wireless connection. Handhelds will have application screens that are dynamic, based on the login of the person using the handheld device.

Dynamic Messaging System

The DMS shall provide a network of integrated visual displays along the upper and lower level commercial vehicle curbside loading zones. These DMS displays will be able to receive and display rolling lists, messages, alerts, and instructions. The content of the display shall be centrally controlled and have the ability to be automated and timed according to other GTMS activity.

Curbside/Lot Surveillance Cameras

The GTMS shall support curbside cameras to record curbside, taxi lot, and van lot activity including license plate numbers of commercial vehicles.

Additional GTMS Hardware

The GTMS shall utilize the existing SFO ITT campus network, and will operate as a VLAN on this existing network. TransCore will be responsible for providing any and all network electronics and passive infrastructure to ensure connectivity. This includes any fiber or copper, fiber transceivers and any network switch upgrades required to provide connectivity. Transcore shall be responsible for all patch cables required to successfully connect and complete the GTMS. Construction and Infrastructure is the responsibility of the Construction and Infrastructure Contractor

TransCore shall provide 10 workstations for use in the day to day operation of the system. These workstations will be installed in the Landside/GTU offices, accounting, and other locations as required to operate the system. Workstations will be installed with the appropriate software, including but not limited to antivirus software, the operating system, any software or drivers required to operate attached peripherals, and any software required to interact with the GTMS. Workstations will meet SFO's ITT standards, and will also be provided with laser printers and document scanners for various printing and scanning tasks. In addition to the 10 workstations, Transcore shall provide a rack mounted 1u workstation which will allow the system administrator access to the servers for administration and maintenance.

3.1 HANDHELD READER

The GTMS shall provide handhelds that are capable of reading the GTMS Transponders. These handhelds will be used by Landside/GTU staff to provide curb management, verify that Transponders are properly functioning, and perform inspections in the mechanics shop. The

handhelds will use a dual Cellular and 802.11 network to communicate in real-time between the handhelds and the GTMS. Please see handheld section below for the detailed requirements. The handhelds will also be used by the GTU mechanics to conduct their inspections and update that data to the GTMS Application once an inspection has been completed.

Contractor shall provide twenty five (25) handheld readers. HRs shall be used primarily for vehicle inspection in the field. HR design shall be subject to SFO review and approval and shall be included in CDRL 50 – "HR Design and Performance Requirements."

The HR shall be configurable for use by SFO or Law Enforcement personnel.

The SFO HR will be used by Curbside Managers at SFO. The SFO HR shall have the ability to remotely retrieve information from the GTMS.

TransCore will be responsible for performing a wireless site survey to ensure that the hand-held wireless devices can operate in the required areas without interference, and without causing interference to existing systems. e.g. ensuring that the proposed hand-held devices do not interfere with the Airport's AirTrain.

3.1.1 Handheld Reader Functionality

TransCore shall provide portable, hand-held devices which can be used to perform tasks including: Curbside management of GT Operator vehicles, automatically input tag identification data into the GTMS after completing inspections, and perform roadway verification of vehicle transponders.

The HR shall be capable of reading GTMS RFID tags and reading transponders regardless of where they are mounted on the GT Operator vehicles. The HR must also be capable of barcode scanning, and have an integrated magnetic stripe reader. HR shall also have the capability to monitor reader/antenna status from Airport roadway locations.

The HR shall present application screens based on the user-type logged in. e.g. when a mechanic logs in to the handheld, they are presented with the inspection application screens.

The display menu and display messages shall be programmable using a developer's utility running on a Windows-Intel PC with the capability to upload the modified menu or messages to the HR using a standard PC port. The display shall be easily visible under all conditions of ambient light ranging from daylight to a darkened environment. HR shall have Standard English keyboard with numeric and symbol keys, and programmable function keys for repetitive processes.

The total HR unit weight shall not exceed two (2) lbs without SFO approval. The unit shall be equipped with a commercially available rechargeable battery, easily replaced in the field. The battery cover shall be removable without tools and secure under normal use. Contractor shall include protective cases, belt holsters and lanyards.

Contractor shall provide a mounting cradle/charger that automatically connects the HR (when inserted) to the GTMS server for data transfer purposes and charges the HR battery. The cradle/charger shall provide a regulated charge that maximizes battery life and charges the battery within one shift, approximately eight (8) hours.

Functionality shall also include, but is not limited to:

1. Allow entry of VIN, transponder number or license plate on a hand-held device, and will display related vehicle information. The data to be displayed includes, but is not limited to:
    1. Company name
    2. PSC/TCP #
    3. Vehicle status
    4. Transponder #
    5. License Plate #
    6. VIN #
2. Scan transponders and assign them to a vehicle, and upload the information to the GTMS database.
3. Allow mechanics to easily enter results into the hand-held inspection form, which will include, but not be limited to:
    1. Pass/fail designation
    2. Violation Failure Details
4. Provide the ability to upload inspection results data from the hand-held device into the GTMS database.
5. Be used to associate the transponder to the vehicle record information at the time of inspection.
6. Print out inspection results once the GTU Mechanics are completed with their inspection.
7. Transmit inspection results wirelessly from the hand-held to the GTMS, which will then store the data and provide access to the inspection results at the local GTU Mechanic workstation.

TransCore shall obtain approval from the SFO Project Manager prior to the procurement of the hand-held devices. Provide cut sheets to the SFO Project Manager for approval of the proposed hand-held device. Purchase hand-held devices as late in the project cycle as possible so as to ensure that the devices are the latest technology available.

The hand-held shall be able to be configured in a "non-network" mode; this will allow for off-site inspections and system registration. This registration process will allow the system to load a temporary version of the database on a portable computer so that data validations and checks can be done off-site

3.1.2 General Requirements

The HR shall meet the following minimum requirements where appropriate:

1. Physical Environment: refer to **Table 4 - HR Operating Environment**
2. Operating Environment: refer to **Table 5 - HR Operating Environment**
3. Reliability: 150,000 mean card reads between failures

4. Software upgrades shall be loadable through a standard PC communications port such as an RS 232

Table 4 - HR Operating Environment	
Parameter	**Physical Requirement**
Dimensions and Layout:	Each HR shall be demonstrated at time of PDR.
Weight:	The total HR unit (excluding carrying case) weight shall not exceed two (2) lbs without approval
Structural Features:	The carrying case shall protect the HR unit from abrasion, and scratching. The battery cover shall be easily removable and be secure under normal use.
Appearance and Styling:	The HR shall conform to generally accepted practices in appearance and styling and shall be approved by SFO. All exterior surfaces shall be clean with corners rounded where appropriate. There shall be no exposed bolt heads, nuts, sharp edges, or cracks on the outside surfaces
Physical Standards	Meet or exceed applicable ML-STD 810F standard
Memory	Have a minimum of 256Mb of internal memory
Wireless communication capabilities	Capable of transferring data by wireless, real-time transfer and receiving alert notifications wirelessly from the GTMS Server using 802.11 wireless technologies or cellular
Data Transfer (Non-Wireless)	Capable of transferring data either by wireless, real-time transfer, or by synchronization via a USB connection to a computer
Identification Labels:	An identification label with the serial number shall be affixed to the HR. Major accessories (for example, cradle, and expansion pack) shall have an affixed label with a unique serial number and part number prominently located on the component.

Table 5 - HR Operating Environment	
Parameter	**Operating Requirement**
Temperature Range:	+32°F to +104°F, Ambient
Humidity:	10% - 95% RH, non-condensing humidity
Shock and Vibration:	Shock and vibration encountered in the field environment
EMI:	Heater and air conditioning controls, high voltage arcs, alternators
Other — dust, grit, rain/water protection	Airborne particles and dust encountered operating environment, and caused by general cleaning and sweeping

3.1.3 Reliability

HR reliability is defined as the incident rate for the active pool of devices measured over each calendar month. The incident rate is the ratio of the incidents recorded in that period to the number of active devices, as shown in the following equation:

$$HR\ \text{Re}liability = \frac{\#\ of\ \ HR\ incidents\ recorded\ in\ calendar\ month}{\#\ of\ \ active\ HR\ devices}$$

TransCore shall be required to maintain a specific level of reliability for the HR, as defined in CDRL 50 "HR Design and Performance Requirements" but in no case shall the incident rate be greater than 10%. Any single HR that has more than two (2) incidents per month shall be replaced with a new unit. If the new unit experiences the same incident rate, Contractor shall be responsible to initiate an investigation to determine the cause.

An incident shall be defined as any first-line maintenance issue reported to TransCore by SFO staff and any second- or third-line maintenance issue requiring action by TransCore to resolve. The tracking and reporting of incidents shall be the responsibility of TransCore.

3.1.4 Third party Requirements

Contractor may supply an HR based on third-party PDA (or PDA-like) product(s). It is expected that the third-party product(s) will evolve over time resulting in products becoming obsolete as more advanced models or new generations of products replace them.

Contractor may upgrade the third-party product(s) to available third-party product(s) if:

1. The current product(s) becomes obsolete or is nearing end-of-life; and
2. The replacement product(s) is equal or better in meeting Contract requirements as the current product(s)

Contractor must notify SFO in advance when third-party products are being replaced. HR designs and pricing shall be subject to SFO review and approval. HR designs shall meet the requirements in section 0 as applicable.

3.2 READER/ANTENNAE REQUIREMENTS

3.2.1 Integrator

TransCore Shall:

1. Ensure that antennae are provided to cover all lanes of the identified locations.
2. Provide readers so that non-lanes of traffic are covered where vehicles could operate and avoid detection of their transponders.

3.2.2 Ground Transportation Management System (GTMS) Hardware

The GTMS hardware shall

1. Replace the existing antennae currently installed as part of the existing AVI system.
2. Communicate the status of the readers to the server. Communications with the server will be through the Ethernet port on the reader using the UDP transport protocol. The application layer will use a TransCore designed protocol, not SNMP.
3. Provide antennae capable of broadcasting radio frequency signals between the reader equipment and the tagged vehicles on a per-lane basis.
4. Be capable of reading multiple transponder formats and standards.
5. Provide internal logic to ensure accurate vehicle trip monitoring and signal discrimination.
6. Have operating frequencies set and tested to avoid interference from other GTMS reader equipment within a given read site. Acceptance of final band operating frequencies shall be obtained from the SFO Project Manager.
7. Be able to accurately (e.g. 99.9%) and reliably monitor vehicles traveling between 0 to 55 mph.
8. Ensure that there is no loss of data as a result of communications or power failures.
9. Allow for connections to peripheral devices, e.g., traffic volume counting detectors, portable readers, and portable printers.
10. Generate a warning message in the central computer when a peripheral device has been connected and where it has been connected.
11. Include visible, externally mounted indicator lights above each lane that shall be activated for a period of no less than 0.5 second each time a valid tagged vehicle passes through a read site within 1 second of the verification of a valid read. These indicator lights shall be installed in a manner that allows them to be easily visible by SFO staff responsible for curbside management.
12. Have a one-to-one relationship between reader antennas, lanes and indicator lights (e.g. the indicator light directly over a lane shall illuminate when a valid read occurs in that

lane.)

13. Allow the end-user administrator to logically define and add readers to the system.
14. Create a historical data entry whenever the failure of an antenna or reader is detected by the system.
15. Readers shall remain active at all times to mitigate possible missed transponder reads

3.2.3 Reader/Antennae

The Reader/Antennae Equipment shall:

1. Utilize and maintain ISO 18000-6C protocol compliance. The readers shall be third party independently certified as compliant with the ISO 18000-6C Standard.
2. Be designed to provide accurate readings of simultaneous vehicle passage in adjacent lanes. However, the readers shall only identify tagged vehicles in the lane(s) to which the reader is assigned.
3. Be designed to prevent double-counting (e.g., counting the same vehicles more than once across multiple antennae)
4. Detect vehicles on a per-lane basis and transmit transponder data to the system server.
5. Be capable of co-existing with Title 21 standard transponders (e.g., BATA Fastrack)
6. Read ISO 18000-6C transponders from other airports (e.g., OAK, SJC) as programmed in the future by Airport staff and provide identifying data to the GTMS
7. Perform 5 readings per pass to ensure transponder validity before acceptance.
8. Be designed to identify vehicle breakdowns in the vicinity of the antenna read-zone (e.g. a tagged vehicle is parked under the reader).
9. Have the capability to search for specified tag identification codes or to filter any non-SFO issued tags.
10. Not interfere with radio frequency and electromagnetic transmissions at the Airport, including but not limited to:
    a. radar systems,
    b. ground-to-ground radio systems,
    c. air-to-ground radio systems,
    d. vehicle electrical systems,
    e. automated train systems,
    f. Cellular telephones.
11. Be able to operate for 72 hours in a stand-alone mode in case of communications failures.
12. Have adequate capacity to store at least 72 hours of buffered transactions.
13. Automatically upload 100 percent of the previously un-transmitted, stored data to the system once communications and/or power are restored.

14. Have the capability to upload any stored data through a manual command from the system or from the face of the reader.

3.3 TRANSPONDER REQUIREMENTS

3.3.1 GTMS Transponder Integrator

TransCore Shall:

1. Supply a total of 20,000 transponders to support the current active vehicles in operation at SFO.
2. Ensure restocking of transponder deliveries are fulfilled within 10 business days from the date the order is placed.
3. Transponder specifications and design shall be detailed in CDRL 65 "GTMS Transponder Design"

3.3.2 GTMS Transponder Functions

The GTMS Shall:

1. Provide ISO 18000-6C compliant transponders. These Transponders shall be third party independently certified as compliant with the ISO 18000-6C Standard.
2. Provide transponders which allow for segregation of vehicle types by transponder number series. E.g., taxicabs shall have one series of numbers, while limos shall have a separate series of numbers.
3. Allow transponders to be mounted in such a way as to limit active tampering with the transponders.
4. Use transponders that are "self-destructive" when tampered with
5. Provide for continuity of transponders between vehicle types, thus reducing the different type of inventory of transponders required to be maintained by SFO
6. Ensure transponder transaction data is continuously uploaded from the reader to the system on an on-line, real-time basis as soon as each transponder has been decoded.
7. Ensure transponder transaction data is transmitted from the reader equipment to the system at a minimum of 28,800 bits per second using an industry-standard open protocol.
8. Use a standard transponder which is/can be manufactured by multiple suppliers, allowing the Airport to competitively bid the restocking of transponders in the future

3.3.3 Transponder Form Factor

The GTMS Transponder shall:

1. Have a readable identification code etched or printed on the transponder, and carry a life expectancy of 10 years.
2. For limousine type vehicles transponder shall be affixed to the windshield with the airport logo visible 50 feet from the outside of the vehicle.

3. Have a unique sequence in identification code from all other airports or customers.
4. Be a color, such as the current transponder orange, or the SFO blue included in the airport's logo. The final decision of the color of the transponder will be approved by SFO Project Manager.
5. For buses and vans, affix to the rooftop of the vehicle and have a hard shell that is durable under the most rugged conditions
6. Easily recyclable and not have special disposal requirements, e.g. hazardous materials.
7. Able to be reused on other vehicles, where applicable
8. Include the unique facility code for SFO and the unique transponder ID in transponder transaction data.
9. Be mountable in such a way as to discourage or prevent tampering of the transponder by the GT Operator.
10. Have a barcode which contains the encoded transponder transaction data.

3.4 DYNAMIC MESSAGING SYSTEM & CURBSIDE CAMERA

3.4.1 Hardware

The dynamic messaging system (DMS) shall consist of the following components:

1. DMS server receiving data from incoming and outgoing readers/antennas, and a list of active transponders from the GTMS
2. Message sign(s) capable of displaying rolling lists, messages and instructions
3. Camera(s) that record the events taking place curbside

The DMS message sign(s) shall be readable in all light conditions and suitable for outdoor use. Sign(s) shall be a commercial, off-the-shelf product. The sign(s) shall be located at the domestic and international terminal upper and lower level commercial ground transportation and taxi lanes.

3.4.2 DMS Functionality

At a minimum, the DMS shall provide the following functionality:

1. DMS sign(s) shall display a rolling list of GT vehicles (including information such as license plate number and name) that have completed the required transponder validation
2. GT Vehicle information shall be displayed on the DMS message sign where the vehicle is currently allowed to pick up passengers, for the specified time.
3. Once the GT vehicle's time at a terminal is up they are prompted to move to the next terminal via the DMS
4. GT Vehicle information shall be removed from the DMS sign after a driver passes the last terminal in the circuit
5. DMS on taxi curbside zones will report anomalous taxi's that did not complete the required reads/transactions

6. The Curbside Camera records events taking place at curbside including vehicle license plate numbers

The design and configuration of the DMS shall be submitted in CDRL 57 – Dynamic Messaging System Design and shall be subject to SFO approval.

3.4.3 DMS Interface

The DMS server shall receive a list of all active GTMS transponders and their corresponding vehicle information from the GTMS at least once per day. SFO shall have the ability to configure the frequency of data exchange between the GTMS and DMS server. The GTMS readers/antennae shall provide a real time read record to the DMS server.

3.5 LICENSE PLATE RECOGNITION

3.5.1 LPR Hardware

The LPR shall consist of the following components:

1. LPR server receiving data from incoming and outgoing LPRs
2. LPR cameras that record the license plates of all vehicles passing beneath the locations indicated in Attachment 3

3.5.2 LPR Functionality

The LPR shall be capable of reading in all light conditions and suitable for outdoor use. LPR shall be a commercial, off-the-shelf product. The LPR shall be located at the domestic and international terminal lanes per Attachment 3. LPR cameras and the LPR server shall be able to be configured to read all vehicles or just commercial vehicles outfitted with an SFO issued transponder.

3.6 ADDITIONAL GTMS HARDWARE REQUIREMENTS

The GTMS non roadside hardware requirements are listed below.

The GTMS shall:

1. Allow Disk storage for the installation of additional disk storage without disruption to the system.
2. Automatically update internal clocks upon power-up or at requests manually entered by maintenance personnel at the reader or from any of the system workstations.
3. Use a pager to alert maintenance personnel (and other staff as designated by SFO) of fatal errors to system components.
4. Server computers shall keep a time and dated log of all error messages issued. This log shall be in a form that may be queried, sorted, summarized and printed.
5. Provide on-line access to the reader equipment to assist in remote system diagnostics.
6. Provide on-line access via phone circuits, through the central server and by direct connections at the reader locations
7. Allow, at a minimum, monitoring of the system, viewing and editing of the failure logs,

monitoring of the communications circuits and data traffic, access to the operator interface, and monitoring of equipment status through the on-line access.

8. Provide high speed communications equipment (100 mbps minimum) as required to link the reader equipment with the system server
9. Provide GTMS and web system server units.
10. Provide a PC based system server with central processor for monitoring trip data transmitted from the reader equipment
11. Provide all servers required to provide a complete system solution
12. Be fully redundant, fault-tolerant, and robust.
13. Have external fault-tolerant Redundant Array of Inexpensive Disks (RAID) technology for data storage and processing.
14. Provide redundant backup system server unit for all system servers.
15. Utilize 10/100/1000BaseT Ethernet Local Area Network technology.
16. Have a user-definable archive schema that allows transaction data to be archived from the active database.
17. Allow access to archived data for historical searches, reports, and research.
18. Provide on-line access to the reader equipment to assist in remote system diagnostics.
19. Provide a minimum of ten (10) workstations. Four dedicated computer workstations shall be for the following locations:
    a. GTPPU (2 workstations)
    b. Landside Operations, and
    c. Ground Transportation Police office

The remaining six workstation locations shall be determined during the course of the project.

20. Supply computer equipment which meets the standards of SFO ITT. Any equipment proposed shall be approved by the SFO Project Manager.
21. Have a documented Mean Time Between Failures (MTBF) of not less than 10,000 hours for a major failure of any system components and a documented MTBF of not less than 2,500 hours for a minor failure of any system components.
22. Operate without failure of any system components for 120 days.
23. Allow for high-speed (greater than 100 mbps) full duplex communications over fiber optic cable and wireless to the hand-held using 802.11Ethernet protocols.
24. Provide point of sale devices to process credit cards and collect magnetic stripe information from drivers' licenses.
25. Provide continuous system self-checking to detect and notify system users of errors and equipment/power failures including but not limited to switch-over's to UPS and emergency power, circuit over trip events, over current events, cabinet door open, antenna failures, and reader circuit failures.

26. Provide messages describing the location and nature of each error or failure condition.
27. Allow SFO to disable and modify selected recurring error messages.
28. Allow the system administrator or maintenance supervisor to have error reports or selected error reports printed to a file or to a printer.
29. Be in a format to allow analysis using standard spreadsheet type software packages, including Microsoft Excel.
30. Include reading time of day supplied by a WWV time clock which will automatically update and synchronize the clocks in all system components at user-defined intervals.
31. Automatically adjust for daylight savings time changes and leap years; such adjustments shall be made without errors in time-based calculations (e.g., dwell time and headway violation charges).
32. Include all necessary operating software, hardware, and equipment to properly interface the workstations with the system server and the network server, and the reader equipment.
33. A roadmap and process for addressing end of life components so that the system does not become obsolete over time.
34. Provide all peripheral devices, including but not limited to keyboards, pointing devices, printers, SVGA color monitors, image scanners backup Digital Audio Tape [DAT] disk drives.
35. Provide one rack-mounted server computer workstation.
36. Mount the servers on appropriate racks matching the existing rack system, where applicable. The racks and the computer hardware shall be securely fastened to resist earthquakes.

4. GTMS APPLICATION REQUIREMENTS

The GTMS Application is the core application software of the GTMS system. This application will be responsible for all data calculations, trip calculations, communication with the GTMS Roadway Hardware, and the central point for the integration with other systems. All reports will retrieve their data from the central system, and will use the GTMS Application to sort, analyze and report on the data. Data access and maintenance will be primarily through the GTMS/TMS Web Portal GTMS/TMS Web Portal, as described below, but the GTMS Application shall allow the GTU and Landside staff to access data through the GTMS Application when the GTMS/TMS Web Portal GTMS/TMS Web Portal is down, or otherwise out of service.

The GTMS Application will manage all vehicle, driver, and trip detail data, as well as manage the transponder inventory. The GTMS Application shall store insurance coverage amount requirements, based on vehicle and fleet type, and make this information available to the GTMS/TMS Web Portal GTMS/TMS Web Portal for data validation and calculations. The GTMS Application shall manage the calendar features of the GTMS, and provide this data to the GTMS/TMS Web Portal GTMS/TMS Web Portal. Any scheduling data will be updated in the GTMS Application, and it shall be the source for this data.

All administrative fees, fines, and charges shall be maintained in the GTMS Application, and the GTMS Application shall track payment of these fees. The GTU staff will have the ability to override certain administrative fees, fines, and charges, depending on access privileges. Once a payment has been received, the fee amount, and the payment amount will be transferred to the PMBS.

The GTMS Application will have the ability to read magnetic stripe information from drivers' licenses and credit cards at the GTU workstations, via the GTMS/TMS Web Portal GTMS/TMS Web Portal and the GTMS Application, and store the data appropriately. The GTMS Application and GTMS/TMS Web Portal GTMS/TMS Web Portal will have an interface to the credit card point of sale device, which is described in the interface section, below. The GTMS Application shall also allow the GTU staff to manually key in data into the proper data fields.

When inspections occur, the data collected, via the handheld devices, will be transmitted and stored in the GTMS Application, and associated with the correct data records. The GTU Mechanic will be able to access inspection forms, enter in inspection data, and upload that data to the GTMS Application.

The GTMS Application shall support the full set of data fields identified in the functional requirements below. In addition, the GTMS Application shall support the addition of a minimum of 50 custom data fields, to be used by the Airport to track additional data elements, as required.

The GTMS Application and PMBS integration will be discussed in the integration section of this spec.

4.1 GTMS INTEGRATION

The GTMS will require integration with several systems. This integration will be critical to the success of the overall project, and will require interaction and coordination with SFO ITT staff, as well as representatives from third-party companies which provide some of the solutions. The goal is to create a seamlessly integrated solution which will streamline the business processes of

the Landside/GTU staff. TransCore shall provide at CDR a complete and detailed description of the GTMS Application Design as part of CDRL 62 'GTMS Application Design'. The GTMS solution will integrate with the following systems:

4.1.1 PMBS Integration

The PMBS is the enterprise financial reporting system for the Airport. The GTMS will be required to create an automated data feed between the GTMS and the PMBS. The frequency of this feed will be determined during the design phase, but at a minimum it will be a nightly batch update. The data feed will be required to use database to database integration. This integration will require close coordination with GCR & Associates, Inc., who is the provider of the PMBS. All costs, work and coordination with GCR & Associates, Inc. shall be included in the contract price between the City and Transcore. Transcore is responsible for any costs for modifying the PMBS.

The PMBS software, Airport IQ Business Manager (ABM), consists of an Oracle 10g database and an application built on the Microsoft Dot Net platform. The PMBS, GTMS/TMS Integration shall be detailed in CDRL 65 "PMBS Integration Design."

4.1.2 Data Warehouse

The Data warehouse is the main data store for the Airport. The GTMS will be required to create an automated data feed between the GTMS and the Data warehouse. The frequency of this feed will be determined during the design phase, but at a minimum it will be a nightly batch update. The data feed will be required to use database to database integration, utilizing views to expose the data for the Data warehouse to use. The data which is sent to the data warehouse will be the roll-up of trip details, so that it can be used for historical reporting. The GTMS will not send the detailed trip-by-trip data to the data warehouse. This integration will require close coordination with SFO ITT, who is the provider of the Data warehouse system.

4.1.3 SFO Taxi Management System (TMS)

The GTMS system will need to integrate with the SFO TMS as part of this contract (see TMS Specification). The GTMS will provide RFID antennae/readers, as well as reporting capabilities, and share data between the two systems. The SFO TMS is used by the Airport to track taxi cab operations, collect fees using a smart card debit system, and coordinate charges based on vehicle type. The integration of the GTMS and the TMS will give Landside/GTU better insight into the trip details of taxi cabs, monitor their use of the taxi hold lots, and ensure that the dispatch rules and regulations are being followed.

4.1.4 BATA Toll System

It is important the BATA Title 21 RFID tags not interfere with the GTMS or that the GTMS not interfere with the BATA AVI system.

4.1.5 GTMS File Server

The GTMS File Server will be the main repository for all files uploaded into the GTMS. This server will be integrated with the GTMS/TMS Web Portal GTMS/TMS Web Portal and the GTMS Application to ensure that the uploaded electronic files are accessible through the various applications and screens, based on system security and user access privileges.

The GTMS will also be required to be an integrated internal solution. The GTMS/TMS Web PortalGTMS/TMS Web Portal, and the GTMS software, along with the GTMS file server, workflow, and other components of the GTMS system shall be seamlessly integrated, providing for a single total package. The GTMS system shall also integrate with the point of sale terminals used by SFO to process credit card transactions in the GTU offices. Please see Section 6 for the detailed functional requirements.

The Integrator will be responsible for ensuring that the user interface through the GTMS/TMS Web PortalGTMS/TMS Web Portal, and the other components of the GTMS, are integrated into a single seamless solution. The GTU staff and the GT Operators should not be aware that multiple components are in use to create the total solution. In order to support this integrated solution, the GTMS/TMS Web PortalGTMS/TMS Web Portal will be the presentation layer, providing all user interface on a day to day basis. The GTMS Application will be the application layer, providing all of the calculations, data collection, report generation, and the primary integration with external systems. The GTMS File Server shall act as the file storage for all documents uploaded from GT Operators as well as files that may be loaded into the system by Landside/GTU staff. This File Server shall have a large file storage capacity, as it will also be the location that the current system documents, both electronic and current hard copy, will be stored in the GTMS.

The GTMS File Server will also provide the workflow process to allow completed packets of data and uploaded files to be routed internally to SFO for approval. The approval process will be tracked by the GTMS File Server, and will store results of the routing process, along with the packets which were routed.

The GTMS File Server shall be fully integrated with the GTMS system, and shall have documents uploaded to it from the GTMS/TMS Web PortalGTMS/TMS Web Portal, and the GTMS Application. The GTMS File Server shall be robust, and provide a fully redundant data store to reduce the risk of data loss if this critical part of the system should become unavailable. It is expected that a high-availability system will be supplied to support the GTMS File Server.

4.2 GTMS RFID INFRASTRUCTURE

The GTMS system shall provide roadway hardware for all locations provided in Attachment 3. The GTMS system will replace the existing roadway locations, the existing GTU garage location, and provide new hardware for all additional locations. It will be up to Transcore to determine if any of the existing equipment identified in this spec can be reused in the new system. It is important to note that the GTMS will be required to co-exist with the Title 21 frequency range, and that the system shall be tuned to ensure that there is no interference between the GTMS, Fastrack, and the AirTrain.

The existing locations will require careful planning and coordination with multiple SFO Divisions. The installation of the new system will most likely require a parallel installation with the existing system in operation while the transition, described below, occurs from the old system to the new system. The existing locations are identified in Attachment 3 and are generally used to track the inbound traffic to capture trip details for commercial vehicles.

New locations include the outbound lanes of traffic as well as ensuring that the choke-points into and out of the airport are covered with reader/antennae to capture all traffic, capture data to be used for calculating dwell time, and other reporting and tracking features. The new locations also

include better coverage and tracking of the taxi cabs, through the taxi hold lot, as well as the stations where the taxis pay their trip fees. It should be noted that the current AVI system processes trip details for invoicing for the limousines, door-to-door, and shuttle vehicles, while the taxi cabs use a smart card system to make their trip fee payments at the time of service. Many of the new locations will be established to support the integration of data between the GTMS and the TMS.

All new locations will require new enclosures, conduit, cabling, fiber, and may require construction to install the conduit in-ground. It is the intent of this project to use the Airport's existing campus network, and therefore it will be necessary to install connectivity from the roadway enclosures to the nearest SSR.

All construction and infrastructure work that is part of the GTMS design will be performed as part of a separate RFP. The successful Construction and Infrastructure Contractor shall be responsible for coordinating with the appropriate Airport Divisions for all construction activity, and shall coordinate any roadway work through the Airport Duty Manager's Office. Installation and any construction must be done in a manner that does not impact the day-to-day operations of SFO.

4.2.1 Interoperability

The current AVI system allows interoperability between SFO, SJC, and OAK airports because all three airports are using the same RFID technology. Each airport issues their own RFID transponders, and each airport registers the other airport's valid RFID transponders in their respective systems. Once these transponders are registered, the RFID technology at each airport reads the transponders and creates trip details for those transponders. This functionality is of high importance to SFO. The GTMS will be designed to support existing and future interoperability.

Interoperability enables the Bay Area airports to support GT Operators who provide transportation services to all three airports. Through this process, a GT Operator can register their vehicle with one of the three airports, receive a transponder, and have those transponders record trip details at all three airports, once it is registered in the other airport's systems.

4.3 GTMS APPLICATION FUNCTIONAL REQUIREMENTS

The following is a list of requirements for the GTMS Application. TransCore shall be responsible to provide the capabilities described herein.

The GTMS Application Shall:

1. Interface with the GTMS/TMS Web Portal to provide all data necessary to display to GT Operators and Landside/GTU staff.
2. Submit monthly trip details to the PMBS system for invoicing.
3. Store and provide all data necessary to create reports.
4. Manage transponder inventories.
5. Identify transponders as active (assigned to a vehicle) or inactive (not assigned to a vehicle)
6. Associate transponders to vehicles.

7. Record all trip details in the GTMS Application.
8. Ensure that all trip details are associated to the correct transponder.
9. Send alert notifications when SNMP notifications are received.
10. Allow the recipient of system notifications to be configurable.
11. Send notifications to GT Operators via email.
12. Store all notifications in a database table so that they are able to be retrieve through the GTMS/TMS Web Portal.
13. Manage and maintain all vehicle data.
14. Manage and maintain all driver data; provide the capability to collect GT operator driver data for the purpose of issuing ID badges for use at the airport.
15. Obtain all agreement and company data from the PMBS.
16. Collect all data from the antennae/readers and store that data in a relational database.
17. Store all fee values to be used for calculations.
18. Provide a user interface which will allow GTU clerks to manually enter in all data which can be entered in through the GTMS/TMS Web Portal.
19. Store trip fee amounts for each Operator type.
20. Perform all calculations necessary to provide the amount owed by a GT Operator. This will include fees, fines, trip fees, and any other administrative fees owed by the operator.
21. Record and store: fees, fines, trip fees, and any other administrative fees by multiple categories. Include, but not be limited to: GT Operator, vehicle, and driver specific charges.
22. Provide a user interface for the Landside/GTU staff in the event that the GTMS/TMS Web Portal is unavailable for their use.
23. Sort, analyze and process all data required for reporting.
24. Maintain and store all insurance coverage amounts based on operator license type, vehicle, and fleet type.
25. Ensure that each GT Operator has the proper amount of insurance coverage, based on the operator license type, vehicle, and fleet type.
26. Have a robust calendar feature which can manage the scheduling of inspections, and other events.
27. Have a calendar that will allow Landside/GTU staff to create enrollment blocks for renewal periods.
28. Manage the enrollment blocks based on the criteria defined by the Landside/GTU staff.
29. Provide all data in real-time to all systems to ensure that there is no data integrity loss.
30. Track and manage all charges and payments.
31. Create a data record for charges and payments once a payment has been applied.

32. Provide database views for use in integrating with external systems.
33. Integrate with a magnetic stripe reader and shall be designed to retrieve data from standard magnetic stripes.
34. Place data retrieved from magnetic stripes in the correct data fields.
35. Be able to search database records using data entered into the application by a magnetic swipe reader.
36. Be PCI-DSS compliant.
37. Interface with a point of sale device to enable the processing of credit card transactions.
38. Allow data to be entered into the system manually, as well as through other data input methods, such as magnetic stripe readers.
39. Manage all inspection data.
40. Provide data to the wireless hand-held device.
41. Accept data entered into forms and applications which are loaded on the hand-held devices and enter that data into the correct data fields in the application.
42. Support all inspection forms and fields.
43. Print inspection results based on the data provided on the handhelds.
44. Validate all data entered into the system.
45. Collect, manage, store, and present all data required for the GTMS/TMS Web Portal.
46. Provide additional data fields which can be assigned and configured as required.
47. Support, at a minimum 99 additional configurable data fields.
48. Provide a user interface for traffic counting.
49. The traffic counting system shall count all vehicles which pass by the GTMS antenna locations.
50. Provide a report to summarize all traffic count data.
51. Provide a user interface to allow integration of the GTMS and the TMS
52. Comply with SFO evolving application and user authentication security standards (e.g., LDAP).
53. Include necessary operating software, hardware, and equipment to properly interface with:
    a. Workstations
    b. System server and the network server,
    c. Reader equipment,
    d. Accounting system,
    e. Taxi Smart Card System
54. Have the minimum accuracies as defined: 99.999% Fee and revenue calculation accuracy

55. Have the minimum accuracies as defined: 99.999% Vehicle trip activity counts (per-lane basis)
56. Have the minimum accuracies as defined: 99.999% System time synchronization
57. Calculate all fees, as required, for various process flows.
58. Provide an API to facilitate integration with future software applications.
59. Provide a high-level overview on how the new GTMS will not interfere with the BATA toll system. For information on the BATA toll system, please contact: Beth Zelinski, Bay Area Toll Authority 101 8th Street Oakland, CA 94607 bzelinski@mtc.ca.gov
60. Operate 24 hours per day, 7 days a week, 365 days per year with a system up-time of 99.999%.

5. GTMS/TMS WEB PORTAL REQUIREMENTS

The GTMS/TMS Web Portal will be the presentation layer of the overall system. The GTMS/TMS Web Portal will be the key solution in automating the business processes of the GTU. TransCore shall provide a GTMS/TMS Web Portal which will allow GT Operators to access their accounts for creation, maintenance, data entry, and license renewals. The web portal will also allow Landside/GTU staff access to the GTMS. Additional features of the web portal will include the ability to have approved driver lists managed by individual companies, as well as the ability to ID badge all permitted ground transportation drivers.

The web interface shall maintain a separate user interface for clients external to SFO, e.g. GT Operators, and clients internal to SFO, e.g. Landside/GTU staff.

The GTU Clerks user interface shall allow the rules to be configurable by the GTU staff, and shall not require a system administrator to modify system rules.

The proposed solution shall support different processes for each type of GT Operator, including but not limited to:

a. Limousine,
b. Taxi,
c. Door to Door
d. Shuttle Operator,
e. Courtesy Vehicle.

The GTMS shall allow GTU staff to confirm the number of seats in a GT Operator's fleet. The proposed solution shall automatically check the number of seats of the largest vehicle in a GT Operator's fleet:

a. 8 seats and under including driver
b. 9 seats up to 15including driver
c. 16 or more seats

5.1 GTMS/TMS WEB PORTAL FUNCTIONS

The GTMS/TMS Web Portal will be the presentation layer of the overall system. The GTMS/TMS Web Portal will be the key solution in automating the business processes of the GTU. TransCore shall provide at CDR a complete and detailed description of the web portal as part of CDRL 63 "Web Portal Design."

5.1.1 Process Summary

The processes which are to be automated through this system include (See Exhibit C for process flow maps of the following processes):

1. Tenant Company Administration
    a. New Operator Permit Packet Submit
    b. New Operator Permit Approval
    c. Annual Registration
    d. Terminate Operator
    e. Bonds and Deposits
    f. Insurance Tracking
    g. Trusted Broker Process
    h. Involuntary Suspension Process
    i. The ability to provide driver information in order for the Airport to ID badge all GT Operator drivers
2. Tenant Vehicle Administration
    a. New Operator Schedule Appointment
    b. New Operator Vehicle Safety Check
    c. Add Limousine Van
    d. Add Limousine
    e. Add Vehicle (non-Limousine)
    f. Delete Vehicle
    g. Replace/Add Door-to-Door
3. Transponder Administration
    a. Transponder Inventory
    b. Transponder Recycle
4. Roadside Administration
    a. Trip Reporting
    b. RFID Equipment Monitoring
    c. Trip Auditing

d. Curbside Coordination

e. Permit Enforcement

5. Monthly Billing

    a. Fee Processing

    b. Trip Fee Payment Process

    c. Admin Fines Receipt

    d. Monthly Billing

    e. Credit/Debit

    f. Fee Calculator

The planned solution shall allow the GT Operator to create their own account on the GTMS/TMS Web Portal, fill in forms to provide required data for the permitting process, upload files and policies, and perform many of the tasks required for the permitting, renewal, and maintenance of their accounts via the web portal. The goal is to reduce the amount of Landside/GTU staff time required to support activities that could otherwise be performed by the GT Operator themselves.

The GTMS/TMS Web Portal will be the main service point for GT Operators, and will allow them to

a. Gain access to their account information

b. Manage their fleet of vehicles in operation at SFO

c. Preview their monthly charges and any outstanding administrative fees and/or fines

d. Schedule inspections

e. Perform other company and vehicle related transactions as necessary

f. View and complete an online orientation.

g. The ability to manage and provide to the airport an approved driver list with all of the requisite information such that the Airport will be able to ID badge all GT Operator drivers.

The GTMS shall, at a minimum, but not be limited to, validate the following data:

1. Copy of The Charter Party (TCP) or Passenger Stage Certificate (PSC) issued by the California Public Utilities Commission or Interstate Commerce Certificate for out of state operators.

2. ACORD Certificate of Insurance. Comprehensive Automobile Liability insurance coverage as follows:

    a. $750,000for vehicle capacity of 8 passengers or less(including driver)

    b. $1,500,000 for vehicle capacity of 9-15 passengers (including driver)

c. $5,000,000 for vehicle capacity of 16 passengers or more (including driver) Include fleet schedule of insured vehicles. Comprehensive General Liability in the amount of $1,000,000 (required for vehicles without Livery Plates).

3. San Francisco International Airport Required Insurance Endorsement naming the City and County of San Francisco as additional insured.
4. Worker's Compensation Insurance Certificate to the statutory limit (CA) $1,000,000 or a Workers Compensation Exemption Declaration form listing SFO as certificate holder.
5. Copy of Department of Motor Vehicles issued valid commercial registration with Livery plates or copy of the red Temporary Registration, Suspense Registration with TCP number, and a copy of Livery Authorization Letter from CPUC (only for Limousine/ luxury SUVs).
6. Department of Motor Vehicle issued valid commercial registration (for non-limousine).
7. If Corporation or LLC: submit copy of Articles of Incorporation / Articles of Organization, including the Statement of Information that lists all corporate officers/members.
8. Copy of Driver's License of all individuals listed on the Statement of Information.
9. Copy of Driver's Licenses of all names listed on the TCP.
10. California Highway Patrol (CHP) Terminal Inspection Report required for vehicles with 11 or more seating capacity (valid 13 months from date of issue) or similar report for out of state operators. Out of state operators must maintain a satisfactory rating in the Company Safety Profile (SAFER).
11. Vans and buses: Submit color photographs to show the color scheme (of the front, side and back displaying the following permanent markings: Company Name on both sides of vehicle Telephone Number on both sides of vehicle TCP/PSC Number needs to be on: VAN (front and back bumper) and BUS (on both sides) Company Vehicle Number on both sides and back of vehicle Vans operating with PSC require "CHARTER" on both sides of vehicle if used for charter service
12. The GTMS GT Operator web portal shall allow for photographs to be submitted online (uploaded through the web portal), via email, or physically delivered to the GTU offices.
13. If vehicles are painted different color schemes, submit request for waiver from common color scheme form.
14. Scheduled Operations require a schedule describing area of service, rates, destinations, and trip frequency.

5.1.2 GTMS/TMS Web Portal – GT Operators

The GT Operators will be able to access the GTMS/TMS Web Portal from computers external to the SFO core network. Through this access, the GT Operator will be able to request that an

account be created for self-service of the GTU processes. Once this account is created, the GT Operator will be able to enter in company, vehicle, driver, insurance, bonding, and other data for processing by the system. Through the account creation and data entry process, the GTMS/TMS Web Portal will take the GT Operator step by step through the various processes of requesting an operating permit, renewing an operating permit, adding, removing or modifying vehicles, and other business processes which affect their operating certificate at the airport. The GT Operator will also be able to retrieve activity accounts, such as the last months invoice, current trip charges to date, and other critical reports that will enable them to manage their fleet and vehicle activity on the Airport. The GTMS/TMS Web Portal will validate data entered to ensure that it is accurate, and meets the list of data fields. The following is a summary of the business processes which the GT Operator will use to interact with the GTMS/TMS Web Portal. Process flow diagrams can be found in Exhibit C.

5.1.2.1 New Operator Packet Submit –

The GT Operator will register with the GTMS/TMS Web Portal and create an account. Before being able to proceed through the submission process, the GT Operator will be required to view an on-line version of the GTU Orientation. Once the Orientation is completed, the GT Operator will be able to complete and submit the New Operator Packet, with the system validating the data that is entered and uploaded to ensure that as few data entry errors exist as possible. Any files which are uploaded by the GT Operator will be stored in the GTMS File Server for use and approval by the GTU staff. The system will identify any missing data, files, or forms, and step the GT Operator through the process of providing that data. Once the packet is routed and approved internal to the Airport, the system will notify the GT Operator to schedule an appointment.

5.1.2.2 New Operator Schedule an Appointment –

When the GT Operator receives notice that their packet has been approved, the GT Operator will be able to log into the GTMS/TMS Web Portal and see a calendar that will identify the limited number of days that they can schedule an appointment. Through the scheduling process, the system will identify if the GT Operator has missed any scheduled appointments, has any fines or administrative fees due, and will ensure that these fees and fines are collected before allowing the GT Operator to schedule their appointment. Once the appointment is scheduled, the time slot will be filled, and no other appointments will be able to be scheduled for that time slot. When the GT Operator arrives at the GTU office, they will be able to present their driver's license to the GTU Clerk, and any additional data will be entered into the system, and the inspection process will be completed.

5.1.2.3 Annual Registration –

During the annual registration process, the GT Operator will be notified that their registration is due for renewal. They will be given a window of time when to respond for the renewal process, and will be instructed through the GTMS/TMS Web Portal on any particular process requirements, fees due, or documents required before renewal inspections will be conducted. The GT Operator may submit all required documentation for renewals via the GT Operator web portal

5.1.2.4 Add Vehicles –

At any time, a GT Operator may wish to add a vehicle to their fleet operating at the Airport.

Depending on the type of service that the GT Operator is allowed to provide at the Airport, and the types of vehicles that are in their fleet, there are several business processes that are followed. All of these processes require the GT Operator to provide specific vehicle information, pay fees and fines, and schedule appointments once their packet is approved by the Airport. For Limousine Vans, an additional approval of the appearance of the vehicle is required, and photos of the vehicle must be provided (uploaded/scanned) to the Airport prior to approval of the packet. In the case of shared ride shuttles, there is a limited number of vehicles that they are allowed to have in their fleet. If the add request exceeds that limit, and Landside does not approve increasing the limit, then the shared ride shuttle operator must submit a delete vehicle request prior to adding a new vehicle to their fleet. The GTMS shall verify that a vehicle does not already exist on another account, when it is requested to be added to a GT Operator's account. The GTMS shall also provide a history for the GT Operator to identify vehicles already in existence on their account. The GTMS shall ensure that no fees are owed for a vehicle or for the GT Operator's account in general, prior to allowing the vehicle to be added to a new account.

5.1.2.5 Inspections –

The web portal shall provide a calendar function which will allow GT Operator's to schedule their inspections online. GT Operator's shall have the ability to view the available inspection dates, and the ability to cancel their inspection via the web 24 hours prior to the scheduled time. The web portal shall not assess the GT Operator a missed inspection fee if the GT Operator cancels their inspection prior to 24 hours before the scheduled inspection time. The GTU shall have the ability to acknowledge in the system that they verified all documentation that the GT Operator brings in at the time of their inspection to ensure that it is the same as the data entered into the GT Operator web portal. This includes, but is not limited to:

1. Driver's licenses
2. Proof of insurance
3. Other necessary documentation.

The GT Operator user interface shall allow them to submit payment for fees online. The GT Operator user interface shall not allow a GT Operator to reschedule their inspection if they owe missed inspection fees, or any other fees. If a vehicle fails inspection, the GTU clerk or the GTU Mechanic's web portal shall allow them to flag the vehicle record in the GTMS Application so that the vehicle will not be able to operate at SFO until the inspection is completed. The GT Operator shall be able to reschedule their inspection at the time of failure, or via the GTMS GT Operator user interface

5.1.2.6 Delete Vehicles –

In addition to adding vehicles to their fleet, GT Operator can also remove, or delete vehicles from their active fleet at the Airport. Through this process, the GT Operator uses the Web Portal to submit a delete request, and is notified that they must return the decals and transponders to the Airport. Once the process is completed, the vehicle is removed from their fleet. The GTMS shall require the GTU clerk to approve the data entered for the deletion of a vehicle from a GT Operator's account.

5.1.2.7 Voluntary Terminate Operator –

Should a GT Operator wish to stop providing service at SFO, they can request to have their operator's permit terminated. In this case, the Operator can submit the necessary information via the Web Portal, and receive a check-list of items that must be returned to the Airport for final refunds and reimbursements.

5.1.2.8 Fee Calculator –

During any of the processes that the GT Operator might use the GTMS/TMS Web Portal for, there is always a fee calculator which calculates fees owed by the GT Operator. These fees include any administrative fines or fees, any trip fees that are owed, or any bonds or other payments that are required before a process is completed.

5.1.2.9 Trusted Broker –

The Trusted Broker module will allow the GT Operator to enter in their insurance broker information, and then verify it against the list of trusted brokers. If the insurance broker that the GT Operator enters is on the list of trusted brokers, then the system will acknowledge that the data entered is valid, and the broker is notified that the GT Operator selected them for their insurance broker. Otherwise, the system will identify that the insurance broker is not in the trusted broker program, and the GT Operator will be given options of how to proceed next.

5.1.2.10 Account Set-up –

The web portal shall allow the GT Operator to start the application process and complete it through multiple sessions. Once it is complete it will be available for processing by the GTU. The GTU clerk shall be able to receive all application data and uploaded files via web portal access. The GTU clerk shall be able to review all submitted data, and communicate back to the GT Operator via email if any submitted data needs to be corrected or updated. The GTU user interface shall provide a module to allow the GTU clerk to electronically route the application packet for approval within SFO, once all data is submitted and validated.

The GTMS/TMS Web Portal shall support email and account posting communications between the GT Operator and SFO staff in order to complete the application and approval process.

5.1.3 GTMS/TMS Web Portal – Landside/GTU Staff

The GTMS/TMS Web Portal will also provide the user interface for the Landside/GTU staff. This tool will allow the Landside/GTU staff to manage all tasks required for the daily operations of the GTU offices. In addition to the GTU clerk's activities, the GTMS/TMS Web Portal will allow the GTU Mechanic to manage the inspection process and to record the results of inspections into the system.

5.1.3.1 New Operator Permit Approval –

The GTU staff will access the data entered in by the GT Operator, as well as the files uploaded to the GTMS File Server through the GTMS/TMS Web Portal. The GTU staff will be able to verify that the data entered and the files uploaded are accurate, and if there is any additional information required from the GT Operator. If additional information is needed, then the GT Operator will be contacted through the GTMS/TMS Web Portal and notified of the information that needs to be provided in order for their packet to be completed. The GTMS/TMS Web Portal will provide a workflow to allow the packet to be routed and approved internal to the Airport.

Once this workflow is completed, the GT Operator will be contacted by the system to proceed with scheduling their appointment.

5.1.3.2 New Operator – Vehicle Safety Check –

When a GT Operator has scheduled an appointment, one of the activities that may occur, depending on the type of vehicle, is a safety check. Through the GTMS/TMS Web Portal, the GT Operator and the GTU clerk have scheduled an appointment, entered in any data required, and notified the GTU mechanic that an inspection is to occur. The GTU mechanic will utilize the handheld devices to record the inspection results, and will upload those results to the GTMS Application. The GTU Clerk and the GT Operator will be able to gain access to this information via the GTMS/TMS Web Portal.

5.1.3.3 Annual Renewal/Registration –

The Annual Registration process shall utilize the GTMS/TMS Web Portal to send notifications to the GT Operators of their annual renewal time. The GTU clerk shall have the ability to use the GTMS/TMS Web Portal to issue these notices, as well as to modify any administrative fees, bond requirements, and to review the packet information submitted through the annual registration process. Notices shall be emailed to GT Operator's, as well as made available on the login screen of the GT Operator's web portal. The GTMS shall automatically assess a fee if the GT Operator submits their renewal packet outside of the renewal time window. All fees shall have the ability to be overridden by a GTU staff with the proper authorization. The GTU shall be able to provide a block of dates for each GT Operator for renewal of their permits. The GTMS shall use the same review process for inspection renewal as is used for new application.

5.1.3.4 Inspections –

The GTU clerk or the GTU Mechanic's web portal shall allow them to enter in a value for a missed inspection fee. While this fee is a fixed amount and is not up to the discretion of the GTU clerk or GTU Mechanic, it is up to their discretion whether or not to assess the fee. The GTU user interface shall provide the ability to add the missed inspection fee to the other fees owed by the GT Operator. The GT Operator user interface shall allow them to submit payment for fees online.

The GTU shall have the ability to acknowledge in the system that they verified all documentation that the GT Operator brings in at the time of their inspection to ensure that it is the same as the data entered into the GT Operator web portal. The GTU web portal shall allow the GTU to reject a GT Operator at inspection time due to improper, inaccurate, or incomplete documentation. GTU staff shall have the ability to enter a reason for a missed or rejected inspection. The reasons for a missed or rejected inspection shall be contained in a dropdown list. A field designated "other" shall be available to support reasons not contained in the predefined list

The GTU or the GTU Mechanic's web portal shall be equipped with a magnetic stripe reader capable of reading driver's license magnetic stripes and having that data entered into the system in the appropriate fields. The GTU user interface shall use the magnetic stripe information from the driver's license to query the record for inspection, and associated documents, fees, and other information for the account. The GTMS shall allow for the magnetic stripe reader to be used for multiple business processes.

The GTMS shall support multiple inspection processes based on vehicle type. For example,

Limousines follow a different inspection process than door to door shuttles. The GTMS shall provide hand-held (see hand-held requirements) devices which the GTU Mechanics will use to enter in inspection observations and data. If a vehicle fails inspection, the GTU clerk or the GTU Mechanic's web portal shall allow them to flag the vehicle record in the GTMS Application so that the vehicle will not be able to operate at SFO until the inspection is completed.

The GTU Clerks/Mechanic's web portal shall provide a field to identify if the reason for the failed inspection is safety related, and a check box to denote whether or not to enter in if a re-inspection fee is required due to a failed inspection

5.1.3.5 Transponder Inventory –

The GTU staff shall have the ability to manage the transponder inventory via the GTMS/TMS Web Portal. While the actual inventory process will be dependent on the final solution, the GTU staff will use the GTMS/TMS Web Portal to manage that process.

5.1.3.6 Transponder Recycle –

This process is also dependent on the final solution provided by Transcore. However, if the transponders are designed such that they can be reused on other vehicles, then the GTMS/TMS Web Portal shall provide a feature to manage the recycling, and reassigning of transponders to other vehicles.

5.1.3.7 Involuntary Suspension Process –

The GTU staff shall have the ability to suspend a GT Operators permit. The GTMS/TMS Web Portal shall allow the GTU staff the ability to make the GT Operator's transponders inactive in the system. Once this action occurs, the GTMS/TMS Web Portal will provide notice to the GT Operator of the involuntary suspension, and any actions that must be completed in order to reactivate their permit and transponders.

6. GTMS FUNCTIONAL & TECHNICAL REQUIREMENTS

6.1 FRAUD MANAGEMENT

TransCore shall provide systems necessary for fraud prevention and detection. This shall be accomplished by, but, not limited to:

1. Providing regular fraud management reports.
2. Providing procedures to detect and/or avoid any inappropriate or fraudulent use of the system. Possible solutions can include software products which look for anomalous transaction patterns such as:
    a. Inconsistent card use patterns
    b. Frequency and usage inconsistencies
    c. More than one card with same serial number.

6.2 FINANCIAL MANAGEMENT

TransCore shall provide systems necessary for the financial management of revenues accrued through operations and for direct operating expenses related to the generation of revenue, including:

1. Credit and debit card payment authorizations and settlement
2. Funds management services to receive, hold, manage, audit, and disperse, payments received through networks as settlement for credit and debit transactions
3. Merchant of record for certain credit and debit card fee payment transactions and the merchant banking relationship to support this activity
4. All financial management practices shall be per the direction of or shall be approved by SFO.

6.3 SYSTEM INTERFACES

6.3.1 Interface Management

TransCore shall provide a database for SFO to maintain all system interfaces and end points, and for each of the following functions:

1. Security:
   a. Maintain valid user IDs and passwords
   b. Validate all system logon and usage activity
   c. Maintain encryption keys necessary for transmission and decryption of secured data
   d. Maintain transaction privileges valid for each end point
   e. Manage SFO access to personal or sensitive information
   f. Develop recovery plan in the event of a security breach.
2. Transaction validation: Assure all transactions originate from a recognized end point, using a recognized and valid card with privileges appropriate to perform that transaction type.
3. Transaction logging: Provide a complete transaction history for each endpoint, suitable for ad hoc inquiry.
4. Interface protocols: Maintain table of interface management information including interface frequencies, communications management (which partner initiates communications), date and times for expected batch transmissions, contact points, and communications protocols.
5. Software management: Maintain "load images" of application data suitable for download to update TransCore provided software in transaction devices and other interface points. Maintain complete download history and current release of software.
6. Transaction batch management:

a. Maintain information on last 'n' transaction batches received from each end point and provide processing algorithms to assure all available transactions are received on a twenty four hour cycle.

b. Provide capabilities to detect duplicate or incorrect batches and provide error-handling procedures.

6.3.2 Interface with Third Party Payment Providers

TransCore shall develop an interface specification, including APIs, to accept payment transactions from third party payment providers. The interface specification shall become the property of SFO. SFO may then freely distribute the interface specification to third parties as required.

The Central System shall be able to import transaction data from third party mobile payment service providers for consolidated reporting. The format of transaction data shall be defined at PDR.

6.4 DATABASE MANAGEMENT

1. SFO will maintain the GTMS Application and Central System. Contractor provided systems shall enable SFO to perform all necessary database maintenance functions.
2. The Central System shall be capable of managing data access requirements, and the integration and linking of data elements so as to provide a seamless management view of all data resources.
3. TransCore shall provide at PDR a complete and detailed description of the transactional database as part of CDRL 54 – Transactional Database Design. This shall include but not be limited to the following:
    a. Database schema
    b. Database dictionary
    c. Description and source of data elements stored
    d. Description and source of data elements stored in the Central System database
    e. Description of amount of data storage available
    f. Description of any data compaction schemes
    g. Estimated time required for transmission of data to the Central System based on typical and maximum transaction activity
4. Logical collections of data to be managed by the system shall include at a minimum:
    a. End Point Database
    b. Transaction Batch Management Database
    c. Transactional Database
    d. Transaction Acquirer History Database
    e. Security and Access Control Database

f. Financial Settlements Database

g. Fee Table Database

h. Operational Parameters Database

i. Reports Archive

j. Customer Service Tracking and Management Database

k. Hot-listed Permit Holder Database

l. Charge-back Response Database.

5. TransCore shall provide the capability for the regular backup of all data, off site archiving, and disaster recovery. Data shall be maintained for a minimum of ninety (90) days before archiving.
6. TransCore shall provide via a secure extranet the capability to generate ad hoc reports and ad hoc queries of the above databases using Microsoft Internet Explorer web browsers or SFO-approved equivalent.

6.5 AUDIT

TransCore shall participate in an independent audit of the clearing system to validate accuracy of all systems processing, cash management, and settlement. The audit will be conducted in accordance with generally accepted auditing standards by an independent auditing firm selected by SFO.

For auditing purposes, the system shall track all transactions from conception to settlement. Each device shall maintain and communicate cumulative audit registers containing information such as the number of transactions conducted at the device, and total dollar value of loads and payments. The system shall also create and maintain an audit trail of accesses to the objects it protects. The audit mechanism shall permit the specific auditing of the actions of one or more users based on the individual's identity or security/administrative role. Audit data shall be protected so that read access to the data is limited to those subjects authorized for review of audit data. Furthermore:

1. Security-relevant events shall be accountable to the subjects responsible for their actions
2. Audit trail shall be protected from unauthorized access, modification, and destruction
3. System shall provide sufficient granularity to trace events to subjects responsible for initiating those events

6.6 PERFORMANCE REQUIREMENTS

TransCore provided system shall have the following capabilities

1. Revenue shall be reconciled and settled with 100% accuracy.
2. Daily reports shall be available by 8 a.m. Pacific time the next business day.
3. All transaction data shall be sent to the GTMS server in real time.
4. At a minimum, data shall be downloaded once every 24 hours, and field devices and computer systems shall be polled at least once every 24 hours.

6.7 GTMS APPLICATION HARDWARE SOFTWARE

TransCore shall provide all system components required to perform all GTMS server activities and functions. Required components include but are not limited to:

1. Computers
2. Image scanning workstations for storing applications and other documents
3. Network components (SFO supplied)
4. Communication lines (SFO supplied)
5. Network communications services (e.g., frame relay/ISDN, SFO supplied)
6. Printers
7. Credit card processing equipment
8. Operating system software
9. Layered software products
10. Application software for account management
11. Site preparation and installation design, including all necessary civil, electrical and mechanical drawings and construction packages

TransCore shall provide a detailed configuration plan (CDRL 10, " Central System Configuration Plan") for all system hardware and software, including component level lists, quantities descriptions, costs, and locations.

6.8 SYSTEM FEATURES

All systems developed by TransCore shall include but not be limited to the following features:

1. Menu-driven user-friendly system or graphical interface
2. Modular system design to allow for cost-effective and expeditious changes dictated by program changes as directed by SFO
3. Security measures, including such features as user passwords and network security
4. Ability for customer service representatives to type text notes on accounts to track various situations, such as credit and debit card activity
5. Audit trail for all database changes
6. Data redundancy (e.g. disk shadowing, mirroring)
7. Use of data validation techniques and file transmission verification techniques in all data communications between all locations to assure validity of all user programs and data
8. Storage of all data in a commercially available relational database that provides SQL for access
9. Inactivity time-outs in application software, both user defined and system defined

10. Reasonableness checks on the data received from SFO and on information provided to customers; recovery or investigation procedures shall be established for the cases when "unreasonableness" is indicated by such checks
11. Appropriate data connectivity and bandwidth for the Central System based on forecast data transaction frequency and volumes
12. Reports shall be available via a web server so that daily settlement reports are accessible via the internet

6.9 SYSTEM ADMINISTRATION

TransCore shall provide communications, procedures, and documentation so that SFO can operate all system hardware and software. These system operations can take place either at one of the specific facilities for the program, or at a separate data processing facility available to SFO. Data processing system operations must support 24 hours a day, seven days a week.

Monitoring and control of all GTMSE computer systems, from the GTMS server through and including all end devices, shall be via SNMP or current standard.

As part of system administration, the system shall provide for the following:

1. System monitoring and recovery
2. System and data security
3. Disaster Recovery (provided by SFO hardware and software)

6.9.1 System Monitoring And Recovery

TransCore shall provide procedures to report problems and implement recovery. TransCore shall provide a detailed system administration schematic, and a recovery and security plan. Both the schematic and the plan shall be included as part of the configuration management package for hardware and software.

TransCore shall provide procedures to facilitate rapid resolution of problems that might be related to SFO's end of system communications, including calling appropriate personnel in such situations.

TransCore shall provide procedures on when and how to retransmit/re-receive files when problems arise. All of the above procedures shall be included in CDRL 11, "Policies and Procedures Manual."

6.9.2 System And Data Security

TransCore shall provide for all aspects of system security, including data security.

TransCore shall describe how system communications, programs, and data will be protected, how access and other security arrangements will be monitored, and how it will protect customer data from unauthorized disclosure and use.

6.9.2.1 Communication Security

TransCore shall utilize tested and accepted communication methods and equipment (provided by SFO) to reduce the possibility of incompatibilities and errors in transmission. TransCore shall

provide a secure communication system to prevent fraud and unauthorized access to the communication system.

TransCore shall specify communication security measures, including transmission accuracy, error recovery, fraud prevention, unauthorized access, and data compression and encryption standards and the basis for selecting such sets of standards. TransCore shall describe the devices that will be used to monitor network communications to ensure the security and integrity of transactions.

6.9.2.2 Control for Internal and External System Access

Although SFO shall be responsible for controlling all system access (via Contractor provided procedures), the system design shall provide for user and system security. Users shall only have access or functions assigned to their assigned level of authority. Access to the system shall be controlled by individual user identification and password security. The system shall allow SFO to administer computer access accounts (log on identifications and passwords), access controls, network controls, maintain confidentiality of information, track security violations, provide local and remote access controls, and segregate functions within the Central System facilities. The system shall provide read-only access to the account management system for SFO staff at their respective facilities. No third-party shall have access to the system unless approved by SFO.

The system shall utilize access control software to provide ID and password protection for direct and remote access, call back for remote access, and violation and activity reporting capabilities. The internal security system shall monitor, based on the user's ID and password, what level of user programs, database files, and maintenance files are accessed. Appropriate security measures shall be built into the system to prevent unauthorized access and identify and track any instances in which access has been denied. In such an event, a message shall be generated and stored indicating the time, date, location, and the identification of the equipment, software, or file to which access was denied.

6.9.2.3 Protection Of Data

SFO owns all data collected and managed by the GTMS. TransCore may not release data to any other entity without SFO's prior written approval. Any and all information relating to the specific customers shall remain confidential and shall not be revealed (unless subpoenaed) or sold at any time.

6.9.2.4 System Redundancy and Back-up

TransCore shall supply a fully redundant system incorporating features such as dual processing, back-up communication lines, automatic backup procedures, error correction protocol, and additional removable storage media that will ensure data (transaction, account, revenue, deposit, and operation data, etc.) in the system is protected and retrievable in the event any error or condition corrupts or contaminates an active file. TransCore shall ensure that any system back-up process would not interfere with or compromise other GTMS server operations. Back-up, archiving, and disaster recovery shall be detailed in CDRL 12, "Data Backup and Disaster Recovery Plan."

The system shall monitor and report the frequency and duration of back-up utilization and provide an explanation for the interruption requiring the back-up system.

The system shall be provided redundancy or back-up connections between all network connections among GTMS devices and with SFO; and all communication lines. TransCore shall demonstrate these required redundancies or back-up capabilities as part of system development and testing prior to start-up and perform periodic tests thereafter (e.g., every three months).

6.10 POLICIES AND PROCEDURES

TransCore shall provide a "Policies and Procedures Manual," CDRL 11.

The Policies and Procedures Manual shall at a minimum include policies and procedures required to perform each and every activity described by the Specification for the GTMS server. The manual should include functional level flow diagrams to describe all system processing of data in each area.

6.11 REPORTING REQUIREMENTS

This section details the GTMS Application reports that the system shall be required to design and provide to SFO. In addition to the reports described in this section, the GTMS Application shall meet all the reporting requirements specified for the GTMS/TMS Web Portal. The GTMS shall make all reports available over the internet.

TransCore shall submit a final design/format for all reports, both financial and non-financial, to SFO for approval (CDRL 13, "GTMS Central System Report Formats"). In general the reporting requirements are:

a. Search, view and print of real-time data

b. Canned reports generated by the application

c. Up to 20 reports designed to SFO's specifications.

The GTMS shall provide similar reporting capabilities as currently exist in the Airport's AVI-GTIS systems.

6.12 REPORTS – FUNCTIONAL & TECHNICAL

1. Vehicle Reads by Location Report content:

    a. Detailed trip reads by day, location, time, for a specified reader location, or all.

2. Company Trip Summary by Location and Hour Report content:

    a. Summary of all trips by a specified company, or all, by location, date and time.

    b. Total reads by company

3. Company and Vehicle Revenue Trips Summary by period Report content:

    a. Revenue trips made by each vehicle linked to a specified company, or all, by date and time.

    b. Total reads by company

4. Company Vehicle Reads Detail by Day Report content:

a. Daily trip details for each vehicle linked to a specified company, or all, for a specified date. Total reads for each vehicle

b. Total reads by company

5. Company and Vehicle Revenue Trips by Day per Date Range Report content:

   a. Trip details for each vehicle linked to a specified company, or all, for each day within the selected date range.

   b. Total reads for each company, for each day in the date range.

6. Detailed Revenue and Non-Revenue Trips Report content:

   a. Trip details for each day in the selected date range – for a specified company or transponder number, or all. Total revenue & non revenue reads

7. Transponder Inventory Details Report content:

   a. List of all transponders in inventory, with totals by status (active, inactive, damaged, available, etc.), for a specific number range or all.

8. Loop Count Report, Report content:

   a. Trip counts for all vehicles, grouped by 15-minute intervals, for specified loop location, or all, for a specified time period.

9. Transponder Count at Loops Report content:

   a. Transponder vehicle counts grouped by 15-minute intervals, for specified loop location, or all, for a specified time period

10. Transponder Tracking Detail report, Report content:

    a. Transponder assignment history (previous vehicle assignments, etc.) for a single transponder or all

11. Tenant Revenue Trip Statistics Report content:

    a. Trip counts for a selected company, or all, for selected date range, with option to show valid or violation trips

12. Invalid Transponder Summary Report content:

    a. List of all invalidated transponders in inventory and associated information

13. Unregistered Transponders Report content:

    a. Trip details for all unregistered transponders detected by SFO readers, for a specified date range, or location.

14. Non-SFO Transponders

    a. Trip details for transponders detected by SFO readers, with an assigned source (OAK, SJO, etc.)

15. Device Failure Report, Report content:

a. Device failure messages for a selected readers or antennas, or all, for specified date range

16. Deleted Vehicles Report, Report content:

a. Vehicle data for those that were deleted from the system, within a selected date range.

17. 12 Month Trip Count Report content:

a. Total trip count for a specified 12 month time period, for a selected company or all

18. Companies and Vehicles by Type, Report content:

a. Vehicle allocation by company and vehicle data for selected company type, or all

b. Number of active/inactive vehicles linked to company at any given time

19. Vehicle Exceptions Report, Report content:

a. Company and vehicle data (TBD) for selected exceptions, such as (replaced/returned transponders, lost/returned decal, no insurance, etc.)

20. Temporary Tags by Tenant, Report content:

a. Vehicle data for those with temporary license plates, for a specified company, or all

21. Vehicle Inspection Schedule Report, Report content:

a. List all scheduled inspections by date and time, for specified date range. List the company and vehicle ID assigned to each time slot.

22. Vehicle Inspection Results Form

a. Hard copy version of form that is on the hand-held device.

23. Upcoming Inspections Report, Report content:

a. List of all vehicles due for renewal in specified time period.

24. Deleted Vehicle Report, Report content:

a. Automatically generated report when a vehicle is deleted, showing all vehicle data

25. Customer Receipts, Report content:

a. For returned transponders and decals

b. For inspection results

c. Payments received

d. Envelope Labels

26. The GTMS will also support creation of various types of violation notices, to be sent to companies.

27. The GTMS will provide the ability to publish monthly vehicle activity details by company to the internet (Requirements TBD).
28. TransCore shall provide a list, description, and samples of all standard reports provided by their product.

6.13 GTMS NETWORK REQUIREMENTS

The GTMS Network Shall:

1. Operate on an Ethernet-based network, capable of transporting data over multiple modes of fiber and copper.
2. Be capable of operating in a Cisco network, as a logically separated VLAN.
3. Be capable of operating in a carrier-class MPLS network.
4. Use the existing SFO campus-wide LAN for network connectivity.
5. Provide additional GBICs, switches, routers, and other network electronics, if required, in order to provide the port capacity to support the GTMS solution.
6. Provide Network Gateway to support wireless hand-held connectivity to the Airport's LAN.
7. Provide Network Firewall to support wireless hand-held connectivity to the Airport's LAN.
8. Provide on-line access to the reader equipment to assist in remote system diagnostics. This on-line access shall allow, at a minimum:
    a. Monitoring of the system,
    b. Viewing and editing of the failure logs,
    c. Monitoring of the communications circuits
    d. Data traffic access to the operator interface,
    e. Monitoring of equipment status
9. Provide standard MIB formats so that any SNMP solution can read and interpret the messages submitted by the system.
10. Have network-addressable antenna controllers, which are capable of providing SNMP messages to the network monitoring system.
11. Provide status of the GTMS Antennas to the SNMP messaging system so that system maintainers can obtain the status of all devices in the GTMS network.
12. Provide users with real-time status of all of the equipment in the GTMS solution from a centralized device status screen.
13. Not provide antenna or reader status using only time-interval metrics, e.g., a transponder read has not occurred at a specific reader for a configured duration of time.
14. Manage readers/antennas by port connection, and shall not require a direct connection to the antenna/reader for software upgrades, or troubleshooting.

15. Allow for management of all network connected devices from any port associated with the GTMS VLAN.
16. Allow for remote restart of all devices connected to the GTMS VLAN. This remote restart shall require administrative login privileges.
17. Log all hardware related events for historical purposes, including event research.
18. Download the reader data transactions in real-time to the GTMS system server.
19. Be capable of expanding to support additional readers/antennas.
20. Assume that the system will double in size in the next 5 years.
21. Adhere to the San Francisco Airports Information Technology standards described in Appendix I.
22. Provide full administrative access and connectivity between GTMS Server and workstations.
23. Integrate the existing point of sale system that is currently in use in the GTU offices.
24. Provide network interface devices to support connectivity between field controller panel and Airport LAN

6.13.1 GTMS Network Integration

TransCore Shall:

1. Be responsible for ensuring that the SFO LAN has the capacity to support the GTMS solution.
2. Provide new equipment cabinet(s) for housing GTMS head end components in SSR.
3. Provide cut sheets for all equipment to be provided under this contract.
4. Receive written approval for all equipment provided under this contract prior to procurement of this equipment. If equipment is provided without approval, Transcore accepts all liability for the cost to replace equipment if it is not acceptable to SFO. The SFO Project Manager shall provide approval.
5. Provide all patch cables for intra-system connectivity and connectivity to the Airport's local area network (LAN)
6. Provide all interface devices required to support wireless hand-held connectivity to the GTMS Server using the Airport's LAN.
7. Provide Wireless Access Points to support wireless hand-held connectivity to the Airport's LAN.
8. Provide interface devices required to support any connectivity to the following Airport systems:
    a. PMBS
    b. Data Warehouse
    c. TMS/Taxi A-Card System

d. Point of Sale system

The GTMS shall obtain PMBS Company, agreement and provision information through read-only access to PMBS. This information will include, but not be limited to:

a. Company ID,
b. Number and Name
c. Agreement ID Number (multiple agreements per company)
d. Provision ID and Type

The GTMS solution shall:

1. Integrate in real-time PMBS company/agreement/provision data needed for GT operations.
2. Link vehicle and trip detail data to a PMBS company, by Company ID, Agreement ID /Number and Provision ID/ Type.
3. Display additional PMBS information. This data shall be read-only in the proposed solution and will include, but not be limited to:
    a. Company name
    b. Company type
    c. DBA name
    d. Contact name Address City State Zip Contact phone
    e. (s) Contact email Contact Fax#
    f. Company status
    g. Company Alternate ID (e.g., TCP Number)
4. Only maintain vehicle and driver level data.
5. Obtain all company level data from PMBS, and any additional company level data that is not included in the PMBS shall be maintained in the proposed solution in a fashion that allows it to be tied back to PMBS
6. Support the PMBS architecture in fulfilling the data sharing needs described in this section.
7. Be required to work with the PMBS vendor to design and implement the data interface process between the PMBS and GTMS.
8. Allow search, view and reporting on the company, agreement and provision data made available by PMBS through read-only views.
9. Create a monthly vehicle trip details table that will be accessible to PMBS through a read-only view; this will be loaded into the PMBS system for billing. This view will contain activity data summarized by vehicle, to include, but not limited to:
    a. Company ID
    b. Agreement ID

c. Provision ID

d. Provision Type

e. Vehicle VIN

f. Transponder number

10. Vehicle trip count
11. Billing period (YYYYMM or Date)
12. Billable flag (Y or N) (as needed for tracking non billable trip statistics in ABM)
13. Provide read-only views to expose data that that may be used by PMBS to address billing for fees and other miscellaneous finds. Such data includes, but shall not be limited to: Fee assessment data, administrative fine assessment data, and other activities that result in cash payment
14. Provide for efficiencies in creation of additional vehicle trip details as required for billing in PMBS per business rules e.g., automatically compute difference between actual and scheduled trips for creation of additional number of trips to be billed.
15. Integrate with PMBS to ensure continued billing for both GT trip activities and for fees and fines currently processed in PMBS via two distinct processes:
    a. Automated standard billing by Accounting
    b. Manual non-standard billing by GTU
16. Integrate with PMBS such a way as to have required access to the existing application and agreement through the PMBS security layer.
17. Have a read-only table view for the creation of non-standard billing records. This table shall be viewable by the PMBS system.
18. Create records in the non-standard billing table only when a payment is made.
19. Create a nonstandard billing record which consists of, at a minimum, the amount owed by the GT Operator, the amount paid by the GT Operator, and any data required to associate this record with the proper ledger records in PMBS.

6.14GTMS ACCESS

6.14.1 Management Access

TransCore is not required to supply physical computers to meet management access requirements. Management workstations shall support the functionality subsequently described for each configuration. The required functionality shall be provided via web interface. Local software applications shall not be permitted. User access rights for each configuration will be defined during design reviews.

6.14.2 System Administration Workstation

The system administration workstation shall have administrator-level access to all GTMS systems and components.

The workstation shall support reporting capabilities on all available GTMS data by utilizing the same reporting tools utilized at the GTMS application. Additionally, this workstation shall have access to all SFO-customizable features of the GTMS. User-adjustable business rules, device settings and diagnostics, system alerts, and system management functions shall all be available based on variable levels of user access rights.

6.14.3 Customer Service Workstation

Customer Service Workstation capability shall be available to any computer connected to the internet, and with the authorization to access permit holder data and transaction history.

6.14.4 Reports Workstation

The Reporting Workstation shall have the capability to access an online report generating tool. The online report generating tool shall allow authorized SFO staff or designated representatives to generate reports and sort data on any fields and/or records available in any data table of the GTMS. The ability to select fields and/or records shall be limited according to access rights as defined by SFO.

6.14.5 Training Workstation

The training workstation shall be used to train SFO and SFMTA personnel in the operation of the GTMS Server. The workstation shall be able to perform simulated tasks such as updates of cardholder information and assessment and resolution of disputes.

7. PROJECT REQUIREMENTS AND PRODUCT SUPPORT

7.1 PROJECT MANAGEMENT

TransCore shall ensure that this contract is effectively and efficiently managed to the mutual benefit of TransCore and SFO. Contractor shall employ as necessary the personnel, personnel hours, tools, and systems to manage and deliver the project. TransCore shall define with SFO staff the format and frequency of the project management deliverables, such as periodic reports and schedules, subject to SFO approval.

7.1.1 Project Management Scope

The project management scope shall enable SFO to ascertain with a high degree of confidence the status of execution of the contract. The system and processes employed shall be sufficiently detailed and inclusive to enable SFO to actively monitor project tasks. TransCore shall employ project management tools to assist with monitoring the project, subject to SFO approval.

7.1.2 Program Requirements

7.1.2.1 Project Manager

TransCore shall establish a Project Manager, subject to SFO approval, who shall be responsive to the needs of SFO as required by the contract. The Project Manager shall ensure that the project tasks are completed on time and within budget. The Project Manager shall coordinate design and engineering activities. The Project Manager shall keep SFO fully informed of the status of the project and shall promptly and regularly notify SFO of any problems or difficulties that may impact the timely or effective completion of the task, milestone, or project.

The Project Manager shall be responsible for support provided by personnel or groups outside the project team, during the period of performance for this Contract. The Project Manager shall have full authority to assign task priority as required to meet the requirements of the project.

The Project Manager shall be competent and fully qualified in all aspects of the Ground Transportation Management System, the project, and the contract. Removal or replacement of the Project Manager by TransCore shall only be with consent of SFO.

7.1.2.2 Project Management Program Plan (CDRL 15)

The objectives of the Project Management Program Plan (CDRL 15) shall be to familiarize SFO with Contractor's intended design and procurement activities, resolve external interfaces, and provide the basis for proceeding to PDR.

The CDR shall cover the following:

1. Outline of overall Project Management Program plan
2. Project Manager responsibility
3. Outline of Contractor organization structure
4. Outline of Contractor engineering organization
5. Outline of Contractor manufacturing organization

6. Preliminary program implementation plan
7. Preliminary installation organization, concepts and control
8. Schedule compliance review and discussion of variances or delays
9. Confirm Contractor's management team and the scope of for each subcontractor
10. Provide a functional block diagram of the system and equipment
11. Provide all items indicated in Exhibit A – Attachment CDRL 15 outline
12. Provide narrative descriptions of the major subsystems proposed by Contractor, including identification of components supplied by subcontractors for each equipment type
13. Provide preliminary device layouts
14. Identify all interfaces between the major subsystems, provide a schedule, and identify responsibilities for completion of detailed definition of the interfaces
15. Confirm that TransCore is familiar with the intended operations and maintenance environment
16. Provide outline and format of display messages
17. Provide physical dimensions of each equipment type
18. Identify power and other facility requirements for each equipment type
19. Identify information needs and decisions required from SFO

The Project Management Program plan shall be submitted and approved by SFO no later than 10 days after notice to proceed (CDRL 15, "Project Management Program Plan"). The plan shall be reviewed and modified as necessary during the execution of the contract. It shall be discussed and updated as required at PDR, and FDR.

7.1.2.3 Project Schedule

TransCore shall develop within five (5) days after the kick-off meeting a final schedule of all milestone and principal tasks coincident with the required schedules of design, approval, manufacture, delivery, installation, and implementation of the project. The project schedule shall include tasks assigned to TransCore and SFO, and shall take into account discussions at the kick-off meeting on the draft schedule previously submitted (CDRL 16, "Project Schedule"). The schedule shall be updated and submitted for approval at least monthly.

7.1.2.4 Submittals

TransCore shall establish as a part of the Project Management Program methods, procedures, and controls to identify, track, and record the status and completion of all required submittals. TransCore shall maintain the schedule and status of all required submittals, which shall minimally contain the following information:

1. CDRL number and suffixes
2. Brief title
3. Scheduled submittal
4. Actual submittal date and correspondence identification number

5. Action taken by SFO and correspondence identification number

All submittals under each CDRL shall be shown. The report shall be updated and submitted not less than every 30 days or as required upon SFO request. In the course of the project, additional submittals or action items may be identified as responsibility of TransCore and/or SFO. Contractor shall maintain a record of such submittals and action items and submit it to SFO monthly, showing the status of all submittals and action items, and persons/organizations responsible.

7.1.3 Project Meetings

TransCore shall participate in various project meetings throughout the performance of this contract as outlined in this section. Unless otherwise approved by SFO, all project meetings will be held on SFO property at locations made available and provided by SFO. TransCore will make every effort to cooperate in the scheduling of meetings and shall provide the required information for the following meetings in a timely manner:

1. Kick-off Meeting
2. Project Status Meetings
3. Design Review Meetings PDR, FDR)

7.1.3.1 Kick-off Meeting

A kick-off meeting will be scheduled and conducted by SFO within fifteen days after NTP. This conference will be conducted at SFO offices unless otherwise designated by SFO. The purpose of the conference is to introduce attendees, to establish lines of communication, and to ensure that TransCore understands requirements of the Contract. This conference will be chaired and conducted by SFO Project Manager. TransCore's Project Manager and key staff shall attend this meeting. Prior to the meeting TransCore shall provide the following with copies of supporting documentation:

1. A list of all Contractor attendees
2. Preliminary Project schedule
3. Project Management Plan
4. Acceptable bonds
5. Insurance certificates
6. A signed Contract Form

The agenda will include, but not be limited to, the following:

1. Introduction
2. Review of responsibilities
3. Review of organization and sub-contractors
4. Adequacy of distribution of Contract Documents
5. Questions concerning errors, ambiguities, and omissions in, and interpretations of specifications and drawings.

6. Documentation control procedures
7. Use of office, storage areas, construction areas, and temporary easements
8. Deliveries and priorities of major equipment
9. Safety, first-aid, emergency actions; and security
10. EEO and affirmative action requirements and community relations
11. Labor provisions
12. Insurance, laws, codes, traffic regulations, and regulations and permits
13. Sequence of critical work, and tentative schedule

7.1.3.2 Project Status Meetings

TransCore will participate in monthly Project Status (Progress) Meetings which may be scheduled or called as SFO deems necessary to ascertain that work is progressing within schedule and in accordance with requirements of the Contract. Progress meetings may be conducted via conference call at SFO's discretion. Attendees shall be representatives of TransCore and SFO as required to support the agenda.

A typical agenda of progress meetings shall include, but not be limited to:

1. Minutes of previous meeting
2. Questions and issues unresolved from the previous meetings
3. Review of work accomplished since previous meeting
4. Field observations, issues, and work quality
5. System and equipment design, manufacture or fabrication issues
6. Product delivery issues
7. Schedule changes, proposed changes, or anticipated changes
8. Other business

7.1.3.3 Implementation and Equipment Installation Meetings

TransCore will participate in Implementation and Equipment Installation Project Meetings which may be scheduled or called as SFO deems necessary to review project implementation and equipment installation tasks. It is anticipated that these meetings shall begin after FDR and will be scheduled as necessary to support implementation and installation task activities.

Attendees shall be representatives of TransCore and SFO as required to support the agenda. A typical agenda of Implementation Meetings shall include, but not be limited to:

1. Minutes of previous meeting
2. Questions and issues unresolved from the previous meetings
3. Review of tasks accomplished since previous meeting
4. Field observations and issues
5. Schedule changes, proposed changes, or anticipated changes

6. Other business

7.1.4 Status Reporting

The final format of a status report which aggregates the inputs from all parties shall be agreed between SFO and Contractor, immediately after award of the Contract. Contractor shall provide monthly status reports to SFO as part of required CDRL documentation. (CDRL 17, "Monthly Progress Report").

Contractor shall implement a separate problem tracking, resolution and reporting system. Issue tracking and resolution report logs shall be provided to SFO as part of CDRL documentation. (CDRL 17, "Monthly Progress Reports"). The degree of automation to be employed for this activity shall be agreed between SFO and Contractor, but regardless of the degree of automation, it shall perform the following functions at minimum:

1. The system shall assign numbers to issues as they are reported to enable accurate tracking.
2. Each issue shall be logged on the date reported.
3. The log shall be updated as the status of the issue changes, for example:
    a. Anticipated solution
    b. Date solution is to be provided
    c. Date solution was provided
    d. Date solution was tested
    e. Results of the test
    f. Acceptance of solution

Issues shall not be closed until the solution has been successfully tested and has been "signed-off" by the reporting entity and another responsible entity such as the Program Manager.

7.2 TRANSITION PLAN

TransCore shall develop a Transition Management Plan (TMP) CDRL 51. The purpose of the TMP is to identify those parts of the GTMS that are going to change and how the existing AVI will be migrated over to the new GTMS without negatively impacting ground transportation operations or causing a loss of revenue. At a minimum, the Transition Plan shall consist of the following sections:

1. Introduction
2. Transition Management Organization Structure
3. Schedule of replacement Activities
4. Stakeholders and Stakeholder Responsibilities
5. AVI Components to be Replaced
6. Operational Impacts
7. Inter- dependencies between Existing AVI Components and Replacement Components

8. Mitigation measures to Minimize Operation Disruptions
9. Transition Issues Resolution Process
10. Transition Management Final Acceptance Process

The first draft of the TMP shall be provided at the PDR. . The final draft of the TMP shall be provided at the FDR. The TMP is considered a living document, and shall be updated and reissued anytime there is a change in circumstances associated with the GTMS that impacts ground transportation operations or revenue.

7.2.1 Interim/Transition Automated Vehicle Identification (AVI) Solution

Tracking of all buses, shuttles, limousines and shared ride vans in the EXISTING SYSTEM is accomplished with AVI transponders manufactured by XCI, Inc., all of which will eventually be replaced by Transcore with ISO 18000-6c transponders. Because the Airport has a limited supply of XCI transponders and the parties recognize that some or all of the XCI transponders may fail before the work to be performed by Transcore under this Agreement is complete, temporary, replacement transponders may be required. In the event the City is unable to secure replacement XCI transponders prior to exhausting its supply of XCI transponders, the City may, at its sole discretion, purchase an alternate device from Contractor for use until such time as the ISO 18000-6c transponders are installed and accepted by the City, consistent with the terms of this Agreement.

The temporary, interim devices available for purchase from TransCore, along with tracking services, are called the ROVR™ System, or "Interim Solution." The Interim Solution consists of an in-vehicle GPS device that communicates via cellular modem to the system's network operation center where relevant location and event data is processed. TransCore's Interim Solution will compare vehicle location to map coordinates loaded into the device. The coordinates define a zone or zones and can be thought of as a virtual gantry or reader location to compare to an existing tag-based system. Once a vehicle enters the defined zone, the device records the event with a timestamp and transmits this event data to the Interim Solution network operations center where the information is processed and stored for later retrieval and reporting.

To discourage tampering, the device used by TransCore in providing an Interim Solution will be programmed to transmit a health status message, a message that confirms the proper functionality of an on board unit. This message will be transmitted 2-3 times a day to ensure the device is powered and operating correctly. The schedule for status updates these will be unknown to the driver. As an additional deterrent, disconnecting the unit will trigger a message to be transmitted once the unit has been reconnected to power.

The power will be supplied to the on board ROVR™ unit through a Y cable connected the vehicle on board diagnostic port (OBD 2 port). The Y cable will allow access to the OBD port for vehicle maintenance and diagnostics without having to remove power to the ROVR™ unit.

Integration with the EXISTING SYSTEM will be through a .dbf file format. Vehicles equipped with the ROVR™ in-vehicle devices will be tracked entering the Airport at four locations (two domestic and two international) and will be charged based on the number of trips

taken. The data that has been collected through the ROVR™ system must be transferred to the EXISTING SYSTEM so that it is available for billing.

In the event the City elects to deploy the Interim Solution, Transcore shall:

- Develop required interface to the ROVR™ system for data retrieval.
- Parse and store in a timely manner all ROVR™ vehicle data provided.
- Compute the vehicle trips for each ROVR™ based vehicle.
- Generate the required monthly billing file for ROVR™ based vehicles
- Provide users the ability to view daily trip data and the monthly billing file for ROVR™ equipped vehicles.
- Perform testing and deploy changes to the EXISTING SYSTEM

7.3 DESIGN REVIEW AND CONFIGURATION CONTROL

TransCore shall participate in PDR, and FDR meetings, which shall be chaired and conducted by SFO with the specific objective to review and approve TransCore's presentation of the preliminary system and final product design. Additional meetings shall be scheduled and conducted as necessary to complete the deliverable tasks designated by the PDR and FDR. Design Review meetings shall be attended by Contractor and SFO personnel as necessary to complete the agenda.

Design Review meetings shall be conducted to evaluate the technical adequacy of the design and the compatibility with the performance requirements of the Contract. TransCore shall provide SFO with documentation and notice of design milestones in accordance with the project requirements and schedule. The documentation shall provide SFO with adequate detail to become familiar with the design status existing at the time of the scheduled review. TransCore shall present a documentation summary and supplementary information upon request, during the design review meetings. Design review meetings are intended to serve as a technical review of Contractor progress toward meeting Contract requirements. At the completion of the review, the status of the review will be presented by TransCore in the form of a statement of action items and schedule of accomplishment necessary to obtain SFO concurrence with the program's technical progress.

7.3.1 System Configuration Management

TransCore shall establish a formal Configuration Management process for SFO to handle all system changes. These changes shall include any of the following:

1. **Fixes**: corrections of malfunctions ("bugs") that are required in order to meet performance and functional requirements as specified in the Specification
2. **Updates**: new software releases provided by TransCore, whether for application software, operating system software, or third-party software
3. **Enhancements**: changes that provide improvement in the operation
4. **Modifications**: changes necessitated by program changes
5. **Upgrades**: augmentation and/or replacement of any system hardware

6. **Documentation revisions**: updates to instructional documents or users' guides to reflect modifications to any existing software or other changes to GTMS' functionality

The Configuration Management process shall include a strict testing procedure to be followed before any system change is implemented in production. This testing procedure shall include reporting of results and acceptance of test results to verify successful completion before implementation.

The Configuration Management process shall include a plan for implementing—on a scheduled basis as appropriate (e.g., monthly)—system changes that incorporate all categories explained above. This process shall include a means by which all system changes are prioritized and scheduled for these regular releases. This process shall include provisions for more frequent interim releases. A Daily Changes Log report shall be part of the Configuration Management process.

7.3.2 Design Reviews

Formal design reviews shall be conducted to evaluate the progress and technical, functional and programmatic adequacy of the design in accordance with the performance requirements of the Contract. In addition to formal design reviews, informal meetings to address key issues shall be held as needed. Prior to each review, a design review package shall be submitted that includes CDRLs and other items required for the review. Design review packages shall be provided at least 15 business days before a design review meeting.

The review of drawings shall be construed neither as permitting any departure from the Contract nor as relieving Contractor of the responsibility for any error, including details, dimensions, and materials. Contractor shall submit drawings for review by SFO.

Design reviews shall consist of the following key activities:

1. Design review package will be reviewed by SFO staff.
2. An Issues List will be created as a result of the review and will be provided to TransCore at least ten business days prior to the scheduled design review meeting.
3. The design review meeting, or series of meetings, will be held between Contractor and SFO staff where TransCore shall explain their design, and SFO confirm the requirements. When possible, issues will be resolved during the design review meetings.
4. Issues not resolved during the meetings will be identified and documented. SFO will determine the appropriate action to close the issue, giving consideration to where the project is in the overall design review process. This may require resubmission of design review items.
5. The submittal will be approved, upon SFO's determination that there are no open issues.

Contractor shall conduct the following three formal design reviews:

7.3.2.1 Preliminary Design Review (PDR)

The objective of PDR is to review the progress of the project and evaluate specification compliance of the completed work and/or work in progress. PDR shall represent approximately 75% completion of the total engineering and organizational design. The PDR shall cover the following:

1. Schedule compliance review and discussion of variances or delays
2. Provide all PDR items indicated in Exhibit A – CDRL List
3. Complete interface drawings, flow charts, detailed screen flows with actual screen shots, server graphics, messages and menus, including accommodations of all operating boundary and error conditions
4. Detailed technical descriptions of major components
5. Detailed interface descriptions, including mounting arrangements and installation methods
6. Single-line power diagrams and functional block diagrams, including a functional overview and a description of how each sub-component goes out of service
7. Communications interfaces
8. List of all GTMS server and Duplicate Data file formats
9. List of special tools and DTE for each device
10. Description of operational and physical compatibility with the existing equipment and equipment installations
11. Design of access control for the following:
    a. Equipment
    b. Software menus
12. Software system-level flow charts
13. Software data backup and recovery procedures
14. Financial settlement process
15. Software version and configuration control system

Ten (10) copies of the specific submittals shall be provided prior to PDR (PDR Package defined in Exhibit A – CDRL List). Each drawing submittal shall include a CD with the drawings in electronic format (.pdf) and one reproducible on regular paper, developed using AutoCAD Version 14 or other software capable of exporting AutoCAD files.

7.3.2.2 Final Design Review (FDR)

The FDR, CDRL 60 shall be conducted when detailed design is complete and production drawings are ready for release. The objective of the FDR is to determine whether the detailed design will satisfy the design requirements established in the Contract. Data submitted for the PDR shall be updated to a level of detail consistent with the completed design and submitted for the FDR. The FDR shall cover the following:

1. Schedule compliance review and discussion of variances or delays
2. Provide all FDR items indicated in Exhibit A – CDRL List
3. Latest revisions of the drawings and documentation submitted for the PDR
4. Shut-down and start-up sequences

5. Demonstrate compatibility with existing equipment
6. Assembly drawings down to the lowest replacement unit level
7. Electrical schematic drawings
8. Flow charts or structure charts that give an overview of software
9. Software documentation at the second level, consisting of structured data flow diagrams to the lowest level of decomposition with software module descriptions in structured narrative format.
10. Input data definitions
11. Output data definitions
12. Diagnostic routines for system self-test
13. Data dictionary

SFO shall have on-site access to drawings and other design and manufacturing information related to manufacturing release of the GTMSE, including source code and other proprietary technical data. On-site access shall be provided at Contractor's facility. Contractor may establish suitable confidentiality agreements.

Ten (10) copies of the specific submittals shall be provided prior to FDR (FDR Package defined in Exhibit A – CDRL List). Each drawing submittal shall include a CD with the drawings in electronic format (.pdf) and one reproducible on regular paper, developed using AutoCAD Version 14 or another software tool capable of exporting AutoCAD files.

7.3.3 Design Baseline

For the purposes of change control, the design baseline for all program elements shall be established at the FDR. Contractor shall submit changes beyond FDR that affect the agreed design characteristics to SFO for approval.

7.3.4 Production Baseline

The equipment and software production baseline shall be established at the FACI. Changes beyond the FACI shall be documented in the form of change requests and submitted for approval.

7.3.5 Drawing Requirements

Drawings shall be dimensioned in U.S. units (feet and inches) or both U.S. and metric units. Electrical schematic drawings shall be drawn in accordance with the standards of the Institute of Electrical and Electronics Engineers.

As-built reproducibles shall be developed using the AutoCAD software application version 14 or another software application capable of exporting AutoCAD files. These shall be submitted on CD (CDRL 18, "Illustrated Parts Catalog").

7.4 TESTING AND ACCEPTANCE

7.4.1 General

All the components, sub-systems, and system processes constituting the SFO GTMS shall be tested combined and individually to ensure they meet the Contract requirements and provide a properly functioning system. The work under this section shall include all labor, materials, and support services required to completely inspect and test all hardware and software. Testing shall be conducted at three levels:

1. Hardware operations — Readers/Antennae, Transponders, LPR's
2. Component interface and integration — device network, software and device interface testing
3. System installation and operations — installation and acceptance testing, including all user interface.

The overall objective of this test process is to thoroughly test each component, device, sub-system and eventually the system as a whole, in a progressive manner which allows faults to be identified, isolated, and rectified in the most cost- and time-efficient manner. Each testing level ensures the relevant Contract requirements for the component(s) have been met prior to moving to the next level.

All tests and inspections will be monitored by the SFO Project Manager and shall be documented by TransCore. All hardware and software not passing inspections and/or tests and not meeting the approval of the SFO Project Manager shall be repaired, replaced, and/or corrected by Contractor and rescheduled for inspection and testing.

Contractor shall submit a written report for each inspection and test, including copies of all inspection/test data for SFO approval. Contractor shall submit testing and performance data at least on a monthly basis. All such reports are Contract deliverables, (CDRL 19, "Test Reports") unless specifically required under another CDRL. Test reports shall include all historical data, such as inspections and tests performed, failures, modifications and repairs, pertaining to the item or system tested. Upon completion of all tests for a particular test phase, Contractor shall issue a separate request for SFO approval of that phase. Acceptance of each phase of testing by SFO shall be required for TransCore to proceed to the next phase.

Contractor shall conduct regular inspections of the procurement, manufacturing, and testing processes in accordance with guidelines defined by Contractor's Quality Assurance Program Plan (CDRL 20, "Quality Assurance Program Plan").

All inspection and test results shall be retained for a period of no less than two years, during which the results shall be available for SFO review. SFO reserves the right, at their discretion, to witness any or all inspections/tests, using SFO or other personnel and/or consultants and agents.

7.4.2 SFO Test Plans, Procedures, and Facilities

Contractor shall submit an Overall Inspection and Test Plan (CDRL 21, "Overall Inspection and Test Plan") for SFO's review and approval, to be used as a controlling document for all inspections and tests. The Test Plan shall identify the inspection and testing to be performed at

each level. Information provided for each inspection and test shall include but not be limited to the following:

1. Inspection/test title
2. Reference to Contract requirements section requiring the inspection/test
3. Responsible organization conducting the inspection/test
4. Inspection/test location
5. Inspection/test objectives
6. Inspection/test pass/fail criteria
7. Inspection/test schedule providing the following information at a minimum:
8. Inspection/test procedure submittal
9. Inspection/test start date
10. Inspection/test duration
11. Inspection/test report/certification submittal

For each inspection, the Test Plan shall also provide check-off sheets for items to be inspected, measurements to be taken, features required to be present, and criteria required to be met. The Test Plan shall cover all Contractor, supplier and subcontractor inspections and tests to be performed, including those performed under Contractor's QA plan. No inspections or tests shall be performed before SFO approval of the Test Plan has been received by Contractor. Inspection and test results will be submitted to SFO for review within 30 days after completion of the inspection or test.

7.4.2.1 Detailed Test Procedures

Contractor shall prepare and submit to SFO a Detailed Test Procedure (CDRL 22, "Detailed Test Procedures") for each test to be performed. This Test Procedure shall include, but not be limited to, the following items for each test:

1. Information provided in the Test Plan (repeated)
2. Test methodology, including input and expected output
3. Equipment and instrumentation to be used for testing
4. Detailed breakdown of all hardware and software components under test
5. Step-by-step test procedures/scripts
6. On-line and off-line diagnostics
7. Any related documentation (drawings, prints, vendor specifications, and recommendations)
8. Forms for recording data, including fields for date, time, location, and name with the signature of person(s) conducting or witnessing the test
9. All other information required to monitor and manage the inspection and testing
10. Name and signature of the person who prepared the test procedure.

A Detailed Test Procedure shall be submitted to SFO for review and approval a minimum of 30 days prior to the test performance. No test shall be conducted until approval of the test procedures has been given by SFO. SFO reserves the right to develop additional test procedures to be performed by Contractor or other designated organizations.

7.4.2.2 Testing Facilities

Device testing shall be performed in controlled, laboratory conditions at Contractor facilities or other SFO approved facility.

Component interface and integration testing, including systems integration testing as described in Section 3.3.4, shall be performed in a test-bed established at a location in the San Francisco County region, as agreed upon by SFO and Contractor. Pre-production units of all of the TMSE used by the SFO system, including each configuration specified here in, shall be assembled in a single test-bed ("SFO testbed") to permit interconnection to simulate the overall SFO system. It is not required that the Central System or Data Servers which support SFO financial and operational data processing be co-located at this site. However, it must be possible to interconnect to them using the telecommunications processes to be used in the installed system environment. The testbed shall be established prior to the network and software testing, using FAT devices. The testbed shall remain operational through the duration of the Contract and shall be updated to reflect any changes to the devices, software and/or system configuration.

Systems installation and acceptance testing, as described herein and as specified by SFO, shall be performed at SFO's facilities upon completion of system installation.

7.4.3 Equipment Inspection and Testing

This section defines the requirements for comprehensive inspection and testing of GTMSE, as specified herein.

A combination of inspections, design qualification tests, FAT and acceptance tests shall be used to establish the integrity of the design and manufacturing of the devices and all their components.

The major inspection and test phases to be conducted are as follows:

1. FACI
2. FAT
3. Production Inspection and Testing
4. Interface and Integration Inspection and Testing (I^3T)
5. Installation Inspection and Testing (I^2T)
6. Acceptance Testing (including all hardware and software elements)

Each test phase must be successfully concluded, reviewed, and approved prior to the start of the subsequent phase.

7.4.3.1 First Article Configuration Inspection

The FACI shall take place after Design Qualification Testing and at the point of assembly after completion of the first production devices listed above. SFO shall be notified not less than ten (10) working days before the FACI date. Subsequently, Contractor shall be advised regarding SFO's attendance.

The FACI shall verify that production hardware complies with design configuration and drawings as agreed upon during FDR, or the latest revision thereof. The design qualification test results shall be available for inspection at the FACI. SFO may request a repeat of any part or all of the Design Qualifications Testing at the FACI, if the results of the initial inspection were unsatisfactory.

Before the FACI, data that includes the latest drawings, design test procedures, specifications, and quality documentation required for adequate checkout of the equipment under inspection and an indentured list of drawings shall be submitted (CDRL 23, "FACI Plan"). The list of drawings shall be identified by revision and be complete to the lowest-level replaceable unit.

7.4.3.2 First Article Testing

The equipment to be tested in the FAT shall be the first production unit of each device identified above. FAT shall be conducted upon successful completion of the FACI.

The FAT shall be conducted by Contractor at Contractor's facility. SFO may assign staff to periodically audit the progress of FAT. All FAT reports shall be subject to SFO's approval (CDRL 24, "First Article Testing Reports"). Each of the following tests shall be completed for each unit:

1. Functional and Cycling Tests
2. Human Factors Test
3. Maintainability Test.

At this level of testing, the first article equipment shall be representative of the final production item. The purpose of this test shall demonstrate that all equipment to be furnished under this Contract have met the specified requirements. Processing time for each FAT shall not exceed the times specified in the SFO GTMSE specification.

In the event TransCore has already conducted substantially similar tests to those described herein, SFO may elect to accept the results of those tests as satisfying the requirements of FAT. The procedures and results of any such tests shall be submitted to SFO for review at least 60 days prior to scheduled conduct of the FAT. Contractors who wish to request a waiver of any requirement based on testing already performed shall submit information indicating their justification for requesting the waiver, any testing already performed, the cost savings for not performing the test originally proposed, and relevance to proposed equipment for SFO approval (CDRL 25, "Request For FAT Waivers"). TransCore shall supply certification for these tests to include test protocols and procedures, actual test data documenting the appropriate tests performed on the equipment and having successfully tested the equipment in conditions that simulate or duplicate in-service conditions. TransCore shall supply to SFO the name, address and phone number of all testing facilities used to perform such testing. If a test is approved by SFO to be waived, then a credit, agreed upon by SFO and Contractor by end of FDR, shall be issued by TransCore to SFO for the costs of waived tests.

Successful completion of the FAT shall be a prerequisite for manufacturing of production equipment. All necessary supplies for the FAT shall be provided by Contractor.

If at any time after the FAT results have been accepted a design change is made, the performance of the modified equipment shall be demonstrated as conforming to the Contract requirements and

the re-test results shall be submitted to the SFO for approval (CDRL 24, "First Article Testing Report").

The functional tests and the functional cycling tests may be conducted simultaneously. The purpose of the functional test shall be to demonstrate that the functions specified throughout this GTMS specification, including all limiting or boundary conditions etc. have been met for each type of GTMSE. GTMS Contractor will obtain the necessary equipment simulators.

The objective of the cycling tests is to determine with reasonable certainty that each GTMSE and each subsystem or component of that GTMSE are capable of meeting the reliability requirements specified herein. The ambient conditions under which equipment will be required to function shall be those existing at Contractor's plant. Ambient test conditions (temperature and humidity) shall be measured and recorded at least twice during each test day.

During the functional and cycling tests, the hardware shall be installed with the equipment with which it will interface in the operational environment, such as the TMS. The equipment used in the functional and cycling tests shall simulate the installed system, aside from network connections to control and monitoring facilities.

In the Detailed Test Procedures for the functional test, Contractor shall identify and list all device features, including all boundary conditions and procedures for handling maintenance and service functions, to be tested during the functional tests. All operating modes, and maintenance modes, shall be included in the tests. The tests shall also include all boundary conditions that can be anticipated due to improper customer action or malfunctioning equipment. Each function tested shall be repeated at least 10 times correctly for successful completion of the functional test. There shall be no failures of the test devices during the functional tests. The functional test shall be repeated if a failure of the device occurs. Contractor shall also demonstrate the ability of available software control to change the types and parameters, including boundary conditions, of transactions permitted.

7.4.3.3 Maintainability Test

Contractor shall conduct a maintainability verification test of the hardware. The purpose of this test shall be to determine if the equipment conforms to the maintainability requirements specified in the equipment specifications. This shall be accomplished by introducing faults into the equipment and then measuring the time required for Contractor's technician to correct the fault.

Maintainability testing shall be performed on the first production devices. The test shall be conducted in the following manner:

1. Contractor shall introduce failed components, misadjustments and incorrect settings. The simulated failures shall be introduced in proportion to their expected failure rates
2. Contractor's personnel shall be assigned to repair the equipment, and shall be unaware of the simulated failures
3. The repair times shall be recorded and the mean times to restore and mean times to replace shall be calculated.

Contractor shall identify the basis of fault selection by module or subassembly, and reasonable time period to restore and replace modules or assemblies in the Test Plan and Detailed Test Procedures. The tests to be performed and acceptable time periods shall be subject to SFO approval.

7.4.3.4 Production Inspections and Tests

Production inspections and tests shall be performed by Contractor and sub-suppliers on each piece of equipment that is produced as an integral part of their QA programs. Production inspections and test shall be performed after a successfully completed FAT. These inspections and tests shall verify that all equipment contains the correct materials, is assembled properly, and functions properly. SFO may choose to observe, participate, conduct, or repeat testing on any item to confirm the validity of Contractor's test procedures and results.

Production inspections and tests shall be conducted at the point of manufacturer on all subsystems and on each completed device prior to each shipment. These inspections and tests shall verify that each unit is produced to at least the same quality level as the unit presented for the FACI and FAT.

Test procedures shall be expanded to focus on areas that prove to be, or have historically been, troublesome. If approved by SFO, tests may be simplified in areas where a high degree of confidence is developed.

Complete records shall be kept of all inspections and tests that are performed. Any failures and subsequent corrective measures shall be noted. Successful completion of the production inspections and tests on all devices shall be a prerequisite for installation of the equipment.

At any time during the manufacturing process, subject to reasonable prior notice, SFO may choose to schedule a visit to Contractor's facility or a subcontractor's facility during normal working hours to audit the manufacturing and QC processes.

7.4.4 Human Factors Testing

The purpose of this test is twofold; first, it will verify that those features and operating characteristics that affect the operator's use of the web portal user interface are easy to understand, easy to use, and quick in response to the operator. Second, it will, verify that those features and operating characteristics that affect the operator's use of the lane equipment is easy to understand, easy to use, and quick in response to the operator. The test shall be designed to evaluate items such as the following:

1. User interface Graphics, display and communications;
2. User interface time to perform a transaction;
3. DMS prompts and instructions during on airport operations
4. Time relationship of displayed messages to actions;
5. Time relationship of displayed messages to operator actions;
6. Accessibility to persons with disabilities.

The overall goal of this test is to ensure that the hardware and user interface have been designed with attention to operator ability, ergonomics, efficiency, operator safety, and operational throughput. ADA compliance with regard to customer operation controls and instructions shall be evaluated.

7.4.5 Interface and Integration Inspection and Testing

Interface and Integration Inspection and Testing (I^3T) shall be performed following successfully conducted and approved FAT. The goal of this level of testing is to ensure that the different unit components of the system integrate together as defined in the Contract requirements. Interface and Integration testing shall also cover the interface of SFO system elements with SFO equipment existing or procured outside of this Contract. At a minimum, this shall include GTMS connection, data communication, and verification of GTMS transactional data to the GTMS Server and the Central System.

For each component in the system, all functions requiring interface to another component, including all boundary conditions and security provisions, in all possible combinations, shall be tested. These functions shall include but not be limited to the following:

1. Alarm transmission and all other device/component monitoring functions
2. Data transmission to GTMS Server and the Central System
3. Data transmission, including all control functions to and from each device
4. Report generation in SFO-approved formats

Contractor shall identify each integrated function in the Detailed Test Procedures, including the boundary conditions and security provisions for each. Boundary and security provisions to be tested to ensure compliance with the Contract requirements shall include but not be limited to the following:

1. Operating ranges for each type of remote device/component
2. Function performance times
3. Data encryption/security provisions for each type of data transfer
4. Required data anti-collision provisions for each applicable type of data transfer.

All data transmissions shall be inspected for accuracy. Inaccurate data transmissions shall be recorded as a failure of the particular test for which the transmission was performed. Contractor shall take any corrective action necessary to ensure the proper performance of all functions tested in the system interface and integration test. Successful completion of this level of testing will be required prior to device installation.

7.4.6 Installation Inspection and Testing

Installation of the equipment at SFO may commence upon successful completion of the system interface and integration inspection tests (I^3T). Installation requirements are subject to the parameters specified herein. The Detailed Test Procedures for installation, inspection and testing shall include installation checklists, identifying the equipment, software, installation configurations and settings and other characteristics applicable to the installation process and parameters, unique to the equipment being installed. The Procedures shall also identify and describe all necessary tests to verify proper interfacing and installation of the equipment with other system facilities. The installation checklists and test procedures shall be submitted to SFO a minimum of 60 days prior to scheduled inspection and testing and shall be subject to the approval of SFO.

Upon verification of proper installation of the equipment, Contractor shall perform a complete installation operational test. All functional characteristics of the installed equipment at each location shall be tested to ensure operation of the equipment as specified, including those involving interfaces with data and revenue collection and control equipment. Upon complete installation, all components, including the TMS, shall be tested as an integrated system.

Contractor shall inform SFO, in writing, of any failures or unacceptable conditions during installation testing. All failures detected during the acceptance testing period shall be analyzed by TransCore. Contractor shall be responsible for taking corrective action to ensure proper functioning of the integrated system.

Contractor shall notify SFO a minimum of 72 hours prior to the scheduling of any inspection or test at a particular site. SFO reserves the right to specify and/or perform installation inspections and tests in addition to those identified by Contractor in the Test Plan and Procedures. Successful completion of all installation testing is required prior to revenue service.

7.4.7 Acceptance Testing

The acceptance testing period will commence upon completion of the settling period following the start-up of revenue service and successful completion and approval of I^2T. Acceptance testing shall be conducted by Contractor and shall be subject to review and approval by SFO.

Acceptance testing shall be performed at a system level, after the start of revenue service, with all components and subsystems completely functional, operational, on-line, and in service. Contractor shall provide to SFO a "Systems Acceptance Testing Plan" (CDRL 26, "System Acceptance Testing Plan"). The plan shall be a comprehensive and detailed document, describing the management, monitoring, recording, and reporting procedures that will govern the acceptance testing period. The Acceptance Testing Plan shall be submitted for review and approval of SFO 60 days prior to the scheduled start of the system acceptance test period. SFO reserves the right to make changes to this document as required and deemed necessary to meet and evaluate performance and operational objectives.

At a minimum the first 15 days of revenue service will be designed as a settling period. During this period a failure review process shall be established (CDRL 27, "Failure Review Process") by the FRT.

The acceptance testing shall be conducted in three performance periods related to the reliability of the system, as subsequently described. Each subsequent acceptance testing period shall not commence until all the requirements specified for the previous period of testing have been met.

7.4.7.1 Settling In Period

At the end of the settling period the MCBF for high transaction volume devices of the same type in a group shall be not less than 40 percent of the MCBFs presented in this document. Also, for devices of the same type in a low transaction volume environment, the MTBF in a group shall be not less than 40 percent of the mean hours between failures in this document. If at the end of the settling period the above MTBF and MCBF criteria are not met, then the reliability of the equipment shall be monitored until these criteria are met for 30 consecutive days. The acceptance testing shall not commence until these MTBF and MCBF requirements are met.

At the end of the settling period, the acceptance testing shall begin and shall be conducted over a minimum of 365 days under revenue service conditions.

The MCBF and MTBF requirements during the acceptance testing shall be incrementally increased from the settling period values in 60 consecutive day periods, as follows:

1. **0-60 days**: 60 percent of the MCBF and MTBF specified herein;
2. **61-120 days**: 80 percent of the MCBF and MTBF specified herein;
3. **121-365 days**: 100 percent of the MCBF and MTBF specified herein.

For any single group, if after 60 consecutive days the MCBF and MTBF for that period has not been met, the acceptance testing shall continue beyond the 60 consecutive days until the equipment has achieved the applicable reliability requirement and maintained it for 60 days. Under no circumstances shall the acceptance testing for any group be allowed to proceed to the next 60 consecutive day test period until the previous criteria has been met by that group.

For each group, the MCBF for high transaction volume devices for a given 60 consecutive day period shall be derived by summing all the transactions for the 60 consecutive day period for that group and device type and dividing by the number of chargeable failures recorded during that period for that group and device type. If for any reason a test period is not comprised of 60 consecutive days, then the average MCBF shall be calculated by summing the transactions and chargeable failures for each individual test period, totaling not less than 60 days of test data.

Should the equipment fail to meet the performance requirements specified above, Contractor shall make whatever improvements are needed to meet the requirements. Contractor shall continue to improve the equipment until the Contract requirements are met. SFO reserves the right to limit the cut-over of the installed equipment if the acceptance test requirements are not being met.

Successful completion of acceptance testing shall be a prerequisite for final acceptance. SFO reserves the right to be the sole judge in determining whether the acceptance testing meets the system requirements and objectives.

7.5 INSTALLATION

7.5.1 General

This section specifies the installation requirements for the GTMS equipment. TransCore shall install, connect, and test the GTMSE in accordance with the Schedule. TransCore shall furnish all hardware for the proper installation of all items of the GTMSE. TransCore shall comply with the requirements of layout, positioning, conduit assignment, and other features as detailed on the drawings of this Contract.

Plans for system installation work, including any requirement and cost for building permits, shall be submitted to SFO. TransCore shall be responsible for building permit cost and approval if required by law.

Plans for communication systems between elements of the data system shall be submitted to SFO. TransCore shall be responsible to ensure that connections operate to provide the performance specified for the system before installation shall begin.

7.5.2 Site Access and Site Work

TransCore shall plan and execute safe access to the work site for on-site work. Such safe access shall be afforded to construction equipment, vehicles, and personnel in accordance with the Contract. TransCore shall take into consideration the following guidelines for on-site work:

1. Minimize nighttime disturbance as required by the local rules and regulations.
2. Minimize disruption to ground transportation, taxi and airport operations.
3. Avoid restricting public rights-of-way.
4. TransCore shall not prevent access for other contractors to the work site.
5. Access to the sites for installation of the GTMS shall be governed by the completion of other SFO contracts. Therefore, TransCore shall incorporate flexibility into planning the overall schedule for this Contract's progression and completion.
6. TransCore shall be responsible for protecting all utilities and other SFO property, streets, private property, and shall repair any damage to same at Contractor's expense.
7. Nighttime work shall be required in order to minimize disruption to SFO operations.

Drawings depicting the typical installation of each type of equipment shall be provided for review by SFO (CDRL 28, "Installation Plan").

8. TRAINING

TransCore shall develop and conduct programs to train SFO training personnel in all aspects related to the equipment, hardware, support and diagnostic equipment, and software provided under this Contract. The training shall provide SFO training personnel with information and skills needed to instruct SFO personnel to operate, maintain, and support the equipment to the lowest replaceable component level. TransCore shall be responsible for training designated personnel in accordance with the requirements specified in this section. The parameters, approach and materials for SFO personnel training shall be submitted to SFO for approval.

Training materials shall reference and/or incorporate the content of the Operations and Maintenance Manuals where appropriate. All SFO training classes will be scheduled by personnel and shall not take place more than four weeks prior to revenue ready approval. SFO reserves the right to videotape training sessions conducted by Contractor for review and future use.

TransCore shall develop course material, provide course instructors, supply necessary handouts and manuals, prepare classroom aids, supply operational GTMSE for training purposes, and all other items as required to train SFO personnel in the operation of the GTMS.

8.1 GENERAL TRAINING GUIDELINES

TransCore's training courses shall comply with the requirements described in this section and shall include the following at a minimum:

8.1.1.1 Training Program Plan

Detailed outlines, lesson plans, and tests shall be submitted for review and approval by SFO (CDRL 29, "Training Program Plan"). Instruction shall be designed to include courses described

below and shall cover equipment familiarization, systems operations, and field and shop maintenance. At a minimum, TransCore must provide a training program that is comprehensive enough to bring employees designated by SFO to the level of proficiency required for operations, service, and maintenance of the furnished equipment. Formal training shall include both classroom and practical work, and shall be augmented by informal follow-up if requested.

Training mock-ups shall be provided to assist with the training. The operational equipment shall be retained by SFO for in-house training. Practical training on equipment shall occupy a significant portion of all training classes.

The plan shall be based upon criteria identified in this specification. The Training Program Plan is to be submitted to SFO for approval no later than 60 days after NTP. The plan shall, at a minimum, provide the following for each course:

1. Brief course description
2. Expected performance objectives and how the expected objectives will be measured
3. Outline for the course content (one for each course)
4. Necessary Pre-requisites
5. Type or method(s) of presentation that will be used
6. Resources required (equipment, classroom/shop space, supplies)
7. An estimated time schedule to train (based on the required number of hours and/or sessions of instruction) employees
8. Intended audience and the maximum class size.

8.1.1.2 Instructor Qualifications

TransCore shall provide experienced and qualified instructors to conduct the training courses at the designated training locations. Training should be oriented to the job classification of the students. SFO reserves the right to review, approve and accept all of the training materials and course work prior to Contractor's use in execution of training. Contractor shall warrant that all instructors are fully qualified to present the course material. SFO reserves the right to request replacement of instructors deemed to be unqualified or whose performance deemed unsatisfactory for any reason. Personnel expected for instructors shall be:

1. SFO trainers who have received instruction on system operation and course delivery for classes to train supervisory personnel to deliver any of the indicated training courses subsequent to Contractor's involvement.
2. Equipment maintenance personnel shall receive instruction on course delivery and on the detailed processes and procedures for maintaining all components of the GTMS.
3. SFO supervisors shall receive instruction in sufficient depth to understand how the various components function in the GTMS

SFO management shall receive instruction about system functions in sufficient detail to allow knowledgeable judgments to be made. TransCore shall expect supervisory and management personnel to audit the training classes. If in the opinion of SFO management personnel, a Contractor instructor(s)' lack the skill or knowledge to provide instruction or cannot

communicate with the students, SFO reserves the right to request the training to be repeated and/or the instructor replaced.

8.1.1.3 Training Equipment

TransCore shall provide functional equipment to facilitate and conduct training at the designated training locations. A minimum of two sets of GTMSE training equipment shall be provided for the training curriculum. SFO recognize that some participants may have to travel to a centralized training area to be agreed upon by SFO and Contractor.

The equipment shall be fully functional and reflect the fee structure and operating characteristics of SFO detailed in this specification.

8.1.1.4 Training Material

TransCore shall submit the training materials required for each course discussed in the Training Program Plan in accordance with the following requirements. Contractor shall provide a list of training materials required for each course discussed in the Training Program Plan. Contractor shall reflect all changes and revisions to the installed GTMS in all training materials, whether supplied to SFO personnel, or used in Contractor-conducted training courses. At a minimum the following training materials shall be provided for each course in sufficient quantities:

1. Instructor guides, including the following:
    a. Course agenda and objectives
    b. Resources and facilities required for the course
    c. Detailed lesson plans or outlined presentations and discussion guides
    d. Pre- and post-training assignments
    e. Instructions for using any audiovisual support and equipment
    f. Student handouts
    g. Operational GTMS equipment
    h. Computer-based presentations
    i. Video recorded demonstrations

Six copies of draft training materials shall be submitted (CDRL 30, "Training Materials") at FDR. Final training materials shall be submitted 60 days before classes are scheduled to begin.

The above deliverables shall be in addition to a master copy of each final version that shall be furnished to each SFO in both electronic and hard copy formats.

8.1.1.5 Electronic Documentation And Training

All documentation and training material provided as final hard copy shall also be submitted in an electronic form as specified by SFO. A directory of all files on the disk shall be listed in hard copy showing filenames, date, file size, and appropriate annotation to cross-reference the chapter and section (CDRL 30, "Training Materials").

8.1.1.6 Reproduction And Updating Of Training Material

SFO reserves the right to reproduce portions or all of the training materials. Contractor shall produce an update or new training aids (e.g. video tapes, manuals, etc.) within two years following the completion of equipment installation. SFO shall receive copies of the updated material for its sole use in SFO training programs, at no cost to SFO.

8.1.2 Training Schedule

TransCore shall provide a preliminary and detailed schedule of training tasks (CDRL 31, "Training Schedule") for SFO review and approval. The detailed schedule of training tasks shall be based upon the equipment installation schedule which shall be established as a dependency in the Project Management Plan. The following proposed training table indicates the anticipated training class durations, in hours. TransCore shall allow for more than one training class (e.g., two classes of each class type at a minimum) due to the availability of the attendees. Contractor shall submit a schedule for SFO approval 60 days in advance of the first training session.

8.1.3 Training Class Duration (hours)

System Administrator-

Classroom Training: A minimum of eighty (80) hours of software training (80 hour class repeated 1 time for 1 system administrator) shall be provided. Transcore shall structure the course to describe all systems, software and applications and support programs. This course shall include a functional overview of the complete software system. The course material shall be presented in depth with the instructor covering detailed design, structure, and algorithms.

On-the-Job Training: An additional three (3) weeks of on-the-job training shall be provided. On-the-job training of the designated airport personnel shall be scheduled with airport and shall commence no later than two months prior to expiration of the equipment warranty period. This training shall be conducted on site at the airport. Transcore shall answer any and all questions regarding the operation, repair, and maintenance of the system, software, and equipment.

Business user training shall be conducted on site at the airport. Business users shall be instructed in all aspects of the operations of the system. A minimum of two (2) courses with twelve (12) hours of business user training shall be provided (4 hour class repeated 3 times with 2 business users per class).

8.1.4 Training Courses

8.1.4.1 Overview Training Courses

The Overview courses shall be designed to provide management, supervisory, and engineering personnel with an overview of the GTMS system, including a functional understanding of the equipment and software. A Concise course shall cover the customer support responsibilities of Contractor and the function of each device, including the interrelationships of the equipment with customers and personnel. The Detailed Overview course shall cover the same material contained in the Concise Overview course and also include detailed instruction on reconciliation.

8.1.4.2 "Train the Trainer" Training

The purpose of this training is to instruct SFO training personnel in the operation and maintenance of the GTMSE and delivery of course content in sufficient detail to establish equipment and operational familiarity. "Train the Trainer" instruction forms the basis for delivery training to SFO line personnel. The courses shall be designed to train instructor and supervisory personnel at SFO to deliver any of the indicated training courses subsequent to Contractors involvement. TransCore shall provide sufficient documentation and data to train SFO training and supervisory personnel who will have responsibility to train additional personnel. At the completion of training, SFO trainers will demonstrate competency in the operation of the GTMS by successful achievement on performance and written examinations.

TransCore shall be required to provide fully configured GTMS workstation for the purpose of this training and shall be responsible for the supply of all necessary training smart cards required to demonstrate the system functionality and to train SFO personnel. Refer to Section 0- 6.14.5 Training Workstation for workstation requirements.

8.1.4.3 Maintenance Training

TransCore shall provide SFO with an experienced and qualified instructor who shall conduct maintenance training. The purpose of the training is to train SFO maintenance personnel supervisors or maintenance contractors in all aspects of maintenance and repair of all equipment provided under this contract. This shall include troubleshooting and diagnostic methods and preventive maintenance techniques to be employed in the proper maintenance of the equipment. TransCore shall develop the course material to be used in this class and provide such training aids as may be required to illustrate and demonstrate the required topics.

At the completion of training, SFO personnel will demonstrate competency in course delivery and in the maintenance of the GTMS by successful achievement on performance and written examinations.

In addition, SFO may send to TransCore's designated facility up to three (3) maintenance personnel to receive comprehensive instructions on the inspection, maintenance and repair of all of the equipment provided under this contract. TransCore shall develop the course material to be used in this training and provide such training aids as may be required to illustrate and/or demonstrate the required points. TransCore shall provide an experienced and qualified instructor(s) for the duration of this course.

Maintenance training shall include but not be limited to the following:

1. Basic construction and operation of the system components
2. Examination and disassembly of all Tier One devices including, but not limited to:
    a. Transponders
    b. Antenna/Readers, LPR's, Transponders
    c. Network Communications Hardware
    d. Electrical wiring harnesses
3. Troubleshooting procedures
4. Field-level repair of system and related equipment

5. Preventive maintenance on all field serviceable equipment. Component and sub assembly level repairs will be performed at the factory by factory trained technicians as a depot level repair.
6. Electrical wiring/troubleshooting
7. Electronic theory and function of system
8. Software overview of all interrelated systems
9. Each student will be required to tear-down and build-up equipment or assemblies in the class
10. Use and maintenance of required bench test unit equipment

Class size will be limited to a maximum of eight (8) participants per class.

8.1.4.4 Operation Training

1. GTMS Server/Application Operation Training

TransCore shall provide an experienced and qualified instructor who shall conduct training classes related to the full and complete operation of the GTMS Server/CS as illustrated in this specification.

System operations training shall be conducted with the objective to familiarize SFO personnel with the GTMS Server/ Application operating systems, communication environment, system protocols, and program logic required to support GTMS Server/ Application system configuration, operation, and maintenance.

Functional operations training shall be conducted with the objective to familiarize SFO personnel with the GTMS Server/Application functional operation, data management, and report generation. The training shall fully review GTMS Server/ Application user functions, including but not limited to, data sorts and database management, report selection and generation, file management and retrieval, file back-up and restoration procedures, fee table management, and GTMS operation.

At the completion of training, SFO personnel will demonstrate competency in the operation of the GTMS by successful achievement on performance and written examinations, evaluation and interpretation of data to assess performance objectives.

2. Equipment Operation Training

TransCore shall provide an experienced and qualified instructor to conduct training courses on complete equipment operations as identified in this specification.

8.1.4.5 GT Operator Training Video

TransCore shall provide a training video that will familiarize GT Operator's with GTMS/TMS Web Portal and the operational environment. The training video shall familiarize drivers with their responsibilities and required actions, as well as payment methods and how fees are charged, in as brief and simple a manner as possible. The training video shall be subject to SFO review and approval.

8.1.5 Training Performance Measurement

Personnel trained in the operation and maintenance of the GTMS equipment shall demonstrate proficiency by actual performance, written tests, and repair of equipment. TransCore shall certify to SFO that personnel passing the written and practical tests are capable of operating and maintaining the GTMSE.

8.2 DOCUMENTATION

TransCore shall provide a complete listing of documentation to be provided in the exercise of these requirements (CDRL 32, "Documentation List"). Included at minimum shall be the documentation title, table of contents, expanded outline, listing of drawings, illustrations, schematics, exhibits, and other such information so as to enable judgment upon the adequacy of the documentation.

Delivery of final documentation shall be in accordance with the project plan, which shall specify dependencies, schedule, quantity, and location (CDRL 32, "Documentation List"). The execution of the Warranty shall require TransCore to maintain documentation to the current revision, incorporating all engineering changes, modifications, changes, corrections, or updates (CDRL 32, "Documentation List"). SFO reserves the right to reproduce documentation for its sole use and purpose.

8.2.1 Documentation Submittal Requirements

Preliminary documents shall be supplied prior to or concurrent with the delivery of the demonstration equipment. A minimum of three sets of documentation for each type of equipment shall be supplied. Documentation for the production equipment that is delivered and installed will be supplied prior to the conclusion of the warranty.

The documents supplied must be the latest version and be for the equipment delivered and installed. No documentation will be considered final until it has been reviewed and approved by SFO Project Manager.

The final version of all documentation shall be provided on in electronic form suitable for use on a Windows™ based PC system. Alternative electronic forms may be substituted upon approval by SFO.

8.2.2 Summary Of Manuals

The following sections summarize the principal documentation that shall be provided in the form of manuals, organized by the desired content. Contractors may recommend alternative organizational formats if desired. Irrespective of the summary and organizational format, all documentation shall provide sufficient description, detail, and illustration to support installation, configuration, operation, maintenance, and repair of all equipment and systems provided under this Contract.

Contractor shall supply the full complement of manuals and documentation required to train SFO personnel to operate and maintain the GTMSE. All manuals shall be in the English language and submitted for review and approval. The manuals shall cover both the hardware and the software associated with each system.

Contractor shall update manuals as required over the life of the Contract to reflect all configurations operational in the field. All manuals shall be furnished as "Controlled" documents and each manual shall contain a unique number. All revisions shall be issued by manual number. Revisions to draft and approved manuals shall be recorded on a control list to be maintained in the front of each manual. The list shall be issued with each revision and shall contain the date of the revision and the page references for that revision.

Manual and training material development shall begin, and occur concurrently with the design process. A schedule for development of the required manuals with time allotted for SFO review shall be submitted 120 days after NTP (CDRL 33, "Manuals Schedule"). The training documentation shall be separate from the operation and maintenance manuals, but may reference those manuals.

Manuals shall be specific to the features and functionality provided by the contracted system. The section of manuals related to the listing of parts shall be organized such that it is separate from its associated manual. This organized format allows reproduction and reference to the listing of parts without the requirement to reproduce or reference the complete manual. The section of manuals related to the specific description or illustration of security equipment or features, to the extent the information can be used to circumvent or defeat system security, or in the opinion of TransCore may be used in such a manner, shall be identified by TransCore. At the discretion of SFO, TransCore may be required to delete, remove, or separately organize such material.

8.2.2.1 Operations Manuals

The Operations Manuals shall provide information and instruction on the various operational controls and features of the equipment and systems (CDRL 34, "Operations Manual").

The manual shall be sufficient in description, detail, and illustration to provide full and adequate reference to the operation of each device and system. A separate Operations Manual shall be provided for each device and system.

In addition to the general requirements above, the GTMS Server/ Application Operations Manual shall provide descriptions of data management functionality and shall incorporate a full and complete description or reference to the related GTMS operational impact, result, or association. For example, instruction related to fee table management shall include description or reference to the resulting GTMS operation, data collection and data reporting action. Instruction related to the document management shall include description or reference to the desired document format.

The manual shall be sufficient in description, detail, and illustration to provide full and adequate reference to the operation of the system and to the development of training programs.

8.2.2.2 Maintenance Manuals

The Maintenance Manuals shall provide information and instruction on the maintenance of the equipment and systems. The manuals shall be sufficient in description, detail, and illustration to provide full and adequate reference to the diagnosis, testing, maintenance, repair, and replacement of devices, modules, components, and system (CDRL 35, "Maintenance Manual").

Manuals shall contain diagrams, illustrations, schematics, parts listings, diagnostic and testing procedures, flow charts, and program code description as necessary to fully support maintenance functions. A separate Maintenance Manual shall be provided for each device and system.

8.2.2.3 Test Equipment Manual

The Test Equipment Manual shall provide operation, adjustment, maintenance, troubleshooting, and storage instructions, and special tools (CDRL 37, "Test Equipment Manual"). The Test Equipment Manual shall also include ATE replacement parts information.

8.2.3 Summary Of Other Documentation

The following is a summary of other principal documentation that shall be provided in addition to that provided as manuals. The requirements are organized by the desired content. Contractors may recommend alternative organizational formats. Irrespective of the summary and organizational format, all documentation shall provide sufficient description, detail, and illustration to support installation, configuration, operation, maintenance, and repair of all equipment and systems provided under this Contract.

All documentation shall be specific to the features and functionality provided by the contracted system. TransCore shall identify the portion of documentation related to the specific description or illustration of security equipment or features, to the extent the information can be used to circumvent or defeat system security, or in the opinion of TransCore may be used in such a manner. At the discretion of SFO, TransCore may be required to delete, remove, or separately organize such material.

8.2.3.1 Listing Of Tools

TransCore shall provide a list of all special or custom tools or instruments required to install, maintain, or adjust any component in the contracted system (CDRL 38, "Special Tools List"). TransCore shall also provide a list of suppliers of required special or custom tools or instruments. If no special tools are required CDRL 38 will state indicate as such.

8.2.3.2 Bill Of Material

A complete Bill of Material (CDRL 39, "Bill of Material") shall be provided that shall include a unique part number, description, generic name and generic part number for each component in the contracted system. The Bill of Material shall include identification to level of specific diode, capacitor, or screw. Diagrams and drawings shall identify each system component and shall call out each component with the unique part number as referenced in the Bill of Material. Sub-component detail shall be provided for Contractor-manufactured equipment. Sub-component detail of commercial equipment such as computers and peripherals, at the discretion of SFO, may be limited to board or major component level.

8.2.3.3 Listing Of Sources

TransCore shall provide by listing sources for purchasing components and parts that are commercially available, other than from TransCore (CDRL 40, "Distributor Sources List"). Components and parts not so listed shall be considered by SFO to be proprietary and available by single source.

8.2.3.4 Communications Protocols

TransCore will provide full and complete documentation of the communications protocol and message set information between any contract-provided GTMS component and any other system or external component, regardless of whether the component is provided under the terms of this Contract or other SFO contract (CDRL 41, "Communications Protocols"). The documentation

shall be sufficient in content and detail to afford SFO the ability to interface and communicate in the same manner to an appropriately compliant component for the purpose of affecting operational control or data exchange.

8.2.3.5 Customer Service Manual

TransCore shall supply for SFO review and approval a user's manual for the customer service systems (CDRL 55 – Customer Service Manual).

8.2.3.6 Listing of Messages

TransCore shall provide a complete listing of system messages not otherwise defined in provided documentation (CDRL 43, "Listing of Messages"). Messages shall include, but not be limited to, displays, indications, tones, status conditions, responses, or actions whether decoded or available for decode.

8.2.3.7 Human Factors Analysis Report

The purpose of CDRL 56, Human Factors Analysis Report is to verify that those features and operating characteristics that affect the driver's use of the device are easy to understand, easy to use, and quick in response to driver actions. The test shall be designed to evaluate items such as the following:

1. Graphics, display and audio messages;

2. Time relationship of displayed and audio messages to machine actions;

3. Time relationship of displayed and audio messages and machine actions to driver actions;

4. Time to perform a transaction;

5. Time between various machine instructions;

6. Accessibility to persons with disabilities.

7. Accessibility to drivers of varying heights in varying vehicle types

8.2.3.8 Source Code

TransCore shall deliver to SFO, computer system and microprocessor Source Code (CDRL 44, "Source Code"). Alternatively, TransCore may elect to deliver such Source Code to an Agent designated by SFO who at no cost to SFO shall record and maintain the documentation on behalf of TransCore. TransCore shall have the responsibility to maintain any such documentation to the current level of product supplied to SFO and shall certify such has been accomplished with delivery of all computer system and microprocessor system product and revisions to such product.

If at any time after the period of Warranty, in the sole opinion of SFO, TransCore is not responsive to the needs of SFO to modify, maintain, or otherwise support the contracted system, SFO shall upon 30-day written notice to TransCore have full, complete, and unabridged right to the obtain the Source Code(s) from the designated Agent.

EXHIBIT A – CDRL LIST

TransCore shall deliver each submittal (CDRL) described below at CDR, PDR and/or FDR, where indicated by a "✓" in the table, and at and within such other time periods as may be specified in the "Other" column. Refer to applicable section of the Specification identified for further information.

GTMS/TMS Contract Data Requirement List (CDRL)				
CDRL	**Submittal Description**	**Required for:**		
		PDR	**FDR**	**Additional**
1	ADA Compliance Report	✓	✓	
2	CID Design	✓	✓	
3	CID Mockup	✓	✓	
4	CID Data Retrieval	✓	✓	
5	TOT Design	✓	✓	
6	TOT Screen Flows	✓	✓	
7	AVM Design	✓	✓	
8	Central System Design	✓	✓	
9	Clearing and Settlement	✓	✓	
10	Central System Configuration Plan	✓	✓	
11	Policies and Procedures Manual	✓	✓	
12	Data Backup and Disaster Recovery Plan	✓	✓	
13	Central System Reports Formats	✓	✓	
14	Card Design	✓	✓	
15	Project Management Program Plan	✓	✓	NTP +10 days
16	Project Schedule			NTP +10 days
17	Monthly Progress Reports			Monthly
18	Illustrated Parts Catalogue		✓	
19	Test Reports		✓	
20	Quality Assurance Program Plan		✓	
21	Overall Inspection and Test Plan		✓	30 days prior to first test
22	Detailed Test Procedures		✓	30 days prior to each test

23	FACI Plan		✓	30 days prior to FACI
24	First Article Testing Reports		✓	Within 15 days of test completion
25	Request for FAT Waivers		✓	
26	System Acceptance Testing Plan	✓	✓	30 days prior to start of acceptance test
27	Failure Review Process		✓	30 days prior to start of acceptance test
28	Installation Plan	✓	✓	
29	Training Program Plan	✓	✓	
30	Training Materials		✓	60 days before first scheduled class
31	Training Schedule		✓	
32	Documentation List	✓	✓	
33	Manuals Schedule	✓	✓	
34	Operations Manual		✓	Per Manuals Schedule
35	Maintenance Manual		✓	Per Manuals Schedule
36	Revenue Servicing Manual		✓	Per Manuals Schedule
37	Test Equipment Manual		✓	Per Manuals Schedule
38	Special Tools List	✓	✓	
39	Bill of Material	✓	✓	
40	Distribution Sources List	✓	✓	
41	Communications Protocols	✓	✓	
42	Printed Circuit Board Drawings	✓	✓	
43	Listing of Messages	✓	✓	
44	Source Code Delivery Plan	✓	✓	
	Source Code			System Acceptance
45	Warranty Plan	✓	✓	90 days prior to beginning of warranty period
46	Spare Modules and Parts List	✓	✓	
47	Consumables List	✓	✓	
48	Standard Support Equipment List	✓	✓	

49	Maintenance Plan	✓	✓	
50	HCR Design and Performance Requirements	✓	✓	
51	Transition Management Plan	✓	✓	
52	PCI Policies and Procedures	✓	✓	
53	Claims Process	✓	✓	
54	Transactional Database Design	✓	✓	
55	Customer Service Manual		✓	Per Manuals Schedule
56	Human Factors Analysis Report		✓	
57	Dynamic Messaging System Design	✓	✓	
58	LEFT BLANK			
59	Preliminary Design Review Package	✓		
60	Final Design Review Package		✓	
61	GEO-Fence, GPS Data, and Equipment Design	✓	✓	
62	GTMS Application Design	✓	✓	
63	GTMS/TMS Web Portal Design	✓	✓	
64	Infrastructure Requirements	✓	✓	
65	PMBS Integration Design	✓	✓	
66	GTMS Transponder Design	✓	✓	

EXHIBIT B – EXISTING SITE CONDITIONS

Current AVI System

SFO installed an AVI System throughout the Airport roadways on the inbound lanes of traffic in 2000. This system is made up of multiple applications and radio frequency identification (RFID) readers, and is used to track limousine, door-to-door vans, shuttles, and other commercial vehicles as they operate at the Airport for the purposes of billing and collecting revenue. GTU uses the current system to manage vehicle information, driver information, trip details, and transponder management for monthly billing.

The current AVI system is comprised of multiple software applications, integrations to other external systems, as well as RFID hardware components. The AVI software applications, which consist of the AVI system application and the Ground Transportation Information System (GTIS), are a combination of a Microsoft Access 97 database, an Oracle 8i database, and associated executable programs written to provide a client/server-type interface. The software components of the current AVI system are maintained by the IBI Group, a third party software development company. The current data model and software structure is limited in its ability to support new business processes and automation. The current AVI system provides a manual integration with the Property Management and Billing System (PMBS) and the Airport's Data Warehouse. The PMBS is an Oracle 10g application provided by GCR & Associates, Inc., and is the enterprise financial application for SFO which is used by the Airport to post financial transactions and provide billing to all Airport operators and tenants. The Airport's Data Warehouse is also an Oracle 10g application supported and maintained by SFO's Information Technology and Telecommunications (ITT) staff, and is the main data store for reporting and data analysis. Because the current AVI system is comprised of so many disparate systems, the GTU staff must enter data multiple times in multiple systems.

The existing RFID hardware is installed in a limited number of locations, which reduces the ability to accurately track commercial vehicles and create trip details. The Airport also needs to closely track and monitor commercial vehicle activity, and currently does not have enough readers to do this effectively. Along with tracking vehicles, and capturing accurate trip details, the Airport does not have any equipment to automate curbside management, to ensure that transponders have not been tampered with, or to ensure that a transponder has been read by an antenna/reader as it enters the Airport.

The existing RFID hardware components of the current AVI system are based on outdated and recently unsupported technology. The current AVI RFID hardware provider, XCI Incorporated ceased operations in December of 2008, and replacement parts for the RFID hardware are no longer available. Moreover, the existing transponders are no longer manufactured, so there are a limited number of transponders available for installation on commercial vehicles. The existing transponders are also susceptible to tampering by the GT Operator drivers.

A similar AVI technology has been in use at San Jose (SJC) and Oakland (OAK) Airports, allowing commercial vehicles to be tracked at all three airports using a single transponder per vehicle. GT Operators drive their vehicles between all three airports, so the ability to read each transponder at all of the Bay Area airports is important. This interoperability allows each airport to issue their own transponders to the GT Operators, but does not require a GT Operator to

obtain a transponder for each airport. Since the existing transponder technology is no longer available, each airport in the Bay Area is beginning to replace their AVI systems. To support interoperability, the Bay Area airports would like to implement a standard RFID technology at each airport. Landside intends to continue supporting interoperability between the other Bay Area airports of San Jose and Oakland.

The current AVI system stores and processes trip details for GT Operator billing and traffic trend measurements. This system currently tracks an average of 12,000 trips per day, including commercial vehicles from San Jose and Oakland Airports. Please see Figure 1.1 for a diagram which illustrates the core components of the current system. The system is comprised of the following components:

1. Ground Transportation Information System (GTIS) – a Microsoft Access 97 application that provides a graphical user interface (GUI) to manage commercial vehicles, as well as the GT Operator specific data.
2. AVI System Application – an Oracle 8i/Visual Basic/Crystal Reports application that interfaces with the RFID readers to retrieve trip details, assign transponders, and create the trip detail records which are uploaded to the airport billing system.
3. RFID Antennae/Readers – these are installed over the roadways to cover all lanes of traffic at specific locations to read AVI Transponders travelling into the Airport.
4. Property Management and Billing System (PMBS) – an Oracle 10g application used for managing tenant company information, posting financial transactions, and providing billing to Airport tenants.
5. Lane Loop Detectors/Radar/Ultrasonic Detectors – the lane loops and radar/ultrasonic detectors which are connected to the AVI enclosures on the roadway count all vehicles which pass over them. This data is stored in the AVI system and is used for reporting purposes and trend analysis.
6. LED Visual Indicators – These are located at strategic locations along the roadway, and identify visually when a transponder is read by an antenna/reader.
7. Data Warehouse – the main data repository for the Airport, which is used mainly for historical and custom reporting.
8. GTU workstations – Workstations used by SFO staff to manage data, pull reports, and conduct business activities in the current AVI system. All workstations are connected to the AVI server and GTIS server via the Airport's network using TCP/IP.

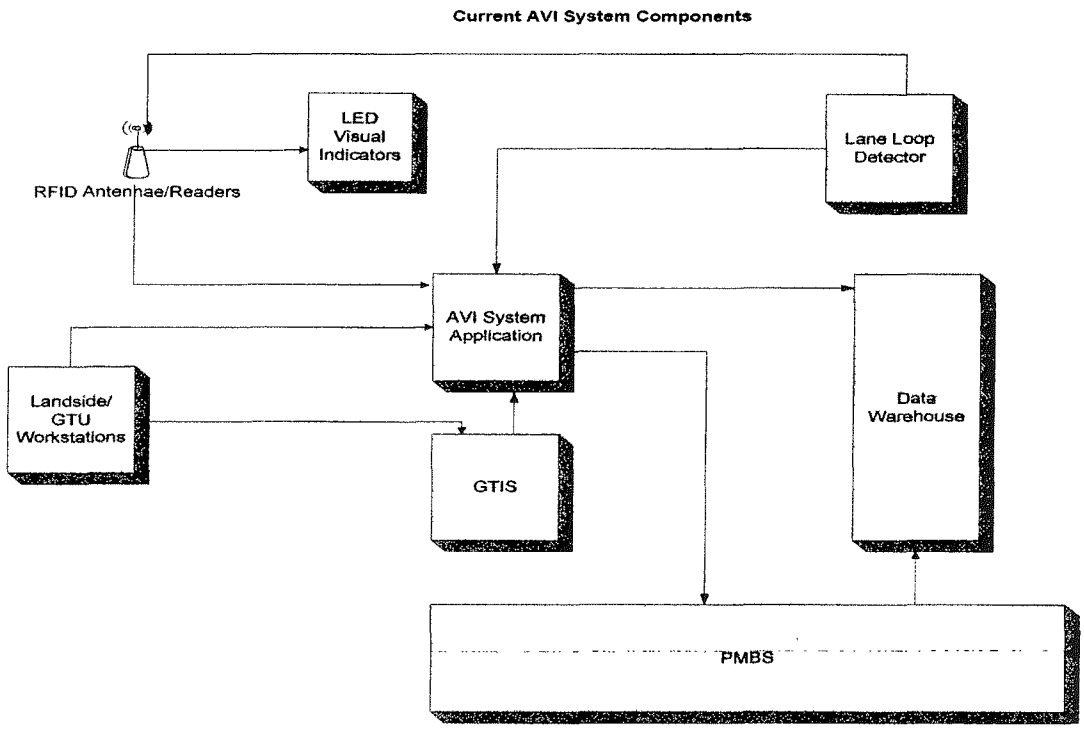


Figure 1.1 Current AVI System Components

RFID Infrastructure Overview

The current AVI system has 23 readers/antennae, 3,485 passive transponders, 1 Digi-Port Server and 10 Fiber modems converters (fiber to serial interface) on single strand fiber. All cabling infrastructure and ground loop detectors are maintained by the Airport. The readers/antennae are installed above the Airport's roadway on existing signage and are located at the Airport's entrance points to the terminals. There are two exceptions to the standard mounting: one occurs at Ground Transportation Staging Lot where the antenna/reader is mounted on a ground pole, and the other at the GTU service garage where the antenna/reader is suspended from the ceiling. The current AVI system uses two types of passive transponders, one that mounts to the top of the commercial vehicle, and one that affixes to the windshield. The current transponders are compatible with the RFID systems that are installed at SJC and OAK, and provide interoperability between the three airports. This allows GT Operators to operate their vehicles between the three Bay Area airports without having to have three separate transponders installed on their vehicles.

In the server room, all of the fiber connections from each enclosure are converted to an Ethernet connection, which is then connected to a Digi-Port converter to be converted to a serial port connection. The serial port connections are then attached to the AVI server. It should be noted that the Digi-Port serial port converter is at end of life and replacement parts are no longer available. The current AVI system is connected to the Airport's campus-wide network via the AVI server and the workstations used to enter and process data. The connections from the

roadway enclosures to the server room use existing fiber, but do not use the Airport's campus-wide network. The new system will be required to connect all equipment to the campus-wide network.

The AVI Antennae/Readers are located across the Airport at 8 roadway locations serviced by 5 enclosures. In addition, there is an antenna location installed in the service garage at the GTU building. The existing locations and components are identified in Figure 1.2, below. These 8 locations will be replaced with the new GTMS, as well as adding in additional locations, all of which are identified in Attachment 3. Each existing roadway location consists of the following components:

1. AVI Antenna/Readers installed above each lane at each location
2. Lane loop detectors or radar/ultrasonic detectors, depending on location
3. Reader controllers installed in the enclosures at each location
4. Fiber modem to convert copper signals to fiber signals
5. Fiber termination panel
6. Twisted pair copper cable to support connectivity of the antenna/readers and the equipment internal to the panels (including shielded and unshielded twisted pair copper cable (18 or 20 gauge), and Cat5 cable)
7. Fiber optic cable to connect each location back to the server head-end [62.5 micron fiber cable (6 or 12 strand)].

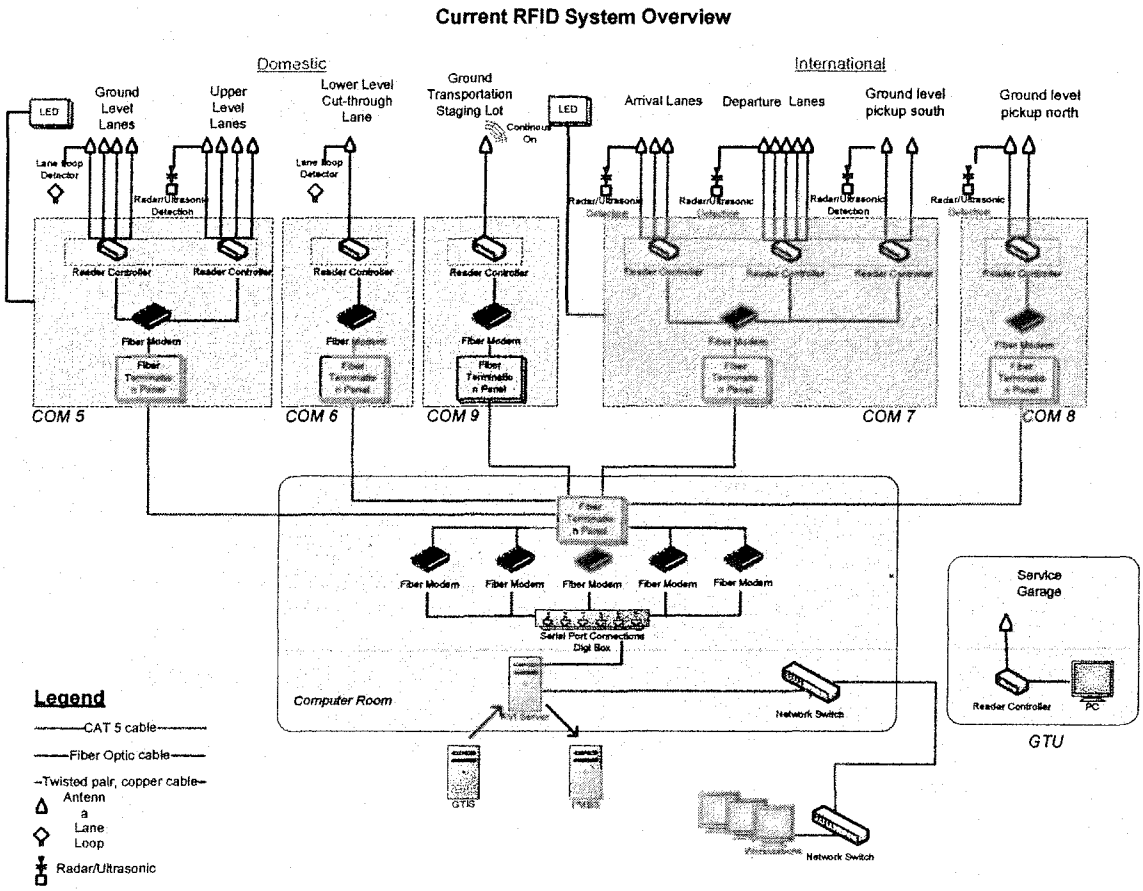


Figure 1.2 Current RFID System Overview

Existing Infrastructure Assessment Overview

During the course of creating this RFP, the Airport conducted an infrastructure assessment. Key findings of this infrastructure assessment include identifying components that will need to be replaced as well as components that could potentially be reused.

Some of the components that will need to be replaced:

a. Antenna/readers
b. Transponders
c. Reader controllers
d. RS232 interface boards and chassis
e. Twisted pair copper cable (system dependent)
f. Fiber modems
g. LED indicators
h. Digi-Port converter

Some of the components that could potentially be reused, depending on the system proposed through this RFP:

a. Reader enclosures in current locations
b. Antenna/reader enclosures
c. Fiber cabling
d. Lane loop detectors
e. Radar/ultrasonic sensors
f. Conduits
g. Pull boxes
h. Electrical surge protectors/UPS units

The Airport also conducted a Radio Frequency (RF) study to determine the current frequencies in use, and any potential interference that might occur with the new GTMS/TMS. This study showed that between 902 MHz – 928 MHz range, interference exists on the Airport, particularly with the automated train used to move passengers between terminal and the rental car center (AirTrain). Within this range, the least amount of interference was discovered in the 920 MHz – 928 MHz range. It will be incumbent on Transcore to ensure that there is no interference from other communication systems which would reduce the read-rate accuracy of the new GTMS/TMS.

Current Taxi Revenue System

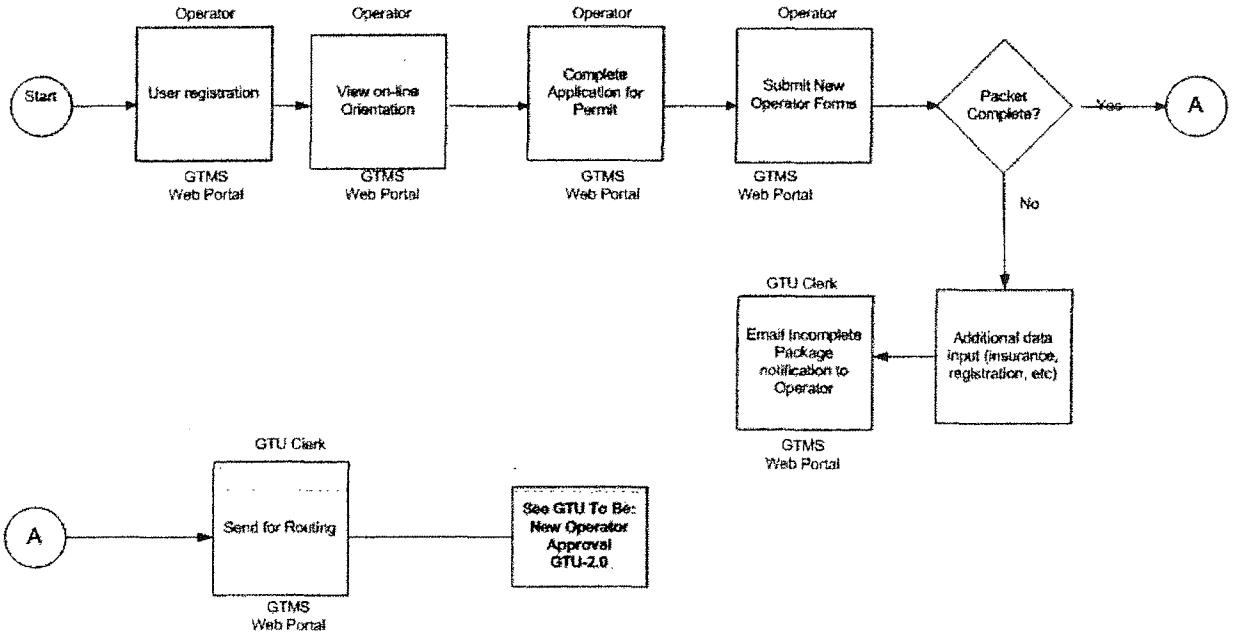
The Airport installed a Taxi Revenue System comprised of antennae/readers in the parking garage to monitor taxi cab activities in 2007. These readers are integrated with the existing SFO Smart card Taxi System (Smart cards), but are not connected to the existing AVI system. The purpose of these readers is to identify compressed natural gas (CNG) taxis to the Smart card System so that they are charged a different fee than non CNG taxis. Since the Smart card and the existing AVI system are not integrated, the trip information collected by the TRS hardware in the parking garage is not available to the existing AVI system. Reporting for these trip details is only available through the Smart card System. Replacing the Smart card System will require new RFID hardware to be installed at current TRS AVI antennae/reader locations.

EXHIBIT C – TO BE BUSINESS PROCESSES

GTU Process Flow Charts - Index

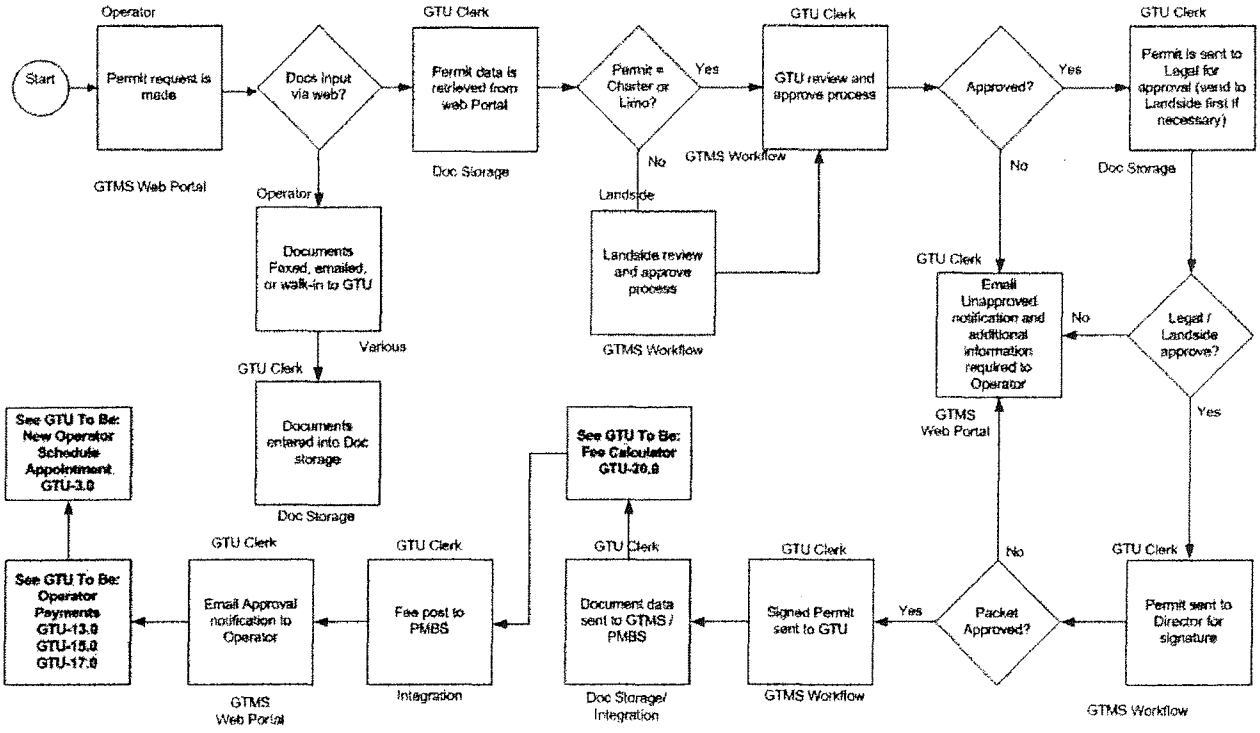
GTU 1.0 – To Be: New Operator - Permit Packet Submit

This diagram represents the future process to be performed by GTU when new operators wish to conduct business at SFO. Submitting required data and documents through the new GTMS web portal to GTU is the first step in the New Operator Permit process.



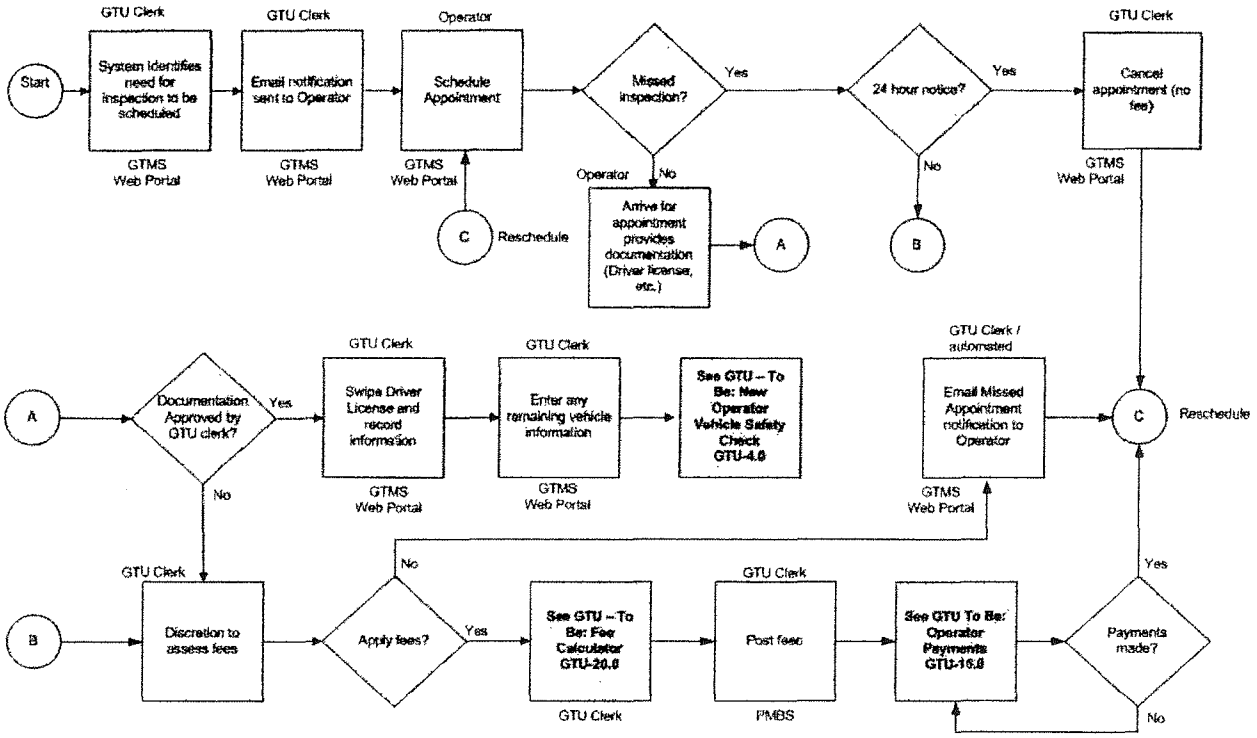
GTU 2.0 – To Be: New Operator - Permit Approval

This diagram represents the future process to be performed by GTU when new operators have submitted all data and documents and the permit must be routed for approval.



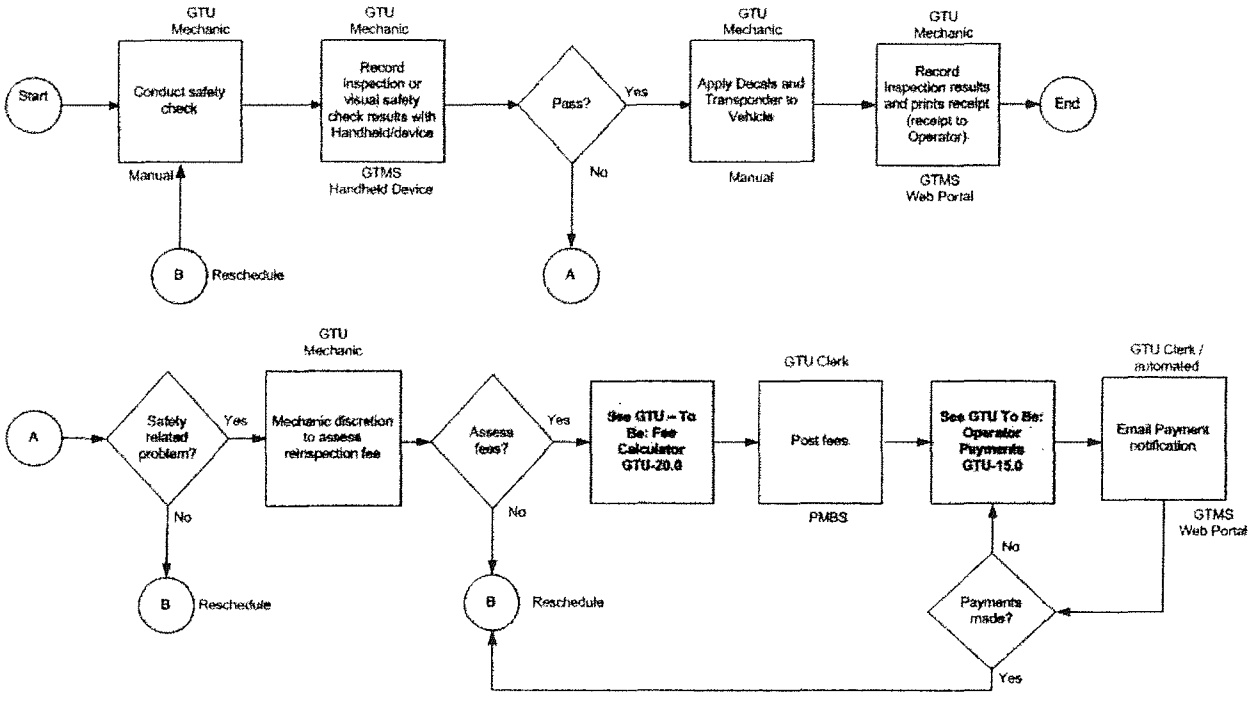
GTU – 3.0 – To Be: New Operator Schedule Appointment

This diagram represents the future process to be performed by GTU to schedule vehicles for inspection. It is performed for new operators and also for existing operators who add new vehicles to their fleet. Operators will use the GTMS web portal to schedule their inspection with GTU.



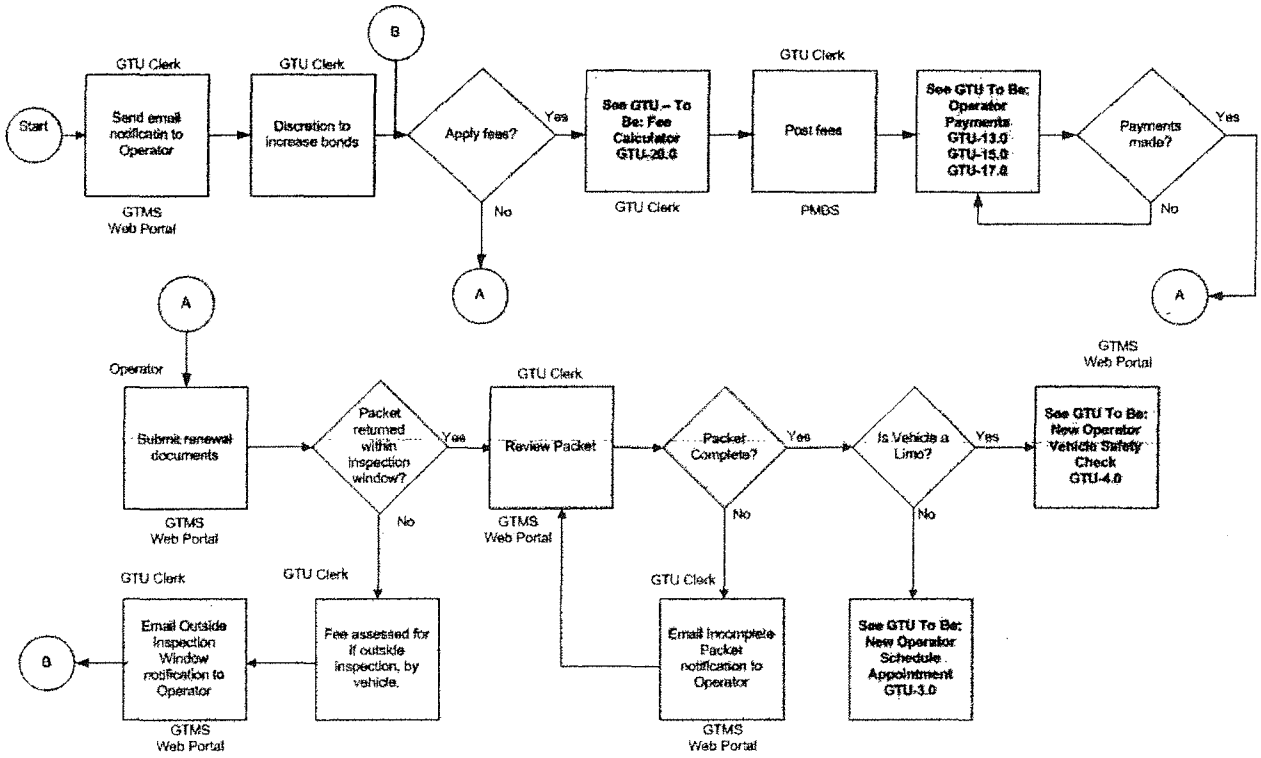
GTU – 4.0 – To Be: New Operator – Vehicle Safety Check

This diagram represents the future process to be performed by GTU after the operator has been scheduled for vehicle inspection(s) and has provided the required documentation.



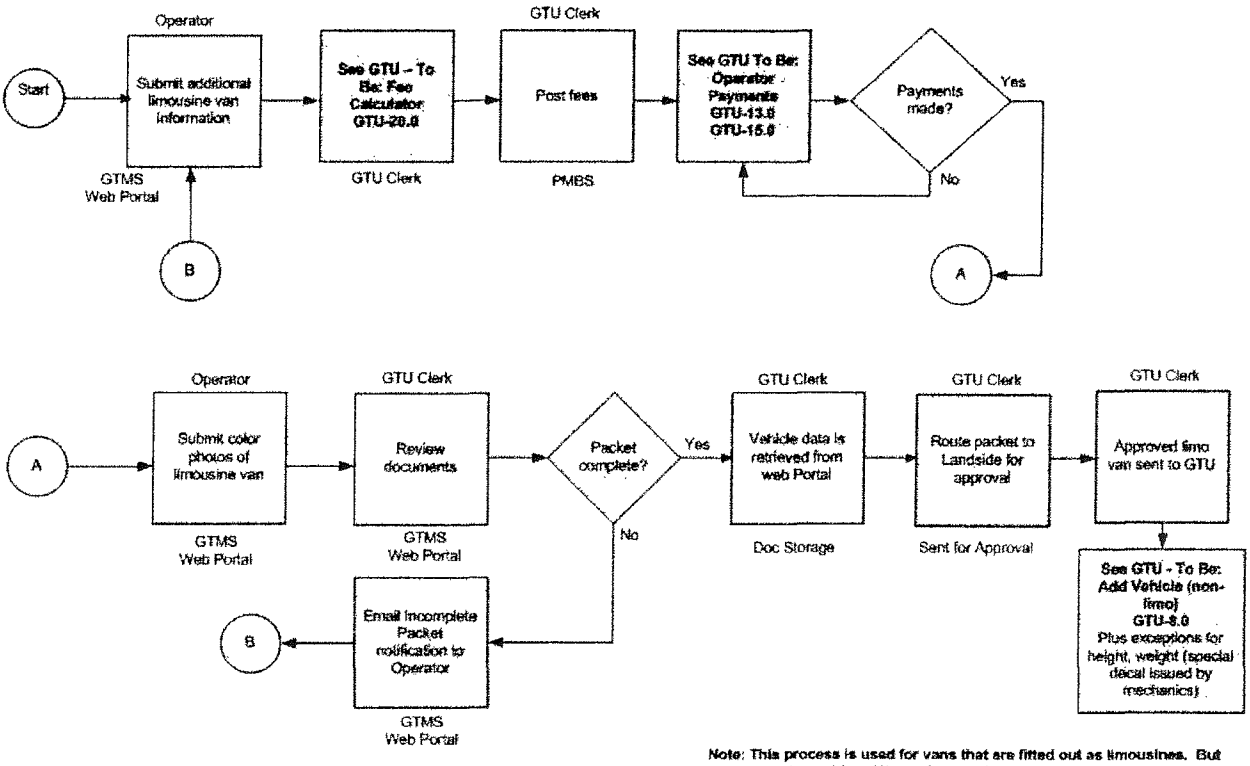
GTU – 5.0 – To Be: Annual Registration

This diagram represents the future process to be used by GTU for annual operator registrations. All GTU Operators are required to have their vehicles inspected and decals reissued annually. Specific paperwork is required for the annual registration process, and all transponders are checked to ensure they are functioning properly. Annual registrations are scheduled during different months for different vehicle types, so this process is ongoing and occurs throughout the year. Operators will use the GTMS web portal to input required data.



GTU – 6.0 - To Be: Add Limousine Van

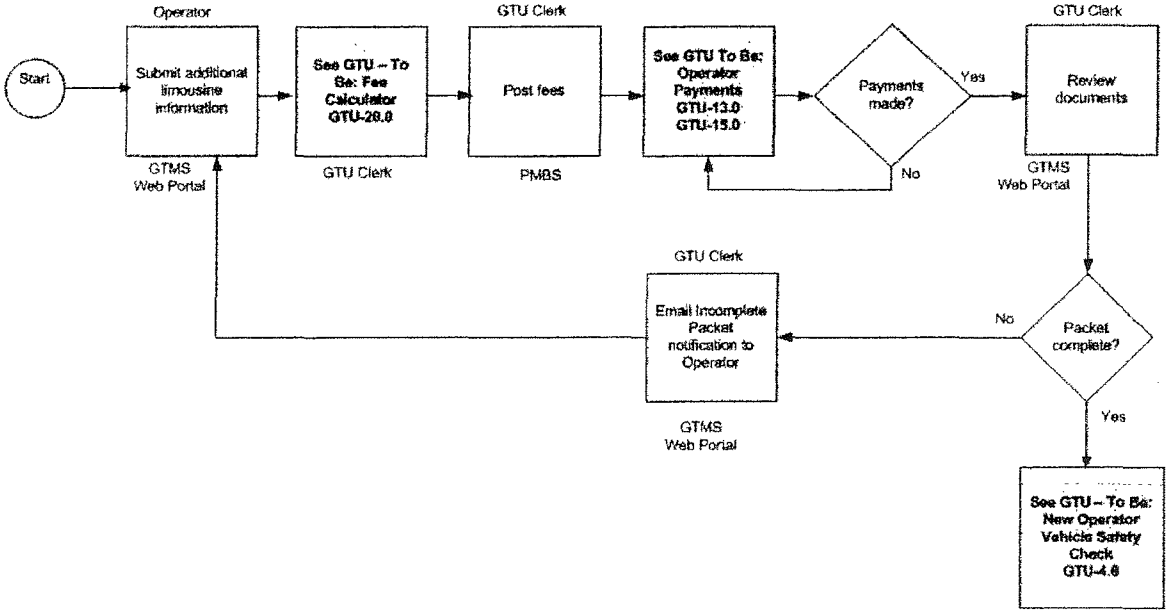
This diagram represents the future process to be performed by GTU when limousine operators wish to add vans to their fleet. Operators will use the GTMS web portal to input required limousine van data and submit the request.



Note: This process is used for vans that are fitted out as limousines. But they are still considered limousines and require approval.

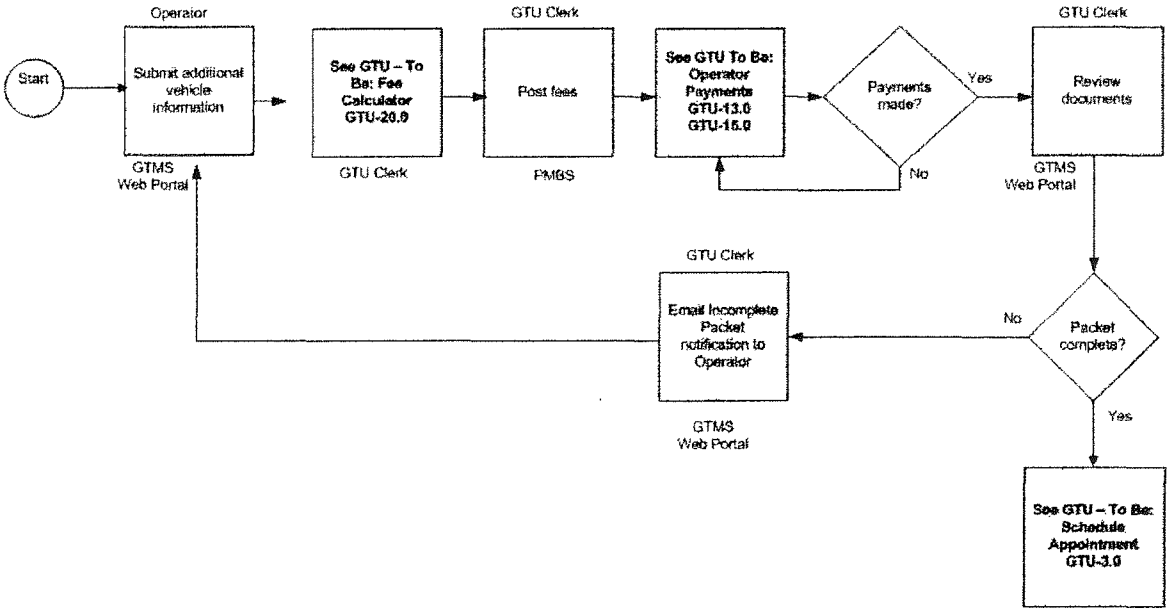
GTU – 7.0 – To Be: Add Limo

This diagram represents the future process to be performed by GTU when limousine operators wish to add limos to their fleet. Operators will use GTMS web portal to input the required limousine data and submit the request.



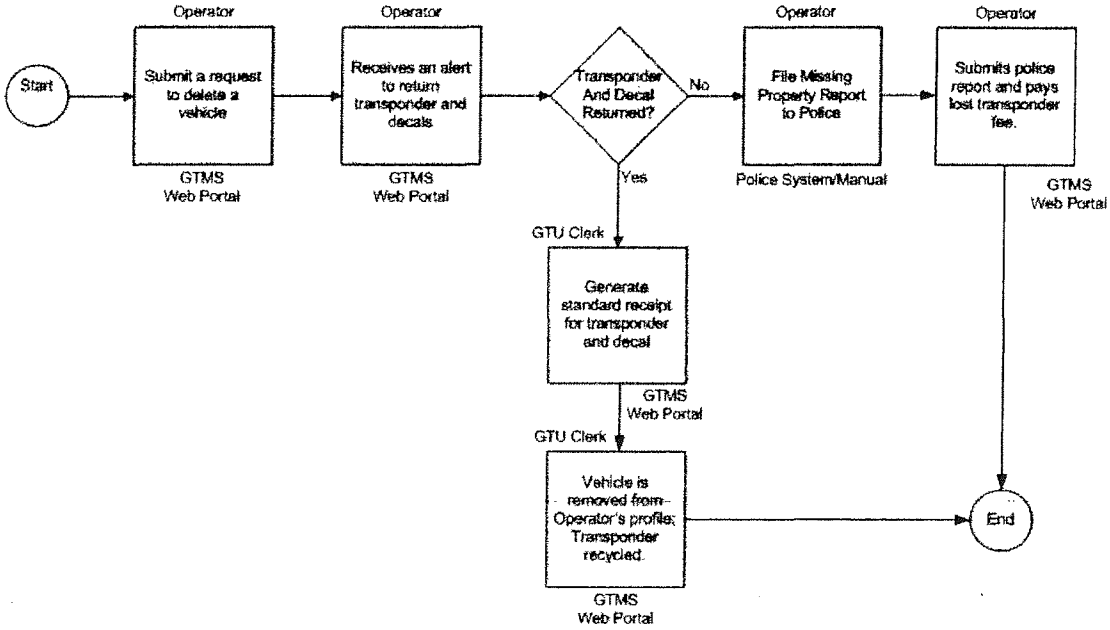
GTU – 8.0 – To Be: Add Vehicle (non-Limo)

This diagram represents the future process that will be performed by GTU when operators wish to add non-limo/van vehicles to their fleet. Operator will use the GTMS web portal to enter vehicle data and submit the request.



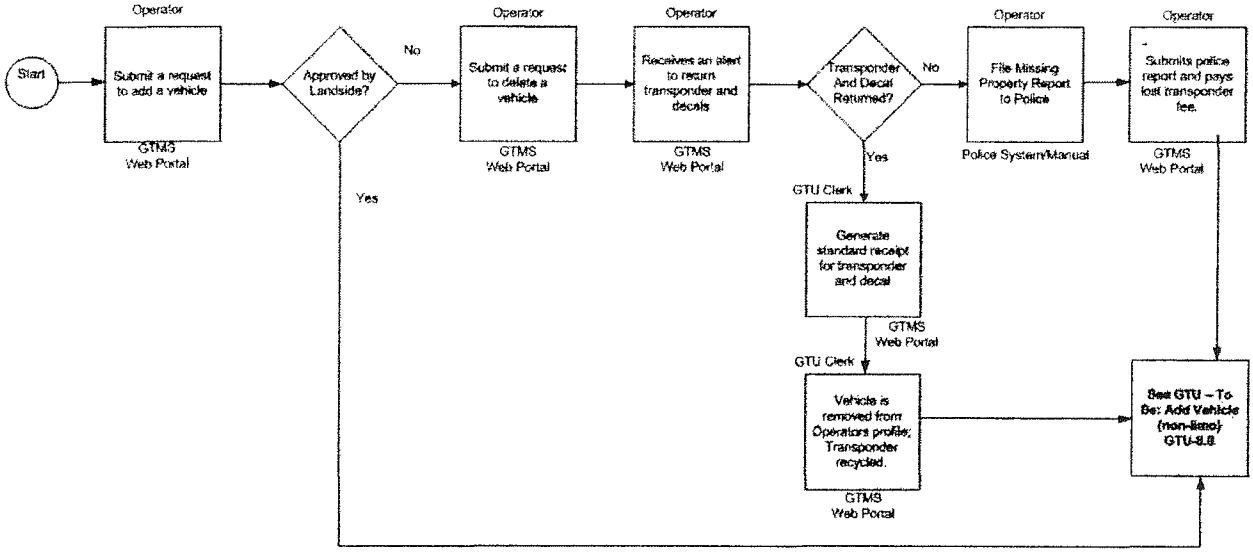
GTU – 9.0 – To Be: Delete Vehicle

This diagram represents the future process to be performed by GTU when a vehicle is removed from a fleet or an operator permit is terminated. The Operator will use the GTMS web portal to enter the data for the vehicle to be deleted and submit the request.



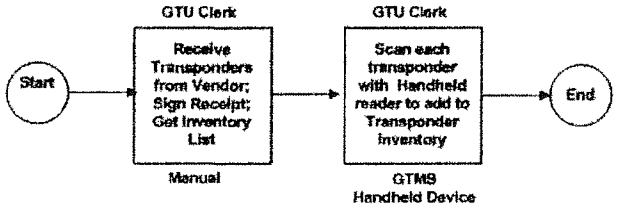
GTU – 10.0 – To Be: Replace/Add Shared-Ride

This diagram represents the future process to be performed by GTU when door-to-door operators wish to add/replace a vehicle in their fleet. Each current door-to-door operator is allocated a vehicle limit, and GTU may replace and/or add to their fleet as long as their limit is not exceeded. If the add request requires an increase in the allocation, Landside Ops approval is required.



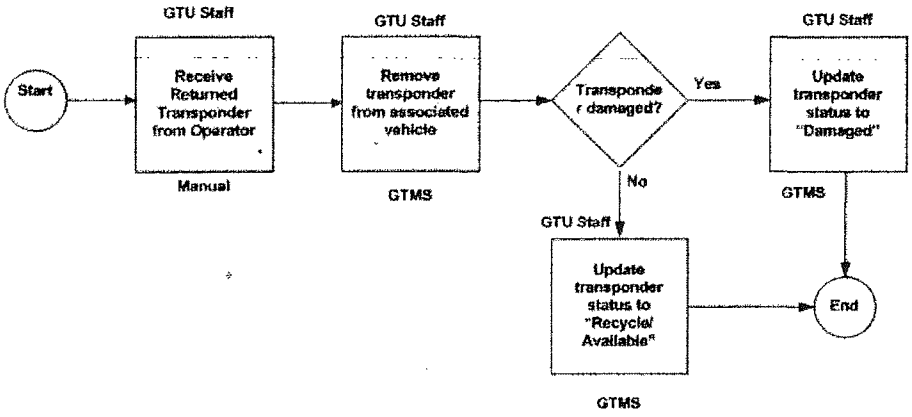
GTU – 11.0 – To Be: Transponder Inventory

This diagram represents the future process to be followed by GTU to record and activate new transponders in the new AVI system. New transponders can then be assigned to operators as needed.



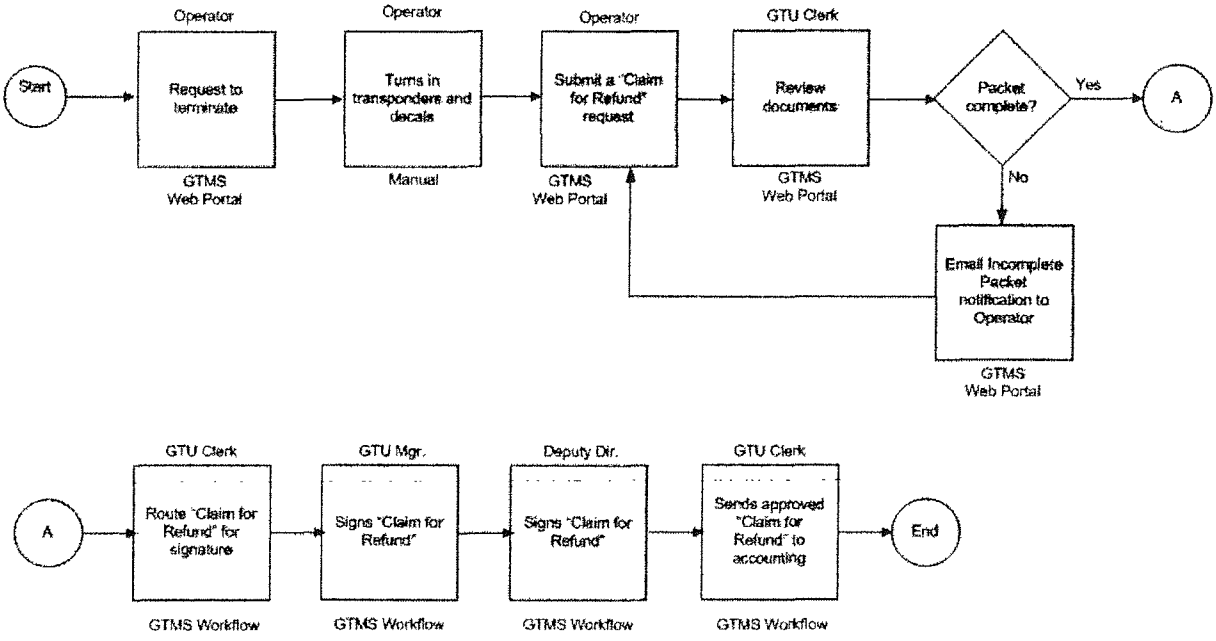
GTU – 11.0 – To Be: Transponder Recycle

Transponders are returned to SFO when operators cease operations. These transponders, if functioning properly, are returned to the transponder inventory so they can be issued to another operator.



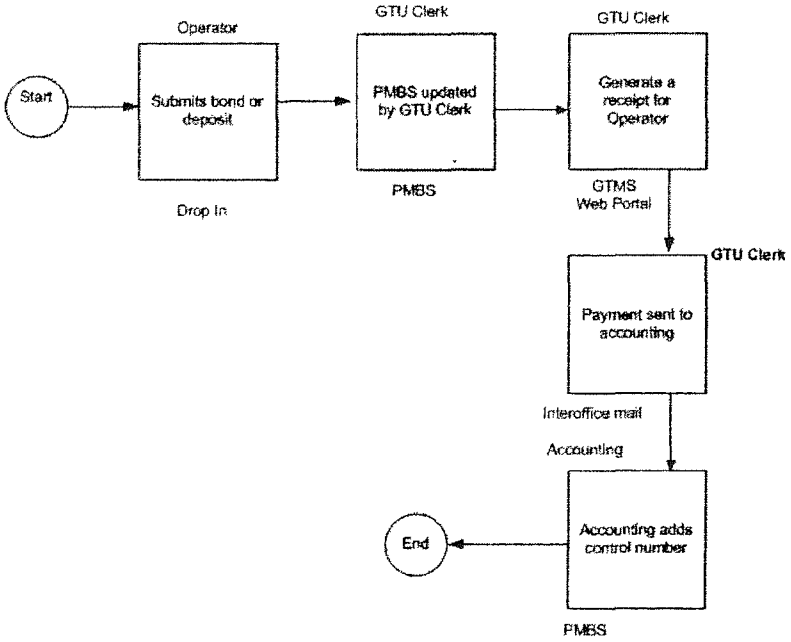
GTU – 12.0 – To Be: voluntary Terminate Operator

This diagram represents the future process for GTU terminations. Terminations of operator permits can occur as a result of operator request, SFO GTU request, or because of default. The majority of terminations are the result of operator requests.



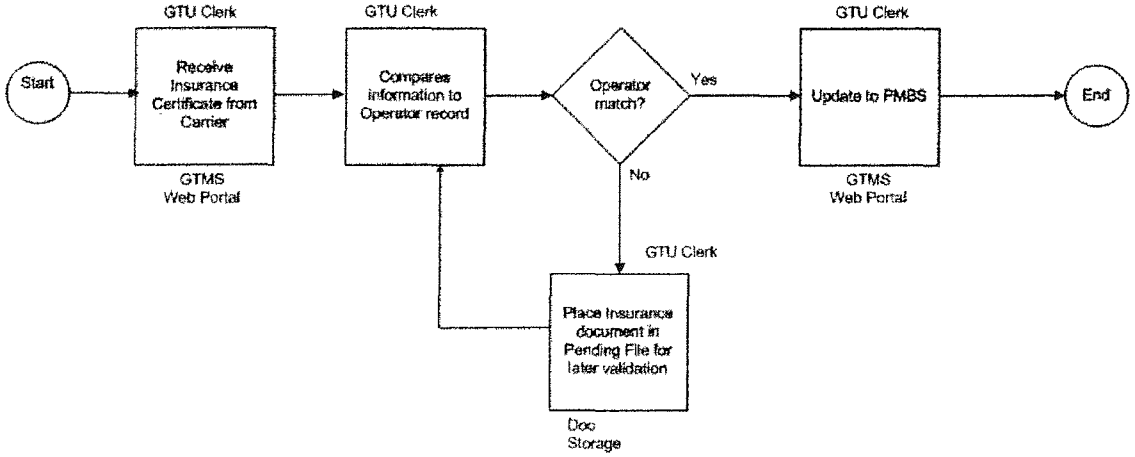
GTU – 13.0 – To Be: Bonds and Deposits

This diagram represents the future process that will be performed by GTU when operators submit surety bonds and/or cash deposits, as required by SFO. These are refundable monies.



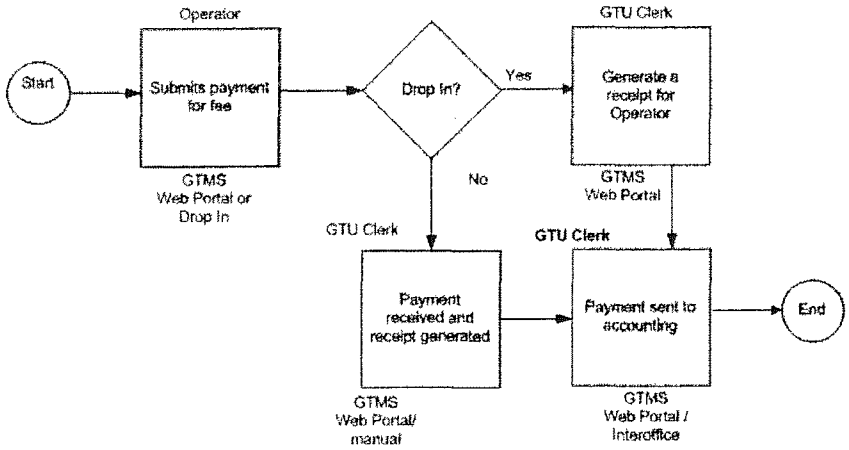
GTU – 14.0 – To Be: Insurance Tracking

This diagram represents the future process that will be completed when Operators submit new or renewal insurance information to GTU. This is a high-volume process and renewal and cancellation notices will be conducted through the GTMS web site.



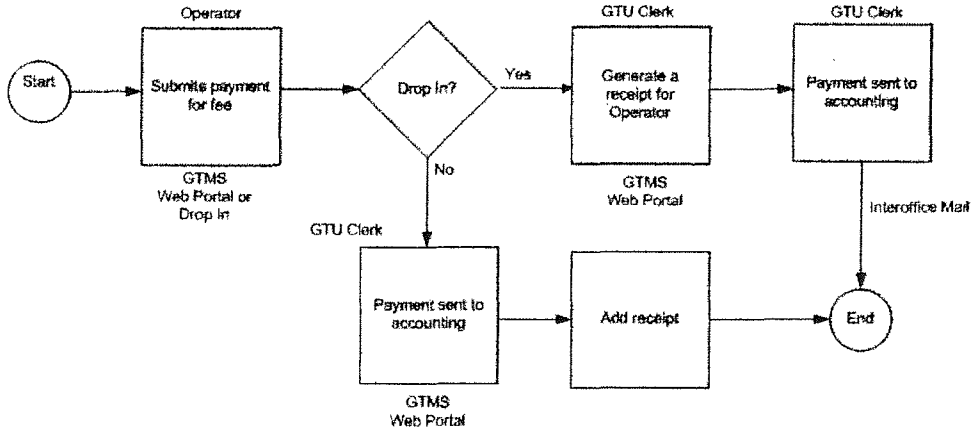
GTU – 15.0 – To Be: Fee Process

This diagram represents the future process that will be performed by GTU when operators are assessed fees.



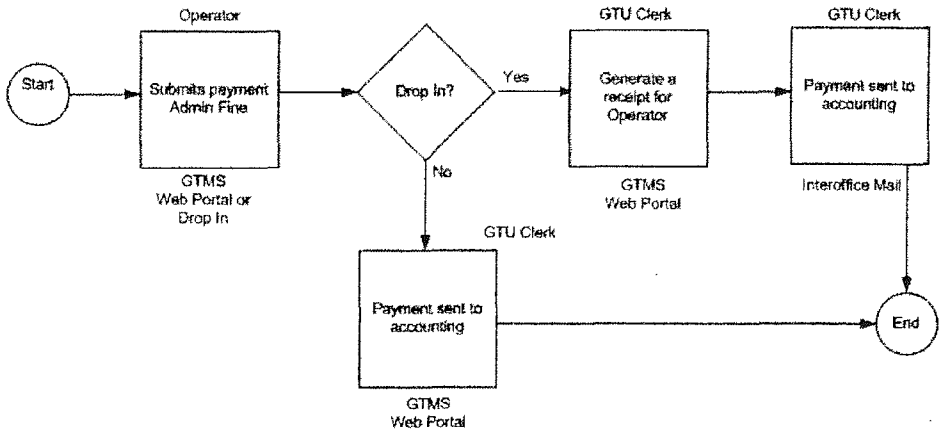
GTU – 16.0 – To Be: Trip Fee Payment Process

This diagram represents the future process that will be performed by GTU after receiving fee payments from operators. The payments will be received by GTU and sent to Accounting where they will be posted in PMBS.



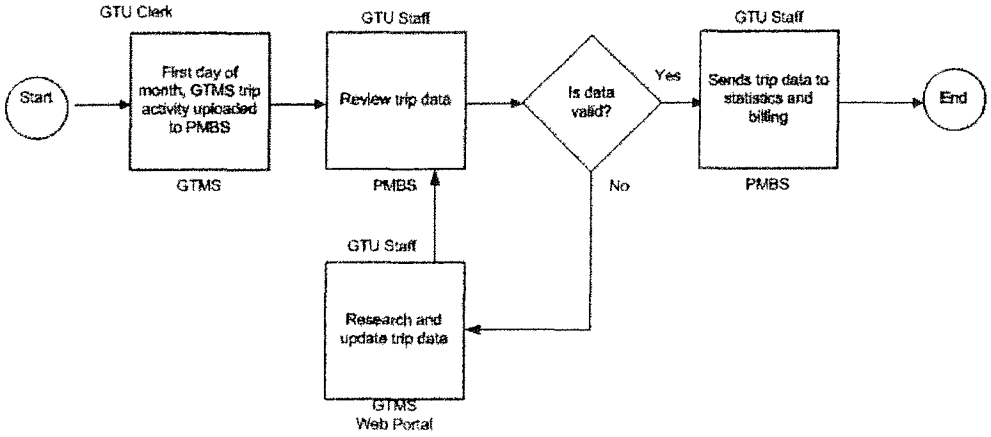
GTU – 17.0 – To Be: Admin Fines Receipts

This diagram represents the future process that will be performed by GTU when operators submit payment for administrative fines that have been assessed by Landside Operations at SFO.



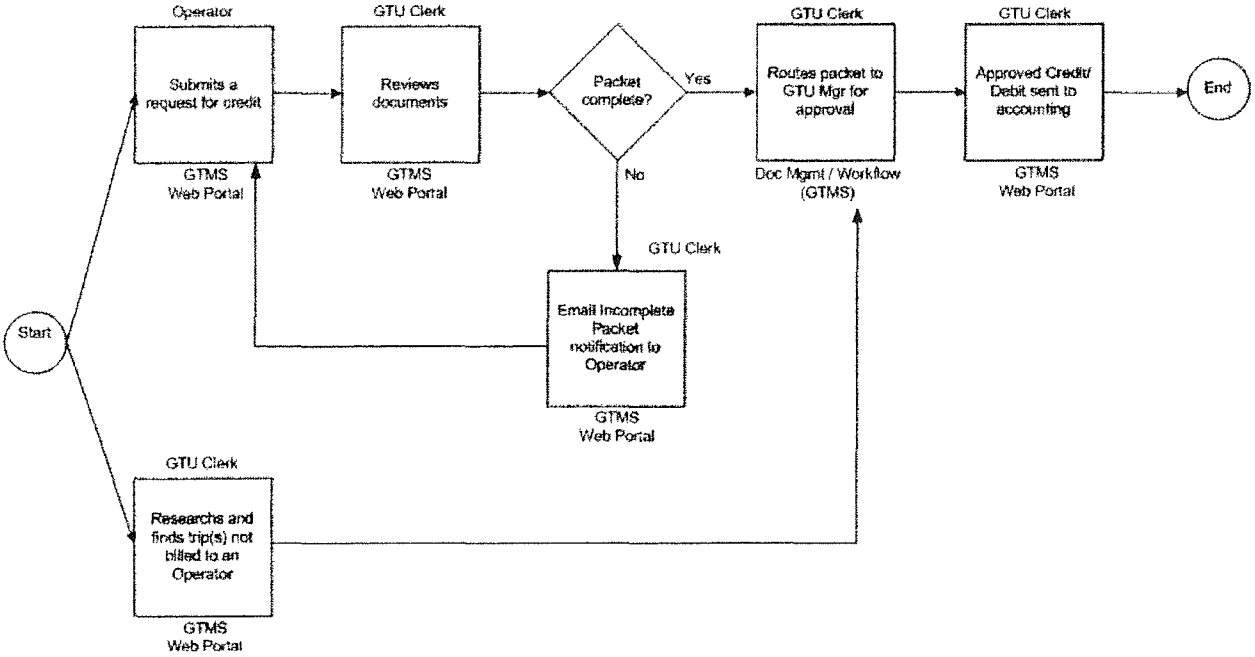
GTU – 18.0 – To Be: Monthly Billing

This diagram represents the future monthly billing process performed by GTU. Operators are billed on a monthly basis for trips that are recorded by the AVI readers placed near the SFO terminal roadways. Operator rate is determined by vehicle type.



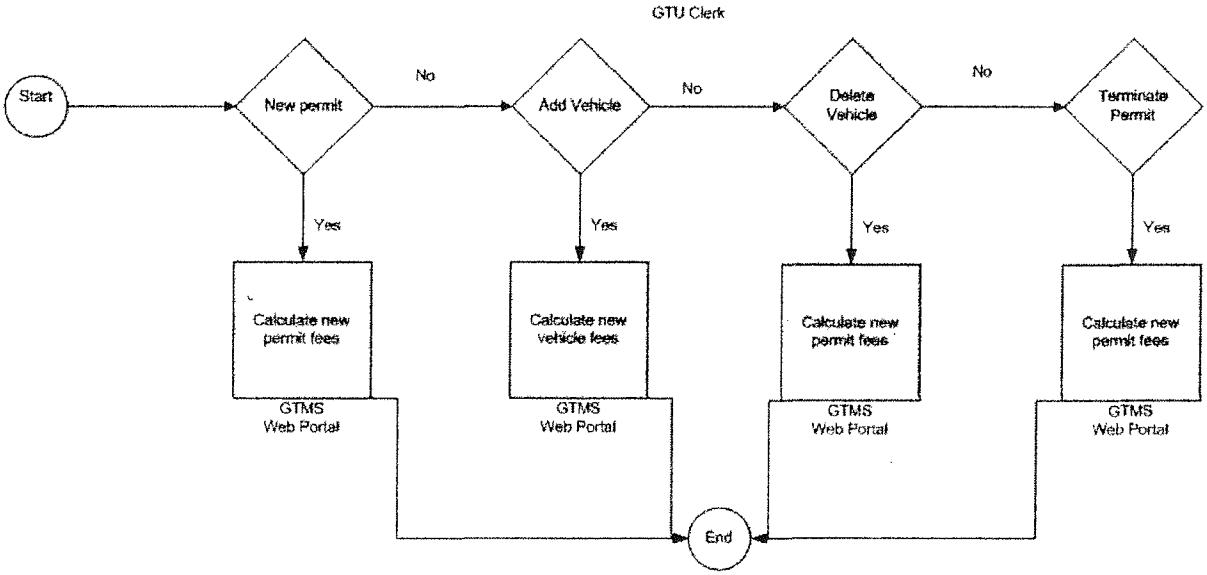
GTU – 19.0 – To Be: Credit/Debit

This diagram represents the future credit/debit process that will be performed by GTU as requested. Credits and debits are requested by different sources and for different reasons, including invoice mistakes, changes in vehicle type, and missing transponder trips. Most debits and credits are due to erroneous AVI trip data.



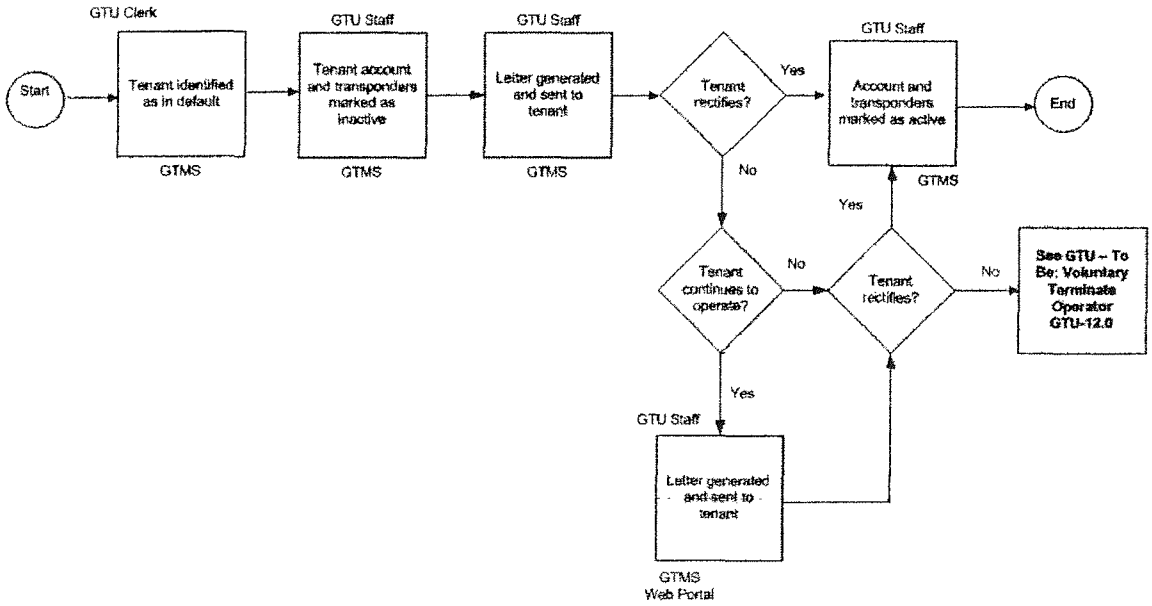
GTU – 20.0 – To Be: Fee Calculator

This diagram represents the future fee calculation that will be done by the GTMS system. The Fee Calculator is used to calculate how much money the operator needs to pay during the new permit and throughout the life of the permit. The fee is based on the fee schedule and the calculation of the type of permit and AVI and PMBS databases.



GTU – 21.0 – To Be: Involuntary Suspension Process

This diagram represents the future involuntary suspension process performed by GTU. The objective is to cease an operators activity at the airport and on the web portal until the operator resolves his/her default permit.



GTU – 22.0 – To Be: Trusted Broker Process

This diagram represents the future trusted broker process performed by GTU. The objective is to create a list of insurance brokers who are authorized to provide insurance to vehicle operators at the airport.

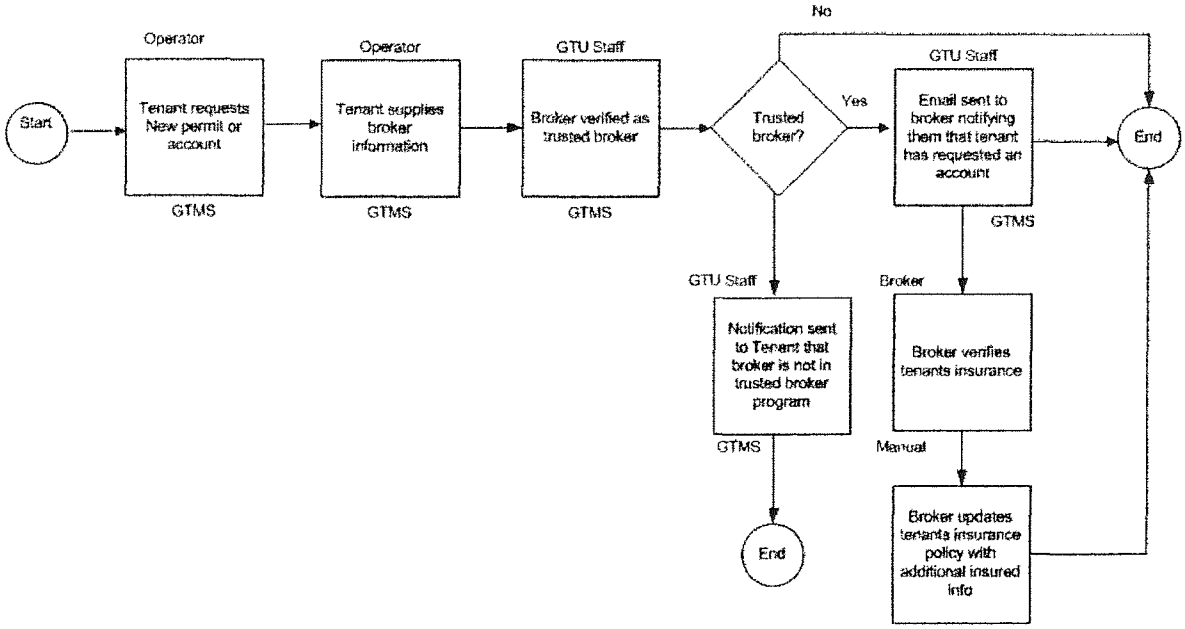


EXHIBIT D – TRANSPONDER TYPE

Neology ISO 18000-6C Tolling Transponder

The Neology model NEO104 windshield tag is a state-of-the-art RFID product delivering impressive performance, security, and durability surpassing other types of tags. Neology's product incorporates the best performance tag in the industry with the lowest impedance and the lowest power consumption

Neology's significant experience with windshield tags has lead to several innovations and refinements. Unlike competitive products, Neology utilizes materials stabilized against UV light for resistance to fade and yellowing with age. The RFID chip in the center of the tag is protected by a unique epoxy encapsulate, sealing the sensitive chip against air and moisture intrusion.

Fully flexible branding for SFO or other agencies will be easily accomplished with full color printing available. The simple and compact form factor allows for ease of installation and will not interfere with driver sight lines when installed as directed. Unlike tape-attached products, there is effectively no possibility for the tag to become dislodged or fall from the interior of the windshield. The product is seamless from the user standpoint as the completely "passive" nature of the tag (no battery is supplied nor is it required) means there are no service or maintenance requirements. Once the tag is affixed to the vehicle, it is designed to destruct if an attempt is made to transfer the product to another vehicle.

The Neology 104 sticker tag delivers these features and benefits:

Feature:

- Minimalist "sticker-type" form factor
- Robust construction
- UV protection (light stability, no sun block required)
- High-resolution color printing
- Completely passive, no battery needed
- Typical 10-year life expectancy

Benefit:

- Cost-effective to deploy and simple, non-intrusive installation.
- Low cost issuance and personalization
- Shippable through lightweight regular mail
- Impressive branding and unsurpassed visual appeal
- Security elements provide additional anti-counterfeit security and a high-quality image

IC Specifications	
Chip type	H3
EPC Memory	96-EPC Bits, extendable to 496 Bits
User Memory	512 User Bits,
Tag Identifier	64 Bit Unique TID
Access Password	32 bits
Kill Password	32 bits
EEPROM data retention	10 years
EEPROM Write Endurance	100,000 cycles
Physical Characteristics	
Tag dimensions (approx.)	11 0x70 mm (LxW)
Antenna Material	Copper
Performance Characteristics	
Operating Frequency	902 - 928 MHz
Supported protocol	ISO/IEC 18000-6C and EPC Global Gen 2 (V 1.2.0)
Read range	up to 11 meters at FCC Part 15
Environmental Characteristics	
ESD Voltage Immunity	+/-2kV
Operating Temperature	-40 to +85°C
Storage Temperature	-50 to 95°C
Relative Humidity	95%

EXHIBIT E – GTMS/TMS INTERFACE SPECIFICATION

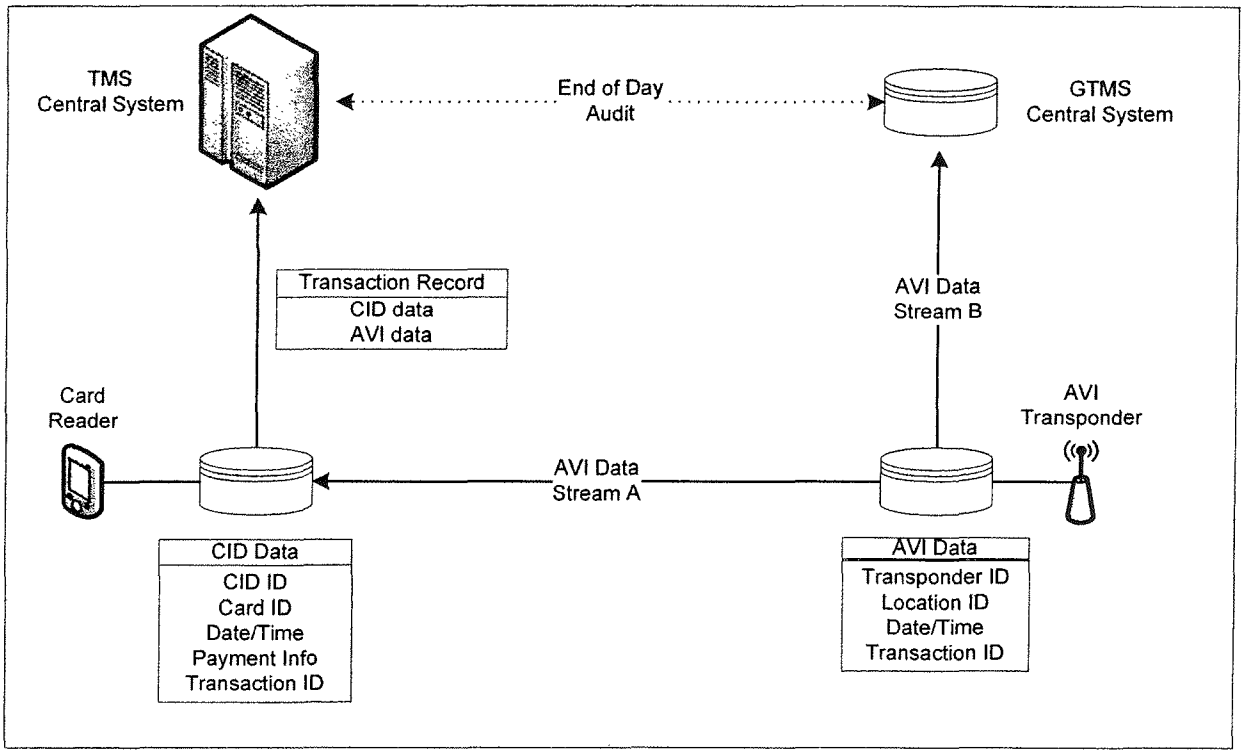


Figure 2 - AVI Interface

1. Communications Protocol

The GTMS shall communicate with the CID using TCP/IP or another approved equal.

2. System Clock

Each system component shall synchronize its internal clock with the TMS Central System or other approved equal.

3. Data Format

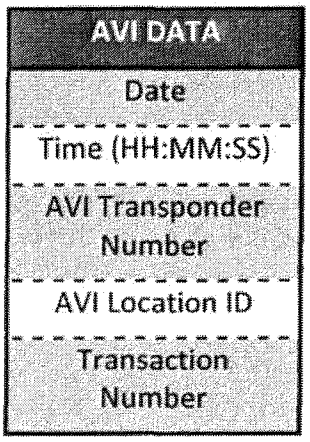
GTMS data shall be delivered to the CID in XML or HTML format.

4. Data Fields

The GTMS shall generate two data streams for each transaction.

Data stream A shall be sent to the CID. Each transaction record sent to the CID shall contain the elements shown in Table 4 – GTMS Data Fields.

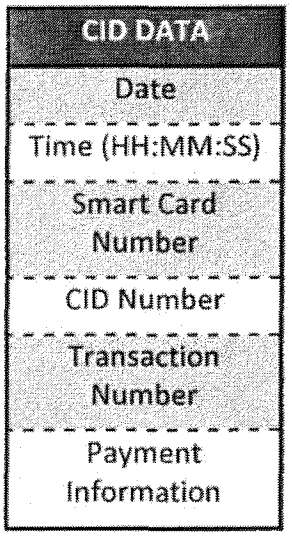
Table 4 – GTMS Data Fields



Data stream B shall be sent the GTMS and shall be defined by the GTMS contractor

The CID shall create a data record consisting of the elements shown in Table 4 - CID Data Fields

Table 4 - CID Data Fields



The CID shall also receive the GTMS data at the time a transponder is detected and create a combined data record. Each combined data record shall contain all CID and GTMS data described in this section. The combined record shall be transferred in real time to the TMS Central System.

5. Timing

AVI transaction records shall be sent to the CID in real time. Combined data records from the CID shall be sent to the Central System in real time. The GTMS shall aggregate AVI transaction

records from data stream B into a batch file daily. This file shall be sent to the TMS Central System on a daily basis for audit purposes.

Taxi Management System Specification

San Francisco International Airport

Prepared by SFO Landside Operations

DOCUMENT CONTROL

Revision	Revision Date	Description	Author
0.1	8/3/2010	Initial Draft	Booz Allen Hamilton
0.2	8/20/210	Revised Draft	Booz Allen Hamilton
1.0	10/1/2010	Changes made following review meetings with SFO staff and potential TransCore Sections to be included in future revision: 1.) Specification for communication with DMV pull list 2.) Scheidt and Bachmann gate communication interface	Booz Allen Hamilton
2.0	6/24/2011	Additional scope: Addition of a GPS solution for 'short trip' identification Removal of Infrastructure requirements	Landside Operations
3.0	3/20/2012	Contract Specification	Landside Operations

TABLE OF CONTENTS

LIST OF ACRONYMS

ACH	Automated Clearinghouse
ADA	Americans with Disabilities Act, as amended, and all regulations
ADAG	Americans with Disabilities Act Guidelines
API	Application Programming Interface
ASCII	American Standard Code for Information Interchange
ATE	Automated Test Equipment
AVI	Automated Vehicle Identification
AVM	Add Value Machine
CDR	Conceptual Design Review
CDRL	Contract Data Requirements List
CID	Card Interface Device
COS	Card Operating System
CMS	Card Management System
CS	Central System
CPU	Central Processing Unit
CSC	Contactless Smart Card
DES	Data Encryption Standards
DIS	Digital Imaging System
DMS	Dynamic Messaging System
DTE	Diagnostic and Test Equipment
EFT	Electronic Funds Transfer
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMV	Europay MasterCard Visa
EN	European Norm (Standard)
FAT	First Article Testing
FACI	First Article Configuration Inspection
FCC	Federal Communications Commission
FDR	Final Design Review
FRT	Failure Review Team
GPS	Global Positioning System
GTMS	Ground Transportation Management System
HCR	Handheld Card Reader
ISO	International Standards Organization
I^3T	Interface and Integration Inspection and Testing
I^2T	Installation Inspection and Testing
LAN	Local Area Network
MAC	Message Authentication Code
MCBF	Mean Cycles Between Failures
MTBF	Mean Time Between Failures
NDA	Non-Disclosure Agreement

NTP	Notice to Proceed
ODBC	Open Database Connector
PCI	Payment Card Industry
PDR	Preliminary Design Review
PIN	Personal Identification Number
QA	Quality Assurance
QC	Quality Control
SFMTA	San Francisco Municipal Transportation Authority
SFO	San Francisco International Airport
SNMP	Simple Network Management Protocol
SPU	Smartcard Processing Unit
SQL	Structured Query Language
TOT	Taxi Office Terminal
TMP	Transition Management Plan
TMS	Taxi Management System
TMSE	Taxi Management System Equipment
UPS	Uninterruptible Power Source
WAN	Wide Area Network

LIST OF DEFINITIONS

The following terms shall have the meanings given to them below unless a contrary intention is expressly indicated in a specific provision of the Specification (in which case such contrary intention shall be limited to and only apply to that specific provision and not other parts of the Specification):

1. TMS Communications Network: The communications network, including all hardware, software and communications media required for interconnection and for the transmission of data between all parts of the TMS, including LAN segments within all SFO and SFMTA facilities and the TMS WAN.
2. TMS LAN: This includes all hardware and software necessary to support data communications between all TMS and other components as part of the TMS within a specific geographic facility such as a parking lot or the Central System, as well as all communications equipment necessary to interface to the TMS WAN for support of data communications between all parts of the TMS.
3. TMS WAN: Includes communications media necessary to interconnect all segments of TMS LANS servicing data communications between all parts of the TMS.
4. Central System: All parts of the TMS, other than the TMSE installed in driver accessible areas including software installed in such TMSE.
5. Contract Drawing List: List of all drawings to be provided by TransCore to SFO/SFMTA.
6. Contract Document List: List of all documents to be provided by TransCore to SFO/SFMTA.
7. Credit/Debit: "credit/debit" means credit and debit combined, credit only and debit only cards and payment systems including without limitation MasterCard, Visa. Discover and EMV
8. Data Transfer: The process of uploading and downloading
9. Download: The act or process of data passing in the direction from a higher-tiered device toward a lower-tiered device
10. SFO: The contracting authority or "Owner" of the TMS being procured.
11. Driver: Taxi Driver in the SFO Taxi System
12. Schema: For purposes of this Specification, schema means the structure of a database system, described in a formal language supported by the database management system, and in a relational database, the schema also defines the tables, the fields in each table, and the relationships between fields and tables. The schema also includes a graphical depiction of the database structure.
13. Upload: The act or process of data passing in the direction from a lower tiered device towards a higher tiered device
14. City: City and County of San Francisco

15. A-card: An A-card is a smart card after it has been issued to a driver with picture and personalized data (such as ID number)
16. Smart Card: Contactless smart card stock ready for issuance
17. Transaction: A transaction is defined as a record created when data is written to the A-card. Three types of transactions conducted by the TMS are:
    a. Add or deduct value
    b. Informational data used to calculate appropriate fee
    c. Event data that triggers an action, such as block, unblock, or autoload

1. INTRODUCTION

The San Francisco International Airport (SFO) and the San Francisco Municipal Transportation Authority (SFMTA) are jointly entering into an effort to modernize the City's A-card program and taxi fare collection environment at the airport. This specification details the taxi management and revenue collection requirements of the overall Ground Transportation and Taxi Management System (GTMS/TMS) for San Francisco International Airport.

Taxi drivers operating within the City and County of San Francisco are required to be permitted by the SFMTA as part of the A-card program. As part of the registration process to get an A-card, each applicant is required to fill out an application, provide a copy of their driver's license, and submit to a background check. Following review of the background check and DMV driver's history, approved applicants are issued an A-card, which authorizes them to drive a taxi. Approved drivers receive a temporary card until their permanent card is delivered. Drivers are required to pay an initial and subsequent annual fee in order to maintain their registration.

SFO requires that taxi drivers pay a fee to pick up a passenger at the airport. The fees are currently collected using smart cards. Cards are issued to individual cab drivers through a specific registration process that requires presenting the airport with a current driver's license and A-card, and completing system training. Cards are loaded with value at AVMs in the overflow taxi lot at the airport.

SFO and SFMTA wish to integrate the A-card program and airport fee collection system by issuing the A-card on a contactless smart card that will also be used for fee payment. The new program will consist of an integration of discrete systems (both new and existing) providing data to a consolidated management system. Administration of the A-card program, as well as of the Taxi Management System, shall be greatly simplified by the merging of these two programs.

Non-SF Taxis

Legitimate taxis sanctioned by various Bay Area municipalities/governments, other than the City and County of San Francisco's SFMTA, are allowed to pick-up passengers at SFO when prearranged by a passenger. TransCore shall provide a way to collect trip fees of varying amounts from the drivers of these taxis, as well as for Taxi Dispatchers to verify their paid/non-paid status. Ideally, a non-SF taxi driver will be able to arrive at the airport with an electronic (mobile device) or a one-time use paper receipt identifying them as a paid taxi for that specific trip. The Non-SF taxi driver will show this receipt to the Taxi Dispatcher in order to occupy the taxi loading zone. It is also expected that a non-SF taxi operator be able to pay online or telephone, mobile or otherwise. All non-SF taxi trips must be included in trip data and statistics.

1.1 CONCEPTUAL ARCHITECTURE

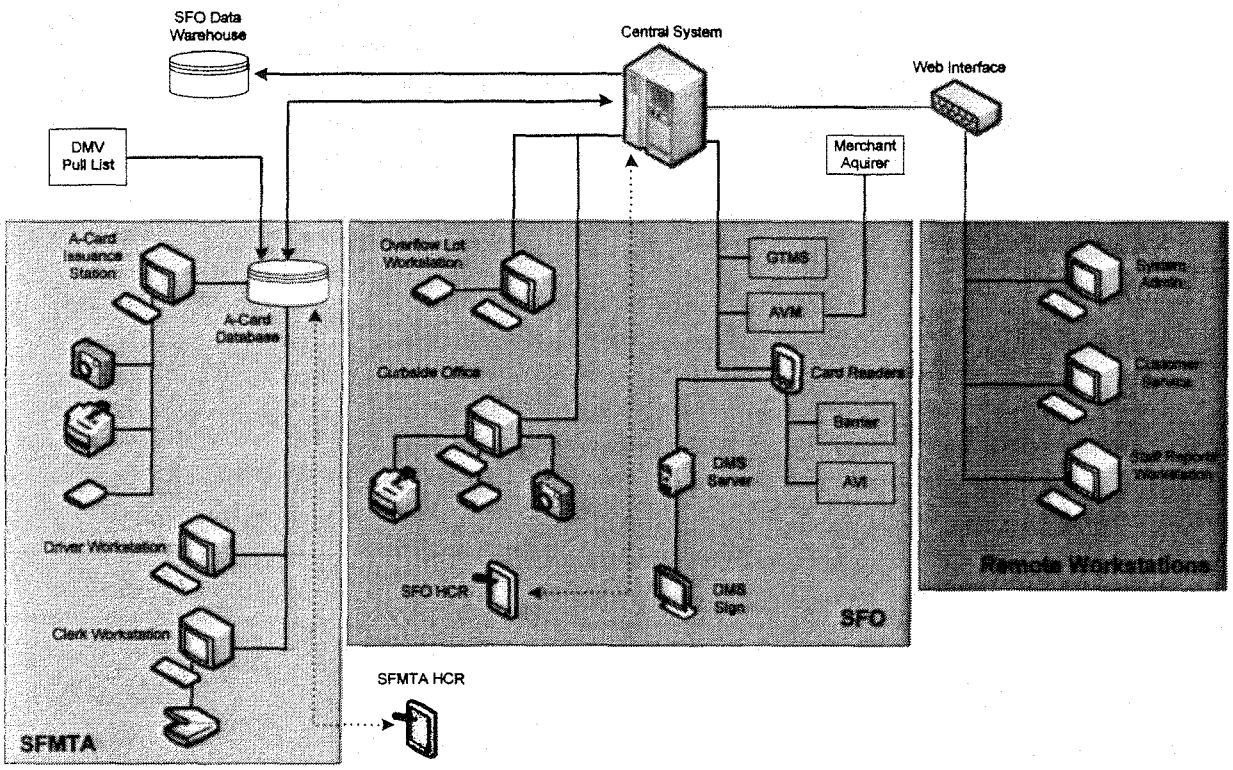


Figure 1 – TMS Architecture

The conceptual architecture of the desired TMS is presented in Figure 1 – TMS Architecture. Where possible, existing devices and infrastructure shall be retained and integrated into the new TMS.

Workstations residing at SFMTA shall serve as the primary registration point for drivers entering the A-card program. Drivers shall be able to enter the required registration information, which will be verified by an SFMTA clerk before being entered into the database. SFMTA shall have the ability to request and receive information from the DMV driver history list and add it to the driver's cardholder account in the A-card database. As part of the registration process, SFMTA shall have the ability to scan driver's licenses and take pictures of applicants. Both the scan and photo shall be added to the cardholder's account information in the A-card database.

Workstations residing at SFO shall serve as the primary resolution points for driver disputes. The TOT and overflow lot workstations shall have access to the A-card database and recent card and driver histories in order to resolve disputes and clear card blocks. Field devices shall provide means of fare payment, data collection, and integration with the GTMS.

Remote workstations shall serve as access points for system administrators, SFMTA/SFO staff members, and customer service representatives. These access points shall have the ability to manage system functionality, investigate cardholder history and account information, and report on system usage data.

Specific functionality of each workstation, device, and subsystem is defined in this document.

1.2 GENERAL REQUIREMENTS

1.2.1 ADA Compliance

The TMS, including all its operable components and sub-components, shall comply with all applicable sections of the Federal ADA and the California Title 24 Requirements using the version from the date of the RFP. The equipment shall also meet the requirements of ADAG.

Descriptions and drawings of the ADA, California Title 24, and Proposed ADAG compliant TMSE shall be submitted for review and approval as part of required documentation (CDRL 1, ADA Compliance Report).

The TMS, when installed, must as a whole comply with ADA requirements and any state and local jurisdiction requirements for accessibility and use by individuals with disabilities. TransCore shall be responsible for determining which parts of the TMS need to be ADA compliant. TransCore shall provide SFO with an ADA compliance analysis report, CDRL 01.

1.2.2 Payment Card Industry Compliance

All credit and debit card acceptance hardware and software as well as integration of design with the existing SFO network shall be Payment Card Industry Data Security Standard (PCI DSS) compliant and listed on the PCI Security Standards Council's list of Approved PIN Entry Devices. All applications that store, process or transmit credit card information as defined by the PCI Security Standards Council will appear on the PCI Security Standards Council's list of Validated Payment Applications listed at www.pcisecuritystandards.org/security_standards/vpa.

All hardware and software required to meet credit, debit and contactless card acceptance functionality supplied by TransCore shall be PCI DSS certified through an independent third party authorized by a professional organization to conduct such activities (certified QSA auditors). SFO's preference is for a third party to process and store all credit and debit card related information in a secure offsite location and that no credit card data is stored on SFO servers.

TransCore shall provide a Policy and Procedures Manual that addresses PCI compliant operations and how to maintain PCI compliance over time (CDRL 52 – PCI Policies and Procedures).

1.2.3 Building Codes

The equipment components and their installation shall comply with all laws, ordinances, codes (e.g. OSHA, ADA, NEC), rules, and regulations of public authorities having jurisdiction over this part of the work. It shall be the responsibility of TransCore to meet these and other current technical, performance, and safety standards that are applicable to all components and to the entire system, even when not specifically referenced. Though TransCore will not be responsible for the infrastructure portion of the TMS, TransCore shall provide technical assistance to the Infrastructure Implementation Team as required in order to meet this requirement.

1.2.4 Open Systems Requirements

The TMS transactional stream of data shall be compiled in a SQL/ODBC compliant database that easily converts the data into common spreadsheet and database formats. SFO/SFMTA shall have the ability to prepare new reports or revise TransCore-provided reports as their reporting standards change and/or are expanded.

All interfaces shall be based on open standards and protocols. Use of any proprietary interfaces shall be approved only by written authorization of SFO. Once approved, TransCore shall provide complete documentation of the proprietary interface for the use of SFO.

1.2.5 Operating Environment

The Taxi Management System and it's components shall operate efficiently in the environment described in Table 2 - Electromagnetic Interference, and Table 3 - Electrical Environment. Devices shall be sealed to prevent entry of rain or dust, and insulated to operate as designed in the following climates and electrical environments. CID, DMS and AVM displays shall be visible in all lighting conditions of the installation environment. CIDs, DMS signs and AVMs shall be installed in outdoor environments, with various levels of sheltering ranging from significant protection to none. CIDs, DMS signs and AVMs shall be designed for exposure to salty air, fog, rain, hail, and other environmental conditions prevalent in the San Francisco Bay Area. DMS signs, AVMs and CIDs shall be required to operate in the environment described in Table 1 - Operating Environment.

Table 1 - Operating Environment

	(CIDs And AVMs)
Temperature Range:	+14°F to +120°F, Ambient
Humidity:	5% - 95% RH, non-condensing
Shock:	• 2-horizontal axes: 5g ± 20% • Vertical axis: 1g ± 20% • Duration: 10 ms ± 2 ms (Repeat all 5 times)
Vibration:	• Continuous sinusoidal sweep at 0.5 octave per minute • 5 Hz to 25 Hz to 5 Hz • 0.25g peak vibratory acceleration
EMI:	See **Table 2**
Other—dust, grit, rain/water protection	Maximum 6 inches of rain per day, wind blown Clean to dusty with blown grit and sand
Power supply:	See also **Table 3**
Nominal Voltage:	110 Volts 60 Hz AC or 12 Volts DC
Operating Range:	10 to 18 Volts DC
Maximum Current Draw:	5 Amp
Voltage Fluctuations:	up to 1,000 Volt spikes for 10 milliseconds 9 Volts DC to 25 Volts DC up to 10 minutes

Table 2 - Electromagnetic Interference

Electromagnetic Emission	FCC, Part 15 or equivalent North American standards
Conducted Susceptibility	EN 50082-2, EMC Generic Immunity Standard, Part 2 or equivalent North American standards
Radiated Susceptibility	EN 50081-1, EMC Generic Emission Standard, Part 1-Domestic and Light Industries or equivalent North American standards
Electromagnetic Immunity	EN 50082-2 or equivalent North American standards
Electrostatic Discharge Immunity	EN 50082-2 or equivalent North American standards
Radiated Radio Frequency Electromagnetic Field Immunity Test	EN 50082-2 or equivalent North American standards
Electrical Fast Transient/Burst Immunity Test	EN 50082-2 or equivalent North American standards
Surge Immunity Test	EN 50082-2 or equivalent North American standards
Voltage Dips, Short Interrupts and Voltage Variations Immunity	EN 50082-2 or equivalent North American standards

Table 3 - Electrical Environment

Surge	± 15%
Transient Impulse	75V
Common Mode Noise	5V

1.3 BUSINESS RULES

The TMS environment shall follow the process described in Figure 2 - TMS Business Rules. System parameters shall be configurable by SFO administrators at authorized workstations. Parameters to be configurable shall include, but not be limited to:

1. Fee amounts in dollars and cents
2. Configuration, Activation or deactivation of short trip program

3. Time parameters of short trip program
4. Incentive periods and trip quantities for selectable vehicle types or card holders

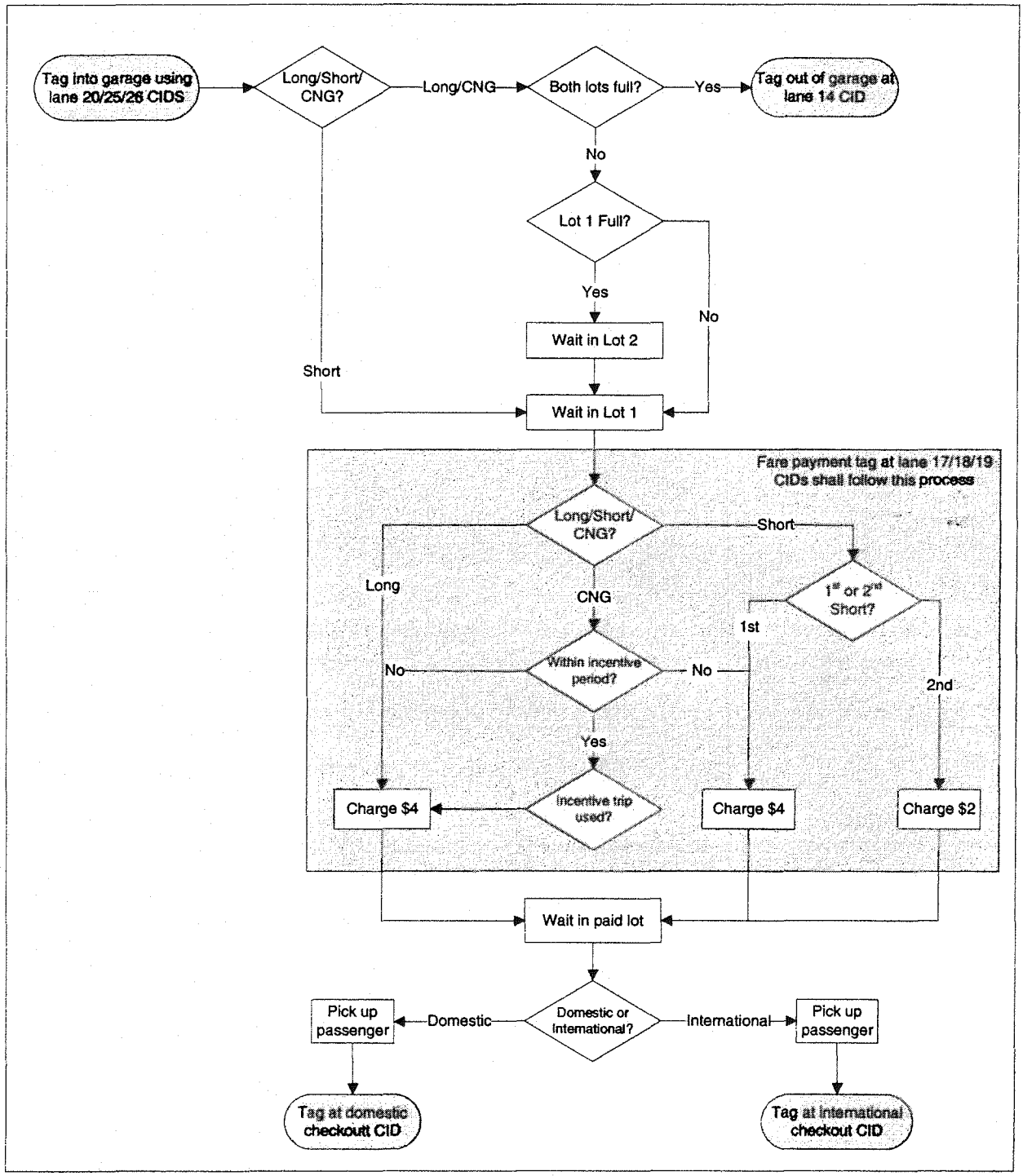


Figure 2 - TMS Business Rules

1.4 RECEIPT ISSUANCE

The TMS shall issue a receipt upon completion of each transaction containing the following information, at a minimum:

1. Amount of transaction
2. Date and time of transaction
3. Device ID
4. Type of transaction
5. Transaction ID
6. Method of payment
7. For credit/debit card transactions, the last four digits of the card/account number

The TMS will issue an electronic receipt to the driver's email address following each payment or add-value transaction. SFO shall have the ability to configure the AVM to supply paper receipts in addition to email receipts in the future.

2. LANE EQUIPMENT

Lane equipment shall consist of:

a. CIDs

b. Scheidt and Bachmann gates

c. GTMS Readers/Antennae

d. DMS

Lane equipment shall meet all requirements specified herein and shall be integrated to function efficiently and report data to both the TMS Central System and GTMS Central System.

2.1 CARD INTERFACE DEVICES

TransCore shall provide CIDs allowing all cards issued by SFO/SFMTA for fee payments to be read and encoded through the contactless interface. This section specifies the CID requirements, interface with other devices and systems, and the contactless interface with the A-card. CID design, including software, hardware, and interfaces, shall be provided for SFO review and approval (CDRL 2, "CID Design").

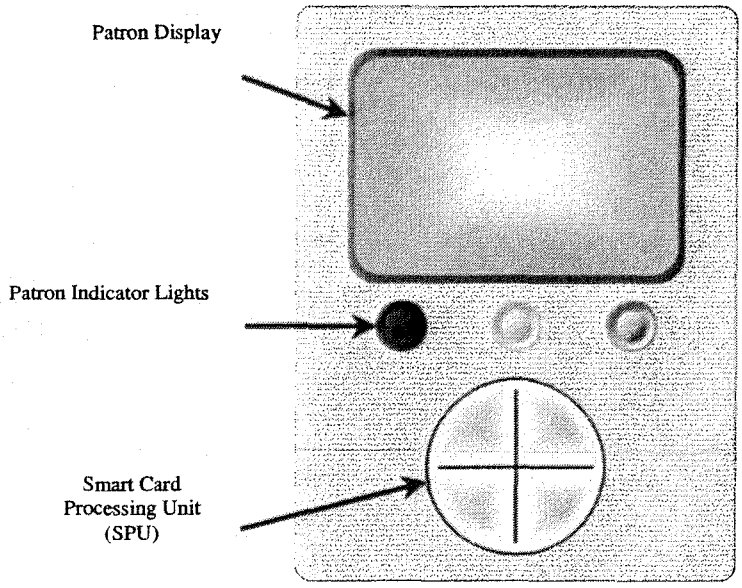
A CID shall support the following functionality:

1. Accept fee payment from the SFO/SFMTA approved card, issued as part of the TMS
2. Read and write transaction data to and from smart cards
3. Transmit transaction data to the Central System
4. Receive software updates, hotlists, action lists, etc. from Central System
5. Receive data from GTMS components

A CID consists of the following components (see also Figure 3 - Card Interface Device)

1. Central Processing Unit
2. Smart Card Processing Unit
3. Visual and Audio Indicators
4. Data Communications Interface

Figure 3 - Card Interface Device



2.1.1 General Requirements

The CIDs shall function reliably in the operating environment presented in section 1.2.5 - Operating Environment.

CIDs shall include any provisions or devices necessary to maintain the internal equipment at an acceptable temperature and humidity. CIDs shall be designed to prevent entry of moisture during a driving rainstorm. Any moisture entering the enclosure shall not cause short circuits or equipment failure. CIDs shall be designed to minimize entry of dust. Device shall be designed so that entry of dust into the enclosure does not cause equipment failure. The CID's design life shall be at least eight years.

2.1.1.1 Central Processing Unit

The CID shall be equipped with a CPU that controls the CID operations (such as card interface and SFO equipment interface) computes fees, and stores the transactional data. The CID shall use solid state memory with sufficient capacity to store, at a minimum, all data since the last data upload to the TMS Central System:

1. Up to 10,000 transaction records
2. 100 log-in log-off records
3. 100 Event records
4. 20,000 hotlisted card numbers
5. Encryption keys for communication and card access

6. Password management
7. Fee table management
8. Card Autoload information

As transaction volumes increase, CID memory shall be expandable to a capacity of at least five times that for previously listed items. The CID shall be provided with a non-volatile solid-state or battery-powered data back-up device for duplicate storage of the primary data files for at least 12 hours.

2.1.1.2 Smart Card Processor Unit

The SPU shall provide the capability within the CID to read and encode CSCs (ISO 14443 Type A, B, and MIFARE memory logic cards). The SPU shall also have the capability to read and process microprocessor based CSCs (ISO 14443 compatible) without requiring any hardware changes or upgrades (with the exception of SAMs).

All CIDs shall have a minimum of three (3) SAM slots to allow interface with multiple smart card applications and/or multiple card types.

The SPU shall be modular in construction so it may be removed from whatever unit it is integrated into and replaced. Security shall be employed in the design to prevent unauthorized access to the SPU.

2.1.1.3 Display/Indicator

TransCore shall provide a display to provide the customer with transactional information. The display shall meet the following minimum requirements:

1. Display shall be easily read under any combination of ambient lighting such as direct sunlight and night-time operation.
2. Display shall be capable of displaying at least two lines of alpha-numeric text with a minimum of twenty characters of at least 0.5 inches tall by 0.375 inches wide for each character.
3. Display messages shall be easily modified on as needed basis, once the system is in operation.
   At a minimum, the following messages shall be provided:
   a. Default or idle message to indicate the system is operational such as, "Tag Card"
   b. Fee amount deducted
   c. Remaining value on the card
   d. Indication of an unsuccessful transaction with reason such as, " Invalid read/encode—try again," "Insufficient value," "Invalid card—See Agent."
   e. Message indicating the CID is not operational "OUT OF SERVICE."
   f. Indicator that the card has a low remaining value "ADD VALUE." This item shall be adjustable as needed by SFO.

SFO will define the message sets and formats with TransCore during the design review process. Detailed screen flows, showing screen shots of all possible screens, shall be included in CDRL 02, "CID Design."

2.1.1.4 Visual and Audio Indicators

The CID shall provide status indicators to the user. These indicators shall consist of a "Green- and Red-Light" to indicate successful or unsuccessful transaction and a "Yellow Light" to indicate another case (to be determined during Design Review) such as, for example, low value remaining on A-card. This feature augments the alpha numeric display.

An audio feedback for indicating the completion of a successful transaction shall also be provided. The audio indicators shall be different sounds, or different volume levels of the same sound. The sound level for each indicator shall be easily controllable by SFO. The type of audio feedback and the parameters are subject to SFO approval.

2.1.1.5 Data Communications Interfaces

Communications between CIDs and other system elements shall be provided using a standard interface and protocol such as Ethernet LAN, and/or TCP/IP. TransCore shall interface the CID with the existing Scheidt and Bachmann gates, as well as the GTMS. TransCore shall provide the complete interface documentation for the CID to SFO as part of CDRL 2 – CID Design.

2.1.2 Configurations

The following CID configurations shall be provided by TransCore to meet SFO needs:

1. Entry CID: The entry CID shall create a record of entry containing data such as time, date, card number and location
2. Freeway Exit CID: The freeway exit CID shall create a record of exit containing data such as time, date, card number, and location
3. Payment CID: The payment CID shall charge the appropriate fare by comparing the previous exit and entry records
4. Card Status and Balance CID: This CID shall display the status (such as blocked or active) and the balance of the A-card
5. Checkout CID: The checkout CIDs shall be located in the domestic and international terminals, and shall record data such as time, date, card number, and location.

2.1.3 Modularity

The CID shall be equipped with spare USB ports that may be configured as needed. The typical use of the communication port will be to plug-in a portable PC, test equipment or flash memory card on an as-needed basis.

2.1.4 Physical Requirements

The CID shall meet the following minimum physical requirements:

2.1.4.1 Dimensions and Layout

A sample mockup of each CID configuration and its mounting shall be demonstrated at time of PDR (CDRL 3, "CID Mockup"). Access to installation environment will be coordinated through SFO.

2.1.4.2 Structural Features

The finish shall resist corrosion, abrasion, and scratching. Color and type of finish shall be such that it minimizes reflections, cracking, and peeling and shall be approved by SFO during PDR. All heavy duty areas shall utilize wear resistant material. Provisions shall be incorporated to drain any liquids that may enter the device.

2.1.4.3 Appearance

The CID shall conform to generally accepted practices in appearance and styling and shall be approved by SFO at PDR. There shall be no exposed bolt heads, nuts, sharp edges, or cracks on the outside surfaces. All displays shall be flush mounted in the enclosures.

2.1.4.4 Locks And Security

Access cover(s) of the CID housing shall be opened with mechanical key(s) for maintenance access to the modules and subassemblies. The key(s) shall be of a type which is not readily duplicated or used for other purposes.

Ten sets of keys shall be delivered separately in a secure manner to SFO's Landside Operations Manager at least 60 days prior to delivery of the first CID.

2.1.4.5 Mounting

The mounting hardware and brackets, as needed, shall be provided with the CID. TransCore shall provide a flexible mounting system that allows the mounting location to be optimized, maximizing user through-put and withstanding the particular operating environment in which it is installed.

The mounting hardware design shall allow ergonomic placement of the CID to accommodate 97% of drivers sitting in all vehicles present in the taxi fleet. CIDs shall undergo human factors testing as described in section 10.3.4 - Human Factors Testing.

2.1.4.6 Identification and Labels

A metal identification label inscribed with the CID serial number shall be permanently attached to the outside of each CID housing. Major subassemblies inside the CID shall have a permanently attached label inscribed with a unique serial number and part number prominently located on the subassembly.

Decals or other graphics shall be applied to the CID to indicate to users the proper location and orientation of smart card to be presented to the unit.

2.1.5 Accuracy and Reliability

CIDs shall have an accuracy rate of 99.73% [3σ (sigma)]. Accuracy for all types of CIDs is defined as the mean ratio of the transactions recorded by the CID as evidenced by the transactional data recorded to the transaction records stored on the A-card.

The CID reliability shall be 4,380 hours Mean Transactions Between Failure (MTBF) or one (1) failure every six (6) months. Any single CID that fails more than two (2) times per month shall be replaced with a new CID. If the new unit experiences the same failure rate, TransCore shall be responsible to initiate an investigation to determine the cause. CIDs shall average no more than two failures per CID configuration type every 90 days for the total population for each type of CID in revenue service. Chargeable and non-chargeable failures are defined below.

1. **Non-Chargeable Failure** — is a malfunction caused by a condition external to the CID, which is neither a functional, environmental, nor a test requirement in this specification and is not expected to be encountered during normal and correct operation in revenue service. Non-chargeable failures shall not affect the MTBF or mean operating hours between failures calculations, and include the following:
    1. Accident or mishandling;
    2. Failure of test facility or test instrumentation;
    3. Equipment failures caused by externally applied over stress conditions in excess of the approved specification requirements contained herein;
    4. Dependent failures occurring with the independent non-relevant failure that caused them;
    5. Failures caused by incorrect operating, maintenance or repair procedures;

All other failures shall be considered relevant and chargeable unless determined to be Non-chargeable by the failure review process. The failure review process shall be applied as needed during the test.

2. **Chargeable failure** — is any malfunction which prevents the CID from performing its designated function, or meeting its performance criteria, when used and operated under the environmental and operational conditions stated in these specifications. At a minimum, the following conditions shall be considered chargeable failures:
    1. Software anomalies and bugs if it prevents the CID from performing its designated functions
    2. Failure to accurately read or encode A-card unless card is defective or if it is prematurely removed from range
    3. Data and/or alarm transmission failure
    4. Partial or complete failure of passenger display.

A FRT shall be established to evaluate which failures are chargeable against TransCore's reliability requirements.

In a high transaction volume environment, reliability (MTBF) shall be calculated as follows: All transactions for each type of CID shall be summed and the result divided by the number of chargeable failures.

In a low transaction environment, reliability shall be calculated as follows: Operating time for each type of CID shall be summed and the result divided by the number of chargeable failures. CIDs shall be considered operational unless reported non-operational.

2.1.6 Alternate Data Removal Process

Alternative means of data removal are subject to SFO approval.

TransCore shall provide an alternate means of extracting data from the CID. The proposed data retrieval system shall be documented as part of CDRL 4 "CID Data Retrieval". It shall be possible to manually off load the data files in the event of a primary data storage failure through a USB interface to a removable Flash Memory device subject to SFO approval. In the event of a primary data storage failure and/or backup data storage battery failure, an indication on the display shall alert SFO personnel.

Correct password entry shall automatically enable the CID to download the transaction data to the back-up device. Neither the CID nor the backup device shall capture the correct password. Unsuccessful attempts to enter the password shall be logged at the CID. The log shall contain detailed information including, the date, time, location, CID number, and erroneous password.

2.1.7 Scheidt and Bachmann gate interface

TransCore shall interface the CID with the existing Scheidt and Bachmann gates according to physical, electrical, and communication requirements.

2.1.8 GTMS Interface

The CID shall receive data from the GTMS as specified in Exhibit D – GTMS/TMS Interface Specification. The CID shall create one transaction record containing smart card data and GTMS data for transmission to the Central System.

TransCore shall interface with the equipment of the GTMS according to physical, electrical, and communication requirements provided in Exhibit D – GTMS/TMS Interface Specification.

2.2 DYNAMIC MESSAGING SYSTEM & CURBSIDE SURVEILLANCE CAMERA

2.2.1 Hardware

The dynamic messaging system (DMS) shall consist of the following components:

1. DMS server receiving transaction data from payment and checkout CIDs, and a list of active AVI transponders from the GTMS
2. Message sign(s) displaying a rolling list of taxi vehicle information
3. HCR capable of transmitting dispatch requests and messages directly to the DMS

4. Camera(s) record events taking place curbside

The DMS message sign(s) shall be readable in all light conditions and suitable for outdoor use. Sign(s) shall be a commercial, off-the-shelf product. The sign(s) shall be located at the domestic and international terminal taxi lanes.

2.2.2 DMS Functionality

At a minimum, the DMS shall provide the following functionality:

1. DMS sign(s) shall display a rolling list of taxis (including information such as license plate number and cab number) that have paid the required fee
2. Taxi information shall be displayed on the DMS message sign after a valid fee was paid at a payment CID
3. Taxi information shall be removed from the DMS sign after a driver tags out at a checkout CID

The design and configuration of the DMS shall be submitted in CDRL 57 – Dynamic Messaging System Design and shall be subject to SFO approval.

2.2.3 DMS Interface

The DMS server shall receive a list of all active transponders and their corresponding vehicle information from the GTMS at least once per day. SFO shall have the ability to configure the frequency of data exchange between the GTMS and DMS server. The payment and checkout CIDs shall provide a real time duplicate transaction record to the DMS server.

2.3 TAXI SHORT GEO-FENCE

TransCore shall provide GPS trip data collection as a component of this specification. The SFO taxi lot has two lines a 'main' or regular line and a 'short' line. Access to the short line is reserved for vehicles meeting special criteria such as CNG fuel and taxis that make short trips i.e. low fares. The short line is intended to reduce the hardship on taxi drivers when their passenger is only a short fare distance from the airport; it is also an incentive to provide equal service to all passengers regardless of destination. GPS trip data will be used to determine if a taxi is or is not eligible for short line privileges under the SFO Short system. This section specifies the GPS requirements, interface with other devices and systems, and the contactless interface with the A-card. GPS Data design, including software, hardware, and interfaces, shall be provided for SFO review and approval (CDRL 61, " GEO-Fence, GPS Data, and Equipment Design ").

At a minimum, the GPS Data Process shall provide the following functionality:

1. The GPS trip data collected shall be aggregated with both Taxi # and Driver A-card #
2. The GPS trip data shall be collected via the vehicles transponder upon entry onto the airport
    a. Initiated upon exit from SFO
    b. Collected upon return to SFO

3. The Taxi Geo-Fence shall use a 5.9 GHz Dedicated Short Range Communication (DSRC) On-Board Unit (OBU) and Roadside Units (RSU) to retrieve the GPS trip data from each taxi. The onboard unit shall also be able to upload and download data to the Handheld device via nonproprietary wireless technology
    a. Each OBU shall be tamper resistant, contain a GPS receiver, flash memory, nonproprietary wireless communication and 5.9 GHz DSRC communication.
    b. The means for providing power to the OBU shall be determined during design phase and is subject to approval by the SFO Project Manager.
    c. The RSU shall upload the GPS trip data from a taxi's OBU via 5.9 GHz DSRC
    d. OBU shall have the ability to receive updates wirelessly through a method determined during design phase, subject to approval by SFO Project Manager.
4. The TMS Central System shall be able to immediately discern if the taxi is or is not eligible for short line privilege based on the trip data collected
5. A record shall be maintained of each transponders short trips in a format and for a period of time to be determined by the TMS designers and approved by SFO Project Manager.

3. TAXI OFFICE TERMINAL

3.1 FUNCTIONAL REQUIREMENTS

The Taxi Office Terminal (TOT) shall be provided for investigating card operating errors and as a customer service workstation to support card-related activities at the curbside office .The TOT design, including all software, hardware, and interfaces, shall be submitted for SFO review and approval (CDRL 5, "TOT Design").

The TOT shall support the following functionality:

1. Access Central System databases
2. Generate alerts
3. Generate reports
4. Provide real-time card account status and system information
5. Variable levels of user access configurable by SFO/SFMTA

The TOT shall consist of the following components:

1. A standard desktop computer meeting all SFO/SFMTA standards and requirements
2. A touch-screen monitor
3. A smart card reader for interaction with any card issues by SFO/SFMTA
4. A printer capable of printing transaction records and system notes
5. Removable, lockable data storage unit
6. UPS

The TOT and curbside office card issuer workstation functionality may be combined into a single unit.

3.1.1 Operator Sign-On/Off

When an operator signs on, the following procedure shall be followed after powering on the TOT. The TOT shall be set up to automatically record the assigned operator's identification, the operator's sign on/sign off PIN and the date/time. Powering off shall disable the TOT but not remove the operator's data. If the first operator has not signed off, the sign-on of a second operator shall cause an automatic sign-off for the first operator without loss of any data.

3.1.2 TOT Maintenance Mode

Through commands entered using the operator interface (e.g., mouse, keyboard, touch screen, etc.), authorized personnel shall be able to place the TOT in "maintenance mode." When in this status, any customer interface displays shall read "Out-of-Service," and the operator interface shall be used to enter commands, perform queries, and receive information from the machine.

The presentation of menu selections to facilitate maintenance actions at the TOT shall be subject to SFO approval (CDRL 6, "TOT Screen Flows").

3.1.3 Smart Card Functionality

Operators using the TOT shall be able to modify driver account information. Information fields to be modifiable may include:

1. A-card number
2. A-card expiration date
3. E-mail address
4. Cab # (at least 5 characters), minimum of three cab numbers shall be available for each driver
5. Taxi Company (drop down list of at least 30 companies, to be editable by SFO)
6. AVI transponder number field, minimum of three transponder number fields shall be available for each driver
7. Driver name (at least 50 characters, first/middle/last
8. Driver address (at least 50 characters)
9. Driver's license expiration date

TOT users shall be able to query the data by any field. The TOT shall be able to retrieve real-time account data and generate an A-card history from the time the card was issued to the current date. The A-card history report shall be configurable to view and print transactions or activity by a user-defined start and end date. All reports shall be available to save and print in a PDF format. Authorized TOT users shall be able to retrieve information (such as card histories) by querying any of the available fields on the card.

3.1.4 Claims Processing

The TOT shall support the processing of refund claims following an incomplete or failed transaction at the AVM. The TOT shall generate a refund claim form containing information from the A-card and AVM refund receipt. Manual input of information into the claim form shall be supported, as well as automatic population of fields based on information stored on the A-card. The claims process shall be subject to SFO review and approval at PDR (CDRL 53 – Claims Process).

3.2 TOT CONFIGURATION

The TOT shall include a PC based CPU, keyboard, color touch screen monitor, network communications interface, smart card processing/interface unit, printer, removable lockable data storage unit, cabinet, clock, UPS and battery backup system. The TOT shall provide communications and power to all peripheral components/assemblies and shall have a single electrical control switch. Movement of the TOT electrical switch to the "off" position shall

initiate an orderly shutdown of the TOT and all related components. All TOT components/assemblies shall be resistant to dust and water sprays/spills.

A description of the overall TOT configuration, including the layout of the components, shall be submitted to SFO for review and approval.

3.2.1 Operator Interface

The operator interface shall be through a touch screen color monitor, keyboard, and any peripheral devices provided such as a mouse. The monitor shall be readable in all ambient light conditions, including both day and night. Default selections shall be provided to speed up the transaction process for commonly used transactions. The TOT operator interface (actual screen shots) shall be subject to SFO review and approval (CDRL 06, "TOT Screen Flows").

3.2.2 Clock

The TOT clock shall be synced to a system clock at the Central System.

3.2.3 UPS And Battery Backup

In the event of a power interruption, a rechargeable dry or sealed gel cell battery source (or UPS) shall provide auxiliary power to the TOT for a minimum of 10 minutes of full operation, complete the transaction in progress at the end of the 10 minutes, and allow for orderly shutdown of the TOT. The TOT shall provide indication to the user once a power outage is detected.

3.3 TOT ALARMS

The alarm and method of activation/deactivation shall be subject to SFO approval. The TOT shall provide real time alerts for specific issues to be defined by SFO. Alarms may include:

1. Impending expiration of driver's license and A-card
2. GTMS and user account tracking abnormalities
3. Business rules violations (i.e. "short trip" violations)

3.4 DATA STORAGE AND TRANSFER

3.4.1 Internal Storage Capacity

Storage shall be sufficient for operating system, necessary device software, and any and all software necessary for the function of the TOT and it's peripherals. Storage space shall also be sufficient for 14 days of transaction data in the event that the Central System is down for an extended period.

3.4.2 Statistical Data Storage

The event data shall be at a minimum the following:

1. TOT turned on

2. TOT operable
3. Operator ID number
4. TOT reprogrammed
5. Communication with Central System on/off
6. Number of smart card processed
7. Fault code number, for items such as:
    a. Smart card failed to load (capture serial number)
    b. Communication with Central System interrupted
    c. Communication with EFT service interrupted.

A detailed list of TOT transaction data and events to be recorded, as well as associated data and codes, shall be submitted to SFO for review and approval. Exact format of the TOT statistical data storage as well as the proposed layout of the data and event coding shall be subject to SFO approval.

3.5 TOT REPORTS

The TOT shall be capable of producing real-time system activity reports. All reports should provide a report summary section that includes category and report totals, if applicable. Reports contents and layouts will be reviewed and approved by SFO staff. Generally, SFO shall be able to request data sorted by any ranges and fields stored in the A-card database and Central System. Reports shall include but not be limited to:

1. Exception reports showing cards that have a high percentage of short trips, replacements, blockings, etc.
2. Driver history reports that list a single driver's history across multiple cards (in cases of replacements), smart card balance transfers, complaints, and alerts involving driver's corresponding AVI or smart card
3. Refund history report
4. Location, date and time information listed by AVI transponder and smart card number
5. End of day report to be generated automatically each day at a time configurable by SFO, including transfers, hotlists, blocks/unblocks, new cards, and refunds, as well as specific information by CID device number, location, and configuration.

3.5.1 Query Information

Real time information, including but not limited to the information described below, shall be available for query at each TOT.

1. System Performance – Daily, weekly, monthly, hourly, configurable time ranges
2. System Alerts – listed by date, time, smart card number, and AVI transponder.

3. Current Cards in Use
4. All cards listing registered owner, card status, and card balance
5. All cards by driver's license or A-card number, with card status and balance
6. All cards by status with registered owner and card balance
7. Balances on active cards
8. Card history
9. Cards by status (total number of cards in each category) – blocked, hotlisted, admonished, etc.
10. Transferred card balances
11. Aging report on these balances
12. Real time information on vehicles and drivers who have entered the system and have not yet checked out, including time entered and their wait time

3.5.2 Card Account Inquiry Receipt

The TOT shall be able to produce an inquiry report which displays all card actions within a selectable range. This report shall be provided to drivers at their request. The inquiry receipt shall display, at a minimum:

1. Transaction numbers for each record
2. Time and date associated with each transaction
3. Origin and destination card numbers associated with any balance transfers
4. Each page shall contain the smart card number associated with the requested data

3.6 MAGNETIC STRIPE READER

The TOT shall include a magnetic strip reader capable of reading the magnetic stripe of the driver's license presented. The TOT software shall support the automatic population of data fields such as name, birth date, and address when a driver's license is swiped. The data fields to be updated shall be configurable. The TOT shall prompt the user if they wish to overwrite any existing fields before making any updates to the driver's stored information.

The magnetic stripe reader shall be mounted on the right hand side of the TOT monitor, or in another convenient location. Exact placement shall be reviewed and approved by SFO.

3.7 OVERFLOW LOT WORKSTATION

A TOT workstation shall be located adjacent to the overflow lot at SFO. The purpose of this workstation is to investigate card errors and driver account status. The overflow lot workstation shall have all of the TOT A-card reading functionality. Initially, the overflow lot workstation shall be configured to not be able to write data to the A-card. The overflow lot workstation shall be configurable to unblock cards in the future.

This workstation shall include:

1. Desktop computer
2. Keyboard
3. Smart card reader

4. ADD VALUE MACHINE

This section specifies the requirements for the AVM to be furnished under this Contract. The AVM may be configured in two ways. A full-featured AVM shall support bill acceptance, as well as credit and debit cards. An alternative configuration shall support credit and debit cards only.

4.1 FUNCTIONAL REQUIREMENTS

The AVM shall accept bills and credit and debit cards to load a smart card. The front panel graphics and controls shall be laid out to facilitate a quick understanding of the AVM operation by the user.

The preliminary fee structure and the functions that will be activated on the first day of revenue service will be finalized and provided to TransCore at 20 days prior to PDR. The final fee structure that will be activated on the first day of revenue service will be finalized and provided to TransCore 30 days before the FDR.

AVM functions shall be expandable by simply modifying software. Initially, the AVM shall be capable of performing the following transaction types at a minimum:

1. Display card status
2. Load value onto card
3. Pay fees and fines

All sequences related to value loading, fee/fine payment, and validation shall be modifiable by downloadable software. Downloadable software shall include at a minimum the following:

1. Displayed messages
2. Audio messages
3. Fee tables
4. Special operating condition parameters
5. Fine/fee information assessed to A-card holders by SFMTA

Upon presentation of an A-card, the AVM shall automatically display the remaining value of the card and/or the status of the card account. SFO shall have the ability to update or manage the AVM fee tables.

The Central System shall receive a record of each transaction conducted by the AVM. The AVM shall report data to the Central System as specified in Exhibit C – Ventek AVM Interface Specification.

4.2 LOADING A SMART CARD

The process for loading a smart card shall follow the procedure outlined in Figure 4 - Smart Card Loading Process. Using the display screen the user will select the amount of stored value he/she wants to load onto the smart card. The AVM display screen shall then indicate the amount due. The user can then pay using cash or credit/debit card. Once the AVM has received the amount due, the user will insert the smart card being loaded for the AVM to update it. After the smart card has been successfully updated, the display screen will inform the user it is safe to remove the card. If card is removed prematurely there shall be two re-try opportunities for the card holder to reinsert the card to complete the transaction.

4.3 PAYMENT METHODS

After the user has selected his or her purchase, the AVM shall display a message on the screen indicating the amount due and the forms of payment accepted. The user can then pay by:

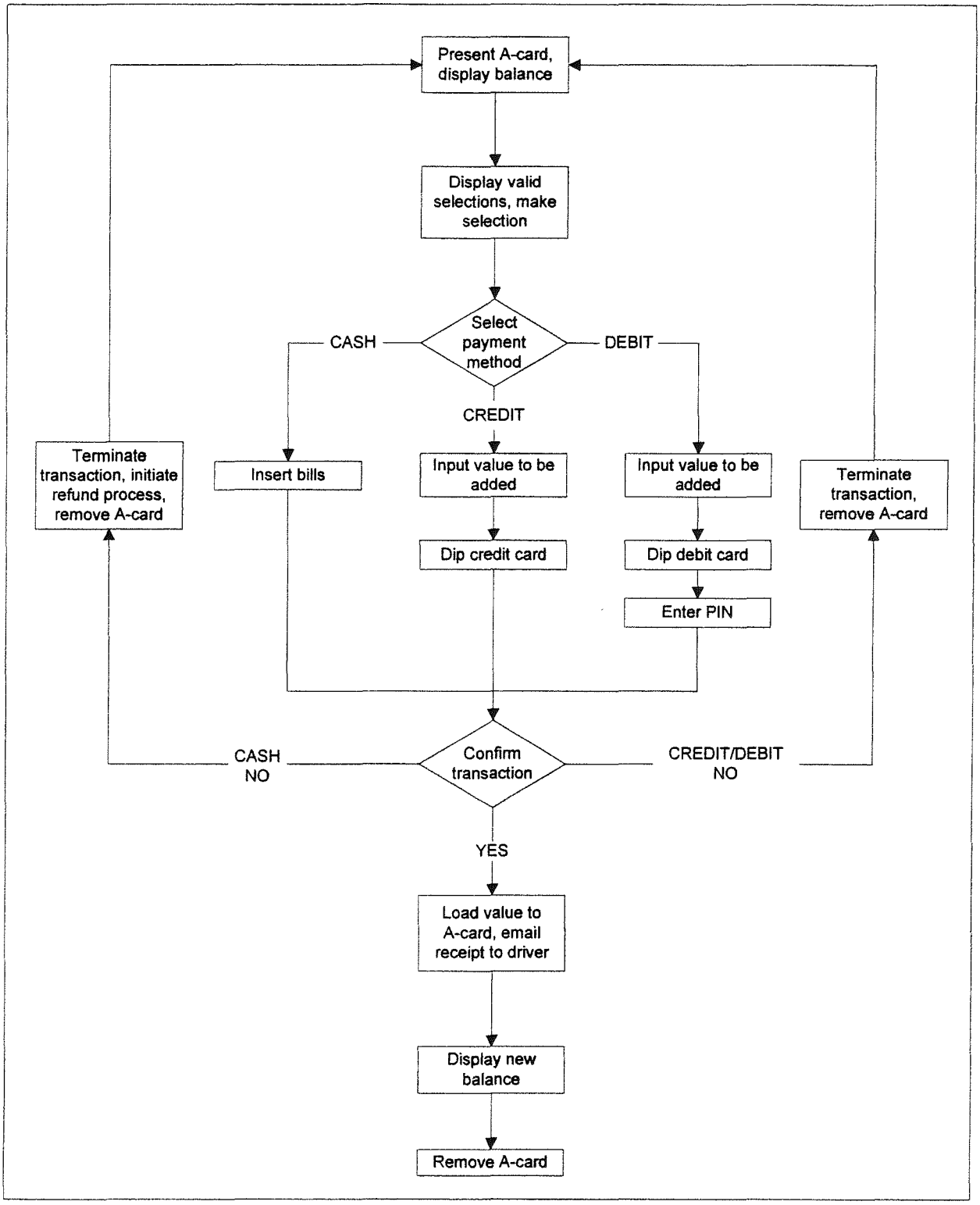
1. Cash:

   User shall be able to insert bills in their respective slots on the front panel. The AVM shall accept $1's, $2's, $5's, $10's, $20's, 50's, and $100's. When the amount due has been inserted, the AVM will issue the appropriate receipt.

2. Credit/Debit Card:

   Users shall be able to insert a credit or debit card into the card reader located on the front panel. If a debit card is used, then the user shall enter the account's PIN code on the keypad located at the front panel. A message on the front display screen shall then display the amount to be charged to the account and ask the user if a receipt for the pending transaction is desired. The user shall select the "yes" or the "no" key on the PIN keypad or on the main display to indicate whether or not a receipt is desired. Once the transaction has been approved, the AVM shall issue a receipt. There shall also be the capability to link a credit/debit card to the Smart A Card through the SFO Web portal in order to have auto-reload functionality.

Figure 4 - Smart Card Loading Process



4.4 TRANSACTION RATES

The AVM shall be capable of meeting the transaction times for different types of payment (cash/electronic) as listed below. The time for a single transaction is measured from the insertion of the last payment instrument (bill or payment card) to the time that the AVM issues a receipt (if requested).

1. **Smart Card Reload – Cash Payment**[1]
   a. Smart Card
   b. Smart Card Acceptance
   c. Bill Acceptance (one (1) bill)
   d. Smart Card Reload

   Total maximum time: 17 seconds

   Notes:

   (1) All transaction times include return to idle screen and encashment of money. All times the user interacts with the system to select payment method and value to be loaded are not included.

2. **Smart Card Reload – Electronic Payment**[1]
   a. Smart Card
   b. Smart Card Acceptance
   c. Credit / Debit Acceptance [2]
   d. Smart Card Reload
   e. Receipt Issuance

   Total maximum time: 16 seconds

   Notes:

   (1) All transaction times include return to idle screen and encashment of money. All times the user interacts with the system to select payment method and load value are not included.

   (2) Credit and debit card transactions do not include the time between requesting and receiving authorization from the merchant acquirer. The transaction time indicated includes the time associated with requesting an authorization and handling the returned authorization.

Transaction times shall be verified as required by SFO. The transaction time for each transaction type shall be measured based on ten (10) consecutive identical transactions performed by trained personnel, under ambient factory conditions.

4.5 USER INTERFACE

The user interface with the machine shall be through a touch screen mounted in the front panel. The overall layout of the front graphics panel and display screen shall be subject to SFO review and approval. A colored sketch of the proposed front layout of the machines shall be submitted for SFO review at the PDR. A scaled, color diagram of the front layout of the AVM, no smaller than 11 inches by 17 inches, shall be submitted to SFO at PDR for approval.

The front panel and display screen shall include graphics and displays to communicate to the user the purchase instructions, selection information, names of controls and slots, and operating status of the AVM.

TransCore shall provide the screen message text in English. A full sample of the message to be presented shall be submitted for review and approval at PDR and FDR. AVM shall be capable of displaying multiple languages to accommodate possible future upgrades.

All cutouts and displays shall be designed to preclude unauthorized access; to be vandal resistant; and to minimize entry of dirt, dust, moisture, and driving rain.

4.5.1 Front Graphics Panel

The front graphics panel shall display user information describing the names of controls and slots. The front graphics panel may be constructed of anodized aluminum or other suitable material approved by SFO, provided that all portions of the panel are backed by stainless steel. The front graphics panel shall be secured to the AVM from within.

All text on the front panel shall be presented with raised lettering. TransCore may propose an alternate design using international symbols instead of words. Any buttons used to facilitate user selection shall be appropriately labeled on the front graphics panel. Button labels shall be presented in English with raised lettering. The presentation of all graphics to be displayed on the front graphics panel, including text, shall be in compliance with ADA requirements and shall be provided for SFO review and approval.

4.5.2 Display Screen

The touch-sensitive display screen shall have a minimum dimension of 10 inches measured on the diagonal. The screen may be tilted up to 30 degrees from the vertical plane to meet ADA and viewing angle requirements. Provisions shall be made to eliminate any fogging of the display due to the environmental conditions, such as high humidity. The display screen type and design shall be provided for SFO review and approval (CDRL 07, "AVM Design").

The display screen shall be protected by a 0.25-inch polycarbonate shield or alternate material approved by SFO. The user display screen and cover shall be designed or enhanced by TransCore to eliminate "glare" or "washout" effects under all sunlight conditions. User displays shall adjust automatically to ambient light conditions so screen information can be read, through the

polycarbonate cover, under all lighting conditions, including direct sunlight, and from an angle of up to 15 degrees in any direction. The display shall be designed such that a user of height ranging from 3 feet 6 inches to 6 feet 9 inches can easily read the instructions. The readability of the screen from various angles under various ambient light conditions shall be demonstrated by TransCore during the FAT.

All messages shall be presented in English. The messages to be displayed and the format of the displays on the screen shall be submitted to SFO for review and approval. Display screen messages shall be modifiable by SFO personnel. Full instructions for changing display screen messages shall be submitted to SFO a minimum of 30 days prior to the end of warranty.

4.5.2.1 User Instructions and Feedback

The display's screen message shall respond to a touch in the appropriate area of the screen or the depression of keypad buttons by a user and provide tactile feedback (unless the keypad is presented on the touch screen, in which case audio feedback shall be provided) throughout the process, including step-by-step instructions for loading value and error messages responding to improper user selections. Also, as a customer inserts money into the AVM, the AVM shall calculate the remaining amount due and display this amount. The display screen shall change in reaction to user actions with no perceptible delay.

All messages shall be in English. The AVM shall have the capability to be upgraded to support up to four languages in the future. The default language shall be English. Once the user has selected the alternate language button, the messages shall be presented in the alternate language for the subsequent transaction.

4.5.2.2 Indication of Special Operating Condition

The following indications shall also be presented on the display screen when applicable during special operating conditions:

1. No bills accepted—In this condition, a shutter shall close off the bill slot and the AVM shall operate in the credit/debit only mode.
2. No credit/debit cards accepted—In this condition, the AVM shall operate in the cash only mode.
3. Receipt not available—If the receipt-issuing system is out of service, for any reason, the user shall be notified after the insertion of a credit/debit card for payment by a message on the display screen that a receipt is not available and shall be asked to indicate whether or not the transaction should be continued.
4. Time-out transaction cancellation warning.
5. When power is removed due to a power failure or circuit breaker trip, or when the AVM is Out-of-Service for any other reason, an "Out-of-Service" indication shall be displayed and powered by the auxiliary power.

Special operating conditions displayed prior to loading value shall be displayed in both English and universal graphical symbols, concurrently, on the display screen. The messages and graphics used to communicate special operating conditions shall be subject to SFO review and approval.

4.5.2.3 Out-of Service Indication

When the AVM is Out-of-Service for any other reason, an "Out-of-Service" indication shall be displayed within the user interface with the exception of a power and/or PC failure, in which the user interface will remain blank.

4.5.2.4 Numeric Keypad

There shall be one alpha-numeric keypad provided on the front panel of the AVM. The keypad shall be located near the display screen in a semi-recessed area to maximize privacy of customers and SFO staff when using the keypad. The keypad shall be used to enter PIN required to support the credit/debit feature and the external security feature.

The numeric keypad shall be a PCI compliant 12 or 16-button keypad commonly used in the banking industry. Each key shall have tactile and an adjustable audible feedback. The keypad shall prevent moisture from getting inside the unit and shall be vandal resistant. The number 5 key shall contain a raised dot to permit recognition by the visually impaired. Alternatively, a second numeric keypad nfor non PIN entries may be used.

4.5.2.5 Failed Transaction Email Notification

The AVM system shall initiate an email notification to the A-card holder of a failed transaction. The email notification shall serve as proof to substantiate a refund claim. The failed transaction email notification shall include a description or a code of the failure that occurred. A duplicate copy of each email notification distributed to the A-card holder shall be archived by the Central System for future reference and analysis.

4.6 BILL HANDLING SYSTEM

The AVM bill handling system shall accept U.S. $1, $2, $5, $10, $20, $50 and $100 bills. The bill handling system shall be programmable to accept at least six additional denominations or bill designs. The bill handling system shall include a bill acceptor, a bill escrow unit, and a bill vault for storage of deposited bills. The bill validator, escrow unit, and vault shall be produced by the same manufacturer and housed as a single, modular unit. No bill processing component shall function within a AVM unless all bill processing components are properly installed and registered by the AVM. The bill processing system shall automatically switch to an "Out-of-Service" condition if any one bill processing component is not installed or operating properly.

Each bill vault shall be fitted with an electronic device that is encoded with a unique serial number. Encoded serial numbers shall identify the money container as a bill vault. The type, size and construction of the serial number identification shall be approved by SFO. In addition, each bill vault shall be marked with the same serial number and a corresponding bar code on the outside of the container. The numbers shall be readable when the bill vault is in place for operation within the AVM. The type, size, and construction of the serial number identification shall be approved by SFO.

When the bill handling system is not in use, a shutter shall protect the bill slot against the entry of fluids.

4.6.1 Bill Validator

The bill validator shall monitor, control, and count all accepted bills by denomination. Bills shall be accepted in any of the four (4) possible orientations. The bill validator shall reject all counterfeit bills and foreign bills.

Not less than 95 percent of all valid bills in general circulation and in acceptable condition shall be accepted upon initial insertion. Upon reinsertion of bills rejected as a result of initial insertion, the acceptance level, including those accepted upon the first insertion, shall be not less than 97 percent. All accepted bills shall be legitimate U.S. currency and shall be deposited in the bill vault. Accuracy of bill registration shall not be less than 99.9 percent.

Bill validator design shall provide tolerance to reliably handle bills in acceptable condition without resulting in bill jams.

Bill validator shall be upgradable to support new currency types.

4.6.2 Bill Escrow

Valid bills accepted by the bill validator shall be transferred to the bill escrow unit. The escrow shall be capable of holding up to 15 bills. The escrow shall hold the bills inserted until the value is loaded on the smart card. If the transaction is completed then the bills in escrow shall be processed into the bill vault. If the time-out period has elapsed or a cancel transaction occurs then the inserted bills shall be returned to the user.

It shall be possible to disable the return of bills to the customer at the discretion of the Airport.

4.6.3 Bill Vault

After acceptance, bills shall be stacked in the bill vault. One (1) bill vault shall be delivered with each AVM and two (2) bill vaults shall be delivered as spare parts. Bill vault design shall permit only a single placement of the bill vault into the AVM after emptying, and a shutter shall be locked in a position to close off the opening when the bill vault is removed.

4.6.3.1 Security Interlocks

The bill vault shall be inserted into the AVM in a unique position only. A concealed sensor built into the bill vault compartment shall detect when the bill vault is fully inserted and aligned properly with the bill acceptor. If a bill vault is not properly locked in position, the concealed sensor shall cause the AVM to switch to or remain in the "Out-of-Service" condition.

The vault may only be removed using controlled keys retained by authorized SFO Revenue Service personnel.

Appropriate mechanical and/or software security interlocks shall be provided to detect if a bill vault has been removed from the AVM but not emptied in the count room. The removal and re-insertion of a bill vault that has not been emptied and reset in the count room shall not be permitted. Collection and Count Room Audit Tickets, shall be printed automatically by the AVM upon closure of the AVM door or after a vault is removed or inserted.

4.6.3.2 Construction

Each bill vault shall have the capacity to store a minimum of 2,000 accepted bills. When empty, the bill vault shall not weigh more than 16 pounds Sodeco BNA542. The bill vault shall be designed and constructed to be pry-proof.

When containing a full complement of bills and dropped on any corner or side from a height of 2.5 feet onto a concrete floor, the bill vault shall not open.

4.6.3.3 Bill Vault Contents Monitoring

The total amount of money and number of bills deposited into the bill vault shall be monitored from the time the vault is inserted in the AVM until it is removed. A warning signal shall be transmitted to the Central System prior to the vault becoming full. The AVM shall switch to the "Out-of-Service" condition when the bill vault is full, and shall send an alarm to the central system. The vault levels for these operations shall be programmable by SFO and shall be set initially to 1,600 bills and 2,000 bills, respectively.

4.7 CREDIT/DEBIT CARD SYSTEM

The AVM shall contain all software and all components to support the use of credit/debit cards for payment.

4.7.1 Bank Card Reader

The cards reader shall be EMV compliant and shall be able to read magnetically encoded cards, contactless smart cards, and combination magnetic/contactless type cards. The card reader shall be of the insert and remove type. The card reader shall have the following capabilities:

1. Read and verify that information in tracks 1 or 2 of the card is encoded in accordance with current the ISO standards
2. Quality standard indicated by the reader manufacturer of at least 5,000 transactions between failures
3. Read 99.9 percent of properly inserted and non-defective cards
4. Detect insertion of a card to initiate transaction and close bill slot shutters

4.7.2 Credit/Debit Card Functionality

The AVM communications link through the VenTek system shall provide the interface with the EFT providers and the bank networks as needed and shall be provided by TransCore.

A second form of authentication shall be defined and configurable by SFO as required in the future. Prior to running internal checks on the card number and requesting approval of the transaction, the AVM shall present the amount to be charged to the account..

All cards used for purchases shall require on-line authorization with the affiliated bank(s). To further limit SFO's exposure to fraud, SFO shall have the capability to construct and maintain a "bad card" list, updated by SFO based upon experience with bad or fraudulent cards. If the card appears in the SFO-generated bad card file or if an authorization is not approved by the

associated bank, the user shall be informed via a message on the customer display screen that the card was not approved and shall be asked to either insert a different form of payment or to cancel the current transaction.

Credit card transactions greater than a preset value and all debit card transactions shall require on-line approval from the banking network or EFT service providers. The request for approval shall be sent to the Central System. The maximum time permitted for such transactions shall be seven (7) seconds plus the time allowed for the Central System to communicate with the bank/service provider. If communication with the bank/service provider is not consummated within a preset time period, programmable from the Central System, the AVM shall notify the customer and request an alternative form of payment or cancellation of the current transaction.

If the card number appears in the bad card file or if the bank or EFT service provider disapproves a card transaction after receiving a request for on-line approval, the user shall be notified that the card was not accepted with a message on the front display screen. At such time, the amount due will be displayed on the screen and the user will be prompted to either insert a different form of payment or cancel the current transaction. Such transactions shall be properly recorded in a separate credit/debit card error file.

Should the AVM fail to properly encode a smart card upon receipt of credit/debit transaction authorization from the central system, it shall reverse the transaction, crediting the proper value to the cardholder's account. The AVM shall record the transaction as an error and notify the user with the appropriate display message(s). The malfunctioning subsystem shall be placed out of service and the appropriate alarm shall be sent to the Central System.

All AVM and/or communications operational errors and exceptions shall be logged by the AVM and uploaded to the Central System. In the event of a failure of the communications network, the AVMs shall automatically retry the connection or operate in the cash-only mode for a programmable time period, after which the machine shall return to the full capabilities. This time period shall be programmable in increments of 30 seconds. The appropriate exceptions reports shall be generated to log details of the aborted transactions.

4.7.3 Accuracy and Availability

The electronic payments functions of the AVM shall have an accuracy rate of 99.73%. Accuracy for electronic payments is defined as the mean ratio of the transactions recorded by the AVM to the actual transaction records received and processed.

4.8 FINE AND FEE PAYMENT

The AVM shall be able to collect fines or fees associated with an A-card account. Cash, credit and debit cards shall be used as the payment media for paying fines and fees.. For example, fines and fees shall be processed by the SFMTA merchant acquirer. The merchant acquirer associated with each transaction type shall be configurable by SFO.

The CMS shall download a file with the current fines and fees to the Central System, once daily at a time specified by SFO. Upon presentation of the A-card to the AVM when a driver wishes to load value, the AVM shall check the A-card against the fine and fee file at the Central System or

the equivalent file at the AVM. If a fee or fine is associated with the A-card presented, the AVM screen shall include the options of paying a fee or fine, in addition to loading value. If no fees or fines are associated with the A-card, the AVM shall follow the value loading process described in Section 4.2 - Loading a smart card.

4.9 SMART CARD SYSTEMS

The AVM shall contain all hardware and software necessary for the operation of smart card subsystems facilitating the following functions:

1. Loading value onto a smart card
2. Viewing the status of the smart card account
3. Payment of fees and fines

4.9.1 Payment By Smart Card

The electronic payment subsystems shall be capable of accommodating an open CSC such as ExpressPay, MasterCard PayPass, Visa Pay Wave or any open loop contactless credit or debit card. A description of all open loop smart card payment provisions shall be submitted to SFO at the PDR.

4.9.2 Contactless Smart Card Interface

An external smart card interface shall be mounted to the front of the AVM. The functionality provided by the smart card interface shall be finalized during PDR. The interface will primarily be used to read and add value to A-cards.

The AVM shall have a fixture mounted on the front panel which shall hold the A-card in place during a transaction. The AVM shall be able to perform all read/write functions to the A-card while it is in place in the fixture. Final design of the fixture shall be submitted to SFO for approval.

4.10 INTERNAL SERVICE AND MAINTENANCE CONTROL

The AVM shall be equipped with an internal keypad or keyboard and display (user display may be used) to enable service and maintenance personnel to input commands to the control system. This keypad or keyboard shall be the only mechanism needed for entering commands. An internal information display shall also be provided to give feed back to the service and maintenance personnel necessary to evaluate the control system's responses to entered commands. Keypad or keyboard commands and internal displays shall be submitted for approval.

4.11 AUDIT REGISTERS

All essential AVM data shall be stored in the central database and reported from the Central System to allow for full recovery from loss of transactional and fault data. At a minimum, the status of the following conditions shall be possible to determine at all times:

1. Amount of money, by denominations, in each of the internal money storage units
2. Number of transactions since last data upload, queried by type and total
3. Number of AVM failures since last data upload
4. Number of revenue service events since last data upload
5. Number of alarm events since last data upload
6. Total money received

Registers shall be kept in a manner such that loss of stored data will not result in corruption of register counts.

Means shall be provided to retain the non-resettable counts during power failures, PC board change outs, or any other necessary maintenance actions.

4.12 MACHINE STATUS

The AVM shall contain all necessary software and hardware for self-diagnosis of machine status. The control system shall provide detailed AVM functional and operational status when requested by authorized SFO personnel via the internal maintenance keypad at the AVM or via the Central System. A status report shall be displayed or printed when requested at the AVM or displayed on the corresponding monitor. Machine status reports shall contain information necessary to aid the diagnosis of a failure condition down to the subcomponent level. Error codes and messages shall be resident at the AVM. A complete list of codes, status messages and definitions shall be submitted for review and approval at the Design Reviews.

4.13 AVM CLOCK

The AVM microprocessor control system shall contain its own quartz crystal-controlled electronic clock, which shall be used to generate time signals to maintain an accurate record of the year, month, day of the month, and time of day (hour and minutes).

The clock shall contain calendar data to determine the year, month, and day, including leap year, without manual intervention for at least 10 years, and shall provide accommodations for automatic correction for daylight savings time.

A means of manually setting year, month, date, hours and minutes via the internal keypad or through the Central System shall be provided. The AVM clocks shall synchronize automatically on a configurable basis (daily by default) and upon command from the Central System. The clock accuracy shall be +/- 1 minute over a year.

4.14 INITIALIZATION

The initialization process shall not take more than 6 minutes from the moment the AVM is switched on to the when the AVM is ready to carry out a transaction.

4.15 DATA STORAGE AND TRANSFER

The AVM shall collect, store, and transmit data to the Central System. Additionally, all event and transaction data shall be transferable by using a solid-state memory device. The AVM shall have sufficient capacity to store all AVM transaction and event data for a minimum of 40 days. Removal of the data storage device shall require the use of a controlled revenue service key.

TransCore shall also provide all AVM hardware and software to support the transfer of data to and from the Central System. Sensitive financial information such as PINs shall be encrypted at the AVM prior to data transfer to the Central System. Data encryption means shall conform to all applicable ISO and DES standards. Also, the standard communications system established for communication between the AVMs and the Central System shall be programmable for optimization activities to decrease communication expenses and/or system delays. Upon installation of the AVMs, TransCore shall be responsible for terminating the communication cable(s) within the AVM. The communication cables shall be provided by others to the nearest junction box. The terminal board shall be mounted in the AVM in an easily accessible location that will facilitate trouble-shooting communication problems. In the event a router or other equipment is required, TransCore shall make provisions to house this equipment in the AVM cabinet or pedestal.

4.16 AUXILIARY POWER SYSTEM

4.16.1 Uninterruptible Power Source

In the event of a power interruption, a rechargeable dry or sealed gel cell battery source shall provide auxiliary power to the AVM in order to, at a minimum, provide the following:

1. Complete the transaction in progress
2. Provide power to the local siren-type alarm for at least 5 minutes.
3. Provide power to the alarm communications system to enable the completion of contact closures in order to transmit continuously the intrusion alarm (door-open alarm condition) for a period of at least 1 hour. Alternatively, the AVM may use TCP/IP to send an alarm message to the Central System.
4. Allow for the orderly shutdown of the AVM, including transmitting all audit data and alarm conditions to the central system.

Upon reinstatement of power, regardless of the duration of power interruption, the uninterruptible power source (UPS) shall be automatically recharged by a charger within the AVM. Failure of the UPS shall not disable the AVM.

4.16.2 Battery Backup

A non-rechargeable battery source shall be provided in the AVM. At a minimum, the battery shall provide the capacity to maintain the clock and memory for 100 hours and permit a single transmission of stored data. A battery charge indicator shall be provided to monitor battery status and a warning signal shall be sent to the Central System when the battery requires replacement.

4.17 LIGHTING FIXTURE

The AVM shall be provided with a lighting fixture to illuminate the face of the AVM. The lighting fixture shall be constructed out of the same material as the cabinet in a manner to keep out dirt, moisture, and insects. The light shall remain on at all times. A by-pass switch shall be provided on the interior of the AVM to permit the lighting fixture to be manually turned on and off.

The lighting fixture shall:

1. Contain a complete fluorescent lamp circuit or equivalent LED lighting.
2. Be constructed to allow easy replacement of the fluorescent lamps
3. Have a .375-inch-thick clear polycarbonate cover over the lamp opening
4. Be accessed for lamp replacement by the use of a key without requiring the opening of the front door of the AVM
5. Utilize commercially available equipment

The color and design of the lighting fixture, including the lamp type, shall be subject to SFO approval.

4.18 CIRCUIT BREAKERS

Each AVM equipment enclosure shall contain a master circuit breaker to remove power from the equipment when activated. Each modular component (e.g. bill acceptor and control module) shall have appropriate protective devices as required by equipment design. Each protective device shall be clearly labeled and easily accessible and replaceable.

4.19 CABINET

The AVM cabinet doors, sides, and top shall be constructed of Series 300 stainless steel sheets or equivalent. Gaps between sheets shall be uniform, with no separation greater than 0.05 inch. When the front door of the AVM is closed, no gaps greater than 0.1 inches shall exist between the door panel and the cabinet, to prevent the door from being pried open. During revenue servicing and maintenance, it shall be possible to fix the AVM door in the "open" position to prevent wind gusts from closing the door unexpectedly. All hinges shall be concealed and secure.

The AVM top shall slope a minimum of five degrees from the horizontal plane toward the rear of the AVM to prevent any accumulation of rain. Exterior stainless steel surfaces shall have a random orbital finish. Interior surfaces other than stainless steel or plated steel shall be powder coasted white with a SFO-approved paint.

The pedestal shall be constructed from the same material as the AVM. If any components required for operation of the AVM are mounted in the pedestal, then a pedestal access door shall be provided with an opening large enough for access to maintain, service, and remove these components. The final AVM dimensions shall be determined at the PDR.

The structural design shall be such that a force of 200 pounds applied in a horizontal plane at the topmost point of the AVM in each of the four mutual sides shall not result in permanent deformation of the AVM or failure of its mounts. The top of the AVM shall withstand vertical loads of 250 pounds concentrated in a 1 square foot area applied at any point on the top surface of the AVM without causing any permanent deformation.

Internal lighting shall be provided to facilitate servicing under low ambient light conditions. An internal AC duplex outlet shall also be provided.

4.20 AVM SHELTER

The AVM shall be placed in the existing shelter. If the dimensions of the AVM do not permit it to pass through the shelter entry way, TransCore shall be responsible for disassembling and reassembling any existing shelter in order to allow for AVM installation. Though TransCore will not be responsible for the infrastructure or construction portion of the TMS, TransCore shall provide technical assistance to the Infrastructure TransCore as required in order to meet this requirement.

4.21 SECURITY AND ACCESS

The design and manufacture of the AVM, including all removable sealed money containers (bill vaults,) shall ensure the highest degree of security. Cabinet design shall provide protection against vandalism and burglary, or AVM removal. All security arrangements shall be submitted for SFO approval.

4.21.1 AVM Access Method

Access to the AVM interior for servicing shall be by the front door. Opening the front door of the AVM shall require engagement of the locking mechanism with the proper keying device and a valid smart card access card and PIN.

Access to the AVM shall be governed by the following methodology:

1. Authorized SFO, maintenance, or revenue servicing personnel uses a controlled key to open the front door manual lock.
2. Authorized personnel insert and remove an Access Card into the card-reading device and entry of the valid PIN. The Access Card is scanned for identification and access authorization.
3. If access authorization is not obtained within a preset time period, a local siren-type alarm shall be activated. Additionally, the AVM shall transmit a security violation alarm. The time period to permit insertion of an Access Card shall be programmable and initially set to 60 seconds.

Upon completion of service functions, service personnel shall insert and remove their Access Card once more to activate the logout process. Alternatively the upon completion of service functions, the AVM will automatically log out the service personnel. Should the machine be closed with an Access Card still resident in the card reading device, the AVM shall not return to

service, but place itself in the "Out-of-Service" mode, and a corresponding alarm shall be sent to the Central System.

In the event of a failure of the smart card reading device, access to the AVM interior shall be granted upon entrance of a master PIN code using the keypad. This master code shall be controlled and programmable by authorized personnel at the Central System.

4.21.2 Locks And Keys

All locks and keys used on the AVM shall be of the high-security type, e.g., Medeco, DOM and Illinois, or SFO approved equal, uniquely keyed for this application. All keys shall be color-coded or use an approved identification method so users can quickly identify the function of the key and the type of lock it opens. The AVM door shall be equipped with a cylindrical multi-point locking mechanism, containing a minimum of four locking points and operated by a T-handle or similar device. Security keys shall be registered, and new or additional keys shall be available only from the manufacturer, by SFO-authorized personnel. All security locks and design are subject to SFO approval review and approval.

Locks providing the same functions shall be keyed alike to permit keys to be used interchangeably among all AVMs. The following keys shall be used for all AVMs:

1. Access (keying) device to open the front door
2. Key to access slides housing various components, including bill vaults and printer units
3. Revenue keys for removing bill vault and non-volatile data storage device from the AVM
4. Count room keys for opening bill vault
5. Key to shunt the local siren-type alarm (if necessary)
6. Key to access lighting fixture

Ten sets of keys shall be delivered separately, in a secure manner to SFO's Landside Operations Manager at least 60 days prior to delivery of the first AVM.

4.22 ALARMS

4.22.1 Local Siren-Type Alarm

The local siren-type alarm shall sound for a time period adjustable from zero (0) seconds when the front door is opened without valid access code. The adjustable duration shall be programmable from the Central System and set initially to the entire time the front door is opened without valid access codes. The machine shall recognize the door as being open for all times when the door panel is 1/4 inch from its closed and locked position, along the side opposite the hinges.

TransCore shall provide an SFO-controlled method for deactivating the siren-type alarm, e.g., the use of a shunt key. The alarm siren shall be a minimum of 110 dB at 3 feet, under both auxiliary and normal power conditions. Both the alarm and the method of deactivation shall be subject to SFO approval.

4.22.2 Alarm Transmission

The AVM shall include all hardware and software, as approved by SFO, necessary to indicate conditions requiring attention and allow the Central System to remotely monitor the conditions. The machine status report can also be provided from the Central System database. All alarm events shall be transmitted in real time upon occurrence to the Central System over the communications network. The alarm shall be cleared when the activating condition is reset. The transmission of alarms shall be organized according to several priority levels:

1. Intrusion/security violation
2. Out-of-Service
3. Maintenance
4. Revenue service

For each alarm event, the AVM shall be capable of transmitting, in real time upon request from the Central System, a machine status report containing detailed information regarding the nature of the alarm event. Such information shall be detailed enough for SFO personnel to remotely assess the exact cause of the alarm down to the component level.

Alarms transferred to the Central System shall also be transmitted in both text and email to designated SFO personnel.

4.22.2.1 Intrusion Alarm

Whenever the front door of the AVM is opened and the door entry procedure has not been completed, the AVM shall transmit the intrusion alarm to the central system. The intrusion alarm shall also be activated whenever money containers in the AVM are accessed without proper authorization. Upon the receipt of authorized security clearance and deactivation of the local siren-type alarm at the AVM the remote alarms shall be automatically cleared.

A shock or motion sensor located within the AVM shall detect severe impacts and motion and activate the intrusion alarm in such instances to prevent unauthorized entry or removal of the AVM. The sensitivity of the shock or motion sensor shall be adjustable and shall not be such that normal contact with the machine during operation, such as a person leaning against or bumping into the machine on any side, will set off the alarm. TransCore shall be responsible for devising a test procedure to demonstrate the level of sensitivity of this alarm to SFO during FAT.

4.22.2.2 Out-of-Service Alarms

An Out-of-Service alarm transmission to the Central System shall indicate that the AVM is not able to operate in revenue service for any reason including loss of power, etc. Removal from revenue service due to the front door of the AVM being open shall not activate an Out-of-Service alarm. Out-of-Service alarms shall also not apply to limited operating conditions occurring from an individual component being placed out of service.

4.22.2.3 Maintenance Alarms

Failure of a component or subsystem causing limited operation of the machine and/or requiring maintenance service shall activate a maintenance alarm. At a minimum, the maintenance alarm shall be transmitted to the Central System for the following events:

1. Bill acceptor faults
2. Bill handling system faults
3. Credit/debit card reader faults
4. Smart-card reader faults
5. Printer system faults such as low paper, empty paper or paper jam
6. Control system faults
7. Power failure

Details regarding the nature of all maintenance service alarm events shall be provided upon request from the Central System down to the subcomponent level.

4.22.2.4 Revenue Service Alarms

A revenue service alarm shall be transmitted to the Central System for any event requiring revenue servicing of the AVM. At a minimum, such events shall include the following:

1. Bill vault near full
2. Bill vault full

4.23 STATISTICAL DATA

The AVM shall monitor and record two types of statistical data, loads by transaction and events by occurrence. Statistical data shall be stored in the AVM. At any given time at least 40 days of operating events and 40 days of transaction data files shall be available to be downloadable. Maintenance and revenue personnel shall be able to access the AVM memory in real-time via keypad commands, and select the day or series of days (up to 40 days) and type of statistical data, depending upon personal authorization codes, to be uploaded. Statistical data will be automatically uploaded upon request from the Central System. The AVMs and CIDs may send alltransaction and event data to the Central System in realtime, storing a backupcopy of all data on a local Flash Memory card and therefor reporting from the Central System database.

When the AVM registers transactions and events, it shall at a minimum record the following relative data fields, as applicable:

1. AVM ID
2. Location name
3. Date and time (separate fields)
4. Employee ID

5. Employee authorization codes
6. AVM entry status
7. Component ID
8. Component content details
9. Card Numbers

In addition, the following information at a minimum shall be recorded for each transaction performed at the AVM:

1. Transaction sequence number (reset to 0 at the close of each day)
2. Type of transaction
3. Revenue for each value load
4. Type of payment, card numbers, and any associated approval codes

AVM events shall include at a minimum all alarm events identified herein, as well as the following events:

1. Power restored to each subsystem (such as electronics control unit, bill system, smart card system)
2. Door opened/closed
3. Valid login
4. Invalid login
5. Electronic transaction approval request
6. Data upload
7. Data download
8. AVM reboot
9. Bill vault removals and insertions, including a cash audit
10. All data storage module removals and insertions
11. Event message or code

Some or all AVM and CID data files may use simple flat files and use encryption or non ASCIII format for security reasons, or approved equal, arranged in rows and columns, and filed for access by commercially available data-processing software such as the most current versions of ISQL, Access, Excel or Oracle. Data files shall be closed at the end of each day and filenames structured to facilitate data identification by day. The closing time for the file shall be programmable by authorized SFO personnel at the Central System in increments of one hour. A detailed list of the events to be recorded and associated data and codes shall be submitted to SFO for review and approval. Exact format of statistical data storage as well as the proposed layout of the data and event coding shall be subject to SFO approval.

4.24 AUDIT TICKET DATA

At a minimum, the following types of audit reports shall be available from each AVM or the Central System:

1. Revenue Report
2. Load Report
3. Collection Report
4. Count Room Report
5. Diagnostics Report
6. Receipt Report

All audit tickets shall present the following information:

1. Title or type of audit ticket
2. AVM number
3. Employee ID
4. Date and time of report

The data fields and format of each audit ticket shall be software programmable and downloadable. The format and presentation of data on all initial audit tickets shall be subject to SFO approval.

4.24.1 Revenue Reports

Upon request from authorized revenue service personnel, the AVM shall issue a Revenue Audit Ticket containing data regarding the content of money containers. The Revenue Audit Ticket shall include the type, number and value of bills resident in the container for each individual money container in the AVM, such as the bill vault. The report shall also display information such as the following:

1. Total dollar value contained in each of the vaults.
2. Total amount of overpayment accepted since last data upload.
3. Total amount of recovered money since last data upload.

4.24.2 Load Reports

Upon request from authorized revenue service personnel at the internal maintenance keyboard, the AVM shall issue a Load Audit Ticket providing value load data. Revenue service personnel shall be able to select, via keypad commands, the day or series of days (up to 10 days) of statistical data to be printed. The default selection shall be the current calendar day. This audit ticket shall present the number and total value of transactions as well as summary data including:

1. Gross amount of money collected
2. Gross amount of money dispensed

3. Net amount of money collected

4.24.3 Collection Reports

Each time a money container is removed or inserted by authorized revenue service personnel, a Collection Report shall be issued by the AVM. The Collection Report shall at a minimum provide the following information:

1. Clear indication of whether the container was "removed" or "inserted" into the AVM
2. Container type (bill vault) and identification number
3. Bill quantity and value resident in the container by bill type
4. Total bills revenue in the container

4.24.4 Count Room Report

Each time a money container is removed or inserted by authorized revenue service personnel, a Count Room report shall be issued by the AVM. The Count Room Report shall not contain any indication of the amount of funds resident in the money container. Data presented on the Count Room Report shall be limited to information such as indication of whether the container was "removed" or "inserted" into the AVM and the bill vault identification number.

4.24.5 Diagnostics Report

On request from service personnel, the AVM shall issue a Diagnostics Report, by event code, providing stored alarm event data. Maintenance and revenue personnel shall be able to select, via keypad commands, the day or series of days (up to 10 days) of transactional events data to be printed. The data presented in the diagnostics report shall be detailed enough for revenue service personnel to view the nature of historical failure events down to the subcomponent level.

4.24.6 Receipt Report

On request from SFO personnel, the AVM shall issue copies of receipts issued following a transaction. SFO personnel shall be able to select, via keypad commands, which receipts to reprint. User-selectable fields shall include:

1. Date range
2. Time range
3. Transaction number
4. Bank EFT confirmation number
5. Credit/Debit card number
6. A-card number
7. Card serial number
8. Transaction value

This report shall be available at the AVM or via web interface.

4.25 ACCURACY AND RELIABILITY

Reliability as defined in this section shall be used to measure the performance of AVMs.

The reliability shall be 10,000 mean transactions between failures (MTBF) for a high transaction volume environment. The reliability shall be 7,500 mean operating hours between failure in a low transaction volume environment. A low transaction volume environment is defined as processing zero (0) up to 250 transactions per day, and a high transaction volume environment is defined as processing 251 and higher transactions per day. Any device that fails more than two (2) times per month shall be replaced with a new unit. If the new unit experiences the same failure rate, TransCore shall be responsible to initiate an investigation to determine the cause.

Alternatively, failures shall average no more than two (2) failures per device type every 90 days for the total population for devices in service. Reliability shall be calculated as follows: Total transactions for each AVM shall be added and divided by the number of chargeable failures to achieve the MTBF; Total operating time for each AVM shall be added and divided by the number of chargeable failures to achieve the mean operating time between failures.

1. **Non-chargeable failure** — is a malfunction caused by a condition external to the Distribution Device, which is neither a functional, environmental, nor a test requirement in this specification and is not expected to be encountered during normal and correct operation in revenue service. Non-chargeable failures shall not affect the MTBF or mean operating hours between failures calculations, and include the following:
    a. Jams caused by foreign materials other than U.S. bills and credit/debit or A-cards inserted in the slots;
    b. Failures cause by fluids injected into the slots;
    c. Accident or mishandling;
    d. Failure of test facility or test instrumentation;
    e. Equipment failures caused by externally applied over stress conditions in excess of the approved specification requirements contained herein;
    f. Dependent failures occurring with the independent non-relevant failure that caused them;
    g. Failures caused by incorrect operating, maintenance or repair procedures;
    h. Bill vault "full" or "empty conditions, or receipt stock empty

All other failures shall be considered relevant and chargeable unless determined to be non-chargeable by the failure review process. The failure review process shall be applied as needed during the test.

2. **Chargeable failure** — is any malfunction which prevents the Distribution Device from performing its designated function, or meeting its performance criteria, when used and operated under the environmental and operational conditions stated in these specifications. At a minimum, the following conditions shall be considered chargeable failures:

a. Software anomalies and bugs

b. Bill jams

c. Failure to accurately read or encode A-card

d. Data and/or alarm transmission failure

e. Exposed currency

f. Failure to return money in escrow

g. Failure to accurately print a receipt

h. Partial or complete failure of passenger display.

A Failure Review Team (FRT) shall be established to evaluate which failures are chargeable against TransCore's reliability requirements. The FRT shall be comprised of, as a minimum, one member from SFO or designated SFO representative, and as a minimum one member from TransCore. Responsible parties within this team will initially attempt to settle any disputes. The SFO Project Director will make a final and binding decision on any disputes that remain unsettled after a period of two weeks.

In the event that the devices do not meet these reliability requirements, TransCore shall identify and implement remedial action, including, as necessary, modification of the equipment, on-site engineering services, on-site technical services, or other related action at no cost to SFO. In the event the installed equipment does not meet these requirements, and remedial action requires TransCore to take an individual AVM out of service for more than 12 hours to implement equipment modifications or replacement, TransCore shall arrange for a supplemental AVM at that location as necessary, so that there is no reduction in vending capacity while remediation is taking place. TransCore shall provide a replacement device within 24 hours of notification.

4.25.1 Accuracy and Availability

The electronic payments functions of the AVM shall have an accuracy rate of 99.73% (3σ sigma). Accuracy for all types of electronic payments is defined as the mean ratio of the transactions recorded by the AVM as evidenced by the transactional data recorded to the actual transaction records received and processed by the Central System.

The cash transaction functions of the AVM shall have an accuracy rate of 99.5%. Accuracy for the cash processing functionality of the AVM is defined as the mean ratio of the moneys recorded as evidenced by the audit receipts produced by the device to the actual moneys in the bill vaults as counted. Cash reconciliation differences attributable to beginning inventory shortages or loading errors shall be excluded. Differences attributable to counting errors shall also be excluded. Reconciliation differences shall be reported by the relevant device within 24 hours.

Availability is defined as the probability that an AVM is operating. The base equation that follows shall be used to calculate availability.

1. Required operating hours - time the equipment is required to be available conduct transactions or other operational activities.

2. Scheduled maintenance hours - time required for predefined scheduled equipment and system maintenance and servicing activities.
3. Required revenue servicing hours - time required for revenue servicing activities such as exchanging money containers, and replenishing receipt stock.
4. System out-of-service hours - time that the equipment is not available to conduct TMS transactions within the predefined scheduled operating window.

$$\text{Availability}_n = \frac{\text{effective operating hours}_n - \text{system out-of-service hours}_n}{\text{effective operating hours}_n}$$

where: effective operating hours_n = (required operating hours_n - (scheduled maintenance hours_n + required revenue servicing hours_n))

Availability shall be measured at a minimum for the following:

1. Each AVM shall be available to conduct a transaction 99.73% [3σ (sigma)] during operating hours.
2. AVMs shall be available to transmit data upon request to the Ventek server 99.73% [3σ (sigma)] during the scheduled time periods for these activities.

5. CENTRAL SYSTEM

This section focuses on the required Central System (CS) capabilities including:

1. Clearing, settlement and financial management
2. Autoloading of funds from a user's debit/credit card
3. Data upload and download to CIDs, AVMs, TOTs, workstations, and CMS
4. System interface management
5. Database management
6. Auditing
7. Performance requirements
8. Hardware and software
9. System features
10. System administration
11. Policies and procedures
12. Reporting
13. Customer service
14. Seamless integration with GTMS
15. Exporting data to SFO Data Warehouse

TransCore shall provide all PC hardware, applications, third party software, and processes required for SFO to perform the Central System functions described in this section. TransCore shall provide comprehensive and detailed Central System design documentation explaining the system architecture, user interfaces, screens, processes and flowcharts required to operate the CS in CDRL 08, "Central System Design".

The CS is intended to become the central management system for the Taxi Management System.

5.1 CLEARING, SETTLEMENT AND FINANCIAL MANAGEMENT

TransCore shall provide central management and control systems necessary to perform the clearing and settlement processes necessary for the Taxi Management System. For purposes of this Specification, "clearing" is defined as the processing of all A-card transactions to determine end-of-day account position based on the transactions by the end-of-day cut-off. The settlement process shall include a set of ACH files needed to move funds among bank accounts as required and shall have the capability of occurring daily. TransCore shall document all clearing and related processes, and procedures for carrying them out, in CDRL 9, "Clearing and Settlement."

The following is a summary list of the required Central System capabilities:

1. Provide transaction processing, and act as the processor for all taxi management transaction activity
2. Clear, reconcile and settle all transactions
3. Manage interfaces with external systems as required
4. Manage fee table updates
5. Detect and manage fraudulent activity
6. Provide the central database for system reporting, and provide standard and ad-hoc (user defined) reports
7. Maintain and operate all Central System databases required for A-card operations
8. Provide and support system security and financial audit
9. Provide access to all data and databases related to the A-card program

5.1.1 Transaction Processing

5.1.1.1 General Processing Requirements

The system shall provide the following general processing functions:

1. Complete audit trail of all system activity
2. Database backup, reorganizations, tuning and other necessary database management functions.

5.1.1.2 Daily Transaction Processing Functions

The System shall provide the following daily transaction processing functions:

1. Reporting
2. Clearing and computation of net position
3. Card initialization processing
4. Card account management data such as value of and dates by which funds are subject to escheatment, dormancy, stale accounts, write-offs, or adjustments
5. Credit/debit autoload and device transactions
6. Cash management activity (such as settlement with credit/debit networks, other payment processing, matching receipts with value loading transactions, and float tracking).

5.1.1.3 Daily Processing Cycle

1. TransCore shall provide systems and software to meet all revenue clearing and processing requirements.
2. The Central System shall operate on a daily processing schedule 7 days per week, 365 days per year.

3. The Central System shall upload all available transactions in real time from CIDs, AVMs, and TOTs.
4. Once database updates are completed, the following daily processing cycle functions shall be performed:
    a. Report generation and management services; reports shall be available by the next day
    b. Data download shall be completed by 4 a.m. Pacific time the following morning.
5. The system shall report and map A-card transactions to the daily business cycle irrespective of the Central System business cycle.

5.1.1.4 End Of Month Processing Cycle

TransCore shall provide next day settlement for the net position determined over the month. All downloads, funds movement, and reports shall be completed by 8 a.m. Pacific time the second business day of each month.

5.1.2 Clearing And Settlement

1. The system shall, at the end of each twenty four hour business cycle, close out the day's activity, reconcile account balances, and calculate revenues.
2. The System shall initiate settlement: funds movement to and from each of the participants' bank accounts (generate an ACH file).
3. Daily fee reconciliation shall take into account all transactions with a financial impact. This shall include as a minimum:
    a. Reload transactions
    b. Payment transactions
    c. Autoload cancellation
    d. Balance transfers for lost and stolen cards
    e. Adjustments, escheatment and write off transactions
4. The system shall reconcile monthly all fee revenue paid to or received from acquirers and/or financial networks, deposits/fees held for A-cards, and interest earned on A-card system funds.
5. TransCore shall use a method for settlement, such as the Federal Reserve System's ACH, wire transfers, or intra-bank money transfers.
6. Daily clearing shall provide the following:
    a. Reconcile daily totals to transaction totals.
    b. Reconcile all daily receipts to accounts receivable (load network, credit, and debit networks).

c. Reconcile cardholder account balances, the beginning balance, the net value of all transactions posted to the account, and the ending account balance.

d. Reconcile the total value of revenue for SFO recognized for the processing day.

e. Reconcile the total funds entering, exiting, and remaining in the system each day.

5.1.3 Fraud Management

1. The system shall provide regular fraud management reports.
2. TransCore shall provide procedures to detect and/or avoid any inappropriate or fraudulent use of the system. Possible solutions can include software products which look for anomalous transaction patterns such as:
   a. Inconsistent card use patterns
   b. Frequency and usage inconsistencies
   c. More than one card with same serial number.

5.1.4 Financial Management

TransCore shall provide systems necessary for the financial management of revenues accrued through A-card operations and for direct operating expenses related to the generation of revenue, including:

1. Credit and debit card payment authorizations and settlement
2. Funds management services to receive, hold, manage, audit, and disperse, payments received through networks as settlement for credit and debit transactions and autoloads
3. Merchant of record for certain credit and debit card fee payment transactions and the merchant banking relationship to support this activity
4. All financial management practices shall be per the direction of or shall be approved by SFO.

5.2 AUTOLOAD

TransCore shall provide autoload systems to permit a subscribing cardholder to automatically load value to a card, on a periodic or on an "as needed" basis, while it is being used to pay. TransCore shall provide capability to enable autoload on a card remotely (that is, at any smart card-enabled device not requiring the cardholder to bring their card to a specified location such as a ticket office).

The cardholder will be required to enroll in the autoload service. The system shall support enrollment by telephone, fax, mail, e-mail, over the Internet, and in-person. At the time of signup, the cardholder may be required to specify the amount of money to be loaded to the electronic purse and the funding account or credit/debit card to be used to pay for the value being loaded onto the card

TransCore shall define settlement processes for A-card value loaded through autoload, subject to SFO's approval.

Funding from individual consumer accounts shall be governed by an EFT Agreement between the consumer who owns the funding account and SFO. To support these agreements, TransCore-provided systems shall access the consumer's designated funding accounts as required by the specific autoload option selected by the cardholder. Funding accounts supported shall include, at minimum—credit card accounts associated with Visa, MasterCard and Discover branded credit cards, as well as charge card accounts such as those associated with depository accounts at financial institutions.

The system shall have a parameter for the minimum value for an autoload transaction. This value shall be modifiable by SFO.

Autoload transactions shall not materially affect throughput at payment devices. Upon successful autoload transaction, card shall be encoded to prevent a second attempt of the same autoload.

5.2.1 Bank Card And EFT Autoload Transactions

5.2.1.1 General

Autoload bank card and EFT transactions shall be processed, authorized, settled, and accounted through Central System with a single bank card clearing institution.

TransCore shall be responsible for establishing the connection between the Central System and the SFO-selected bank card clearinghouse, and providing all associated Central System software for purposes of determining validity of and approving (or rejecting) bank card or EFT transactions associated with autoload. The information on the clearinghouse to be used for all bank card transactions will be provided to TransCore.

SFO will negotiate contracts with others to act as the bank and clearinghouse service providers for any bank card transactions made via the AVMs. TransCore shall be responsible for coordinating any technical interfaces necessary with these service providers for handling bank card transactions.

TransCore shall obtain certification of the bank card system prior to permitting transactions to occur. Any costs associated with additional time required from the service provider for certification shall be the responsibility of TransCore. TransCore shall be responsible for demonstrating successful credit/debit functionality between the Central System and the bank clearinghouse on the "live" revenue ready system. Test bank cards shall be the responsibility of TransCore.

5.2.1.2 Bank Card Usage Limits

For purposes of controlling potential losses through bank card fraud, the Central System shall maintain a database of all bank card autoloads. The database shall impose checks of transactions requests; if such checks are not passed, the transaction shall be denied:

1. The database shall be updated automatically for each bank card sale.

2. The database shall have the ability to limit the number and value of transactions in total and by type for individual credit cards for given durations. Such limits shall be software definable and modifiable by SFO. For example, it shall be possible to deny a bank card transaction request for the same card when a third transaction is requested within a 10-day period and when the total value of card transactions exceeds a specified dollar amount in a given week.
3. The database shall include a SFO-maintained list of bank cards that are known to be unacceptable (i.e. the "local hotlist").

5.2.1.3 Bank Card Clearing

All bank card transactions shall be verified by the Central System prior to being sent to the financial clearing institutions. All requests for bank card transaction authorization shall be sent to a single bank card clearinghouse from the Central System. From the clearinghouse, subsequent transmission of bank card information shall be forwarded by the clearinghouse to the appropriate financial institution. The authorization process shall be capable of simultaneous transactions, i.e., it shall not be required that one transaction is received and processed prior to the next transaction request being processed.

5.2.1.4 Funds Settlement

The Central System shall generate an electronic settlement report with the appropriate financial institution. Once the settlement report has been successfully transmitted, a hard copy report shall be available for printing and download. The settlement report shall be incremental in nature, containing transactions that have successfully occurred since the most recent transmittal of a settlement report.

5.2.2 Post-bill Autoload

In order to utilize the autoload service, the cardholder first shall complete the process of application, approval and activation of the card.

The CID shall recognize an autoload-enabled card when it is presented for payment, and shall load the card with predesignated value in accordance with the service parameters.

The designated cash value shall be loaded into the A-card e-purse when that purse falls to or below a pre-defined value. The trigger level for autoload shall be an SFO modifiable system parameter.

The CID shall record the autoload event. When the device data is uploaded to the Central System, the system shall access the funding account designated for that card to collect the funds due. If the funds are collected, the process is complete. In the event that the funds due cannot be collected, the system shall hotlist the card, preventing its further use. The system shall complete this process within timeframes such that the credit exposure from such post-bill transactions does not exceed one day. TransCore shall not bear this credit risk if the hotlisting is completed within the specified time frame. Should TransCore not transmit the hotlist to card devices within contractually-required time every day, TransCore shall bear this additional exposure.

The system shall have the flexibility to utilize this function to provide "credit services" to institutional programs if so desired by SFO or TransCore. In this mode, the funds collection function shall not be activated until a specified longer time (e.g., one month), and any resulting hotlisting process required because of non-collectability of funds will not be triggered until beyond that time. The credit exposure in this instance will be borne by the party that has the business relationship with the institutional program permitting such delayed billing.

5.2.3 One-off Autoload

TransCore shall enable a cardholder to automatically load value to a card on an ad-hoc basis. The system shall not require cardholders to activate the service by presenting their cards in person at a designated facility. Cardholders shall be able to remotely activate this value load service via phone or Internet.

Remote activation of a one-off value load shall proceed as follows:

1. A cardholder desires to load value and calls TMS customer service.
2. The cardholder provides the required information necessary to process the value load request (e.g., card serial number, funding credit/debit card).
3. In a pre-bill model, online authorization is obtained, and the cardholder is charged at this time.
4. During the next complete download/upload cycle for the TMS Central System , the cardholder's value load request is downloaded to all CIDs.
5. The cardholder presents his card to a card reader, which compares the cardholder's card serial number to a list of one-off autoload requests. If a match is found, the reader then checks to make sure that the requested value has not already been loaded. If not, the reader loads the requested value.
6. In a post-bill model, the cardholder is charged after the next complete download/upload cycle, when the successful value load transaction is recorded by the SFO central system.
7. Upon successful completion of the one-off autoload, the cardholder's serial number is deleted from the list of pending requests.
8. The system shall allow this sequence to be repeated as upon successful completion of pending one-off autoload.

5.2.4 Autoload Service Discontinuance

TransCore shall provide for the following autoload service discontinuance scenarios. Cardholders shall not be required to present their cards in order to discontinue autoloads.

1. Voluntary Discontinuance—Post-bill cardholders may discontinue autoload service permanently or temporarily by not utilizing the card. If the card is not used, there will be no autoload and the designated funding account will not be billed. Pre-bill cardholders can discontinue autoload services by not paying their pre-bill amount. Should such non-payment continue for a period to be set by SFO modifiable system parameter, disable the

autoload designator in the card, thus enabling the card to be dropped from the autoload lists. Under this scenario, the cardholder shall be required to reinstate the autoload function should they desire to do so in the future.

2. Involuntary Discontinuance—The system shall enable SFO to discontinue autoload service for any cardholder in accordance with their financial management guidelines.

5.3 DATA UPLOAD AND DOWNLOAD

5.3.1 General Upload And Download Management

The system shall provide the following data upload and download management functions:

1. Creation of batch files
2. Batch validation and management:
    a. All batches received
    b. Required software version loaded
    c. Validate source of batch
    d. Duplicate detection
    e. Batch consistency (details match header data)
    f. Batch data archive
    g. Security enforcement.
3. Transaction validation and management:
    a. Data field edit checks
    b. Transaction consistency checks
    c. Validity of card serial number
    d. Validity of card status.
4. Execute any exception/error handling processes
5. Update database
6. Post account balances
7. Management of upload and download processes:
    a. Implementation of security processes
    b. Retransmission as necessary
    c. Assurance that all SFO's computer systems have received downloads.

5.3.2 Data Upload

The Central System is envisioned primarily as an off-line accountable system with transaction data being collected by remote processors or transaction devices, assembled in transaction batches, and depending on the specific interface, but typically once per twenty four hours, submitted to the Central System. In addition, there are on-line interface requirements for certain administrative transactions between the Central System and the TOT.

Real time online transactions shall include:

1. Payment transactions
2. Reload transactions
3. Cancellation and reversal transactions
4. Confirmation of blocks, option changes, and reloads
5. Real time credit/debit authorizations

Administrative transactions—both on-line to Central System database and in off-line batch transaction mode—shall include:

1. Account setup
2. Updates to account information
3. Balance inquiries
4. Reload cards
5. Provide previous transaction information
6. Report lost/stolen or malfunctioning cards
7. Card block/unblock
8. Change cardholder options/privileges
9. Card replacements (balance transfers)
10. Collect/update cardholder personal identifying information
11. Enroll in autoload program
12. Process customer-initiated autoload requests
13. Card problem reporting
14. Claims processing

TransCore shall provide capabilities for the management of all transaction interfaces including:

1. Procedures for upload management that ensure integrity
2. Process to guarantee successful uploads from all computer systems according to the predetermined schedule; the process shall include error handling, retransmission protocols, acknowledgments, data reconciliation procedures, batch validation

3. Duplication detection—batch management and tracking
4. Detection and management of duplicate transactions
5. Detection and determination of value of missing transactions
6. Secure logging of all incoming transactions and a complete audit trail of all activity
7. Backup procedures for daily uploads in the event the primary procedure is unavailable or fails.

5.3.3 Data Download

The system shall transmit, on a SFO-approved scheduled basis, information to computer systems necessary for operations. The following types of transactions and information flows shall be supported in real time:

1. Card blocking and unblocking
2. Card option changes
3. Autoload instructions
4. Reversals of autoloads
5. Privilege and option changes/cancellations
6. Reports
7. Transaction logs
8. Database off load
9. ACH settlement transactions.

The system shall be capable of managing all download interfaces, such as:

1. Schedule for downloading to all computer systems
2. Procedures for download management that ensure integrity
3. Process to guarantee successful downloads to all computer systems according to the pre-determined schedule; the process shall include error handling, retransmission protocols, acknowledgments, data reconciliation procedures, batch validation; TransCore shall provide procedures to ensure that all operational parameter changes are downloaded and installed in accordance with the schedule requirement for their implementation
4. Duplication detection—download batch management and tracking
5. Complete audit of all outgoing transactions
6. A backup procedure for daily downloads in the event the primary procedure is unavailable or fails.

5.4 SYSTEM INTERFACES

TransCore shall design and implement the following systems interfaces between the Central System and the following SFO computer systems.

1. SFO Central System —process uploaded payment transactions, loads, autoloads, block, unblock and autoload acknowledgments. Download blocks, unblocks, autoloads, status or privilege changes, and other operational parameter data as required
2. Credit and Debit Card Network—act as merchant acquirer to receive on-line authorizations for credit card autoloads and to receive financial settlements
3. ACH—implement funds movement in support of the settlement process
4. Internet—provide account setup, card initialization, autoload setup, balance inquiry, transaction history, and status inquiry transactions
5. Customer Interface Devices—modify A-card customer messages and screens
6. Internet-based reports server—all Central System reports and ad-hoc reporting shall be available via the Internet
7. GTMS – receive and process AVI data from the Ground Transportation Management System
8. SFO Data Warehouse – transfer and archive TMS data

5.4.1 Interface Management

TransCore shall provide a database for SFO to maintain all system interfaces and end points, and for each of the following functions:

1. Security:
   a. Maintain valid user IDs and passwords
   b. Validate all system logon and usage activity
   c. Maintain encryption keys necessary for transmission and decryption of secured data
   d. Maintain transaction privileges valid for each end point
   e. Manage SFO access to personal or sensitive information
   f. Develop recovery plan in the event of a security breach.
2. Transaction validation: Assure all transactions originate from a recognized end point, using a recognized and valid card with privileges appropriate to perform that transaction type.
3. Transaction logging: Provide a complete transaction history for each endpoint, suitable for ad hoc inquiry.
4. Interface protocols: Maintain table of interface management information including interface frequencies, communications management (which partner initiates

communications), date and times for expected batch transmissions, contact points, and communications protocols.

5. Software management: Maintain "load images" of application data suitable for download to update TransCore provided software in transaction devices and other interface points. Maintain complete download history and current release of software.
6. Transaction batch management:
    a. Maintain information on last 'n' transaction batches received from each end point and provide processing algorithms to assure all available transactions are received on a twenty four hour cycle.
    b. Provide capabilities to detect duplicate or incorrect batches and provide error-handling procedures.

5.4.2 Interface with Third Party Payment Providers

TransCore shall develop an interface specification, including APIs, to accept payment transactions from third party payment providers. The interface specification shall become the property of SFO. SFO may then freely distribute the interface specification to third parties as required.

The Central System shall be able to import transaction data from third party mobile payment service providers for consolidated reporting. The format of transaction data shall be defined at CDR.

5.5 DATABASE MANAGEMENT

1. SFO will maintain the Central System. TransCore provided systems shall enable SFO to perform all necessary database maintenance functions.
2. The Central System shall be capable of managing data access requirements, and the integration and linking of data elements so as to provide a seamless management view of all data resources.
3. TransCore shall provide at PDR a complete and detailed description of the transactional database as part of CDRL 54 – Transactional Database Design. This shall include but not be limited to the following:
    a. Database schema
    b. Database dictionary
    c. Description and source of data elements stored
    d. Description and source of data elements stored in the CS database
    e. Description of amount of data storage available
    f. Description of any data compaction schemes

g. Estimated time required for transmission of data to the CS based on typical and maximum transaction activity

4. Logical collections of data to be managed by the system shall include at a minimum:
    a. End Point Database
    b. Transaction Batch Management Database
    c. Transactional Database
    d. Card Account Database
    e. Card Registration Database
    f. Card Account Transaction History
    g. Transaction Acquirer History Database
    h. Security and Access Control Database
    i. Cash Management Database
    j. Financial Settlements Database
    k. Fee Table Database
    l. Operational Parameters Database
    m. Reports Archive
    n. Customer Service Tracking and Management Database
    o. Historical Database of Blocked and Inactive Cards
    p. Hotlisted Card Database
    q. Charge-back Response Database.
5. TransCore shall provide the capability for the regular backup of all data, off site archiving, and disaster recovery. Data shall be maintained for a minimum of ninety (90) days before archiving.
6. TransCore shall provide via a secure extranet the capability to generate ad hoc reports and ad hoc queries of the above databases using Microsoft Internet Explorer web browsers or SFO-approved equivalent.

5.6 AUDIT

TransCore shall participate in an independent audit of the clearing system to validate accuracy of all systems processing, cash management, and settlement. The audit will be conducted in accordance with generally accepted auditing standards by an independent auditing firm selected by SFO.

For auditing purposes, the system shall track all A-card transactions from conception to settlement. Each device shall maintain and communicate cumulative audit registers containing information such as the number of transactions conducted at the device, and total dollar value of

loads and payments. The system shall also create and maintain an audit trail of accesses to the objects it protects. The audit mechanism shall permit the specific auditing of the actions of one or more users based on the individual's identity or security/administrative role. Audit data shall be protected so that read access to the data is limited to those subjects authorized for review of audit data. Furthermore:

1. Security-relevant events shall be accountable to the subjects responsible for their actions
2. Audit trail shall be protected from unauthorized access, modification, and destruction
3. System shall provide sufficient granularity to trace events to subjects responsible for initiating those events

5.7 PERFORMANCE REQUIREMENTS

TransCore provided system shall have the following capabilities

1. Revenue shall be reconciled and settled with 100% accuracy.
2. Daily reports shall be available by 8 a.m. Pacific time the next business day.
3. All transaction data shall be sent to the Central System in real time.
4. At a minimum, data shall be downloaded once every 24 hours, and field devices and computer systems shall be polled at least once every 24 hours.

5.8 SYSTEM HARDWARE AND SOFTWARE

TransCore shall provide all system components required to perform all Central System activities and functions. Required components include but are not limited to:

1. Computers
2. Image scanning workstations for storing applications and other documents
3. Network components (SFO supplied)
4. Communication lines (SFO supplied)
5. Network communications services (e.g., frame relay/ISDN, SFO supplied)
6. Printers
7. Credit card processing equipment
8. Operating system software
9. Layered software products
10. Application software for account management
11. Site preparation and installation design, including all necessary civil, electrical and mechanical drawings and construction packages
12. At SFO's option, TransCore shall provide terminals at designated locations for remote access to the Central System.

TransCore shall provide a detailed configuration plan (CDRL 10, "Central System Configuration Plan") for all system hardware and software, including component level lists, quantities descriptions, costs, and locations.

5.9 SYSTEM FEATURES

All systems developed by TransCore shall include but not be limited to the following features:

1. Menu-driven user-friendly system or graphical interface
2. Modular system design to allow for cost-effective and expeditious changes dictated by program changes as directed by SFO
3. Security measures, including such features as user passwords and network security
4. Ability for customer service representatives to type text notes on accounts to track various situations, such as credit and debit card activity
5. Audit trail for all database changes
6. Data redundancy (e.g. disk shadowing, mirroring)
7. Use of data validation techniques and file transmission verification techniques in all data communications between all locations to assure validity of all user programs and data
8. Storage of all data in a commercially available relational database that provides SQL for access
9. Inactivity time-outs in application software, both user defined and system defined
10. Reasonableness checks on the data received from SFO and on information provided to customers; recovery or investigation procedures shall be established for the cases when "unreasonableness" is indicated by such checks
11. Appropriate data connectivity and bandwidth for the Central System based on forecast data transaction frequency and volumes
12. The CS reports shall be available via a web server so that daily settlement reports are accessible via the internet

5.10 SYSTEM ADMINISTRATION

TransCore shall provide communications, procedures, and documentation so that SFO can operate all system hardware and software. These system operations can take place either at one of the specific facilities for the program, or at a separate data processing facility available to SFO. Data processing system operations must support 24 hours a day, seven days a week.

Monitoring and control of all TMSE computer systems, from the Central System through and including all end devices, shall be via SNMP or current standard.

As part of system administration, the system shall provide for the following:

1. System monitoring and recovery

2. System and data security
3. Disaster Recovery (provided by SFO hardware and software)

5.10.1 System Monitoring And Recovery

TransCore shall provide procedures to report problems and implement recovery. TransCore shall provide a detailed system administration schematic, and a recovery and security plan. Both the schematic and the plan shall be included as part of the configuration management package for hardware and software.

TransCore shall provide procedures to facilitate rapid resolution of problems that might be related to SFO's end of system communications, including calling appropriate personnel in such situations.

TransCore shall provide procedures on when and how to retransmit/re-receive files when problems arise.

All of the above procedures shall be included in CDRL 11, "Policies and Procedures Manual."

5.10.2 System and Data Security

TransCore shall provide for all aspects of system security, including data security.

TransCore shall describe how system communications, programs, and data will be protected, how access and other security arrangements will be monitored, and how it will protect customer data from unauthorized disclosure and use.

5.10.2.1 Communication Security

TransCore shall utilize tested and accepted communication methods and equipment (provided by SFO) to reduce the possibility of incompatibilities and errors in transmission. TransCore shall provide a secure communication system to prevent fraud and unauthorized access to the communication system.

TransCore shall specify communication security measures, including transmission accuracy, error recovery, fraud prevention, unauthorized access, and data compression and encryption standards and the basis for selecting such sets of standards. TransCore shall describe the devices that will be used to monitor network communications to ensure the security and integrity of transactions.

5.10.2.2 Control for Internal and External System Access

Although SFO shall be responsible for controlling all system access (via TransCore provided procedures), the system design shall provide for user and system security. Users shall only have access or functions assigned to their assigned level of authority. Access to the system shall be controlled by individual user identification and password security. The system shall allow SFO to administer computer access accounts (log on identifications and passwords), access controls, network controls, maintain confidentiality of information, track security violations, provide local and remote access controls, and segregate functions within the Central System facilities. The system shall provide read-only access to the account management system for SFO and SFMTA

staff at their respective facilities. No third-party shall have access to the system unless approved by SFO/SFMTA.

The system shall utilize access control software to provide ID and password protection for direct and remote access, call back for remote access, and violation and activity reporting capabilities. The internal security system shall monitor, based on the user's ID and password, what level of user programs, database files, and maintenance files are accessed. Appropriate security measures shall be built into the system to prevent unauthorized access and identify and track any instances in which access has been denied. In such an event, a message shall be generated and stored indicating the time, date, location, and the identification of the equipment, software, or file to which access was denied.

5.10.2.3 Protection Of Data

SFO and SFMTA own all data collected and managed by the TMS System. TransCore may not release data to any other entity without SFO's prior written approval. Any and all information relating to the specific customers and their A-card accounts shall remain confidential and shall not be revealed (unless subpoenaed) or sold at any time.

5.10.3 System Redundancy and Back-up

TransCore shall supply a fully redundant system incorporating features such as dual processing, back-up communication lines, automatic backup procedures, error correction protocol, and additional removable storage media that will ensure A-card data (transaction, account, revenue, deposit, and operation data, etc.) in the system is protected and retrievable in the event any error or condition corrupts or contaminates an active file. TransCore shall ensure that any system back-up process would not interfere with or compromise other Central System operations. Back-up, archiving, and disaster recovery shall be detailed in CDRL 12, "Data Backup and Disaster Recovery Plan."

The system shall monitor and report the frequency and duration of back-up utilization and provide an explanation for the interruption requiring the back-up system.

The system shall be provided redundancy or back-up connections between all network connections among Central System devices and with SFO; and all communication lines. TransCore shall demonstrate these required redundancies or back-up capabilities as part of system development and testing prior to start-up and perform periodic tests thereafter (e.g., every three months).

5.11 POLICIES AND PROCEDURES

TransCore shall provide a "Policies and Procedures Manual," CDRL 11.

The Policies and Procedures Manual shall at a minimum include policies and procedures required to perform each and every activity described by the Specification for the Central System. The manual should include functional level flow diagrams to describe all system processing of data in each area.

5.12 REPORTING REQUIREMENTS

This section details the Central System reports that the system shall be required to design and provide to SFO. In addition to the reports described in this section, the Central System shall meet all the reporting requirements specified for the TOT in section 2. The Central System shall make all reports available over the internet.

TransCore shall submit a final design/format for all reports, both financial and non-financial, to SFO for approval (CDRL 13, "Central System Report Formats"). In general the reporting requirements are:

1. TransCore shall specifically identify in the reports, accounting entries, and automatic transfers, all funds collected and reported.
2. TransCore shall provide for system-generated reports that are automatically produced, printed, and distributed.
3. The system shall provide SFO with on-line access to data relevant to their organization via secure extranet and Web browser that allow the user to:
    a. Generate pre-programmed reports and ad-hoc reports
    b. Perform ad-hoc queries of the transactional database and other databases
    c. View reports and query results on a computer screen, download them to a file in common database file format, and print them locally as hard copy.
4. Queries and reports shall be provided via an Oracle database, or equivalent, on a TransCore-provided report server that shall host up-to-date duplicates (mirror) of the Central System's databases.
5. The use of manual reports shall be minimized.

The system shall allow for modification of reports as required. SFO reserves the right to require additional reports by PDR.

5.13 CUSTOMER SERVICE SYSTEMS

TransCore systems shall enable SFO/SFMTA customer service representatives to assist cardholders with:

1. Answers to questions regarding the A-card service.
2. Resolution of A-card related problems, such as apparent card malfunctions.
3. Card replacement and value refund requests, and verbal reports on the status of such requests.
4. Information on the unused value remaining on an A-card. Unused value information will be as of the last data upload for remote inquiries
5. Reporting lost and stolen cards
6. Card requests

7. Autoload requests
8. Registration
9. Supplying the replacement value of lost, stolen, defective registered cards or defective anonymous cards, and restore cards to their previous states and settings

TransCore shall supply for SFO review and approval a user's manual for the customer service systems (CDRL 55 – Customer Service Manual).

5.13.1 Internet-Based Service

TransCore shall also provide drivers with the capability to manage and change their account information and options via this PIN-protected, secure website. In addition to use of PINs, the site shall incorporate industry-standard security features to protect against theft of personal information, A-card activity, and payment card and financial data. This website shall also permit customers to:

1. View recent financial transactions associated with customer-designated credit or debit cards
2. View A-card uses and value loads
3. Update authorized account information
4. Select method of confirmation of account changes (Web-based display or e-mail)
5. Make payment for autoloads (both "one-off" value loads and recurring autoloads).
6. Customers shall be provided confirmations of each change made to their account information and options.

The Central System shall keep a record of all account changes made by drivers. SFO shall provide all firewall hardware and communications equipment. TransCore shall provide open APIs to interface web services with the Central System.

5.14 INTERFACE WITH SFO DATA WAREHOUSE

All transactional data shall be archived in the SFO data warehouse. It shall be possible to adjust the frequency of data archiving to accommodate taxi operations.

6. CARD MANAGEMENT SYSTEM

TransCore shall supply a Card Management System (CMS). The CMS shall support activities associated with the managing the lifecycle of a smart card from the time the card stock is delivered to when the issued A-card is retired.

TransCore shall provide all hardware, application and other third party software, and processes required for the SFMTA/SFO to perform the CMS functions described in this section.

The CMS is intended to manage the entire lifecycle of each A-card issued by SFMTA. SFO and SFMTA require the new smart card management system to meet at a minimum the following requirements:

1. A web-based system that allows both SFO and the SFMTA access to the entire database from their respective offices
2. Equipment for renewal and reissuance of lost A-cards at both offices, giving drivers a choice of where to renew their cards
3. Magnetic stripe readers for importing data directly from a driver's license magnetic stripe
4. Cardholders shall be able to pay outstanding fees and fines at AVMs
5. The CMS shall provide a complete and comprehensive database of all permitted drivers. The database shall be accessible through the internet, TOT, workstations, and handheld devices used by taxi investigators and airport personnel. The database shall contain, at a minimum:
    a. DMV driver's license history
    b. Driver disciplinary history
    c. Outstanding balances due for A-card/smart card renewal or additional fees, penalties, and other charges
    d. Ability to immediately block card based on information stored in the database
6. Store driver information including photo and taxi company affiliation
    a. Company affiliation must be stored in database
    b. System shall allow for driver to have multiple different cab company affiliations
7. Card management system must synchronize driver information with the DMV Pull List
8. Immediate alerts in case of driver license or A-card expiry or imminent expiry with automatic blocking capabilities in cases of expiry
9. Ability to block/hotlist cards based on noncompliance with business rules or regulations

6.1 CMS WORKSTATION COMPONENTS

6.1.1 Desktop Computers

All desktop computers shall meet the requirements of the respective site's IT policies. For workstations to be installed at SFO, refer to the most recent version of SFO ITT Operating Environment: Current and Targeted (OECT) for requirements at SFO.

6.1.2 Digital Imaging System

A DIS shall be provided in order to take photographs of authorized drivers for the A-card. The DIS shall meet the following minimum requirements:

1. Capture photographs for integration into user profiles and printing onto smart cards
2. Capture photographs using a digital camera with a minimum of 8 megapixel resolution capability.
3. The DIS shall automatically:
    a. Adjust and calibrate the digital camera before each use
    b. Automatically adjust images post-capture
    c. Perform a check of the image quality to satisfy the requirements of standard biometric systems prior to the storage of the photograph.
4. Store the photograph and automatically link it to a unique record in the card management system
5. Allow at least one (1) photograph to be captured and stored per A-card holder
6. Capture and store photographs of sufficient quality as to allow for future biometric analysis.
7. The digitized photo formats should be in ICAO guidelines governing 'Machine Readable Travel Documents'.

Photographs taken for the purposes of the DIS should be frontal pose photographs as per National Institute of Standards and Technology (NIST) recommendations. The DIS must periodically, automatically and securely upload photographs to the cardholder database for permanent storage.

In addition to the functional requirements, the DIS shall consist of the following, or an approved equal:

1. Fargo DTC550-LC dual sided printer with magnetic encoder and lamination module (or equivalent)
2. Fargo print security suite (or equivalent) to add security features to the cards
3. Valcam Zoom USB camera with flash
4. Blue cloth backdrop

5. Tripod

6.1.3 Smart Card Reader

The card reader/writer shall provide, at a minimum, the following functionality:

1. Read an A-Card to determine card status
2. Securely initialize an A-Card
3. Securely activate an A-Card
4. Personalize an A-Card
5. Block/unblock an A-Card
6. Make updates to A-Card data

6.1.4 Digital Document Scanner

The digital document scanner shall be capable of creating a high-quality digital image of a driver's license or document up to 11"x17" in size. Document scanner shall be a flat-bed type scanner, and shall be capable of producing digital scans in multiple formats such as PDF and JPG. Additional file formats may be requested by SFO/SFMTA.

6.2 CMS WORKSTATION CONFIGURATIONS

The CMS shall support various configurations of workstations for use in different areas of the Taxi Management System. Each workstation described below shall be configured to support specific operations of the A-card program or Taxi Management System. The components of each workstation shall comply with the specifications described in section 6.1. Each workstation shall be connected to the SFMTA A-card database with configurable levels of access to be determined by SFMTA and SFO. The workstations primary function shall be to access and edit driver information in the A-card database. TransCore shall submit design documentation on each workstation configuration for SFO review and approval.

6.2.1 A-Card Issuance Station

An A-card issuance station will be located at SFMTA, and shall provide all equipment, software and systems necessary to initialize, personalize, activate and issue the A-card. The purpose of the A-card issuance station is to capture the required information from A-card applicants into the program database, including a photograph and scan of their driver's license. A-card issuance stations shall consist of the following components at a minimum:

- Desktop computer
- Keyboard
- DIS
- Smart card reader

6.2.2 Driver Registration Workstation

The driver registration workstation shall be located at SFMTA. The purpose of this workstation is to allow drivers access to manually input their personal information into an A-card program application. Information captured at this workstation shall be able to be reviewed and approved by SFMTA staff at the SFMTA clerk workstation. Following approval, the information will be inserted in the A-card program database.

The Driver Registration Workstation shall consist of:

- Desktop computer
- Keyboard

6.2.3 SFMTA Clerk Workstation

The SFMTA clerk workstation shall be located at SFMTA. The purpose of this workstation is to allow SFMTA staff an opportunity to review the information provided at the Driver Registration Workstation for approval, as well as scan an image of the applicant's driver's license for inclusion in the A-card program database. This workstation shall also have the capabilities to access the existing A-card files.

This workstation shall consist of:

- Desktop computer
- Keyboard
- Digital document scanner
- Smart card reader
- Magnetic stripe reader

6.2.4 Curbside Office Workstation

The curbside office workstation shall be located in the curbside office at SFO. The purpose of this workstation is to provide SFO staff with the ability to renew and reissue A-cards. SFO staff shall not issue new cards at this location, but shall have the ability to update all driver information in the A-card database, including their photograph and driver's license information.

This workstation shall include:

- Desktop computer
- Keyboard
- Digital imaging system
- Smart card reader
- Magnetic stripe reader
- Printer

6.3 INITIALIZATION

The CMS shall provide the capability to initialize A-card memory with parameters and/or applications from TransCore-provided card management databases. Card initialization parameters shall include, but not be limited to:

1. Common card data elements
2. Card security provisions (keys)
3. Initial value parameters
4. Institutional account parameters and options.

Card initialization shall occur in the presence of a secure access module (SAM) or another smart card, which would hold the encryption key(s). Card initialization will be a manual process.

6.4 PERSONALIZATION

The CMS shall provide the capability to personalize A-cards with the required driver data.

The CMS shall provide the capability to personalize A-cards by printing cardholder photos generated at the DIS, special graphics and text unique to each card on either or both sides of the card.

The CMS shall provide the capability to automatically link the cards with cardholder-specific data in the card management databases.

TransCore shall provide the capability for SFMTA and SFO to perform manual bulk personalization of cards (30 cards/hour with photo printing or graphics).

6.5 CARD TESTING

Upon initialization of each card, SFMTA/SFO shall have the capability to verify that the card is functioning. Any cards that fail to work shall be cataloged for return to the manufacturer for replacement.

6.6 STOCKING/INVENTORY

TransCore-provided database shall provide tracking of the card from the time of receipt through its program life. Cards that have not been either returned or reported lost will be considered active cards until such time as SFO designates some convention for inactive cards.

TransCore shall provide an inventory system to track A-card inventory levels and usage. TransCore-provided inventory system shall:

1. Track all undistributed cards once they are entered into the system; location tracking is done by card package.
2. Monitor inventory levels at distribution locations and provide a notification when card stock falls below a level designated by SFO and SFMTA.
3. Prepare statistical reports detailing the procurement and disposition of all cards

The inventory system used shall support:

1. Flexible packaging options and control by number ranges (of pre-numbered cards)
2. Management of sub-classifications of cards, such as cards with particular graphics
3. Tracking of individual packets of cards to their inventory locations, whether at TransCore, SFO, or at SFMTA.

6.7 CARD HOLDER MANAGEMENT SYSTEMS

TransCore shall provide software necessary for card management functions, which include tracking all distributed cards, maintaining a current status and history of card use, maintaining a database of information contained on the card and maintaining current account balances for each card.

The card holder management system shall include, but not be limited to, the following functionality:

1. Sort data records by name, address, A-card number, phone number, zip code, Taxi Company, driver's license number, and cab number.
2. View data on individual drivers online, including but not limited to :
    a. Driver name
    b. Address
    c. Phone number
    d. A-card number
    e. A-card serial number
    f. Card type
    g. Driver's license number
    h. Card initialization date
    i. Operator ID
    j. Call history with type of problem (i.e. failure to receive, card problem, AVM, or problem)
    k. Date of last call
    l. Taxi company
    m. Taxi number
    n. Driver's license expiration date
    o. A-card expiration date
3. Maintain A-card autoload transactions associated with customer-designated credit or debit cards.

4. Support autoload functions for individual customers
5. Maintain all card registration information and other pertinent data
6. Maintain database of all system transactions and events that occurred with the specific card

The system shall create an action list to be downloaded daily to all smart card devices. The action list is a set of instructions to update information on A-cards when they are used. Examples of action list instructions include autoload status change and card classification change.

6.7.1 Card Information

The card management system shall, at a minimum, include the following information, and shall have capabilities to add additional data elements in the future. These are data elements envisioned to be recorded and stored by the Central System.

1. Each card shall have a unique card identifier
2. Card Type:
    a. A-card
    b. Temporary A-card
    c. Non-SF Taxi Card
3. Card Status:
    a. Active/inactive
    b. Card block/unblock
    c. Hotlisted
    d. Application or function block/unblock
    e. Registered/anonymous
    f. Date issued
    g. Expiration date
4. Card Privileges/Options/Restrictions:
    a. Autoload
    b. Maximum card value
5. Cab Company
    a. Cab number
    b. AVI transponder number

c. Cab company name (to be selectable from a pull-down menu, administration of cab company list to be customizable by SFO/SFMTA, non-SF card types shall have their own unique list of selectable cab companies)

6. Registration Information:
    a. Driver's license number
    b. Name
    c. Address
    d. E-mail address
    e. Phone number
    f. Photo (as required)
    g. Date of birth
    h. Image of Application.
7. Card Transaction History:
    a. Payments
    b. Status/options/privilege changes
    c. Data required to support fee policies short trip
    d. All card reads occurring in the system
8. Autoload Information:
    a. Autoload threshold—e-cash—dollar amount
    b. Credit/payment card account number (stored in encrypted format, and with customer service representatives able to view the last 4 digits)
    c. Direct debit bank information (stored in encrypted format)
9. Non-Sufficient Funds History
10. Current Account Stored Value (dollar value with a configurable maximum).

6.7.2 Cardholder Account Database

The card holder account database shall be maintained from the time an A-card is issued until the A-card is retired. TransCore shall provide software to access the card accounts for making changes, additions, updates, and queries as required for future operations as defined by the Airport.

Specific card management requirements shall include:

1. Establish cardholder account at card issuance
2. Update cardholder account for card replacement
3. Cardholder value transfer for malfunctioning card

4. Maintain cardholder options and privileges
5. Maintain current card account balance
6. Maintain card transaction history
7. Maintain card application and configuration information.
8. Block/unblock/hotlist card
9. Suspend accounts
10. Reactivate suspended accounts and update any data fields therein

6.7.3 Privacy

TransCore shall implement systems which are consistent with SFO's public disclosure policy, and that ensure the privacy of cardholder personal information. The systems and procedures shall also ensure the privacy of the card holder

6.7.4 Hotlist and Block/Unblock

TransCore-provided systems shall have the ability to block lost or stolen A-cards. The A-card hotlist shall also be able to be used for other card management functions, such as fraud management or business rules enforcement. The system shall place the serial numbers of lost or stolen cards in the hotlist and download the list to all devices each night to block use of cards. Once blocked, only authorized personnel with the appropriate security keys shall be capable of unblocking the card. Upon confirmation that block has occurred and card is updated, blocked cards shall be removed from the hotlist. The CMS shall be capable of sending both "block" and "unblock" instructions to the field devices.

The system shall download the hotlist at least daily to end devices. The system shall also have the ability to download a hotlist immediately upon demand of an authorized agent of SFO.

The system shall create a transaction record each time a blocked card is tagged on a TMS device.

6.7.5 Balance Protection

The system shall enable all card holders to receive the protection of unused balances should they lose their card. The system shall allow SFO to replace A-cards and transfer the unused balances as confirmed by the card database within 24 hours of the card being reported lost or stolen.

6.8 CARD HOLDER ACCOUNT FEES

A-card accounts shall require annual renewal fees, which shall be automatically assessed to the card balance at the required time. Cards with negative balances shall be denied entry by the TMS lane devices.

6.9 SMART CARD SECURITY KEYS

The TMS shall generate a new set of security keys for each add-value transaction of an A-card.

7. SMART CARDS

7.1 GENERAL

The readers shall be technically capable of both reading and updating uniquely stored A-card information through the contactless interface. Detailed Card Design and Operation documentation, including detailed Card Operating System description, shall be provided for SFO review and approval (CDRL 14, "Card Design"). The system shall accommodate ISO 14443 microprocessor cards, as subsequently specified.

SFO will not preclude the use of a dual interface card as the A-card as long as the contactless portion of the card meets the requirements herein and the contact portion meets all sections of ISO/IEC 7816.

SFO will provide TransCore with the card initialization application and keys after execution of contract.

7.2 PHYSICAL STANDARDS

All SFO smart card media shall conform with physical standards defined by the ISO standards 7810, 7813 and 14443 as applicable.

7.3 CARD OPERATING SYSTEM

TransCore shall provide a Card with a card operating system (COS) that conforms to the following requirements:

1. The COS shall support a multi-application structure to allow SFO to create and add new applications without interfering with the existing ones.
2. The COS shall allow the addition, updating, and/or the deletion of existing applications.
3. TransCore shall provide specifications on how the COS is designed to secure and safeguard the integrity of transaction data stored on the card such as the file protection function, data encryption algorithms, and/or MAC. These specifications may be subject to NDA between the customer & the COS supplier. The transaction speed requirements specified herein shall not be impacted by the COS security features design, specifically through the card's contactless interface. TransCore supplied specifications in that regard are subject to SFO review and approval.

7.4 CARD MEMORY STORAGE CAPACITY

At a minimum, the memory storage capacity shall be sufficient to support all SFO and SFMTA functions as described in this specification document. The A-card shall store a history of at least 20 transactions, including payments, loads, and any other card-write activities. TransCore shall choose and specify the memory capacity of the A-card according to TransCore's analysis of the data requirements and the anticipated addition of SFO and non-SFO applications to the card.

7.5 CARD RELIABILITY

At a minimum, the card shall achieve at least a mean 10,000 transactions before card failure. A-card transactions are defined as completed load or payment transactions. TransCore shall replace all defective cards at no charge. If defective card problems persist, TransCore shall also provide a written report detailing the technical explanations behind the causes of the problem.

7.6 USEFUL CARD LIFE

For all SFMTA and SFO-issued cards, the A-card card shall last at least four (4) years when used on a daily basis under normal circumstances. In the event the card graphics are a critical security feature, the graphics shall not deteriorate for at least three years when used on a daily basis under normal circumstances for payment.

7.7 MAGNETIC STRIPE

A-cards shall have a magnetic stripe capable of storing driver identification information as required by SFO and SFMTA. The magnetic stripe may be incorporated into future taxi meter functionality, and must therefore be compatible with all current taxi meter magnetic stripe reader standards.

7.8 CARD EXPIRY

Cards shall be configured to expire five years from initial issuance to driver.

7.9 GRAPHIC REQUIREMENTS

All A-cards shall conform to the FIPS-201 graphic standard. Information to be populated on the card shall be provided to TransCore during the conceptual design reviews.

7.10 PROCESSING THROUGHPUT

The processing of a transaction shall be completed within 0.6 seconds (600 milliseconds) of presentation within the operating range inclusive of any system "configuration data," "hot list," or "action list" downloads and/or transmission activity. Initialization of a transaction begins once the card is within the set operating range. The following shall be concluded within the specified time frame:

1. Initialization
2. Authentication and other security processes
3. Data Exchange (read and encode)
4. Validation
5. Display processing output result on display(s)

8. HANDHELD CARD READER

TransCore shall provide contactless handheld card readers. Contactless HCRs shall be used primarily for card inspection in the field. HCR design shall be subject to SFO review and approval and shall be included in CDRL 50 - HCR Design and Performance Requirements.

The HCR shall be configurable for use by either SFO or SFMTA personnel.

The SFMTA HCR will be used by roving taxi inspectors. The SFMTA HCR shall have the ability to remotely retrieve information from the CMS. Upon presentation of the A-card, the SFMTA HCR shall display card data, as well as access the driver's account information on the CMS. CMS and A-card information to be displayed shall be subject to SFMTA review and approval.

The HCR shall be dual 802.11 network and cellular able to communicate with the GTMS/TMS in real time using Cellular communications such as LTE/3G Technology.

The SFO HCR will be used by taxi inspectors at SFO. The SFO HCR shall have the ability to remotely retrieve information from the TMS Central System. Upon presentation of the A-card, the SFO HCR shall display card data and view the driver's transaction history. CS and A-card information to be displayed shall be subject to SFO review and approval.

8.1 CONTACTLESS HANDHELD CARD READER FUNCTIONALITY

The primary function of the HCR shall be to permit SFO and SFMTA enforcement personnel to provide balance information to the cardholder by being able to scroll through the transaction history of the last ten (at a minimum) transactions stored on the card.

The HCR shall allow realtime details stored on the A-card database to be read via the contactless interface and shall not require the card to be inserted into a slot. Taxi drivers shall provide enforcement personnel with their A-card, who will then tag the HCR to inspect the recent transactions conducted.

On reading the card, the HCR shall first indicate whether or not the card is valid. This information will be displayed to enforcement personnel as a simple "yes/no." Enforcement personnel shall also be able to scroll through previous transactions to determine card balance and expiration dates. The design shall minimize the interaction of the user with the device. The total time for interrogating the card shall be less than 0.5 seconds. The HCR shall also incorporate an audible indicator that can be used to signal enforcement personnel.

The display menu and display messages shall be programmable using a developer's utility running on a Windows-Intel PC with the capability to upload the modified menu or messages to the HCR using a standard PC port. The display shall be easily visible under all conditions of ambient light ranging from daylight to a darkened environment.

The total HCR unit weight shall not exceed 1.94 lbs. The unit shall be equipped with a commercially available rechargeable battery, easily replaced in the field. The battery cover shall be removable without tools and secure under normal use. If an ergonomic evaluation determines that enforcement personnel require an HCR carrying case, TransCore shall provide such an

accessory. TransCore shall ensure that the A-card can be read while the HCR is enclosed in a carrying case.

TransCore shall provide a mounting cradle/charger that automatically connects the HCR (when inserted) to the Central System for data transfer purposes and charges the HCR battery. The cradle/charger shall provide a regulated charge that maximizes battery life and charges the battery within one shift, approximately eight (8) hours. Visual indication of transaction status and card validity shall be presented via the HCR display screen.

8.2 GENERAL REQUIREMENTS

The HCR shall meet the following minimum requirements where appropriate:

1. Operating Environment: refer to **Table 4 – Operating Requirement**
2. Physical Environment: refer to **Table 4 – Physical Requirement**

Table 4 – Operating Requirement

Parameter	Operating Requirement
Temperature Range:	+32°F to +104°F, Ambient
Humidity:	10% - 90% RH, non-condensing
Shock and Vibration:	Shock and vibration encountered in the field environment
EMI:	Heater and air conditioning controls, high voltage arcs, alternators
Other — dust, grit, rain/water protection	Airborne particles and dust encountered operating environment, and caused by general cleaning and sweeping

3. Reliability: 150,000 mean card reads between failures
4. Software upgrades shall be loadable through a standard PC communications port such as an RS 232

8.3 RELIABILITY

HCR reliability is defined as the incident rate for the active pool of devices measured over each calendar month. The incident rate is the ratio of the incidents recorded in that period to the number of active devices, as shown in the following equation:

$$HCR\ \text{Re}liability = \frac{\#\ of\ HCR\ incidents\ recorded\ in\ calendar\ month}{\#\ of\ active\ HCR\ devices}$$

Table 4 – Physical Requirement	
Parameter	**Physical Requirement**
Dimensions and Layout:	Each HCR shall be demonstrated at time of PDR.
Weight:	The total HCR unit (excluding carrying case) weight shall not exceed 2 lbs without SFO approval.
Structural Features:	The carrying case shall protect the HCR unit from abrasion, and scratching. The battery cover shall be easily removable and be secure under normal use.
Appearance and Styling:	The HCR shall conform to generally accepted practices in appearance and styling and shall be approved by SFO. All exterior surfaces shall be clean with corners rounded where appropriate. There shall be no exposed bolt heads, nuts, sharp edges, or cracks on the outside surfaces
Locks and Security:	N/A
Mounting:	N/A
Identification Labels:	An identification label with the serial number shall be affixed to the HCR. Major accessories (for example, cradle, expansion pack) shall have an affixed label with a unique serial number and part number prominently located on the component.

TransCore shall be required to maintain a specific level of reliability for the HCR, as defined in CDRL 50 "HCR Design and Performance Requirements" but in no case shall the incident rate be greater than 10%. Any single HCR that has more than two (2) incidents per month shall be replaced with a new unit. If the new unit experiences the same incident rate, TransCore shall be responsible to initiate an investigation to determine the cause.

An incident shall be defined as any first-line maintenance issue reported to TransCore by SFO staff, and any second- or third-line maintenance issue requiring action by TransCore to resolve. The tracking and reporting of incidents shall be the responsibility of TransCore.

8.4 THIRD PARTY REQUIREMENTS

TransCore may supply an HCR based on third-party PDA (or PDA-like) product(s) such as a smart phone or Tablet. It is expected that the third-party product(s) will evolve over time resulting in products becoming obsolete as more advanced models or new generations of products replace them.

TransCore may upgrade the third-party product(s) to available third-party product(s) if:

1. The current product(s) becomes obsolete or is nearing end-of-life; and
2. The replacement product(s) is equal or better in meeting Contract requirements as the current product(s)

TransCore must notify SFO in advance when third-party products are being replaced. HCR designs and pricing shall be subject to SFO review and approval. HCR designs shall meet the requirements in section 8 - Handheld Card Reader as applicable

9. WORK STATIONS

9.1 MANAGEMENT WORKSTATIONS

TransCore is not required to supply physical computers to meet these requirements. Management workstations shall support the functionality subsequently described for each configuration. The required functionality shall be provided via web interface. Local software applications shall not be permitted. User access rights for each configuration will be defined during design reviews.

9.2 SYSTEM ADMINISTRATION WORKSTATION

The system administration workstation shall have administrator-level access to all TMS systems and components.

The workstation shall support reporting capabilities on all available TMS data by utilizing the same reporting tools utilized at the Central System and CMS. Additionally, this workstation shall have the access to all SFO-customizable features of the TMS. User-adjustable business rules, device settings and diagnostics, system alerts, and system management functions shall all be available based on variable levels of user access rights.

9.3 CUSTOMER SERVICE WORKSTATION

Customer Service Workstation shall have the same functionality as the TOT, with the exception of card issuance capability. Customer Service Workstation capability shall be available to any computer connected to the internet with the necessary software installed (if required), and the authorization to access cardholder data and transaction.

9.4 REPORTS WORKSTATION

The Reporting Workstation shall have the capability to access an online report generating tool. The online report generating tool shall allow authorized SFO staff or designated representatives to generate reports and sort data on any fields and/or records available in any data table of the TMS. The ability to select fields and/or records shall be limited according to access rights as defined by SFO.

9.5 TRAINING WORKSTATION

The training workstation shall be used to train SFO and SFMTA personnel in the operation of the Central System. The workstation shall be able to perform simulated tasks such as updates of cardholder information and assessment and resolution of disputes.

10. PROJECT REQUIREMENTS AND PRODUCT SUPPORT

10.1 PROJECT MANAGEMENT

TransCore shall ensure that this contract is effectively and efficiently managed to the mutual benefit of TransCore, SFO, and SFMTA. TransCore shall employ as necessary the personnel, personnel hours, tools, and systems to manage and deliver the project. TransCore shall define with SFO staff the format and frequency of the project management deliverables, such as periodic reports and schedules, subject to SFO approval.

10.1.1 Project Management Scope

The project management scope shall enable SFO to ascertain with a high degree of confidence the status of execution of the contract. The system and processes employed shall be sufficiently detailed and inclusive to enable SFO to actively monitor project tasks. TransCore shall employ project management tools to assist with monitoring the project, subject to SFO approval.

10.1.2 Program Requirements

10.1.2.1 Project Manager

TransCore shall establish a Project Manager, subject to SFO approval, who shall be responsive to the needs of SFO as required by the contract. The Project Manager shall ensure that the project tasks are completed on time and within budget. The Project Manager shall coordinate design and engineering activities. The Project Manager shall keep SFO fully informed of the status of the project and shall promptly and regularly notify SFO of any problems or difficulties that may impact the timely or effective completion of the task, milestone, or project.

The Project Manager shall be responsible for support provided by personnel or groups outside the project team, during the period of performance for this Contract. The Project Manager shall have full authority to assign task priority as required to meet the requirements of the project.

The Project Manager shall be competent and fully qualified in all aspects of the Taxi Management System, the project, and the contract. Removal or replacement of the Project Manager by TransCore shall only be with consent of SFO.

10.1.2.2 Project Management Program Plan

The plan shall include, but not be limited to, the following:

1. Outline of overall Project Management Program plan
2. Project Manager responsibility
3. Outline of TransCore organization structure
4. Outline of TransCore engineering organization
5. Outline of TransCore manufacturing organization
6. Preliminary program implementation plan

Plan for providing technical assistance to the Infrastructure Implementation Team The Project Management Program plan shall be submitted and approved by SFO in conjunction with NTP (CDRL 15, "Project Management Program Plan"). The plan shall be reviewed and modified as necessary during the execution of the contract. It shall be discussed and updated as required at Ten Days from Notice to Proceed, PDR, and FDR. An outline required for CDRL 15 is attached to this Contract.

10.1.2.3 Project Schedule

TransCore shall develop within five (5) days after the kick-off meeting a final schedule of all milestone and principal tasks coincident with the required schedules of design, approval, manufacture, delivery, installation, and implementation of the project. The project schedule shall include tasks assigned to TransCore and SFO, and shall take into account discussions at the kick-off meeting on the draft schedule previously submitted (CDRL 16, "Project Schedule"). The schedule shall be updated and submitted for approval at least monthly.

10.1.2.4 Submittals

TransCore shall establish as a part of the Project Management Program methods, procedures, and controls to identify, track, and record the status and completion of all required submittals. TransCore shall maintain the schedule and status of all required submittals, which shall minimally contain the following information:

1. CDRL number and suffixes
2. Brief title
3. Scheduled submittal
4. Actual submittal date and correspondence identification number
5. Action taken by SFO and correspondence identification number

All submittals under each CDRL shall be shown. The report shall be updated and submitted not less than every 30 days or as required upon SFO request. In the course of the project, additional submittals or action items may be identified as responsibility of TransCore and/or SFO. TransCore shall maintain a record of such submittals and action items and submit it to SFO monthly, showing the status of all submittals and action items, and persons/organizations responsible.

10.1.3 Project Meetings

TransCore shall participate in various project meetings throughout the performance of this contract as outlined in this section. Unless otherwise approved by SFO, all project meetings will be held on SFO property at locations made available and provided by SFO. TransCore will make every effort to cooperate in the scheduling of meetings and shall provide the required information for the following meetings in a timely manner:

1. Kick-off Meeting
2. Project Status Meetings

3. Design Review Meetings (CDR, PDR, FDR)

10.1.3.1 Kick-off Meeting

A kick-off meeting will be scheduled and conducted by SFO within fifteen days after NTP. This conference will be conducted at SFO offices unless otherwise designated by SFO. The purpose of the conference is to introduce attendees, to establish lines of communication, and to ensure that TransCore understands requirements of the Contract. This conference will be chaired and conducted by SFO Project Manager. TransCore's Project Manager and key staff shall attend this meeting. Prior to the meeting TransCore shall provide the following with copies of supporting documentation:

1. A list of all TransCore attendees
2. Preliminary Project schedule
3. Project Management Plan
4. Acceptable bonds
5. Insurance certificates
6. A signed Contract Form

The agenda will include, but not be limited to, the following:

1. Introduction
2. Review of responsibilities
3. Review of organization and sub-TransCores
4. Adequacy of distribution of Contract Documents
5. Questions concerning errors, ambiguities, and omissions in, and interpretations of specifications and drawings.
6. Documentation control procedures
7. Use of office, storage areas, construction areas, and temporary easements
8. Deliveries and priorities of major equipment
9. Safety, first-aid, emergency actions; and security
10. EEO and affirmative action requirements and community relations
11. Labor provisions
12. Insurance, laws, codes, traffic regulations, and regulations and permits
13. Sequence of critical work, and tentative schedule

10.1.3.2 Project Status Meetings

TransCore will participate in monthly Project Status (Progress) Meetings which may be scheduled or called as SFO deems necessary to ascertain that work is progressing within schedule and in accordance with requirements of the Contract. Progress meetings may be conducted via

conference call at SFO's discretion. Attendees shall be representatives of TransCore and SFO as required to support the agenda.

A typical agenda of progress meetings shall include, but not be limited to:

1. Minutes of previous meeting
2. Questions and issues unresolved from the previous meetings
3. Review of work accomplished since previous meeting
4. Field observations, issues, and work quality
5. System and equipment design, manufacture or fabrication issues
6. Product delivery issues
7. Schedule changes, proposed changes, or anticipated changes
8. Other business

10.1.3.3 Implementation and Equipment Installation Meetings

TransCore will participate in Implementation and Equipment Installation Project Meetings which may be scheduled or called as SFO deems necessary to review project implementation and equipment installation tasks. It is anticipated that these meetings shall begin after FDR and will be scheduled as necessary to support implementation and installation task activities.

Attendees shall be representatives of TransCore and SFO as required to support the agenda. A typical agenda of Implementation Meetings shall include, but not be limited to:

1. Minutes of previous meeting
2. Questions and issues unresolved from the previous meetings
3. Review of tasks accomplished since previous meeting
4. Field observations and issues
5. Schedule changes, proposed changes, or anticipated changes
6. Other business

10.1.4 Status Reporting

The final format of a status report which aggregates the inputs from all parties shall be agreed between SFO and TransCore, immediately after award of the Contract. TransCore shall provide monthly status reports to SFO as part of required CDRL documentation. (CDRL 17, "Monthly Progress Report").

TransCore shall implement a separate problem tracking, resolution and reporting system. Issue tracking and resolution report logs shall be provided to SFO as part of CDRL documentation. (CDRL 17, "Monthly Progress Reports"). The degree of automation to be employed for this activity shall be agreed between SFO and TransCore, but regardless of the degree of automation, it shall perform the following functions at minimum:

1. The system shall assign numbers to issues as they are reported to enable accurate tracking.
2. Each issue shall be logged on the date reported.
3. The log shall be updated as the status of the issue changes, for example:
    a. Anticipated solution
    b. Date solution is to be provided
    c. Date solution was provided
    d. Date solution was tested
    e. Results of the test
    f. Acceptance of solution

Issues shall not be closed until the solution has been successfully tested and has been "signed-off" by the reporting entity and another responsible entity such as the Program Manager.

10.1.5 Transition Plan

TransCore shall develop a Transition Management Plan (TMP) CDRL 51. The purpose of the TMP is to identify those parts of the TMS that are going to change and how the existing TMS will be migrated over to the new TMS without negatively impacting taxi operations or causing a loss of revenue. At a minimum, the Transition Plan shall consist of the following sections:

1. Introduction
2. Transition Management Organization Structure
3. Schedule of replacement Activities
4. Stakeholders and Stakeholder Responsibilities
5. TMS Components to be Replaced
6. Operational Impacts
7. Inter- dependencies between Existing TMS Components and Replacement Components
8. Mitigation measures to Minimize Operation Disruptions
9. Transition Issues Resolution Process
10. Transition Management Final Acceptance Process

An outline of the TMP shall be provided at the PDR. The first draft of the TMP shall be provided at the CDR. The final draft of the TMP shall be provided at the FDR. The TMP is considered a living document, and shall be updated and reissued anytime there is a change in circumstances associated with the TMS that impacts taxi operations or revenue.

10.2 DESIGN REVIEW AND CONFIGURATION CONTROL

TransCore shall participate in CDR, PDR, and FDR meetings, which shall be chaired and conducted by SFO with the specific objective to review and approve TransCore's presentation of the preliminary system and final product design. Additional meetings shall be scheduled and conducted as necessary to complete the deliverable tasks designated by the PDR and FDR. Design Review meetings shall be attended by TransCore, SFO and SFMTA personnel as necessary to complete the agenda.

Design Review meetings shall be conducted to evaluate the technical adequacy of the design and the compatibility with the performance requirements of the Contract. TransCore shall provide SFO with documentation and notice of design milestones in accordance with the project requirements and schedule. The documentation shall provide SFO with adequate detail to become familiar with the design status existing at the time of the scheduled review. TransCore shall present a documentation summary and supplementary information upon request, during the design review meetings. Design review meetings are intended to serve as a technical review of TransCore progress toward meeting Contract requirements. At the completion of the review, the status of the review will be presented by TransCore in the form of a statement of action items and schedule of accomplishment necessary to obtain SFO and SFMTA concurrence with the program's technical progress.

10.2.1 System Configuration Management

TransCore shall establish a formal Configuration Management process for SFO to handle all system changes. These changes shall include any of the following:

1. **Fixes**: corrections of malfunctions ("bugs") that are required in order to meet performance and functional requirements as specified in the Specification
2. **Updates**: new software releases provided by TransCore, whether for application software, operating system software, or third-party software
3. **Enhancements**: changes that provide improvement in the operation
4. **Modifications**: changes necessitated by program changes
5. **Upgrades**: augmentation and/or replacement of any system hardware
6. **Documentation revisions**: updates to instructional documents or users' guides to reflect modifications to any existing software or other changes to TMS' functionality

The Configuration Management process shall include a strict testing procedure to be followed before any system change is implemented in production. This testing procedure shall include reporting of results and acceptance of test results to verify successful completion before implementation.

The Configuration Management process shall include a plan for implementing—on a scheduled basis as appropriate (e.g., monthly)—system changes that incorporate all categories explained above. This process shall include a means by which all system changes are prioritized and scheduled for these regular releases. This process shall include provisions for more frequent

interim releases. A Daily Changes Log report shall be part of the Configuration Management process.

10.2.2 Design Reviews

Formal design reviews shall be conducted to evaluate the progress and technical, functional and programmatic adequacy of the design in accordance with the performance requirements of the Contract. In addition to formal design reviews, informal meetings to address key issues shall be held as needed. Prior to each review, a design review package shall be submitted that includes CDRLs and other items required for the review. Design review packages shall be provided at least 15 business days before a design review meeting.

The review of drawings shall be construed neither as permitting any departure from the Contract nor as relieving TransCore of the responsibility for any error, including details, dimensions, and materials. TransCore shall submit drawings for review by SFO.

Design reviews shall consist of the following key activities:

1. Design review package will be reviewed by SFO and SFMTA staff.
2. An Issues List will be created as a result of the review and will be provided to TransCore at least ten business days prior to the scheduled design review meeting.
3. The design review meeting, or series of meetings, will be held between TransCore, SFO and SFMTA staff where TransCore shall explain their design and SFO confirm the requirements. When possible, issues will be resolved during the design review meetings.
4. Issues not resolved during the meetings will be identified and documented. SFO will determine the appropriate action to close the issue, giving consideration to where the project is in the overall design review process. This may require resubmission of design review items.
5. The submittal will be approved, upon SFO's determination that there are no open issues.

TransCore shall conduct the following three formal design reviews:

10.2.2.1 Preliminary Design Review

The objective of PDR is to review the progress of the project and evaluate specification compliance of the completed work and/or work in progress. PDR shall represent approximately 75% completion of the total engineering and organizational design. The PDR shall cover the following:

1. Schedule compliance review and discussion of variances or delays
2. Provide all PDR items indicated in Exhibit A – CDRL List
3. Complete interface drawings, flow charts, detailed screen flows with actual screen shots, server graphics, messages and menus, including accommodations of all operating boundary and error conditions
4. Detailed technical descriptions of major components

5. Detailed interface descriptions, including mounting arrangements and installation methods
6. Single-line power diagrams and functional block diagrams, including a functional overview and a description of how each sub-component goes out of service
7. Communications interfaces
8. List of all GTMS server and Duplicate Data file formats
9. List of special tools and DTE for each device
10. Description of operational and physical compatibility with the existing equipment and equipment installations
11. Design of access control for the following:
    a. Equipment
    b. Software menus
12. Software system-level flow charts
13. Software data backup and recovery procedures
14. Financial settlement process
15. Software version and configuration control system

Ten (10) copies of the specific submittals shall be provided prior to PDR (PDR Package defined in Exhibit A – CDRL List). Each drawing submittal shall include a CD with the drawings in electronic format (.pdf) and one reproducible on regular paper, developed using AutoCAD Version 14 or other software capable of exporting AutoCAD files.

10.2.2.2 Final Design Review

The FDR shall be conducted when detailed design is complete and production drawings are ready for release. The objective of the FDR is to determine whether the detailed design will satisfy the design requirements established in the Contract. Data submitted for the PDR shall be updated to a level of detail consistent with the completed design and submitted for the FDR. The FDR shall cover the following:

1. Schedule compliance review and discussion of variances or delays
2. Provide all FDR Items indicated in Exhibit A – CDRL List
3. Latest revisions of the drawings and documentation submitted for the PDR
4. Shut-down and start-up sequences
5. Demonstrate compatibility with existing equipment
6. Assembly drawings down to the lowest replacement unit level
7. Electrical schematic drawings
8. Flow charts or structure charts that give an overview of software

9. Software documentation at the second level, consisting of structured data flow diagrams to the lowest level of decomposition with software module descriptions in structured narrative format.
10. Input data definitions
11. Output data definitions
12. Diagnostic routines for system self-test
13. Data dictionary

SFO shall have on-site access to drawings and other design and manufacturing information related to manufacturing release of the TMSE, including source code and other proprietary technical data. On-site access shall be provided at TransCore's facility. TransCore may establish suitable confidentiality agreements.

Ten (10) copies of the specific submittals shall be provided prior to FDR (FDR Package defined in Exhibit A – CDRL List). Each drawing submittal shall include a CD with the drawings in electronic format (.pdf) and one reproducible on regular paper, developed using AutoCAD Version 14 or another software tool capable of exporting AutoCAD files.

10.2.3 Design Baseline

For the purposes of change control, the design baseline for all program elements shall be established at the FDR. TransCore shall submit changes beyond FDR that affect the agreed design characteristics to SFO for approval.

10.2.4 Production Baseline

The equipment and software production baseline shall be established at the FACI. Changes beyond the FACI shall be documented in the form of change requests and submitted for approval.

10.2.5 Drawing Requirements

Drawings shall be dimensioned in U.S. units (feet and inches) or both U.S. and metric units. Electrical schematic drawings shall be drawn in accordance with the standards of the Institute of Electrical and Electronics Engineers.

As-built reproducibles shall be developed using the AutoCAD software application version 14 or another software application capable of exporting AutoCAD files. These shall be submitted on CD (CDRL 18, "Illustrated Parts Catalog").

10.3 TESTING AND ACCEPTANCE

10.3.1 General

All the components, sub-systems, and system processes constituting the SFO TMS shall be tested combined and individually to ensure they meet the Contract requirements and provide a properly functioning system. The work under this section shall include all labor, materials, and support

services required to completely inspect and test all hardware and software. Testing shall be conducted at three levels:

1. Device operations — CIDs, TOTs, and AVMs
2. Component interface and integration — device network, software and device interface testing
3. System installation and operations — installation and acceptance testing, including user interface.

The overall objective of this test process is to thoroughly test each component, device, sub-system and eventually the system as a whole, in a progressive manner which allows faults to be identified, isolated, and rectified in the most cost- and time-efficient manner. Each testing level ensures the relevant Contract requirements for the component(s) have been met prior to moving to the next level.

All tests and inspections will be monitored by the SFO Project Manager and shall be documented by TransCore. All hardware and software not passing inspections and/or tests and not meeting the approval of the SFO Project Manager shall be repaired, replaced, and/or corrected by TransCore and rescheduled for inspection and testing.

TransCore shall submit a written report for each inspection and test, including copies of all inspection/test data for SFO approval. TransCore shall submit testing and performance data at least on a monthly basis. All such reports are Contract deliverables, (CDRL 19, "Test Reports") unless specifically required under another CDRL. Test reports shall include all historical data, such as inspections and tests performed, failures, modifications and repairs, pertaining to the item or system tested. Upon completion of all tests for a particular test phase, TransCore shall issue a separate request for SFO approval of that phase. Acceptance of each phase of testing by SFO shall be required for TransCore to proceed to the next phase.

TransCore shall conduct regular inspections of the procurement, manufacturing, and testing processes in accordance with guidelines defined by TransCore's Quality Assurance Program Plan (CDRL 20, "Quality Assurance Program Plan").

All inspection and test results shall be retained for a period of no less than two years, during which the results shall be available for SFO review. SFO reserves the right, at their discretion, to witness any or all inspections/tests, using SFO or other personnel and/or consultants and agents.

10.3.2 SFO Test Plans, Procedures, and Facilities

TransCore shall submit an Overall Inspection and Test Plan (CDRL 21, "Overall Inspection and Test Plan") for SFO's review and approval, to be used as a controlling document for all inspections and tests. The Test Plan shall identify the inspection and testing to be performed at each level. Information provided for each inspection and test shall include but not be limited to the following:

1. Inspection/test title
2. Reference to Contract requirements section requiring the inspection/test

3. Responsible organization conducting the inspection/test
4. Inspection/test location
5. Inspection/test objectives
6. Inspection/test pass/fail criteria
7. Inspection/test schedule providing the following information at a minimum:
8. Inspection/test procedure submittal
9. Inspection/test start date
10. Inspection/test duration
11. Inspection/test report/certification submittal

For each inspection, the Test Plan shall also provide check-off sheets for items to be inspected, measurements to be taken, features required to be present, and criteria required to be met. The Test Plan shall cover all TransCore, supplier and subcontractor inspections and tests to be performed, including those performed under TransCore's QA plan. No inspections or tests shall be performed before SFO approval of the Test Plan has been received by TransCore. Inspection and test results will be submitted to SFO for review within 30 days after completion of the inspection or test.

10.3.2.1 Detailed Test Procedures

TransCore shall prepare and submit to SFO a Detailed Test Procedure (CDRL 22, "Detailed Test Procedures") for each test to be performed. This Test Procedure shall include, but not be limited to, the following items for each test:

1. Information provided in the Test Plan (repeated)
2. Test methodology, including input and expected output
3. Equipment and instrumentation to be used for testing
4. Detailed breakdown of all hardware and software components under test
5. Step-by-step test procedures/scripts
6. On-line and off-line diagnostics
7. Any related documentation (drawings, prints, vendor specifications, and recommendations)
8. Forms for recording data, including fields for date, time, location, and name with the signature of person(s) conducting or witnessing the test
9. All other information required to monitor and manage the inspection and testing
10. Name and signature of the person who prepared the test procedure.

A Detailed Test Procedure shall be submitted to SFO for review and approval a minimum of 30 days prior to the test performance. No test shall be conducted until approval of the test

procedures has been given by SFO. SFO reserves the right to develop additional test procedures to be performed by TransCore or other designated organizations.

10.3.2.2 Testing Facilities

Device testing shall be performed in controlled, laboratory conditions at TransCore facilities or other SFO approved facility.

Component interface and integration testing, including systems integration testing as described in Section 3.3.4, shall be performed in a test-bed established at a location in the San Francisco County region, as agreed upon by SFO and TransCore. Pre-production units of all of the TMSE used by the SFO system, including each configuration specified herein, shall be assembled in a single test-bed ("SFO testbed") to permit interconnection to simulate the overall SFO system. It is not required that the Central System or Data Servers which support SFO financial and operational data processing be co-located at this site. However, it must be possible to interconnect to them using the telecommunications processes to be used in the installed system environment. The testbed shall be established prior to the network and software testing, using FAT devices. The testbed shall remain operational through the duration of the Contract and shall be updated to reflect any changes to the devices, software and/or system configuration.

Systems installation and acceptance testing, as described herein and as specified by SFO, shall be performed at SFO's facilities upon completion of system installation.

10.3.3 Equipment Inspection and Testing

This section defines the requirements for comprehensive inspection and testing of TMSE, as specified herein.

A combination of inspections, design qualification tests, FAT and acceptance tests shall be used to establish the integrity of the design and manufacturing of the devices and all their components.

The major inspection and test phases to be conducted are as follows:

1. FACI
2. FAT
3. Production Inspection and Testing
4. Interface and Integration Inspection and Testing (I^3T)
5. Installation Inspection and Testing (I^2T)
6. Acceptance Testing (including all hardware and software elements)

Each test phase must be successfully concluded, reviewed, and approved prior to the start of the subsequent phase.

10.3.3.1 First Article Configuration Inspection

The FACI shall take place after Design Qualification Testing and at the point of assembly after completion of the first production devices listed above. SFO shall be notified not less than ten

(10) working days before the FACI date. Subsequently, TransCore shall be advised regarding SFO's attendance.

The FACI shall verify that production hardware complies with design configuration and drawings as agreed upon during FDR, or the latest revision thereof. The design qualification test results shall be available for inspection at the FACI. SFO may request a repeat of any part or all of the Design Qualifications Testing at the FACI, if the results of the initial inspection were unsatisfactory.

Before the FACI, data that includes the latest drawings, design test procedures, specifications, and quality documentation required for adequate checkout of the equipment under inspection and an indentured list of drawings shall be submitted (CDRL 23, "FACI Plan"). The list of drawings shall be identified by revision and be complete to the lowest-level replaceable unit.

10.3.3.2 First Article Testing

The equipment to be tested in the FAT shall be the first production unit of each device identified above. FAT shall be conducted upon successful completion of the FACI.

The FAT shall be conducted by TransCore at TransCore's facility. SFO may assign staff to periodically audit the progress of FAT. All FAT reports shall be subject to SFO's approval (CDRL 24, "First Article Testing Reports"). Each of the following tests shall be completed for each unit:

1. Functional and Cycling Tests
2. Human Factors Test
3. Maintainability Test.

At this level of testing, the first article equipment shall be representative of the final production item. The purpose of this test shall demonstrate that all equipment to be furnished under this Contract have met the specified requirements. Processing time for each FAT shall not exceed the times specified in the SFO TMSE specification.

In the event TransCore has already conducted substantially similar tests to those described herein, SFO may elect to accept the results of those tests as satisfying the requirements of FAT. The procedures and results of any such tests shall be submitted to SFO for review at least 60 days prior to scheduled conduct of the FAT. Those who wish to request a waiver of any requirement based on testing already performed shall submit information indicating their justification for requesting the waiver, any testing already performed, the cost savings for not performing the test originally proposed, and relevance to proposed equipment for SFO approval (CDRL 25, "Request For FAT Waivers"). TransCore shall supply certification for these tests to include test protocols and procedures, actual test data documenting the appropriate tests performed on the equipment and having successfully tested the equipment in conditions that simulate or duplicate in-service conditions. TransCore shall supply to SFO the name, address and phone number of all testing facilities used to perform such testing. If a test is approved by SFO to be waived, then a credit, agreed upon by SFO and TransCore by end of FDR, shall be issued by TransCore to SFO for the costs of waived tests.

Successful completion of the FAT shall be a prerequisite for manufacturing of production equipment. All necessary supplies for the FAT shall be provided by TransCore.

10.3.3.3 AVM Functional Tests And Functional Cycling Tests

All bills used for AVM FAT shall conform to the following criteria:

1. No corner folds which exceed 0.05 square inches
2. No holes
3. No missing pieces beyond a single corner not exceeding 0.05 square inches
4. No tears beyond a single tear in any location not exceeding 1/4-inch
5. Not limp, discolored or faded due to previous soaking in water, soiling with other liquids or worn to partially destroy the printing
6. Not wet to the extent that water may be twisted or wrung from their surfaces
7. Flattened if crumpled, creased or folded.

All bills used for the FAT which do not meet the above requirements shall be culled or corrected to meet the specified conditions prior to commencing the test. Any jam caused by bills accepted for the AVM test lot shall result in failure of the test.

If at any time after the FAT results have been accepted a design change is made, the performance of the modified equipment shall be demonstrated as conforming to the Contract requirements and the re-test results shall be submitted to the SFO for approval (CDRL 24, "First Article Testing Report").

The functional tests and the functional cycling tests may be conducted simultaneously. The purpose of the functional test shall be to demonstrate that the functions specified throughout this TMS specification, including all limiting or boundary conditions, external AVM interface compliance, etc. have been met for each type of TMSE. TMS TransCore will obtain the necessary equipment simulators. These devices shall be used by TMS TransCore during this FAT to demonstrate AVM external interface compliance.

The objective of the cycling tests is to determine with reasonable certainty that each TMSE and each subsystem or component of that TMSE are capable of meeting the reliability requirements specified herein. The ambient conditions under which equipment will be required to function shall be those existing at TransCore's plant. Ambient test conditions (temperature and humidity) shall be measured and recorded at least twice during each test day.

During the functional and cycling tests, the AVM shall be installed with the equipment with which it will interface in the operational environment, such as a GTMS. The equipment used in the functional and cycling tests shall simulate the installed system, aside from network connections to control and monitoring facilities.

In the Detailed Test Procedures for the functional test, TransCore shall identify and list all device features, including all boundary conditions and procedures for handling maintenance and service functions, to be tested during the functional tests. All operating modes, such as limited cash acceptance modes and maintenance modes, shall be included in the tests. The tests shall also

include all boundary conditions that can be anticipated due to improper customer action or malfunctioning equipment. Each function tested shall be repeated at least 10 times correctly for successful completion of the functional test. There shall be no failures of the test devices during the functional tests. The functional test shall be repeated if a failure of the device occurs. TransCore shall also demonstrate the ability of available software control to change the types and parameters, including boundary conditions, of transactions permitted at each AVM.

For cycling tests, a minimum of 1,000 transactions shall be conducted for the AVM. For each device, these transactions shall be divided evenly between all possible transactions and card purchase/load/deduction types/values for that particular device. The transactions shall also employ all possible payment combinations for a device. The stored value amounts shall be representative of those expected to be employed in the SFO system. Detailed information regarding the transaction types, values, and payment methods to be used in the cycling test shall be included in the Detailed Test Procedures and subject to SFO approval.

The cycling test for the AVMs shall consist of a total of 5,000 transactions, distributed evenly among the various AVMs to be tested. All possible deductions shall be tested.

The reliability of each device and each major sub-component or sub-system shall be tracked and recorded during the cycling test. Failure of bills to register on the first insertion shall not be counted as a failure. A tally of insertion attempts shall be kept. A bill validator failure shall be counted when more than 3 percent of bills fail to register on the second insertion.

Accuracy of bill registration shall be based on comparing counts recorded by the data processing system with counts in the bill vaults. Testing shall verify that only valid U.S. bills are accepted for payment. Test results shall show conclusively that invalid bills (e.g., foreign or counterfeit) are rejected. Of all receipts printed as part of the functional and cycling tests, 5 percent will be selected on a random basis and kept to be evaluated by SFO for printing quality.

In addition to the tests specified above, functional testing shall consist of the following types of tests, at a minimum:

1. The AVM shall demonstrate that the accuracy requirements are met. The capacity of the cashbox shall also be verified.
2. The AVM shall demonstrate all methods of receipt provision
3. TransCore shall demonstrate how the Ground Transportation Management System (GTMS) will be configured to work as part of SFO's LAN/WAN system. This demonstration shall include at a minimum, transfer of files and upload/download of parameters.
4. Power Isolation/Continuity Tests shall include but not be limited to:
    a. Power Input To Earth Ground Isolation
    b. Power Input To Earth Logic Isolation
    c. Logic Ground To Chassis Continuity
    d. Earth Ground To Chassis Continuity

e. Power Distribution Verification

At least 8 hours shall be set aside for unstructured testing, which will include incomplete transactions, random keystrokes, foreign currency, etc.

A maximum of eight (8) hours shall be permitted for preventive maintenance during running of the functional and cycling tests.

10.3.3.4 Maintainability Test

TransCore shall conduct a maintainability verification test of the equipment. The purpose of this test shall be to determine if the equipment conforms to the maintainability requirements specified in the equipment specifications. This shall be accomplished by introducing faults into the equipment and then measuring the time required for TransCore's technician to correct the fault.

Maintainability testing shall be performed on the first production devices. The test shall be conducted in the following manner:

1. TransCore shall introduce failed components, maladjustments and incorrect settings. The simulated failures shall be introduced in proportion to their expected failure rates
2. TransCore's personnel shall be assigned to repair the equipment, and shall be unaware of the simulated failures
3. The repair times shall be recorded and the mean times to restore and mean times to replace shall be calculated.

TransCore shall identify the basis of fault selection by module or subassembly, and reasonable time period to restore and replace modules or assemblies in the Test Plan and Detailed Test Procedures. The tests to be performed and acceptable time periods shall be subject to SFO approval.

10.3.3.5 Production Inspections and Tests

Production inspections and tests shall be performed by TransCore and sub-suppliers on each piece of equipment that is produced as an integral part of their QA programs. Production inspections and test shall be performed after a successfully completed FAT. These inspections and tests shall verify that all equipment contains the correct materials, is assembled properly, and functions properly. SFO may choose to observe, participate, conduct, or repeat testing on any item to confirm the validity of TransCore's test procedures and results.

Production inspections and tests shall be conducted at the point of manufacturer on all subsystems and on each completed device prior to each shipment. These inspections and tests shall verify that each unit is produced to at least the same quality level as the unit presented for the FACI and FAT.

Test procedures shall be expanded to focus on areas that prove to be, or have historically been, troublesome. If approved by SFO, tests may be simplified in areas where a high degree of confidence is developed.

Complete records shall be kept of all inspections and tests that are performed. Any failures and subsequent corrective measures shall be noted. Successful completion of the production inspections and tests on all devices shall be a prerequisite for installation of the equipment.

At any time during the manufacturing process, subject to reasonable prior notice, SFO may choose to schedule a visit to TransCore's facility or a sub to TransCore during normal working hours to audit the manufacturing and QC processes.

10.3.4 Human Factors Testing

The purpose of this testing detailed in CDRL 56, "Human Factors Analysis Report" is to verify that those features and operating characteristics that affect the driver's use of the device are easy to understand, easy to use, and quick in response to driver actions. The test shall be designed to evaluate items such as the following:

1. Graphics, display and audio messages;
2. Time relationship of displayed and audio messages to machine actions;
3. Time relationship of displayed and audio messages and machine actions to driver actions;
4. Time to perform a transaction;
5. Time between various machine instructions;
6. Accessibility to persons with disabilities.
7. Accessibility to drivers of varying heights in varying vehicle types

The overall goal of this test is to ensure that the devices have been designed with attention to ergonomics, efficiency, driver safety, and operational throughput. ADA compliance with regard to customer operation controls and instructions shall be evaluated.

10.3.5 Interface and Integration Inspection and Testing

Interface and Integration Inspection and Testing (I^3T) shall be performed following successfully conducted and approved FAT. The goal of this level of testing is to ensure that the different unit components of the system integrate together as defined in the Contract requirements. Interface and Integration testing shall also cover the interface of SFO system elements with SFO equipment existing or procured outside of this Contract. At a minimum, this shall include GTMS connection, data communication, and verification of TMS transactional data to the Central System.

For each component in the system, all functions requiring interface to another component, including all boundary conditions and security provisions, in all possible combinations, shall be tested. These functions shall include but not be limited to the following:

1. Alarm transmission and all other device/component monitoring functions
2. Data transmission to GTMS
3. Data transmission, including all control functions to and from each device
4. Report generation in SFO-approved formats

TransCore shall identify each integrated function in the Detailed Test Procedures, including the boundary conditions and security provisions for each. Boundary and security provisions to be tested to ensure compliance with the Contract requirements shall include but not be limited to the following:

1. Operating ranges for each type of remote device/component
2. Function performance times
3. Data encryption/security provisions for each type of data transfer
4. Required data anti-collision provisions for each applicable type of data transfer.

All data transmissions shall be inspected for accuracy. Inaccurate data transmissions shall be recorded as a failure of the particular test for which the transmission was performed. TransCore shall take any corrective action necessary to ensure the proper performance of all functions tested in the system interface and integration test. Successful completion of this level of testing will be required prior to device installation.

10.3.6 Installation Inspection and Testing

Installation of the equipment at SFO may commence upon successful completion of the system interface and integration inspection tests (I^3T). Installation requirements are subject to the parameters specified herein. The Detailed Test Procedures for installation, inspection and testing shall include installation checklists, identifying the equipment, software, installation configurations and settings and other characteristics applicable to the installation process and parameters, unique to the equipment being installed. The Procedures shall also identify and describe all necessary tests to verify proper interfacing and installation of the equipment with other system facilities. The installation checklists and test procedures shall be submitted to SFO a minimum of 60 days prior to scheduled inspection and testing and shall be subject to the approval of SFO.

Upon verification of proper installation of the equipment, TransCore shall perform a complete installation operational test. All functional characteristics of the installed equipment at a each location shall be tested to ensure operation of the equipment as specified, including those involving interfaces with data and revenue collection and control equipment. Upon complete installation, all components, including the AVMs and GTMS, shall be tested as an integrated system.

TransCore shall inform SFO, in writing, of any failures or unacceptable conditions during installation testing. All failures detected during the acceptance testing period shall be analyzed by TransCore. TransCore shall be responsible for taking corrective action to ensure proper functioning of the integrated system.

TransCore shall notify SFO a minimum of 72 hours prior to the scheduling of any inspection or test at a particular site. SFO reserves the right to specify and/or perform installation inspections and tests in addition to those identified by TransCore in the Test Plan and Procedures. Successful completion of all installation testing is required prior to revenue service.

10.3.7 Acceptance Testing

The acceptance testing period will commence upon completion of the settling period following the start-up of revenue service and successful completion and approval of I^2T. Acceptance testing shall be conducted by TransCore and shall be subject to review and approval by SFO.

Acceptance testing shall be performed at a system level, after the start of revenue service, with all components and subsystems completely functional, operational, on-line, and in service. TransCore shall provide to SFO a "Systems Acceptance Testing Plan" (CDRL 26, "System Acceptance Testing Plan"). The plan shall be a comprehensive and detailed document, describing the management, monitoring, recording, and reporting procedures that will govern the acceptance testing period. The Acceptance Testing Plan shall be submitted for review and approval of SFO 60 days prior to the scheduled start of the system acceptance test period. SFO reserves the right to make changes to this document as required and deemed necessary to meet and evaluate performance and operational objectives.

At least the first 15 days of revenue service will be designed as a settling period. During this period a failure review process shall be established (CDRL 27, "Failure Review Process") by the FRT.

The acceptance testing shall be conducted in three performance periods related to the reliability of the system, as subsequently described. Each subsequent acceptance testing period shall not commence until the all requirements specified for the previous period of testing have been met.

10.3.7.1 Settling In Period

At the end of the settling period the MCBF for high transaction volume devices of the same type in a group shall be not less than 40 percent of the MCBFs presented in this document. Also, for devices of the same type in a low transaction volume environment, the MTBF in a group shall be not less than 40 percent of the mean hours between failures in this document. If at the end of the settling period the above MTBF and MCBF criteria are not met, then the reliability of the equipment shall be monitored until these criteria are met for 30 consecutive days. The acceptance testing shall not commence until these MTBF and MCBF requirements are met.

At the end of the settling period, the acceptance testing shall begin and shall be conducted over a minimum of 365 days under revenue service conditions.

The MCBF and MTBF requirements during the acceptance testing shall be incrementally increased from the settling period values in 60 consecutive day periods, as follows:

1. **0-60 days**: 60 percent of the MCBF and MTBF specified herein;
2. **61-120 days**: 80 percent of the MCBF and MTBF specified herein;
3. **121-365 days**: 100 percent of the MCBF and MTBF specified herein.

For any single group, if after 60 consecutive days the MCBF and MTBF for that period has not been met, the acceptance testing shall continue beyond the 60 consecutive days until the equipment has achieved the applicable reliability requirement and maintained it for 60 days. Under no circumstances shall the acceptance testing for any group be allowed to proceed to the next 60 consecutive day test period until the previous criteria has been met by that group.

For each group, the MCBF for high transaction volume devices for a given 60 consecutive day period shall be derived by summing all the transactions for the 60 consecutive day period for that group and device type and dividing by the number of chargeable failures recorded during that period for that group and device type. If for any reason a test period is not comprised of 60 consecutive days, then the average MCBF shall be calculated by summing the transactions and chargeable failures for each individual test period, totaling not less than 60 days of test data.

Should the equipment fail to meet the performance requirements specified above, TransCore shall make whatever improvements are needed to meet the requirements. TransCore shall continue to improve the equipment until the Contract requirements are met. SFO reserves the right to limit the cut-over of the installed equipment if the acceptance test requirements are not being met.

Successful completion of acceptance testing shall be a prerequisite for final acceptance. SFO reserves the right to be the sole judge in determining whether the acceptance testing meets the system requirements and objectives.

10.4 INSTALLATION

10.4.1 General

This section specifies the installation requirements for the TMS equipment. TransCore shall assist in the installation, connect, and test the TMSE in accordance with the Schedule. TransCore shall furnish all hardware for the proper installation of all items of the TMSE. TransCore shall provide technical assistance to the Infrastructure Implementation team with the requirements of layout, positioning, conduit assignment, and other features as detailed on the drawings of this Contract.

Plans for communication systems between elements of the data system shall be submitted to SFO. TransCore shall be responsible to ensure that connections operate to provide the performance specified for the system before installation shall begin.

10.4.2 Site Access and Site Work

Though the TMS TransCore will not be responsible for the construction or infrastructure integration, TransCore shall provide technical assistance to the Infrastructure Implementation team and if necessary plan and execute safe access to the work site for on-site work. Such safe access shall be afforded to construction equipment, vehicles, and personnel in accordance with the Contract. TransCore shall take into consideration the following guidelines for on-site work:

1. Minimize nighttime disturbance as required by the local rules and regulations.
2. Minimize disruption to taxi and airport operations.
3. Avoid restricting public rights-of-way.
4. TransCore shall not prevent access for other TransCores to the work site.

5. Access to the sites for installation of the TMS shall be governed by the completion of other SFO contracts. Therefore, TransCore shall incorporate flexibility into planning the overall schedule for this Contract's progression and completion.
6. TransCore shall be responsible for protecting all utilities and other SFO property, streets, private property, and shall repair any damage to same at TransCore's expense.
7. Nighttime work shall be required in order to minimize disruption to SFO operations.

Drawings depicting the typical installation of each type of equipment shall be provided for review by SFO (CDRL 28, "Installation Plan").

10.5 TRAINING

TransCore shall develop and conduct programs to train SFO and SFMTA training personnel in all aspects related to the equipment, hardware, support and diagnostic equipment, and software provided under this Contract. The training shall provide SFO and SFMTA training personnel with information and skills needed to instruct SFO and SFMTA personnel to operate, maintain, and support the equipment to the lowest replaceable component level. TransCore shall be responsible for training designated personnel in accordance with the requirements specified in this section. The parameters, approach and materials for SFO personnel training shall be submitted to SFO and SFMTA for approval.

Training materials shall reference and/or incorporate the content of the Operations and Maintenance Manuals where appropriate. All SFO and SFMTA training classes will be scheduled by personnel and shall not take place more than four weeks prior to revenue ready approval. SFO reserves the right to videotape training sessions conducted by TransCore for review and future use.

TransCore shall develop course material, provide course instructors, supply necessary handouts and manuals, prepare classroom aids, supply operational TMSE for training purposes, and all other items as required to train SFO personnel in the operation of the TMS.

10.5.1 General Training Guidelines

TransCore's training courses shall comply with the requirements described in this section and shall include the following at a minimum:

10.5.1.1 Training Program Plan

Detailed outlines, lesson plans, and tests shall be submitted for review and approval by SFO (CDRL 29, "Training Program Plan"). Instruction shall be designed to include courses described below and shall cover equipment familiarization, systems operations, and field and shop maintenance. At a minimum, TransCore must provide a training program that is comprehensive enough to bring employees designated by SFO and SFMTA to the level of proficiency required for operations, service, and maintenance of the furnished equipment. Formal training shall include both classroom and practical work, and shall be augmented by informal follow-up if requested.

Training mock-ups shall be provided to assist with the training. The operational equipment shall be retained by SFO for in-house training. Practical training on equipment shall occupy a significant portion of all training classes.

The plan shall be based upon criteria identified in this specification. The Training Program Plan is to be submitted to SFO for approval no later than 60 days after NTP. The plan shall, at a minimum, provide the following for each course:

1. Brief course description
2. Expected performance objectives and how the expected objectives will be measured
3. Outline for the course content (one for each course)
4. Necessary Pre-requisites
5. Type or method(s) of presentation that will be used
6. Resources required (equipment, classroom/shop space, supplies)
7. An estimated time schedule to train (based on the required number of hours and/or sessions of instruction) employees
8. Intended audience and the maximum class size.

10.5.1.2 Instructor Qualifications

TransCore shall provide experienced and qualified instructors to conduct the training courses at the designated training locations. Training should be oriented to the job classification of the students. SFO reserves the right to review, approve and accept all of the training materials and course work prior to TransCore's use in execution of training. TransCore shall warrant that all instructors are fully qualified to present the course material. SFO reserves the right to request replacement of instructors deemed to be unqualified or whose performance deemed unsatisfactory for any reason. Personnel expected for instructors shall be:

1. SFO trainers who have received instruction on system operation and course delivery for classes to train supervisory personnel to deliver any of the indicated training courses subsequent to TransCore's involvement.
2. Equipment maintenance personnel shall receive instruction on course delivery and on the detailed processes and procedures for maintaining all components of the TMS.
3. SFO supervisors shall receive instruction in sufficient depth to understand how the various components function in the TMS

SFO management shall receive instruction about system functions in sufficient detail to allow knowledgeable judgments to be made. TransCore shall expect supervisory and management personnel to audit the training classes. If in the opinion of SFO management personnel, a TransCore instructor(s)' lack the skill or knowledge to provide instruction or cannot communicate with the students, SFO reserves the right to request the training to be repeated and/or the instructor replaced.

10.5.1.3 Training Equipment

TransCore shall provide functional equipment to facilitate and conduct training at the designated training locations. A minimum of two sets of TMSE training equipment shall be provided for the training curriculum. SFO recognize that some participants may have to travel to a centralized training area to be agreed upon by SFO and TransCore.

The equipment shall be fully functional and reflect the fee structure and operating characteristics of SFO and SFMTA detailed in this specification.

10.5.1.4 Training Material

TransCore shall submit the training materials required for each course discussed in the Training Program Plan in accordance with the following requirements. TransCore shall provide a list of training materials required for each course discussed in the Training Program Plan. TransCore shall reflect all changes and revisions to the installed TMS in all training materials, whether supplied to SFO personnel, or used in TransCore-conducted training courses. At a minimum the following training materials shall be provided for each course in sufficient quantities:

1. Instructor guides, including the following:
    a. Course agenda and objectives
    b. Resources and facilities required for the course
    c. Detailed lesson plans or outlined presentations and discussion guides
    d. Pre- and post-training assignments
    e. Instructions for using any audiovisual support and equipment
    f. Student handouts
    g. Operational TMS equipment
    h. Computer-based presentations
    i. Video-taped demonstrations

Six copies of draft training materials shall be submitted (CDRL 30, "Training Materials") at FDR. Final training materials shall be submitted 60 days before classes are scheduled to begin.

The above deliverables shall be in addition to a master copy of each final version that shall be furnished to each SFO in both electronic and hard copy formats.

10.5.1.5 Electronic Documentation And Training

All documentation and training material provided as final hard copy shall also be submitted in an electronic form as specified by SFO. A directory of all files on the disk shall be listed in hard copy showing filenames, date, file size, and appropriate annotation to cross-reference the chapter and section (CDRL 30, "Training Materials").

10.5.1.6 Reproduction And Updating Of Training Material

SFO reserves the right to reproduce portions or all of the training materials. TransCore shall produce an update or new training aids (e.g. video tapes, manuals, etc.) within two years

following the completion of equipment installation. SFO shall receive copies of the updated material for its sole use in SFO training programs, at no cost to SFO.

10.5.2 Training Schedule

TransCore shall provide a preliminary and detailed schedule of training tasks (CDRL 31, "Training Schedule") for SFO review and approval. The detailed schedule of training tasks shall be based upon the equipment installation schedule which shall be established as a dependency in the Project Management Plan. The following proposed training table indicates the anticipated training class durations, in hours. TransCore shall allow for more than one training class (e.g., two classes of each class type at a minimum) due to the availability of the attendees. TransCore shall submit a schedule for SFO and SFMTA approval 60 days in advance of the first training session.

Table 6 - Training Class Duration (hours)

Training Course	Overview	Operations	Maintenance (Level I)	Maintenance (Level II)
Lane Equipment	2	4	4	8
TOT	4	4	4	8
AVM	2	4	4	8
Central System	8	12	16	16
CMS	8	12	16	16
PCI Training	2	2	4	4

Training Courses

10.5.2.1 Overview Training Courses

The Overview courses shall be designed to provide management, supervisory, and engineering personnel with an overview of the TMS system, including a functional understanding of the equipment and software. A Concise course shall cover the customer support responsibilities of TransCore and the function of each device, including the interrelationships of the equipment with customers and personnel. The Detailed Overview course shall cover the same material contained in the Concise Overview course and also include detailed instruction on reconciliation.

10.5.2.2 "Train the Trainer" Training

The purpose of this training is to instruct SFO training personnel in the operation and maintenance of the TMSE and delivery of course content in sufficient detail to establish equipment and operational familiarity. "Train the Trainer" instruction forms the basis for delivery training to SFO line personnel. Train the Trainer courses shall be provided for each Overview, Operations, Maintenance, Revenue Collections, and Network Operations course listed in Table 3.5-1. The courses shall be designed to train instructor and supervisory personnel at SFO to deliver any of the indicated training courses subsequent to TransCores involvement. TransCore shall provide sufficient documentation and data to train SFO training and supervisory personnel who will have responsibility to train additional personnel. At the completion of training, SFO trainers will demonstrate competency in the operation of the TMS by successful achievement on performance and written examinations.

TransCore shall be required to provide fully configured TMS workstation for the purpose of this training and shall be responsible for the supply of all necessary training smart cards required to demonstrate the system functionality and to train SFO personnel. Refer to Section 9.5 - Training Workstation for workstation requirements.

10.5.2.3 Revenue Collection Training

TransCore shall provide the services of a qualified and experienced instructor who shall conduct Revenue System training classes for SFO training personnel in the proper procedures for cashbox removal and servicing and operation. At the completion of training, SFO training personnel will demonstrate competency in course delivery and in the operation of the TMS by successful achievement on performance and written examinations.

10.5.2.4 Maintenance Training

TransCore shall provide SFO with an experienced and qualified instructor who shall conduct maintenance training. The purpose of the training is to train SFO maintenance personnel supervisors or maintenance TransCores in all aspects of maintenance and repair of all equipment provided under this contract. This shall include troubleshooting and diagnostic methods and preventive maintenance techniques to be employed in the proper maintenance of the equipment. TransCore shall develop the course material to be used in this class and provide such training aids as may be required to illustrate and demonstrate the required topics.

At the completion of training, SFO personnel will demonstrate competency in course delivery and in the maintenance of the TMS by successful achievement on performance and written examinations.

In addition, SFO may send to TransCore's designated manufacturing facility up to three (3) maintenance personnel to receive comprehensive instructions on the inspection, maintenance and repair of all of the equipment provided under this contract. TransCore shall develop the course material to be used in this training and provide such training aids as may be required to illustrate and/or demonstrate the required points. TransCore shall provide an experienced and qualified instructor(s) for the duration of this course.

Maintenance training shall include but not be limited to the following:

1. Basic construction and operation of the system components
2. Examination and disassembly of all Tier One devices including, but not limited to:
    a. Bill validator
    b. Electronic chassis
    c. Lower section and cashbox
    d. Electrical wiring harnesses
    e. CIDs
3. Troubleshooting procedures
4. Field-level repair of system and related equipment
5. Preventive maintenance on all subassemblies
6. Electrical wiring/troubleshooting
7. Electronic theory and function of system

8. Software overview of all interrelated systems
9. Disassembly and repair of cashboxes and vaults
10. Each student will be required to tear-down and build-up equipment in the class
11. Use and maintenance of required bench test unit equipment

Class size will be limited to a maximum of eight (8) participants per class.

10.5.2.5 Operation Training

1. TOT/Central System Operation Training

TransCore shall provide an experienced and qualified instructor who shall conduct training classes related to the full and complete operation of the TOT/CS as illustrated in this specification.

System operations training shall be conducted with the objective to familiarize SFO personnel with the TOT/CS operating systems, communication environment, system protocols, and program logic required to support TOT/CS system configuration, operation, and maintenance.

Functional operations training shall be conducted with the objective to familiarize SFO personnel with the TOT/CS functional operation, data management, and report generation. The training shall fully [illegible] /CS user functions, including but not limited to, data sorts and database management, report selection and generation, file management and retrieval, file back-up and restoration procedures, fee table management, and TMS operation.

At the con[illegible]rsonnel will demonstrate competency in the operation of [illegible]ment on performance and written examinations, evaluation and interpretation of data to assess performance objectives.

2. Equipment Operation Training

[illegible]n experienced and qualified instructor to conduct training courses on complete [illegible]ntified in this specification.

3. Revenue Servicing Training

TransCore shall provide an experienced and qualified instructor to conduct training courses on complete revenue servicing operations as identified in this specification.

10.5.2.6 Taxi Driver Training Video

TransCore shall provide a training video that will familiarize taxi drivers with TMS smart card payment and management environment. The training video shall familiarize drivers with their responsibilities and required actions, as well as payment methods and how fees are charged, in as brief and simple a manner as possible. The training video shall be subject to SFO review and approval.

10.5.3 Training Performance Measurement

Personnel trained in the operation and maintenance of the TMS equipment shall demonstrate proficiency by actual performance, written tests, and repair of equipment. TransCore shall certify

to SFO that personnel passing the written and practical tests are capable of operating and maintaining the TMSE.

10.6 DOCUMENTATION

TransCore shall provide a complete listing of documentation to be provided in the exercise of these requirements (CDRL 32, "Documentation List"). Included at minimum shall be the documentation title, table of contents, expanded outline, listing of drawings, illustrations, schematics, exhibits, and other such information so as to enable judgment upon the adequacy of the documentation.

Delivery of final documentation shall be in accordance with the project plan, which shall specify dependencies, schedule, quantity, and location (CDRL 32, "Documentation List"). The execution of the Warranty shall require TransCore to maintain documentation to the current revision, incorporating all engineering changes, modifications, changes, corrections, or updates (CDRL 32, "Documentation List"). SFO reserves the right to reproduce documentation for its sole use and purpose.

10.6.1 Documentation Submittal Requirements

Preliminary documents shall be supplied prior to or concurrent with the delivery of the demonstration equipment. A minimum of three sets of documentation for each type of equipment shall be supplied. Documentation for the production equipment that is delivered and installed will be supplied prior to the conclusion of the warranty.

The documents supplied must be the latest version and be for the equipment delivered and installed. No documentation will be considered final until it has been reviewed and approved by SFO Project Manager.

The final version of all documentation shall be provided on in electronic form suitable for use on a Windows™ based PC system. Alternative electronic forms may be substituted upon approval by SFO.

10.6.2 Summary Of Manuals

The following sections summarize the principal documentation that shall be provided in the form of manuals, organized by the desired content. TransCores may recommend alternative organizational formats if desired. Irrespective of the summary and organizational format, all documentation shall provide sufficient description, detail, and illustration to support installation, configuration, operation, maintenance, and repair of all equipment and systems provided under this Contract.

TransCore shall supply the full complement of manuals and documentation required to train SFO and SFMTA personnel to operate and maintain the TMSE. All manuals shall be in the English language and submitted for review and approval. The manuals shall cover both the hardware and the software associated with each system.

TransCore shall update manuals as required over the life of the Contract to reflect all configurations operational in the field. All manuals shall be furnished as "Controlled" documents

and each manual shall contain a unique number. All revisions shall be issued by manual number. Revisions to draft and approved manuals shall be recorded on a control list to be maintained in the front of each manual. The list shall be issued with each revision and shall contain the date of the revision and the page references for that revision.

Manual and training material development shall begin, and occur concurrently with the design process. A schedule for development of the required manuals with time allotted for SFO review shall be submitted 120 days after NTP (CDRL 33, "Manuals Schedule"). The training documentation shall be separate from the operation and maintenance manuals, but may reference those manuals.

Manuals shall be specific to the features and functionality provided by the contracted system. The section of manuals related to the listing of parts shall be organized such that it is separate from its associated manual. This organized format allows reproduction and reference to the listing of parts without the requirement to reproduce or reference the complete manual. The section of manuals related to the specific description or illustration of security equipment or features, to the extent the information can be used to circumvent or defeat system security, or in the opinion of TransCore may be used in such a manner, shall be identified by TransCore. At the discretion of SFO, TransCore may be required to delete, remove, or separately organize such material.

10.6.2.1 Operations Manuals

The Operations Manuals shall provide information and instruction on the various operational controls and features of the equipment and systems (CDRL 34, "Operations Manual").

The manual shall be sufficient in description, detail, and illustration to provide full and adequate reference to the operation of each device and system. A separate Operations Manual shall be provided for each device and system.

In addition to the general requirements above, the CS Operations Manual shall provide descriptions of data management functionality and shall incorporate a full and complete description or reference to the related TMS operational impact, result, or association. For example, instruction related to fee table management shall include description or reference to the resulting TMS operation, data collection and data reporting action. Instruction related to the document management shall include description or reference to the desired document format.

The manual shall be sufficient in description, detail, and illustration to provide full and adequate reference to the operation of the system and to the development of training programs.

10.6.2.2 Maintenance Manuals

The Maintenance Manuals shall provide information and instruction on the maintenance of the equipment and systems. The manuals shall be sufficient in description, detail, and illustration to provide full and adequate reference to the diagnosis, testing, maintenance, repair, and replacement of devices, modules, components, and system (CDRL 35, "Maintenance Manual").

Manuals shall contain diagrams, illustrations, schematics, parts listings, diagnostic and testing procedures, flow charts, and program code description as necessary to fully support maintenance functions. A separate Maintenance Manual shall be provided for each device and system.

10.6.2.3 Revenue Servicing Manual

TransCore shall provide a revenue service manual (CDRL 36 "Revenue Servicing Manual) for revenue services on TMS. These manuals shall contain, at minimum, information on the procedures for the replacement of receipt stock and bill vaults. This manual shall be provided as an independent document and not included with other training materials.

10.6.2.4 Test Equipment Manual

The Test Equipment Manual shall provide operation, adjustment, maintenance, troubleshooting, and storage instructions, and special tools (CDRL 37, "Test Equipment Manual"). The Test Equipment Manual shall also include ATE replacement parts information.

10.6.3 Summary Of Other Documentation

The following is a summary of other principal documentation that shall be provided in addition to that provided as manuals. The requirements are organized by the desired content. TransCores may recommend alternative organizational formats. Irrespective of the summary and organizational format, all documentation shall provide sufficient description, detail, and illustration to support installation, configuration, operation, maintenance, and repair of all equipment and systems provided under this Contract.

All documentation shall be specific to the features and functionality provided by the contracted system. TransCore shall identify the portion of documentation related to the specific description or illustration of security equipment or features, to the extent the information can be used to circumvent or defeat system security, or in the opinion of TransCore may be used in such a manner. At the discretion of SFO, TransCore may be required to delete, remove, or separately organize such material.

10.6.3.1 Listing Of Tools

TransCore shall provide a list of all special or custom tools or instruments required to install, maintain, or adjust any component in the contracted system (CDRL 38, "Special Tools List"). TransCore shall also provide a list of suppliers of required special or custom tools or instruments.

10.6.3.2 Bill Of Material

A complete Bill of Material (CDRL 39, "Bill of Material") shall be provided that shall include a unique part number, description, generic name and generic part number for each component in the contracted system. The Bill of Material shall include identification to level of specific diode, capacitor, or screw. Diagrams and drawings shall identify each system component and shall call out each component with the unique part number as referenced in the Bill of Material. Sub-component detail shall be provided for TransCore-manufactured equipment. Sub-component detail of commercial equipment such as computers and peripherals, at the discretion of SFO, may be limited to board or major component level.

10.6.3.3 Listing Of Sources

TransCore shall provide by listing sources for purchasing components and parts that are commercially available, other than from TransCore (CDRL 40, "Distributor Sources List").

Components and parts not so listed shall be considered by SFO to be proprietary and available by single source.

10.6.3.4 Communications Protocols

TransCore will provide full and complete documentation of the communications protocol and message set information between any contract-provided TMS component and any other system or external component, regardless of whether the component is provided under the terms of this Contract or other SFO contract (CDRL 41, "Communications Protocols"). The documentation shall be sufficient in content and detail to afford SFO the ability to interface and communicate in the same manner to an appropriately compliant component for the purpose of affecting operational control or data exchange

10.6.3.5 Printed Circuit Boards

TransCore shall provide a schematic diagram for all printed circuit boards with a corresponding parts layout for each printed circuit board (CDRL 42 "Printed Circuit Board Drawings"). The diagrams shall specifically call out each mechanical or electrical component and its location.

10.6.3.6 Listing of Messages

TransCore shall provide a complete listing of system messages not otherwise defined in provided documentation (CDRL 43, "Listing of Messages"). Messages shall include, but not be limited to, displays, indications, tones, status conditions, responses, or actions whether decoded or available for decode.

10.6.3.7 Source Code

TransCore shall deliver to SFO computer system and microprocessor Source Code (CDRL 44, "Source Code"). Alternatively, TransCore may elect to deliver such Source Code to an Agent designated by SFO who at no cost to SFO shall record and maintain the documentation on behalf of TransCore. TransCore shall have the responsibility to maintain any such documentation to the current level of product supplied to SFO and shall certify such has been accomplished with delivery of all computer system and microprocessor system product and revisions to such product.

If at any time after the period of Warranty, in the sole opinion of SFO, TransCore is not responsive to the needs of SFO to modify, maintain, or otherwise support the contracted system, SFO shall upon 30-day written notice to TransCore have full, complete, and unabridged right to the obtain the Source Code(s) from the designated Agent.

EXHIBIT A – CDRL LIST

TransCore shall deliver each submittal (CDRL) described below at PDR and/or FDR, where indicated by a "✓" in the table, and at and within such other time periods as may be specified in the "Other" column. Refer to applicable section of the Specification identified for further information.

GTMS/TMS Contract Data Requirement List (CDRL)				
CDRL	**Submittal Description**	**Required for:**		
		PDR	**FDR**	**Additional**
1	ADA Compliance Report	✓	✓	
2	CID Design	✓	✓	
3	CID Mockup	✓	✓	
4	CID Data Retrieval	✓	✓	
5	TOT Design	✓	✓	
6	TOT Screen Flows	✓	✓	
7	AVM Design	✓	✓	
8	Central System Design	✓	✓	
9	Clearing and Settlement	✓	✓	
10	Central System Configuration Plan	✓	✓	
11	Policies and Procedures Manual	✓	✓	
12	Data Backup and Disaster Recovery Plan	✓	✓	
13	Central System Reports Formats	✓	✓	
14	Card Design	✓	✓	
15	Project Management Program Plan	✓	✓	NTP +10 days
16	Project Schedule			NTP +10 days
17	Monthly Progress Reports			Monthly
18	Illustrated Parts Catalogue		✓	
19	Test Reports		✓	
20	Quality Assurance Program Plan		✓	
21	Overall Inspection and Test Plan		✓	30 days prior to first test
22	Detailed Test Procedures		✓	30 days prior to

				each test
23	FACI Plan		✓	30 days prior to FACI
24	First Article Testing Reports		✓	Within 15 days of test completion
25	Request for FAT Waivers		✓	
26	System Acceptance Testing Plan	✓	✓	30 days prior to start of acceptance test
27	Failure Review Process		✓	30 days prior to start of acceptance test
28	Installation Plan	✓	✓	
29	Training Program Plan	✓	✓	
30	Training Materials		✓	60 days before first scheduled class
31	Training Schedule		✓	
32	Documentation List	✓	✓	
33	Manuals Schedule	✓	✓	
34	Operations Manual		✓	Per Manuals Schedule
35	Maintenance Manual		✓	Per Manuals Schedule
36	Revenue Servicing Manual		✓	Per Manuals Schedule
37	Test Equipment Manual		✓	Per Manuals Schedule
38	Special Tools List	✓	✓	
39	Bill of Material	✓	✓	
40	Distribution Sources List	✓	✓	
41	Communications Protocols	✓	✓	
42	Printed Circuit Board Drawings	✓	✓	
43	Listing of Messages	✓	✓	
44	Source Code Delivery Plan	✓	✓	
	Source Code			System Acceptance
45	Warranty Plan	✓	✓	90 days prior to beginning of warranty period
46	Spare Modules and Parts List	✓	✓	

47	Consumables List	✓	✓	
48	Standard Support Equipment List	✓	✓	
49	Maintenance Plan	✓	✓	
50	HCR Design and Performance Requirements	✓	✓	
51	Transition Management Plan	✓	✓	
52	PCI Policies and Procedures	✓	✓	
53	Claims Process	✓	✓	
54	Transactional Database Design	✓	✓	
55	Customer Service Manual		✓	Per Manuals Schedule
56	Human Factors Analysis Report		✓	
57	Dynamic Messaging System Design	✓	✓	
58	LEFT BLANK			
59	Preliminary Design Review Package	✓		
60	Final Design Review Package		✓	
61	GEO-Fence, GPS Data, and Equipment Design	✓	✓	
62	GTMS Application Design	✓	✓	
63	GTMS/TMS Web Portal Design	✓	✓	
64	Infrastructure Requirements	✓	✓	
65	PMBS Integration Design	✓	✓	
66	GTMS Transponder Design	✓	✓	

EXHIBIT B – EXISTING SITE CONDITIONS

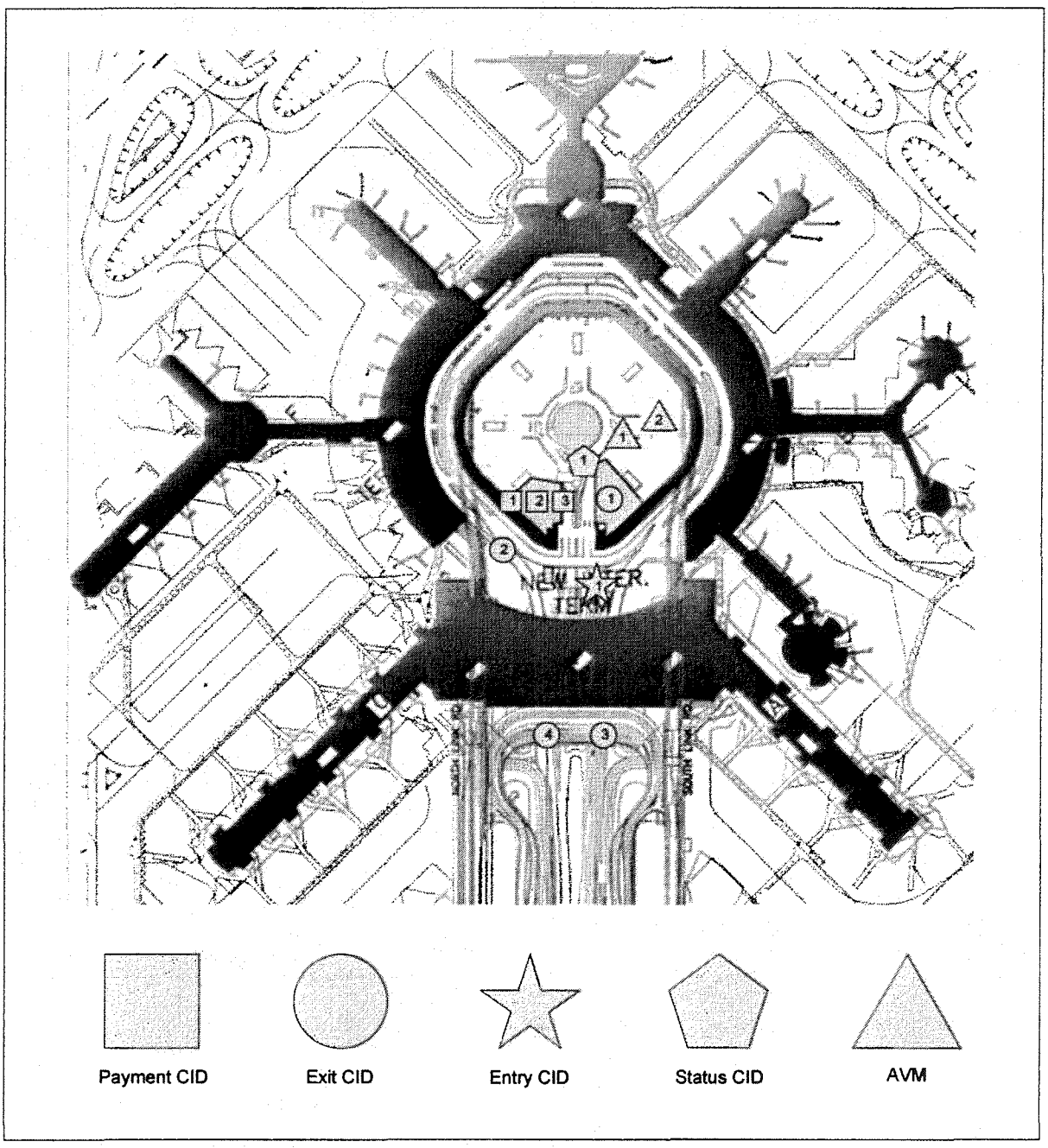


Figure 5 - Existing Site Plan and Device Locations

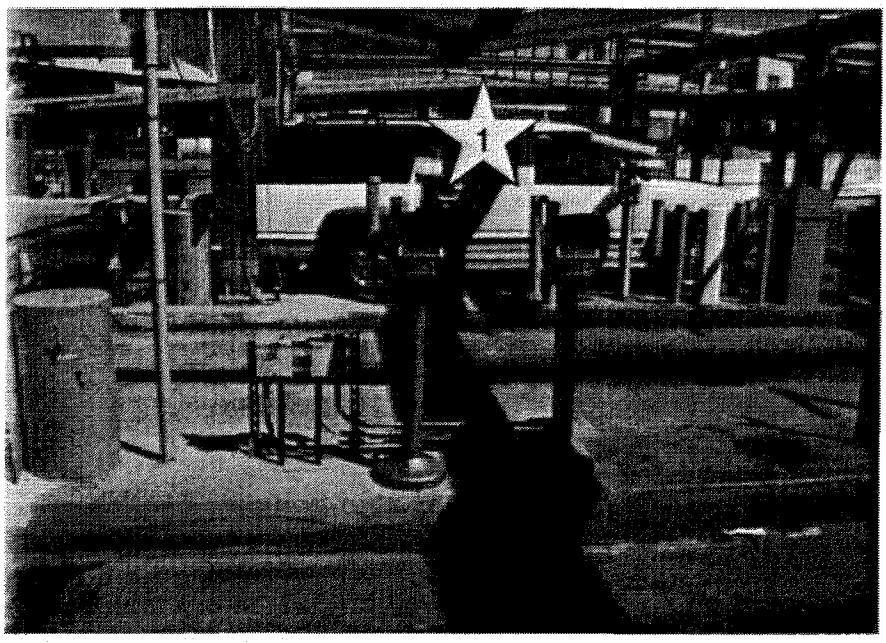


Figure 6 - Entry Lane 25 CIDs

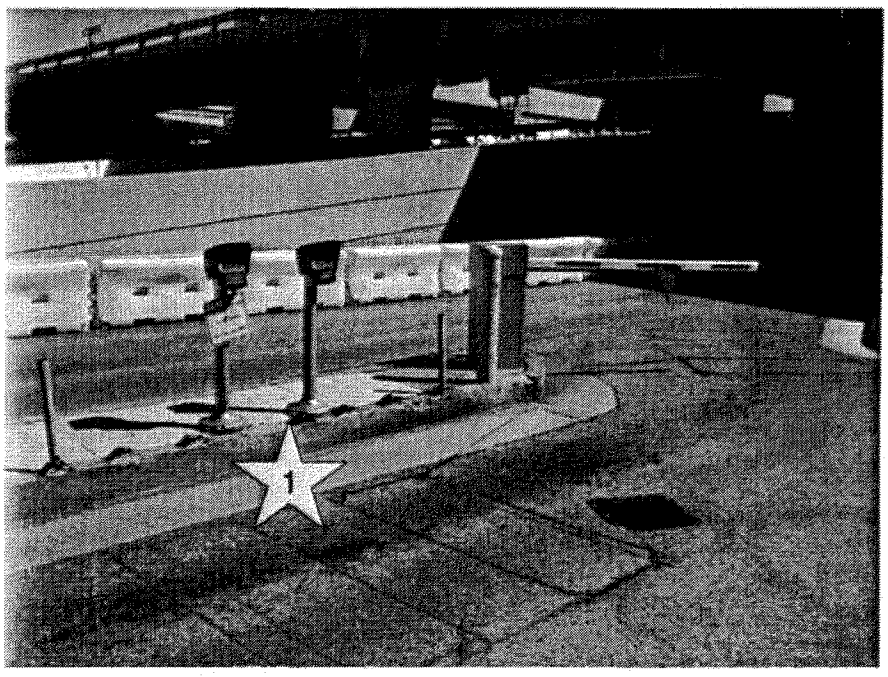


Figure 7 - Entry Lane 26 CIDs

Figure 8 - AVM Enclosure in Overflow Lot

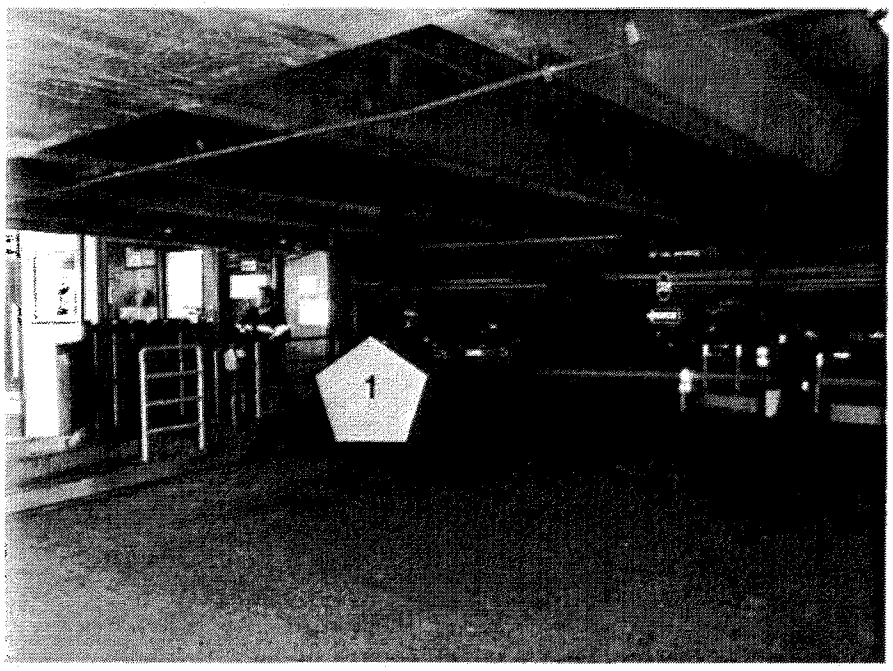


Figure 9 – Overflow Lot Status CID

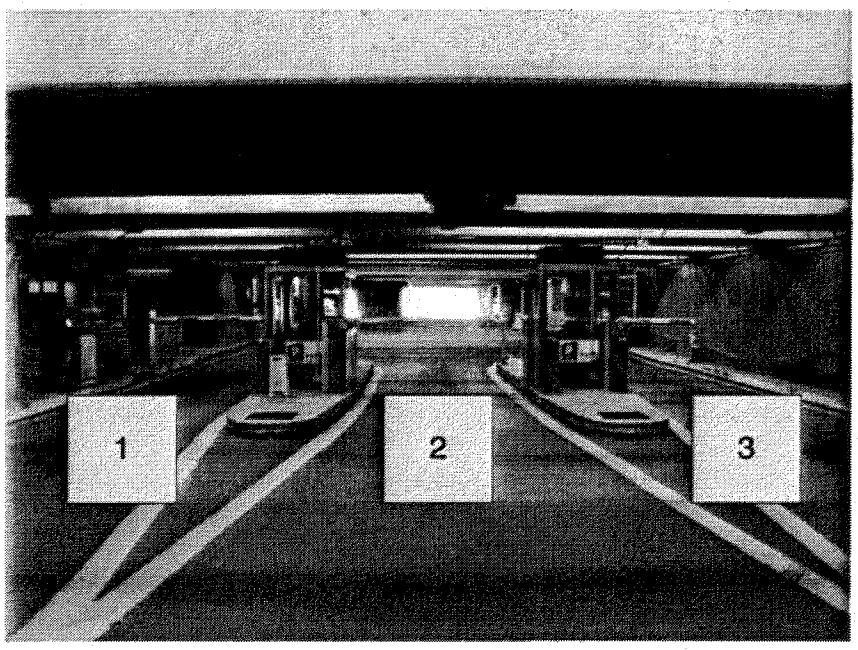


Figure 10 – Payment CIDs

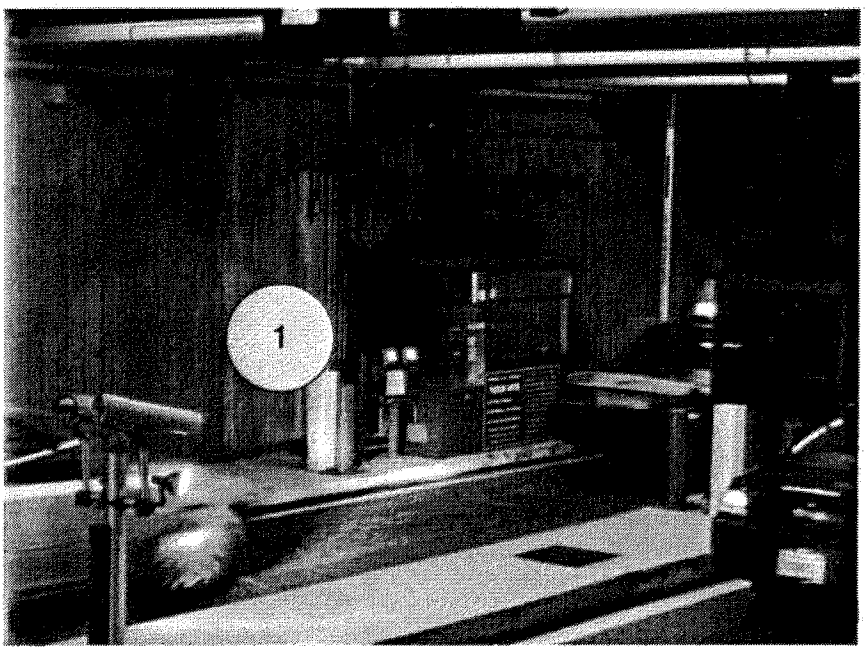


Figure 11 - Freeway Exit CIDs

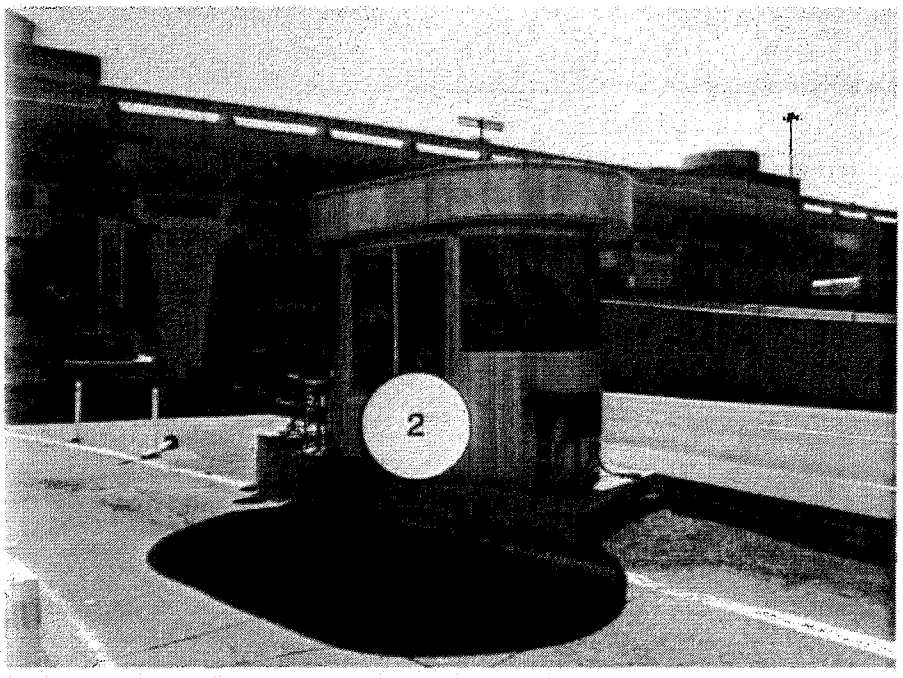


Figure 12 - Domestic Terminal Check-out CIDs

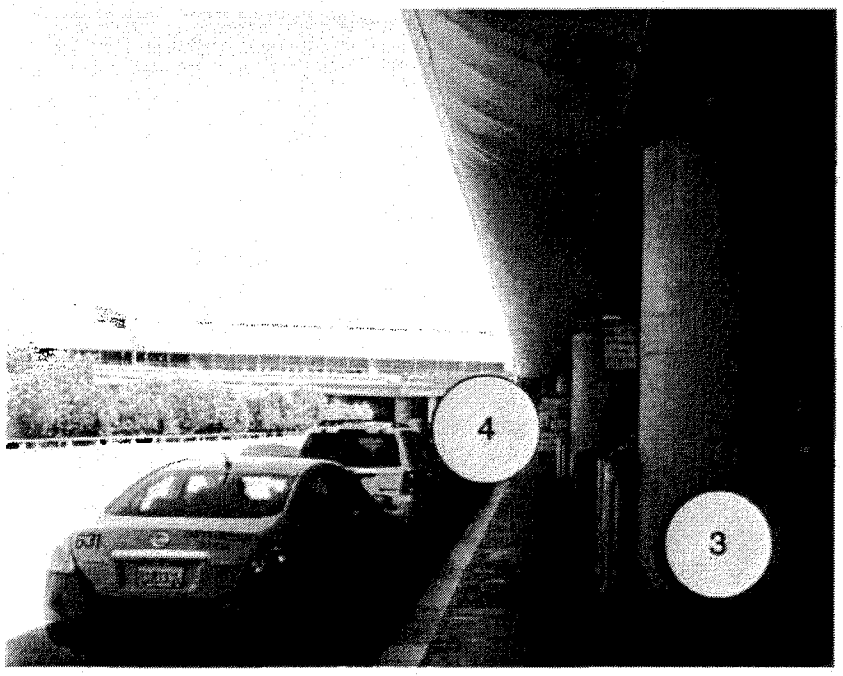


Figure 13 - International Terminal Check-out CIDs

EXHIBIT C – VENTEK AVM INTERFACE SPECIFICATION

The VenTek AVM shall report usage data (UD) to the Central System in XML format. Each AVM shall have a unique name. Logical IDs shall follow the format AVM1, AVM2, etc.

UD shall be transferred between the Ventek server and the TMS Central System in .xml format.

The Central System shall read the XML files on a daily basis. Connection between the Ventek server and Central System shall be established once per day to download transactions of the past day. The operational day will be used (day n 4:00am → day n+1 3:59:59am).

The insertion date (on the database) will be used to filter transactions.

The two statements above indicate that each day after 4:00am in the morning, the export files will be generated for the previous operational day. All relevant transactions that are generated on the AVM system in this timeframe will be taken into account for the given export.

File names shall follow the following format:

- yyyyddmmAVMx.xml (example 20061026AVM1.xml)

The Ventek server will store its UD files for export on a shared drive on the SFO network. The Central System shall collect the UD file once a day from one folder for each AVM. Preferred example:

- SharedDir\AVM1\ToProcess\20061026AVM1.xml
- SharedDir\AVM2\ToProcess\20061026AVM2.xml

The Central System will then move the successfully processed .xml files to another shared folder. Preferred example:

- SharedDir\AVM1\Processed\20061026AVM1.xml
- SharedDir\AVM2\Processed\20061026AVM2.xml

Fieldname	Type	Length	Key	Description
CardId	*Number*	*10*	*	Internal key (technical)
LoadEvent	*char*	*1*		See note
LoadedAmount	*Decimal*	*4.2*		Real amount loaded to the Epurse
LoadDate	*string*	*8*		String representation of the transaction date
LoadTime	*string*	*6*		String representation of the transaction time
Location	*string*	*4*		'AVM1' or 'AVM2'
EpurseValue	*decimal*	*5.2*		Value of the Epurse before the described action was performed
MethodOfPayment	*char*	*1*		Enum: 1: Cash 6: Credit Card 7: Debit Card
CardIssuer	*char*	*1*		Issuer of the card
CardExpirationDate	*Number*	*5*		Card Expiration Julian Date as received from the cardreader
ApplicationTransactionSeqNr	*Number*	*10*		Identifies the n-th transaction on a card
ApplicationExpirationDate	*Number*	*5*		Application Expiration Julian Date as received from the cardreader

Figure 14 – Example of XML Record

Note on field types:

- *Load'Date' has the following format "DDMMYYYY"*
- *Load'Time' has the following format "HHMMSS"*

Note on LoadEvent:

- *Type '3': Manual Reload*
- *Type '4': Reload Failure*

EpurseLoad.xml

```
<?xml version="1.0"?>
<EpurseLoad>
    <Card CardId = "500001">
        <LoadEvent type = "3">
            <LoadedAmount>150.00</LoadedAmount>
            <LoadDate>07042005</LoadDate>
            <LoadTime>124500</LoadTime>
            <LoadSeqNr>1</ LoadSeqNr >
            <Location>AVM1</Location>
        </LoadEvent>
        <EpurseValue>20.00</EpurseValue>
        <MethodOfPayment>1</MethodOfPayment>
        <CardIssuer>1</CardIssuer>
        <CardExpirationDate>4012</CardExpirationDate>
        <ApplicationTransactionSeqNr>22</ApplicationTransactionSeq
        Nr>
        <ApplicationExpirationDate>4250</ApplicationExpirationDate>
    </Card>
</EpurseLoad>
```

Figure 15 - Example of XML Contents

EXHIBIT D – GTMS/TMS INTERFACE SPECIFICATION

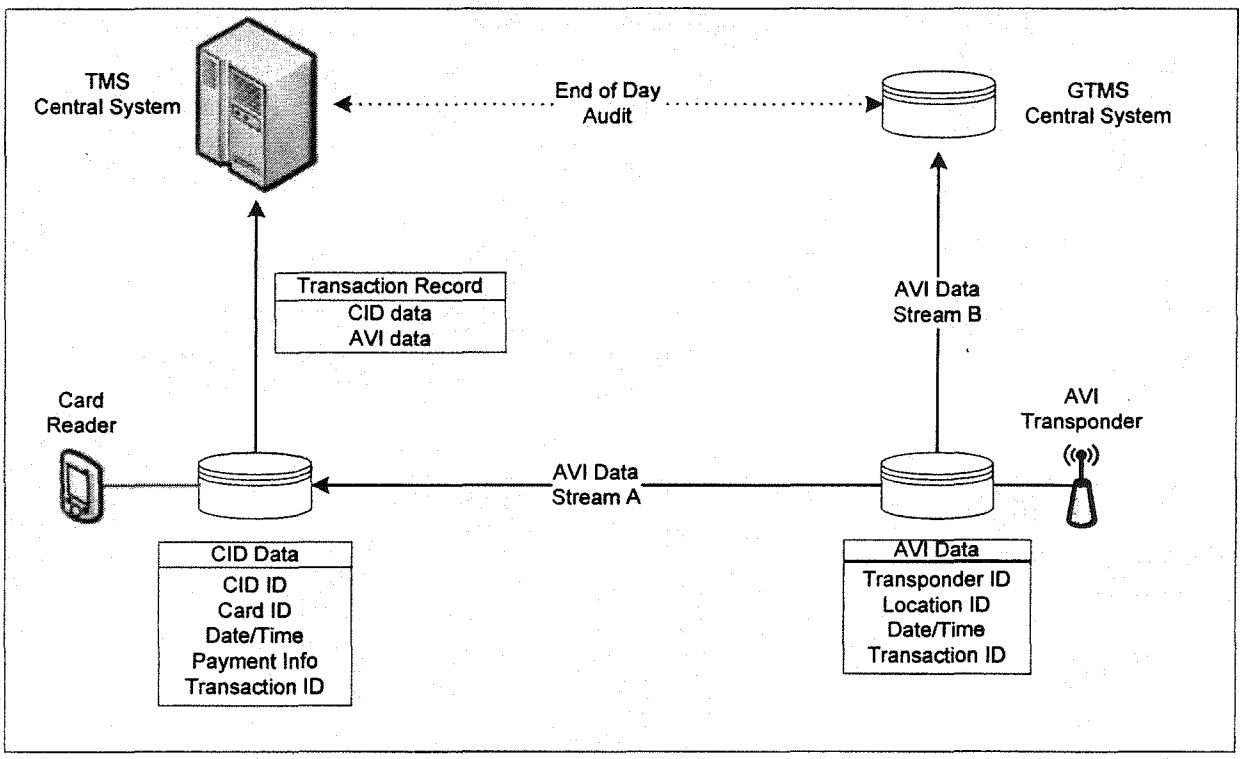


Figure 16 - AVI Interface

1. Communications Protocol

The GTMS shall communicate with the CID using TCP/IP or another approved equal.

2. System Clock

Each system component shall synchronize its internal clock with the TMS Central System or other approved equal.

3. Data Format

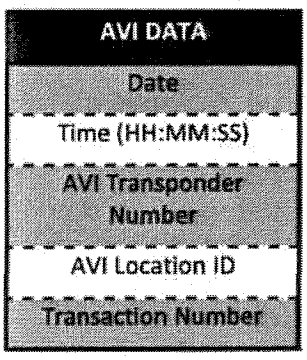
GTMS data shall be delivered to the CID in XML or HTML format.

4. Data Fields

The GTMS/TMS shall generate two data streams for each transaction.

Data stream A shall be sent to the CID. Each transaction record sent to the CID shall contain the elements shown in Table 4 – GTMS Data Fields.

Table 4 - GTMS Data Fields

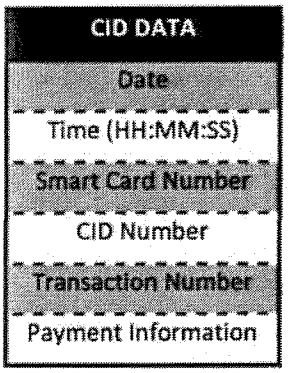


Data stream B shall be sent the GTMS and shall be defined by the GTMS TransCore

The CID shall create a data record consisting of the elements shown in

Table 5 - CID Data Fields

Table 5 - CID Data Fields



The CID shall also receive the GTMS data at the time a transponder is detected and create a combined data record. Each combined data record shall contain all CID and GTMS data described in this section. The combined record shall be transferred in real time to the TMS Central System.

5. Timing

AVI transaction records shall be sent to the CID in real time.

Combined data records from the CID shall be sent to the TMS Central System in real time.

The GTMS Central System shall aggregate AVI transaction records from data stream B into a batch file daily. This file shall be sent to the TMS Central System on a daily basis for audit purposes.

Appendix B
Calculation of Charges

I. Compensation, Excluding Interim Solution

The compensation for the work described in Appendix A, exclusive of the Interim Solution, shall be Seven Million Nine Hundred and Twenty Thousand Two Hundred and Twenty –Seven Dollars ($7,920,227).

II. Retention

TransCore shall submit invoices upon completion of the tasks identified in Appendix C to this Agreement. The City shall retain twenty percent (20%) from of the total contract price in Phase 3. The retention amount shall be released to TransCore upon Final Acceptance

III. Compensation and Term for Interim Solution

In the event the City, in its sole discretion, determines TransCore shall deploy the Interim Solution, as defined in Appendix A, the City shall lease Interim Solution, on the terms set forth herein and in Attachment 1 hereto.

Lease Term: 12 months; month-to-month thereafter with no change in monthly lease amount

Interim System Development and Preparation Fee: Ninety Three thousand Thirty Four Dollars ($93,034), of which fifty percent (50%) shall be due within thirty (30) days of delivery and installation of not fewer than seventy-five (75) ROVR units; and the remaining fifty percent (50%) when all initial 75 delivered units demonstrate ninety-five percent (95%) reliability for sixty (60) days. In the event the Interim System fails to function as warranted by Transcore, the entire Interim System Development and Preparation Fee shall be refunded to the City.

In-vehicle devices, per month: Eighteen Dollars ($18)

One-time activation fee: Fifteen Dollars ($15) per unit

Buy-out: The City will lease ROVR units on an as-needed basis in batches. Beginning in month 24, the City may elect to purchase ROVR devices for One Dollar ($1) per unit.

Monthly data charge post-purchase: $7.00

In no event shall the cost of the Interim Solution exceed Three Hundred and Forty-One Thousand Dollars ($341,000).

In the event an in-vehicle ROVR device is non-functional, TransCore shall replace such device within 24 hours of notification by the City. Replacement devices shall be at no cost to the City.

IV. Personnel

Hourly rates of personnel assigned to this project shall not exceed the rates set forth in Table 1, below.

Table 1 Rates by Labor Classification

Labor Classification	Average Hourly Rate
Tech Project Manager	$168
Operations Manager	$175
Principal Engineer	$176
Systems Engineer	$160
IT Engineer	$119
Drafter/CAD Operator	$86
Scheduler	$160
Technical Writer	$67
Electronic Tech	$67
Senior Field Tech	$83
Install Tech	$72
IBI Principal	$215
Ventek Principal	$215

City and County of San Francisco
Office of Contract Administration
Purchasing Division
City Hall, Room 430
1 Dr. Carlton B. Goodlett Place
San Francisco, California 94102-4685

Equipment Lease Agreement

This form is an attachment to the Agreement between the City and County of San Francisco ("City") and Transcore, LP ("Contractor/Lessor"), dated this 28th day of August, 2012. The terms and conditions of this attachment are referenced in and incorporated into the Agreement between the City and Contractor/Lessor.

Recitals

WHEREAS, the City and Contractor/Lessor have entered into an Agreement ("MASTER AGREEMENT") in which Contractor/Lessor will serve as an Integrator to design, build and maintain a Ground Transportation & Taxi Management System (GTMS/TMS) hereinafter referred to as the "NEW SYSTEM"; and,

WHEREAS, the terms and conditions of the MASTER AGREEMENT are incorporated herein by this reference as though fully set forth; and

WHEREAS, the NEW SYSTEM will replace the Automated Vehicle Identification System (AVI) and the Taxi Revenue System (TRS) and upgrade the Airport's current ground transportation and taxi management hardware and software, hereinafter referred to as the "EXISTING SYSTEM"; and,

WHEREAS, tracking of all buses, shuttles, limousines and shared ride vans in the EXISTING SYSTEM is accomplished with AVI transponders manufactured by XCI, Inc., all of which will eventually be replaced by Contractor/Lessor with ISO 18000-6c transponders; and

WHEREAS, the Airport has a limited supply of XCI transponders and the parties recognize that some or all of the XCI transponders may fail before the work to be performed by Contractor/Lessor under the MASTER AGREEMENT is complete, which would require temporary, replacement transponders; and

WHEREAS, the MASTER AGREEMENT provides that the City may, at its option and as a temporary measure, lease from Contractor/Lessor in-vehicle GPS devices that communicate via cellular modem to the system's network operation center where relevant location and event data is processed; and

WHEREAS, the GPS devices and their communication abilities are known interchangeably as the "ROVR System" and "Interim Solution"; and

WHEREAS, Contractor/Lessor represents and warrants that it is qualified to perform the services required by City as set forth under the MASTER AGREEMENT and this Equipment Lease Agreement;

Now, THEREFORE, the parties agree as follows:

1. **Certification of Funds; Budget and Fiscal Provisions; Termination in the Event of Non Appropriation.** This Agreement is subject to the budget and fiscal provisions of the City's Charter. Charges will accrue only after prior written authorization certified by the City's Controller, and any amount of the City's obligation hereunder shall not at any time exceed the amount certified for the purpose and period stated in such advance authorization. This Agreement will terminate without penalty, liability or expense of any kind to City at the end of any fiscal year in the event funds are not appropriated for the next succeeding fiscal year. If funds are appropriated for a portion of the fiscal year, this Equipment Lease Agreement will terminate, without penalty, liability or expense of any kind at the end of the term for which funds are appropriated, and Contractor/Lessor's sole remedy shall be repossession of the equipment. This Section shall control against any and all other provisions of this Equipment Lease Agreement.

2. **Term of the Agreement.** Subject to Section 1, the term of this Agreement shall be twelve (12) months, commencing on the date Contractor/Lessor delivers and installs the first groups of ROVR System devices. The 12-month terms shall run on individual ROVR System devices from the date each becomes operable.

3. **City's Sole Discretion to Renew.** Notwithstanding anything to the contrary contained in this Lease (including, without limitation, any terms and conditions of Contractor/Lessor attached hereto) in no event shall the term of this Lease be longer than the initial term expressly stated in this Lease unless the City, in its sole discretion, elects to continue the lease of ROVR System devices and payment of monthly service charge on a month to month basis. In that event, the equipment lease and monthly service charge will continue at the same rate as set forth in Appendix B to the MASTER AGREEMENT.

4. **City's Payment Obligation.** In no event will the City make an advance payment. In the event any payment of any amount of monies is required by any Vendor or Manufacturer prior to acceptance of the Equipment by the City, Contractor/Lessor is to advance such amounts. The City will make a good faith effort to pay all invoices within thirty days of billing. In no event will the City pay any late fees or charges for payments made after the 30 day period. Contractor/Lessor and the City understand and intend that the obligations of the City to pay Rental Payments hereunder shall constitute a current expense of the City and shall not in any way be construed to be a debt of the City in contravention of any applicable constitutional or statutory limitations or requirements concerning the creation of indebtedness by the City, nor shall anything contained herein constitute a pledge of the general tax revenues, funds or monies of the City. The City shall pay Rental Payments, exclusively from legally available funds, to Contractor/Lessor or, in the event of an authorized assignment by Contractor/Lessor to its assignee, according to the terms of this Agreement, upon presentation of invoices furnished by Contractor/Lessor in a form acceptable to the Controller. Each invoice must have a unique identifying number. Payments will be made in United States Dollars by warrant drawn on the Treasurer of City and County of San Francisco. Rental Payments shall be in consideration for the City's use of the Equipment during the applicable fiscal year in which such payments are due. **In no event shall the amount of this Agreement exceed Three Hundred and Forty-One Thousand Dollars ($341,000).** The breakdown of costs associated with this Agreement appears in Appendix B to the MASTER AGREEMENT.

5. **Maintenance.** Contractor/Lessor shall be responsible for all service, repair and maintenance of the ROVR System unless otherwise specified by this Agreement.

6. **Use, Licenses.** The City will not use or operate the ROVR System improperly, carelessly, in violation of any applicable law or in a manner contrary to that contemplated by this Lease.

7. **Delivery of Equipment; Transportation.** Contractor/Lessor prepare the ROVR System for use by the City, as described in Appendix A to the MASTER AGREEMENT, and shall deliver and install the

ROVR System at no additional cost. The ROVR System to be provided under this Agreement shall be delivered, installed and made ready for operation at a location designated by the City.

8. Installation. The Contractor/Lessor shall prepare the site, obtain all permits and licenses, if any, necessary for the installation and operation of the ROVR System, furnish, assemble and install the ROVR System as necessary at the location as designated by the City. Contractor/Lessor must comply with all State laws and local Ordinances in installing the ROVR System.

9. Contractor/Lessor's Removal and the City's Surrender of the ROVR System. At the end of the lease term or unless sooner terminated or in the event the City elects to purchase the ROVR System, the City agrees to surrender the ROVR System in as good a condition as when furnished, reasonable wear and tear excepted. Contractor/Lessor agrees, at Contractor/Lessor's cost to accept and remove the ROVR System as provided in this Lease. Contractor/Lessor's failure to accept and remove the ROVR System shall entitle the City to remove the ROVR System and place it in any storage facility in San Francisco at Contractor/Lessor's sole expense and Contractor/Lessor shall hold the City free and harmless from any expense or damages of any kind occasioned thereby and arising therefrom.

10. Default. In the event of a default by Contractor/Lessor under this Lease, City shall have the right to exercise its legal and equitable remedies, including, without limitation, the right to terminate this Lease. In addition, City shall have the right (but no obligation) to cure (or cause to be cured) on behalf of Contractor/Lessor any default by Contractor/Lessor. Contractor/Lessor shall pay to City on demand all costs and expenses incurred by City in effecting such cure, with interest thereon from the date of incurrence at the maximum rate then permitted by law. City shall have the right to offset from any amounts due to Contractor/Lessor under this Lease all damages, losses, costs or expenses incurred by City as a result of such default by Contractor/Lessor.

11. Force Majeure. Contractor/Lessor shall not be liable for failure to furnish Equipment ready for use on the date specified or to remove in accordance with the terms of this Lease nor shall City be liable for delay in installation or removal when such failures are due to causes beyond the reasonable control of either such as acts of God, acts of civil or military authority, fires, strikes, floods, epidemics, quarantine, war, riot, delays in transportation, care shortages, and inability due to causes beyond its reasonable control to obtain necessary labor, materials or manufacturing facilities, and in such event the party under obligations to perform shall perform as soon as such cause is removed.

12. The City's Right to Use Other Equipment Simultaneously with the ROVR System. Except as otherwise stated in the MASTER AGREEMENT, the City does not grant Contractor/Lessor an exclusive right during the term of this Lease to supply the City with any other equipment. The City reserves the right to lease or purchase similar or different equipment from any other supplier or Contractor/Lessors which may be used contemporaneously with any item of the ROVR System leased hereunder.

13. Warranty.

a. Title: Contractor/Lessor warrants that the ROVR System developed for use as an Interim Solution, as defined in the MASTER AGREEMENT will, prior to its delivery and installation to City, be the sole and exclusive property of Contractor/Lessor. If notified promptly in writing of any judicial action brought against City based on an allegation that City's use of the ROVR System infringes a patent or copyright, or any rights of a third party, or constitutes misuse or misappropriation of a trade secret or any other right in intellectual property (infringement), Contractor/Lessor will hold City harmless and defend such action at its expense. Contractor/Lessor will pay the costs and damages awarded in any such action or the cost of settling such action, provided that Contractor/Lessor shall have sole control of the defense of any such action and all negotiations or its settlement or compromise. If notified promptly in

writing of any informal claim (other than a judicial action) brought against City based on an allegation that City's use of the ROVR System constitutes Infringement, Contractor/Lessor will pay the costs associated with resolving such claim and will pay the settlement amount (if any), provided that Contractor/Lessor shall have sole control of the resolution of any such claim and all negotiations for its settlement. In the event that a final injunction shall be obtained against City's use of the ROVR System by reason of Infringement, or in Contractor/Lessor's opinion City's use of the ROVR System is likely to become the subject of Infringement, Contractor/Lessor may at its option and expense (a) procure for City the right to continue to use the ROVR Systems as contemplated hereunder, (b) replace the ROVR System with non-infringing, functionally equivalent substitute ROVR System, or (c) suitably modify the ROVR System to make its use hereunder non-infringing while retaining functional equivalency to the unmodified version of the ROVR System. If none of these options is reasonably available to Contractor/Lessor, then the ROVR System may be terminated at the option of either party hereto and Contractor/Lessor shall refund to City all amounts paid under this Agreement.

b. Scope of Warranty: Contractor/Lessor hereby warrants to City that all of the equipment, computer systems and software, including firmware as warranted by third party suppliers, furnished under the ROVR System shall be free from defects in material and workmanship under normal operating use and service. Contractor/Lessor warrants that it is the owner of the equipment and licensor of the proprietary (non-third party) software included in the ROVR System. Contractor/Lessor will provide the City nontransferable fully paid licenses to use all software that Contractor/Lessor furnishes with the ROVR System, under the written terms established by the software manufacturers. Contractor/Lessor will provide the City with copies of all applicable licenses. Contractor/Lessor warrants that it has a right to grant such licenses. Contractor/Lessor warrants that the software, when used properly, will be free from reproducible defects that materially vary from its specifications. Any reproducible bugs or defects shall be remedied by Contractor/Lessor. City's exclusive remedy shall be for Contractor/Lessor, at no charge to City, either to repair or replace nonconforming software, at Contractor/Lessor's option. Contractor/Lessor warrants that replacement of repaired equipment and/or software furnished hereunder will be in accordance with current industry standards and that all labor will be in accordance with industry standards.

c. Warranty Coverage and Term. Any ROVR System, software, electrical, electronic, and mechanical or system malfunction shall be corrected, replaced, or repaired promptly by Contractor/Lessor. The Warranty shall extend for the full term of the lease, including all lease extensions.

d. Repairs. Contractor/Lessor shall be responsible for all costs associated with the repair of components and/or subsystems, the shipping charges to and from Contractor/Lessor's repair facilities, and the costs associated with their re-installation. Contractor/Lessor shall be responsible for meeting with SFO to determine the schedule of repairs. Contractor/Lessor may perform, at its option, the required repairs. The cost of necessary personnel, tools and materials shall be borne solely by Contractor/Lessor. Contractor/Lessor shall provide on-site personnel to support SFO with preventive and troubleshooting maintenance for a period of 120 days after system acceptance. "Troubleshooting" means power, connectivity, and supporting infrastructure; field repair, remove and replace defective parts, returning the ROVR SYSTEM to service.

14. Enjoyment of the ROVR System. Provided that and so long as the City is not in default under this Lease, Contractor/Lessor hereby covenants to provide the City during the Lease Term with quiet use and enjoyment of the ROVR System, and the City shall during the Lease Term peaceably and quietly have and hold and enjoy the ROVR System, without suit, trouble or hindrance from Contractor/Lessor, except as expressly set forth in this Lease. Any assignee of Contractor/Lessor shall not interfere with the City's quiet use and enjoyment during the Lease Term so long as the City is not in default pursuant to this Lease.

15. Title to the ROVR System. Title to the ROVR System and any and all additions, repairs, replacements or modifications thereto shall be held in the name of Contractor/Lessor, and the City shall have no right, title or interest in the ROVR System or any additions, repairs, replacements or modifications thereto except to the extent the City elects to purchase the ROVR System.

16. Liability for Damage to ROVR System. It is understood and agreed that the City is responsible for loss of or damage to any Contractor/Lessor owned ROVR System involved, only as caused by the negligent or wrongful actions of City's officers, agents and employees.

17. Contractor/Lessor's Default. Failure or refusal of Contractor/Lessor to perform or do any act herein required shall constitute a default. In the event of any default, in addition to any other remedy available to the City, this Contract may be terminated by the City upon ten days' written notice. Such termination does not waive any other legal remedies available to the City.

18. Taxes. The City will only pay California sales and use taxes. The Contractor/Lessor is to add California sales and use taxes to the monthly payment and the tax must be properly identified on each monthly invoice. Any other taxes presently in effect which may be levied upon this Agreement, the transaction, or the ROVR System or services delivered pursuant hereto shall be borne by the Contractor/Lessor. The Contractor/Lessor will be responsible for all property taxes. In the event any taxes or charges are enacted after the date of execution of this Lease Agreement, those taxes or charges shall be borne as mutually agreed. The Contractor/Lessor will indemnify and hold City harmless from any fines, penalties or interest thereon imposed during the Lease term or in connection with termination of the lease by any federal, State or local government or taxing authority. The taxes covered by this Section shall only include those attributable to the ROVR System. Under no circumstances will the City pay any taxes imposed on, based on, or measured by the net income of the Contractor/Lessor.

19. Assignment. Notwithstanding any other provision in this lease, in no event shall all or any portion of this lease be assigned without the prior written approval of Purchasing and the City Attorney. Furthermore, in no event shall Contractor/Lessor effect a public offering of certificates of participation, municipal securities or other debt instruments presenting fractionalized interests in this lease. For purposes of this Section, a public offering shall occur when the certificates of participation, municipal securities or other debt instruments are either: (a) offered or sold to more than twenty investors; or, (b) offered or sold in denominations of less than $10,000.

Appendix C

Payment and Project Schedule and Progress Reports

I. OVERVIEW

The work described in Appendix A to this Agreement shall proceed in three phases, as follows:

Phase I	System Design and Documentation
Phase II	Development, Procurement and Installation
Phase III	Transition, System Testing and Acceptance

Consistent with CDRL 16, TransCore shall provide the City with a project schedule within ten (10) days of the Notice to Proceed. The project schedule shall be updated at the following intervals:

- Completion of the Preliminary Design Review;
- Completion of the Final Design Review; and
- Within 24 hours of TransCore's discovery that the deadline for completion of tasks in the then-existing project schedule will not be met.

II. Schedule and Progress Reports

A. Project Schedule. The Project Schedule is set forth herein and may be amended by mutual agreement between City and Contractor.

1. **Delays.** Contractor agrees that if slippage occurs, it will assign additional qualified personnel to the project.

2. **Time of the Essence.** The parties agree that time is of the essence, and that the System will be developed and implemented in accordance with the Project Schedule.

3. **Infrastructure Schedule.** It is agreed that the NEW SYSTEM project schedule (8841R) set forth herein is contingent upon the Infrastructure Project Schedule, which will be the subject of a separate contract with a different contractor (Contract 9111A). Any additional time added or delays to the Infrastructure Schedule (9111A) shall result in a corresponding calendar day for calendar day increase to the NEW SYSTEM Project Schedule (8841R) set forth herein. However, in no event will the City make any additional payments to Contractor as a result of delays occasioned by the contractor selected to perform the infrastructure work.

4. **Beneficial Use**. No later than four (4) weeks after installation is complete, the Contractor shall deliver to the City the new integrated GTMS/TMS ("NEW SYSTEM") replacing the functions of the existing and separate ("EXISTING SYSTEM") and allowing transition of currently supported day-to-day operations and functions of the EXISTING SYSTEM to the NEW SYSTEM. The delivery of the NEW SYSTEM includes placing the NEW SYSTEM into revenue collection service. The NEW SYSTEM will be used by City staff to perform daily operations and functions such as account management and taxi fee collection. The EXISTING SYSTEM data will be maintained for 19 months following this schedule milestone to allow access to historical account and transaction data. No payment for completion of Phase 2 Milestone 15 Existing Location Installation (Stage 2) shall be made by the City until the conditions listed here are met and approved in writing by Airport Project manager.

B. **Progress Reports.** Contractor will provide City with weekly written status reports advising the City of its progress.

Payment Schedule (Updated August 14, 2012)

Estimated Invoice Date	Milestone ID	Pay Item Description	Notes/Comments	% of Price	Amount
		Phase 1			
Tue 9/4/12	1	Mobilization	Invoiced 4 weeks after NTP	5%	396,011
Tue 9/4/12	2	CDRL 15 - Project Management Program Plan	-	2%	158,405
Tue 9/18/12	3	Infrastructure Requirements	-	3%	237,607
Tue 10/2/12	4	Hardware Drawing Package	-	5%	396,011
Tue 10/30/12	5	Conceptual Design	-	5%	396,011
Tue 12/25/12	6	GTMS/TMS Servers	-	5%	396,011
Tue 1/15/13	7	Preliminary Design	-	5%	396,011
Tue 3/12/13	8	Final Design	-	5%	396,011
Thu 3/28/13	9	GTMS/TMS Solution Development (Sprint 1-5)	-	5%	396,011
			Phase 1 Subtotal	40%	$ 2,168,091
		Phase 2			
Tue 5/21/13	10	AVM Installation	-	3%	237,607
Wed 6/19/13	11	CID Installation	-	2%	158,405
Fri 8/30/13	12	DMS/VSS Installation	-	5%	396,011
Thu 10/24/13	13	GTMS/TMS Solution Development (Sprint 6-12)	-	5%	396,011
Tue 11/26/13	14	New Location Installation (Stage 1)	-	5%	396,011
Wed 1/22/14	15	Existing Location Installation (Stage 2)	-	10%	792,023
			Phase 2 Subtotal	30%	$ 2,376,068
		Phase 3			
Wed 1/29/14	16	LPR Testing	-	2%	158,405
Mon 2/3/14	17	CID Testing	-	2%	158,405
Wed 2/12/14	18	AVM Testing	-	1%	79,202
Wed 2/12/14	19	Reader/Antenna Testing	-	1%	79,202
Wed 2/26/14	20	GTMS Application Testing	-	1%	79,202
Wed 4/2/14	21	TMS Application Testing	-	1%	79,202
Fri 4/18/14	22	GPS Capability Testing	-	1%	79,202
Wed 4/30/14	23	GTMS/TMS Web Portal Testing	-	1%	79,202
Wed 5/28/14	24	System Acceptance	-	20%	1,584,045
			Phase 3 Subtotal	30%	$ 2,376,068
			Total	100%	$ 7,920,227

JPMorgan Chase Bank, N.A.
Global Trade Services
131 South Dearborn, 5th Floor
Mail Code: IL1-0236
Chicago, IL 60603-5506

OCT 17, 2012
OUR L/C NO.: CPCS-375157

AIRPORT COMMISSION
CITY AND COUNTY OF SAN FRANCISCO
ATTN: DEPUTY DIRECTOR, AIRPORT OPERATIONS
SAN FRANCISCO INTERNATIONAL AIRPORT
INTERNATIONAL TERMINAL, NO. SHOULDER BLDG., 5
SAN FRANCISCO, CA 94128

LADIES AND GENTLEMEN:

WE HEREBY ESTABLISH AN IRREVOCABLE LETTER OF CREDIT IN FAVOR OF THE CITY AND COUNTY OF SAN FRANCISCO ("CCSF") BY AND THROUGH ITS AIRPORT COMMISSION IN THE AMOUNT OF THREE MILLION UNITED STATES DOLLARS (USD3,000,000.00) FOR THE ACCOUNT OF TRANSCORE LP, 8158 ADAMS DRIVE, LIBERTY CENTRE - BLDG. 200, HUMMELSTOWN, PA 17036 ("ACCOUNT PARTY"), AVAILABLE BY YOUR DRAFT AT SIGHT, WHEN ACCOMPANIED BY THE FOLLOWING DOCUMENTS:

1) A COPY OF AGREEMENT BETWEEN THE CITY AND COUNTY OF SAN FRANCISCO AND TRANSCORE LP, CONTRACT NO. 8841R; AND

2) A DATED STATEMENT SIGNED BY THE AIRPORT DIRECTOR OF THE AIRPORT COMMISSION OF THE CITY AND COUNTY OF SAN FRANCISCO, OR HIS/HER DESIGNEE (SIGNED AS SUCH), STATING ANY OF THE FOLLOWING EVENTS HAS OCCURRED OR IS CONTINUING:

A) TRANSCORE LP ("ACCOUNT PARTY") HAS DEFAULTED UNDER THE ONE OR MORE AGREEMENTS WITH THE CITY AND COUNTY OF SAN FRANCISCO, ACTING BY AND THROUGH ITS AIRPORT COMMISSION AT SAN FRANCISCO INTERNATIONAL AIRPORT; OR

B) TRANSCORE LP ("ACCOUNT PARTY") HAS BECOME INSOLVENT, OR HAS TAKEN THE BENEFIT OF ANY PRESENT OR FUTURE INSOLVENCY STATUTE, OR HAS MADE A GENERAL ASSIGNMENT FOR THE BENEFIT OF CREDITORS, OR HAS FILED A VOLUNTARY PETITION IN BANKRUPTCY, OR A PETITION OR ANSWER SEEKING AN ARRANGEMENT FOR ITS REORGANIZATION, OR THE READJUSTMENT OF ITS INDEBTEDNESS UNDER THE FEDERAL BANKRUPTCY LAWS, OR UNDER ANY OTHER LAW OR STATUTE OF THE UNITED STATES OR ANY STATE THEREOF, OR ANY JURISDICTION AVAILABLE TO ACCOUNT PARTY, OR HAS CONSENTED TO THE APPOINTMENT OF A RECEIVER, TRUSTEE, OR LIQUIDATOR OF ANY OR SUBSTANTIALLY ALL OF ITS PROPERTY; OR

App. D

JPMorgan Chase Bank, N.A.
Global Trade Services
131 South Dearborn, 5th Floor
Mail Code: IL1-0236
Chicago, IL 60603-5506

OCT 17, 2012
OUR L/C NO.: CPCS-375157

C) A PETITION UNDER ANY OF THE FEDERAL BANKRUPTCY LAWS OR AN ACTION UNDER ANY INSOLVENCY LAW OR STATUTE HAS BEEN FILED AGAINST TRANSCORE LP ("ACCOUNT PARTY"); OR

D) THIS LETTER OF CREDIT IS EXPIRING AND CITY HAS NOT RECEIVED AN EXTENSION OR ACCEPTABLE REPLACEMENT LETTER OF CREDIT OR BOND AT LEAST 30 DAYS PRIOR TO THE EXPIRATION DATE.

SUCH STATEMENT SHALL BE PREFACED WITH THE FOLLOWING: "WE HEREBY DEMAND USD..... UNDER JPMORGAN CHASE BANK, N.A., LETTER OF CREDIT NO. CPCS-375157," AND SHALL THEN LIST ALL OF THE APPLICABLE CONDITIONS (A-D) SET FORTH ABOVE.

DRAFTS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS AND CONDITIONS OF THIS LETTER OF CREDIT WILL BE DULY HONORED BY US UPON PRESENTATION AND DELIVERY OF THE DRAFT AND STATEMENT SPECIFIED ABOVE. PARTIAL DRAWS ARE PERMITTED. SUCH DRAFTS MAY BE PRESENTED IN PERSON OR BY REGISTERED MAIL, OVERNIGHT MAIL, OVERNIGHT COURIER SERVICE, OR OTHER COURIER SERVICE SENT TO OUR OFFICES AT: 131 SOUTH DEARBORN STREET, 5TH FLOOR, MAIL CODE IL1-0236, CHICAGO, IL 60603-5506, ATTN: STANDBY LC UNIT.

THIS LETTER OF CREDIT SHALL REMAIN IN FULL FORCE AND EFFECT UNTIL OCTOBER 31, 2015. THE EXPIRATION DATE SHALL THEN AUTOMATICALLY EXTEND WITHOUT AMENDMENT IN ONE (1) YEAR INCREMENTS UNLESS JPMORGAN CHASE BANK, N.A. ELECTS NOT TO EXTEND THIS LETTER OF CREDIT. IN THAT EVENT, JPMORGAN CHASE BANK, N.A. SHALL SEND NOTICE TO THE AIRPORT COMMISSION AT LEAST SIXTY (60) CALENDAR DAYS PRIOR TO SUCH EXPIRATION DATE THAT JPMORGAN CHASE BANK, N.A. SHALL NOT EXTEND THIS LETTER OF CREDIT. SUCH NOTICE IS NOT EFFECTIVE UNLESS SENT BY CERTIFIED MAIL OR HAND DELIVERED COURIER, AT THE ADDRESS STATED ABOVE. UPON RECEIPT OF SUCH NOTICE THE AIRPORT COMMISSION OF THE CITY AND COUNTY OF SAN FRANCISCO MAY DRAW UNDER THIS LETTER OF CREDIT BY PRESENTATION OF THE SIGHT DRAFT, AS SPECIFIED ABOVE.

THIS LETTER OF CREDIT IS GOVERNED BY THE INTERNATIONAL STANDBY PRACTICES, ICC PUBLICATION NO. 590 (THE "ISP98"), AND THE LAWS OF THE STATE OF CALIFORNIA. IN THE EVENT OF ANY CONFLICT, THE LAWS OF THE STATE OF CALIFORNIA WILL CONTROL.

JPMorgan Chase Bank, N.A.
Global Trade Services
131 South Dearborn, 5th Floor
Mail Code: IL1-0236
Chicago, IL 60603-5506

OCT 17, 2012
OUR L/C NO.: CPCS-375157

PLEASE ADDRESS ALL CORRESPONDENCE REGARDING THIS LETTER OF CREDIT TO THE ATTENTION OF THE STANDBY LETTER OF CREDIT UNIT, 131 SOUTH DEARBORN, 5TH FLOOR, MAIL CODE IL1-0236, CHICAGO, IL 60603-5506, INCLUDING THE LETTER OF CREDIT NUMBER MENTIONED ABOVE. FOR TELEPHONE ASSISTANCE, PLEASE CONTACT THE STANDBY CLIENT SERVICE UNIT AT 1-800-634-1969, SELECT OPTION 1, OR 1-312-385-7910, AND HAVE THIS LETTER OF CREDIT NUMBER AVAILABLE.

Catherine M Moreno
AUTHORIZED SIGNATURE

BOND NO. 09038801

Appendix E
Performance Bond

KNOW ALL BY THESE PRESENTS, that WHEREAS, the Airport Commission of the City and County of San Francisco, State of California, has awarded to: TransCore, LP hereinafter designated as the "Principal," a Contract by RESOLUTION NO.12-0188, adopted on August 28, 2012 for: Seven Million, Nine Hundred and Twenty Thousand, Two Hundred and Twenty-Seven Dollars ($7,920,227).

San Francisco International Airport Contract No. 8841R

WHEREAS, said Principal is required under the terms of said Contract to furnish a Bond for the faithful performance of said Contract;

NOW, THEREFORE, we the Principal and

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

as Surety, are firmly bound unto the City and County of San Francisco in the penal sum of Four Million Nine Hundred Twenty Thousand dollars Two hundred Twenty Seven **($4,920,227)**

lawful money of the United States for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents for a performance bond and an equal and separate penal sum for a separate payment bond. The conditions of this obligation is such that if the said principal does well and faithfully performs all the conditions and covenants of said Contract, according to the true intent and meaning thereof, upon its part to be kept and performed, then the above obligation is to be null and void, otherwise to remain in full force and effect.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the above bounden Principal, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract, including the provisions for liquidated damages in the said Contract, any changes, additions or alterations thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City and County of San Francisco, its officers and agents, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their seal this 7 TH day of SEPTEMBER, 20 12, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Approved as to form:
Dennis J. Herrera
City Attorney

By: _____
Deputy City Attorney

TRANSCORE, LP

Principal

By: _____
Russell L. Reeser, Vice President

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

Surety

By: _____
JANICE H. FENNELL, ATTORNEY-IN-FACT

END OF DOCUMENT

Power of Attorney
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

KNOW ALL MEN BY THESE PRESENTS: That the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, a corporation of the State of Maryland, by FRANK E. MARTIN JR., Vice President, and ERIC D. BARNES, Assistant Secretary, in pursuance of authority granted by Article VI, Section 2, of the By-Laws of said Company, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, does hereby nominate, constitute and appoint **Richard C. ROSE, Jeremy C. ROSE and Janice H. FENNELL, all of Knoxville, Tennessee, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Company, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its office in Baltimore, Md., in their own proper persons.

The said Assistant Secretary does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article VI, Section 2, of the By-Laws of said Company, and is now in force.

IN WITNESS WHEREOF, the said Vice-President and Assistant Secretary have hereunto subscribed their names and affixed the Corporate Seal of the said FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 27th day of January, A.D. 2012.

ATTEST: **FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

By:

Eric D. Barnes *Assistant Secretary* *Frank E. Martin Jr.* *Vice President*

State of Maryland }
City of Baltimore } ss:

On this 27th day of January, A.D. 2012, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came FRANK E. MARTIN JR., Vice President, and ERIC D. BARNES, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself deposeth and saith, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and that the said Corporate Seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Maria D. Adamski *Notary Public*
My Commission Expires: July 8, 2015

EXTRACT FROM BY-LAWS OF FIDELITY AND DEPOSIT COMPANY OF MARYLAND

"Article VI, Section 2. The Chairman of the Board, or the President, or any Executive Vice-President, or any of the Senior Vice-Presidents or Vice-Presidents specially authorized so to do by the Board of Directors or by the Executive Committee, shall have power, by and with the concurrence of the Secretary or any one of the Assistant Secretaries, to appoint Resident Vice-Presidents, Assistant Vice-Presidents and Attorneys-in-Fact as the business of the Company may require, or to authorize any person or persons to execute on behalf of the Company any bonds, undertaking, recognizances, stipulations, policies, contracts, agreements, deeds, and releases and assignments of judgements, decrees, mortgages and instruments in the nature of mortgages,...and to affix the seal of the Company thereto."

CERTIFICATE

I, the undersigned, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that the Vice-President who executed the said Power of Attorney was one of the additional Vice-Presidents specially authorized by the Board of Directors to appoint any Attorney-in-Fact as provided in Article VI, Section 2, of the By-Laws of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed."

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said Company,

this 7TH day of SEPTEMBER, 2012.

Gerald F Haley

Assistant Secretary

City and County of San Francisco
Airport Commission
P. O. Box 8097
San Francisco, California 94128

Software and Equipment Maintenance Agreement
Contract 9266

TransCore, LP

This Software and Equipment Maintenance Agreement ("Agreement") is made this [insert date] between the City and County of San Francisco ("City"), acting by and through its Airport Commission or the Commission's designated agent ("Commission") and **TransCore, LP** ("Contractor").

WHEREAS, a Request for Proposal ("RFP") was issued on June 24, 2011, and City selected Contractor as the highest qualified scorer pursuant to the RFP; and

WHEREAS, Commission awarded this contract to Contractor on [insert date], pursuant to Resolution No. [insert resolution number]; and

WHEREAS, Contractor represents and warrants that it is qualified to perform the services required by City as set forth under this Contract; and,

WHEREAS, Commission is authorized to enter into all contracts which relate to matters under its jurisdiction; and

WHEREAS, approval for this Agreement was obtained when the Civil Service Commission approved Contract number PSC No. 4099-10/11 on April 18, 2011;

WHEREAS, Commission in Resolution No. 12-XXXX further authorized the Airport Director to enter into a 5-year maintenance agreement ("Maintenance Agreement") with Contractor at previously negotiated pricing of Two Hundred Forty-Eight Thousand Nine Hundred Seventy-Three Dollars ($248,973) per year; and

WHEREAS, the warranty period having expired, Commission now desires to enter into said Maintenance Agreement; and

Now, THEREFORE, the parties agree as follows:

1. Definitions. Where any word or phrase defined below, or a pronoun used in place thereof, is used in any part of this Agreement, it shall have the meaning herein set forth.

Effective Date	Date upon which the Controller has certified to the availability of funds and the Contractor has been notified in writing or the Software is received and installed at the customer site, whichever is later.
Errors, Defects and Malfunctions	Either a deviation between the function of the Software and the documentation furnished by Contractor for the Software, or a failure of the Software which degrades the use of the Software.

Fix	Repair or replacement of source, object or executable code in the Software to remedy an Error, Defect or Malfunction.
Maintenance Agreement	This Software and Equipment Maintenance Agreement and [list Appendices] which together specify the terms and conditions for the correction of software Errors, Defects and Malfunctions in the Software, for the provision of Upgrades to the Software, and for the provision of Support Services to end users of the Software.
Patch	Temporary repair or replacement of code in the Software to remedy an Error, Defect or Malfunction. Patches may be made permanent and released in Subsequent Releases of the Software.
Priority Category	A priority assigned to an Error, Defect or Malfunction, designating the urgency of correcting an Error, Defect or Malfunction. Assignment of a Priority Category to an Error, Defect or Malfunction is based on City's determination of the severity of the Error, Defect or Malfunction and Contractor's reasonable analysis of the priority of the Error, Defect or Malfunction.
Priority Protocol	Based on the Priority Category, rules specifying the turnaround time for correcting Errors, Malfunctions and Defects; escalation procedures, and personnel assignment.
Software	Licensed programs and associated documentation licensed to City by [insert name of Licensor], as listed in Appendix A [insert the following if upgrades will be required] and any modification or Upgrades or modifications to the program(s) provided under this Maintenance Agreement.
Subsequent Release	A release of the Software for use in a particular operating environment which supersedes the Software. A Subsequent Release is offered and expressly designated by Contractor as a replacement to a specified Software product. A Subsequent Release will be supported by Contractor in accordance with the terms of this Software Maintenance Agreement. Multiple Subsequent Releases may be supported by Contractor at any given time.
Support Services	The Software support service required under this Maintenance Agreement. Support Services include correcting an Error, Defect or Malfunction; providing telephone and/or online support concerning the installation and use of the Software; training in the installation and use of the Software; on-site consulting and application development services; detection, warning and correction of viruses; and disabled/disabling code.
Upgrade	Either an enhancement to the Software code to add new features or functions to the system or software programming revisions containing corrections to Errors, Defects and Malfunctions that have been reported by users or discovered by the Contractor.
Warranty Period	A period commencing with the installation of the Software product during which reported Errors, Defects and Malfunctions for Software products are corrected without charge in accordance with the provisions below.

Workaround	A change in the procedures followed or end user operation of the software to avoid an Error, Defect or Malfunction without significantly impairing functionality or degrading the use of the Software.

Whenever the words "as directed," "as required," "as permitted," or words of like effect are used, it shall be understood as the direction, requirement, or permission of the Airport Commission. The words "sufficient," "necessary," or "proper," and the like, mean sufficient, necessary or proper in the judgment of the Airport Commission, unless otherwise indicated by the context.

2. Certification of Funds; Budget and Fiscal Provisions; Termination in the Event of Non-Appropriation. This Maintenance Agreement is subject to the budget and fiscal provisions of the City's Charter. Charges will accrue only after prior written authorization certified by the City's Controller, and any amount of the City's obligation hereunder shall not at any time exceed the amount certified for the purpose and period stated in such advance authorization. This Maintenance Agreement will terminate without penalty, liability or expense of any kind to City at the end of any fiscal year in the event funds are not appropriated for the next succeeding fiscal year. If funds are appropriated for a portion of the fiscal year, this Maintenance Agreement will terminate, without penalty, liability or expense of any kind at the end of the term for which funds are appropriated.

THIS SECTION SHALL CONTROL AGAINST ANY AND ALL OTHER PROVISIONS OF THIS MAINTENANCE AGREEMENT.

3. Term of the Maintenance Agreement. Subject to Section 2, the term of this Maintenance Agreement shall be from **[insert beginning date]** to **[insert termination date]**.

4. Effective Date of Agreement. This Agreement shall become effective when the Controller has certified to the availability of funds and Contractor has been notified in writing.

5. Services Contractor Agrees to Perform. The Contractor agrees to perform the services provided for in Appendix A, "Description of Services," attached hereto and incorporated by reference as though fully set forth herein. If Appendix A includes as-needed services, such services shall be requested by City through the issuance of a written task order signed by City and Contractor, which task order shall be made a part of and incorporated into the Agreement as though fully set forth herein without the need for a formal amendment to the Agreement. The task order shall include a description of the as-needed services, the deliverables, schedule for performance, cost, and method and timing of payment.

6. City's Payment Obligation. The City will make a good faith attempt to pay all invoices within 30 days of billing. However, in no event shall City be liable for interest or late charges for any late payments made after such 30 day period. Contractor and the City understand and intend that the obligations of the City to pay maintenance charges hereunder shall constitute a current expense of the City and shall not in any way be construed to be a debt of the City in contravention of any applicable constitutional or statutory limitations or requirements concerning the creation of indebtedness by the City, nor shall anything contained herein constitute a pledge of the general tax revenues, funds or monies of the City. The City shall pay maintenance charges, exclusively from legally available funds, to Contractor or, in the event of an authorized assignment by Contractor to its assignee, according to the terms of this Maintenance Agreement, upon presentation of invoices furnished by Contractor in a form acceptable to the Controller. Payments will be made by warrant drawn on the Treasurer of the City. In no event shall the amount of this Maintenance Agreement exceed **the previously negotiated price of Two Hundred Forty-Eight Thousand Nine Hundred Seventy-Three Dollars ($248,973) per year**. The breakdown of costs associated with this Maintenance Agreement appears in Appendix B, "Calculation of Charges," attached hereto and incorporated by reference as though fully set forth herein.

7. No Automatic Renewal. Notwithstanding anything to the contrary contained in this Agreement (including, without limitation, any terms and conditions of Contractor attached hereto): (a) in no event shall the term of this Agreement be longer than the initial term expressly stated in this Agreement; (b) any automatic renewal or extension (whether or not conditioned upon any notice or absence thereof from either party) or any similar "evergreen" provision shall be deemed null and void ab initio; and (c) the term of this Agreement shall not be extended or renewed except by written agreement duly authorized, executed and delivered by City. In the event of any inconsistency within this Agreement relating to the duration of the initial term hereof, the shorter initial term shall govern. If no initial term is stated in this Agreement, then the term shall be one year from the date on which the term commences.

8. Guaranteed Maximum Costs. The City's obligation hereunder shall not at any time exceed the amount certified by the Controller for the purpose and period stated in such certification. Except as may be provided by City ordinances governing emergency conditions, the City and its employees and officers are not authorized to request Contractor to perform services or to provide materials, equipment and supplies that would result in Contractor performing services or providing materials, equipment and supplies that are beyond the scope of the services, materials, equipment and supplies agreed upon in the contract unless the Maintenance Agreement is amended in writing and approved as required by law to authorize the additional services, materials, equipment or supplies. The City is not required to reimburse Contractor for services, materials, equipment or supplies that are provided by Contractor which are beyond the scope of the services, materials, equipment and supplies agreed upon in the contract and which were not approved by a written amendment to the Maintenance Agreement having been lawfully executed by the City. The City and its employees and officers are not authorized to offer or promise to Contractor additional funding for the contract which would exceed the maximum amount of funding provided for in the contract for Contractor's performance under the contract. Additional funding for the contract in excess of the maximum provided in the contract shall require lawful approval and certification by the Controller. The City is not required to honor any offered or promised additional funding for a contract which exceeds the maximum provided in the contract which requires lawful approval and certification of the Controller when the lawful approval and certification by the Controller has not been obtained. The Controller is not authorized to make payments on any contract for which funds have not been certified as available in the budget or by supplemental appropriation.

9. Payment; Invoice Format. Invoices furnished by Contractor under this Maintenance Agreement must be in a form acceptable to the Controller. Each invoice must contain a unique identifying number. All amounts paid by City to Contractor shall be subject to audit by City. Payment shall be made by City to Contractor at the address specified in the section entitled "Notices to the Parties." City may withhold payment to Contractor in any instance in which Contractor has failed or refused to satisfy any material obligation provided for under this Maintenance Agreement.

10. Submitting False Claims; Monetary Penalties. Pursuant to San Francisco Administrative Code §21.35, any contractor, subcontractor or consultant who submits a false claim shall be liable to the City for the statutory penalties set forth in that section. The text of Section 21.35, along with the entire San Francisco Administrative Code is available on the web at http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:sanfrancisco_ca. A contractor, subcontractor or consultant will be deemed to have submitted a false claim to the City if the contractor, subcontractor or consultant: (a) knowingly presents or causes to be presented to an officer or employee of the City a false claim or request for payment or approval; (b) knowingly makes, uses, or causes to be made or used a false record or statement to get a false claim paid or approved by the City; (c) conspires to defraud the City by getting a false claim allowed or paid by the City; (d) knowingly makes, uses, or causes to be made or used a false record or statement to conceal, avoid, or decrease an obligation to pay or transmit money or property to the City; or (e) is a beneficiary of an inadvertent

submission of a false claim to the City, subsequently discovers the falsity of the claim, and fails to disclose the false claim to the City within a reasonable time after discovery of the false claim.

11. Taxes. Payment of any taxes, including possessory interest taxes and California sales and use taxes, levied upon this Maintenance Agreement, the transaction, or the services delivered pursuant hereto, shall be the obligation of Contractor. If this Maintenance Agreement entitles Contractor to the possession, occupancy or use of City real property for private gain, then the following provisions apply:

a. Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that this Maintenance Agreement may create a possessory interest subject to property taxation and Contractor, and any permitted successor or assign, may be subject to the payment of such taxes.

b. Contractor, on behalf or itself and any permitted successors and assigns, further recognizes and understands that any assignment permitted hereunder and any exercise of any option to renew or other extension of this Maintenance Agreement may constitute a change in ownership for purposes of property taxation and therefore may result in a revaluation of any possessory interest created hereunder. Contractor shall report any assignment or other transfer of any interest in this Maintenance Agreement or any renewal or extension thereof to the County Assessor within sixty days after such assignment, transfer, renewal or extension.

c. Contractor further agrees to provide such other information as may be requested by the City to enable the City to comply with any reporting requirements under applicable law with respect to possessory interests.

12. Scope of Service Coverage

a. Contractor shall provide Support Services **[and provide Upgrades]** during the term of this Maintenance Agreement for the Software.

b. During the term of this Maintenance Agreement, Contractor will furnish Error, Defect or Malfunction correction in accordance with the Priority Categories listed below, based on the City's determination of the severity of the Error, Defect or Malfunction and Contractor's reasonable analysis of the priority of the Error, Defect or Malfunction.

1) Priority 1: An Error, Defect or Malfunction which renders the Software inoperative; or causes the Software to fail catastrophically.

2) Priority 2: An Error, Defect or Malfunction which substantially degrades the performance of the Software, but does not prohibit the City's use of the Software.

3) Priority 3: An Error, Defect or Malfunction which causes only a minor impact on the use of the Software.

c. Contractor will furnish Error, Defect or Malfunction correction in accordance with the following protocols:

1) Priority 1 Protocol: Within two hours, Contractor assigns a product technical specialist(s) to diagnose and correct the Error, Defect or Malfunction; thereafter, Contractor shall provide ongoing communication about the status of the correction; shall proceed to immediately provide a Fix, a Patch or a Workaround; and exercise all commercially reasonable efforts to include a Fix or Patch for the Error, Defect or Malfunction in the next Subsequent Release. Contractor will escalate resolution of the problem to personnel with successively higher levels of technical expertise until the Error, Defect or Malfunction is corrected.

2) Priority 2 Protocol: Within four hours, Contractor assigns a product technical specialist(s) to diagnose the Error, Defect or Malfunction and to commence correction of the Error, Defect or Malfunction; to immediately provide a Workaround; to provide escalation procedures as reasonably determined by Contractor's staff; and to exercise all commercially reasonable efforts to include a Fix or Patch for the Error, Defect or Malfunction in the next Software maintenance release.

3) Priority 3 Protocol: Contractor may include a Fix or Patch in the next Software major release.

13. Hotline Support. Contractor shall provide remote access hotline support to City to help City answer routine questions with respect to the use of the Software. Contractor also shall provide remote access hotline support to City to initiate resolution of Priority 1 and Priority 2 Errors, Defects and Malfunctions. Hotline support shall be made available by phone between the hours of 8 a.m. and 6 p.m. Pacific time Monday through Friday, except legal holidays. Hotline support shall be available by electronic bulletin board, electronic mail or other service 24-hours a day, seven-days a week. Responses to questions posted by electronic means will be made within the time frame established under Priority Protocols for an Error, Defect or Malfunction in a Software Product.

14. City Responsibilities Related to Support. City shall use reasonable efforts to make available to Contractor reasonable access to the equipment on which City experienced the Error, Defect or Malfunction, the Software Product and all relevant documentation and records. City shall also provide reasonable assistance to Contractor, including sample output and diagnostic information, in order to assist Contractor in providing Support Services. City shall be responsible for the interface between the Software and other software products installed on City equipment. Unless otherwise agreed in writing between City and Contractor, City is responsible for installing, managing and operating any Software delivered under this Maintenance Agreement.

15. Payment Does Not Imply Acceptance of Work. The granting of any payment by City, or the receipt thereof by Contractor, shall in no way lessen the liability of the Contractor to replace unsatisfactory work, equipment, or materials although the unsatisfactory character of such work, equipment or materials may not have been apparent or detected at the time such payment was made. Materials, equipment, components, or workmanship that did not conform to the requirements of this Maintenance Agreement may be rejected by City and in such case must be replaced by Contractor without delay.

16. Qualified Personnel. Work under this Maintenance Agreement shall be performed only be competent personnel under the supervision of and in the employment of Contractor. Contractor will comply with City's reasonable requests regarding assignment of personnel, but all personnel, including those assigned at City's request, must be supervised by Contractor. Contractor shall assign adequate personnel resources to provide the level of service within the response times specified in this Maintenance Agreement.

17. Responsibility for Equipment. City shall not be responsible for any damage to persons or property as a result of the use, misuse or failure of any equipment used by Contractor, or by any of its employees, even though such equipment be furnished, rented or loaned to Contractor by City.

18. Independent Contractor; Payment of Taxes and Other Expenses

a. **Independent Contractor.** Contractor or any agent or employee of Contractor shall be deemed at all times to be an independent contractor and is wholly responsible for the manner in which it performs the services and work requested by City under this Maintenance Agreement. Contractor or any agent or employee of Contractor shall not have employee status with City, nor be entitled to participate in any plans, arrangements, or distributions by City pertaining to or in connection with any retirement, health or other benefits that City may offer its employees. Contractor or any agent or employee of Contractor is liable for the acts and omissions of itself, its employees and its agents. Contractor shall be responsible for all obligations and payments, whether imposed by federal, state or local law, including, but not limited to, FICA, income tax withholdings, unemployment compensation, insurance, and other similar responsibilities related to Contractor's performing services and work, or any agent or employee of

Contractor providing same. Nothing in this Maintenance Agreement shall be construed as creating an employment or agency relationship between City and Contractor or any agent or employee of Contractor. Any terms in this Maintenance Agreement referring to direction from City shall be construed as providing for direction as to policy and the result of Contractor's work only, and not as to the means by which such a result is obtained. City does not retain the right to control the means or the method by which Contractor performs work under this Maintenance Agreement.

b. **Payment of Taxes and Other Expenses.** Should City, in its discretion, or a relevant taxing authority such as the Internal Revenue Service or the State Employment Development Division, or both, determine that Contractor is an employee for purposes of collection of any employment taxes, the amounts payable under this Maintenance Agreement shall be reduced by amounts equal to both the employee and employer portions of the tax due (and offsetting any credits for amounts already paid by Contractor which can be applied against this liability). City shall then forward those amounts to the relevant taxing authority. Should a relevant taxing authority determine a liability for past services performed by Contractor for City, upon notification of such fact by City, Contractor shall promptly remit such amount due or arrange with City to have the amount due withheld from future payments to Contractor under this Maintenance Agreement (again, offsetting any amounts already paid by Contractor which can be applied as a credit against such liability). A determination of employment status pursuant to the preceding two paragraphs shall be solely for the purposes of the particular tax in question, and for all other purposes of this Maintenance Agreement, Contractor shall not be considered an employee of City. Notwithstanding the foregoing, should any court, arbitrator, or administrative authority determine that Contractor is an employee for any other purpose, then Contractor agrees to a reduction in City's financial liability so that City's total expenses under this Maintenance Agreement are not greater than they would have been had the court, arbitrator, or administrative authority determined that Contractor was not an employee.

19. Insurance

a. Without in any way limiting Contractor's liability pursuant to the "Indemnification" section of this Agreement, Contractor must maintain in force, during the full term of the Agreement, insurance in the following amounts and coverages:

1) Workers' Compensation, in statutory amounts, with Employers' Liability Limits not less than $1,000,000 each accident, injury, or illness; and

2) Commercial General Liability Insurance with limits not less than $1,000,000 each occurrence Combined Single Limit for Bodily Injury and Property Damage, including Contractual Liability, Personal Injury, Products and Completed Operations; and

3) Commercial Automobile Liability Insurance with limits not less than $1,000,000 each occurrence Combined Single Limit for Bodily Injury and Property Damage, including Owned, Non-Owned and Hired auto coverage, as applicable.

b. Commercial General Liability and Commercial Automobile Liability Insurance policies must be endorsed to provide:

1) Name as Additional Insured the City and County of San Francisco, its Officers, Agents, and Employees.

2) That such policies are primary insurance to any other insurance available to the Additional Insureds, with respect to any claims arising out of this Agreement, and that insurance applies separately to each insured against whom claim is made or suit is brought.

c. Regarding Workers' Compensation, Contractor hereby agrees to waive subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City for all work performed by the Contractor, its employees, agents and subcontractors.

d. All policies shall provide ten days' advance written notice to the City of reduction or nonrenewal of coverages or cancellation of coverages for any reason. Notices shall be sent to the City address in the "Notices to the Parties" section.

e. Should any of the required insurance be provided under a claims-made form, Contractor shall maintain such coverage continuously throughout the term of this Agreement and, without lapse, for a period of three years beyond the expiration of this Agreement, to the effect that, should occurrences during the contract term give rise to claims made after expiration of the Agreement, such claims shall be covered by such claims-made policies.

f. Should any of the required insurance be provided under a form of coverage that includes a general annual aggregate limit or provides that claims investigation or legal defense costs be included in such general annual aggregate limit, such general annual aggregate limit shall be double the occurrence or claims limits specified above.

g. Should any required insurance lapse during the term of this Agreement, requests for payments originating after such lapse shall not be processed until the City receives satisfactory evidence of reinstated coverage as required by this Agreement, effective as of the lapse date. If insurance is not reinstated, the City may, at its sole option, terminate this Agreement effective on the date of such lapse of insurance.

h. Before commencing any operations under this Agreement, Contractor shall furnish to City certificates of insurance and additional insured policy endorsements with insurers with ratings comparable to A-, VIII or higher, that are authorized to do business in the State of California, and that are satisfactory to City, in form evidencing all coverages set forth above. Failure to maintain insurance shall constitute a material breach of this Agreement.

i. Approval of the insurance by City shall not relieve or decrease the liability of Contractor hereunder.

j. (Reserved)

20. Indemnification. Contractor shall indemnify and save harmless City and its officers, agents and employees from, and, if requested, shall defend them against any and all loss, cost, damage, injury, liability, and claims thereof for injury to or death of a person, including employees of Contractor or loss of or damage to property, arising directly or indirectly from Contractor's performance of this Maintenance Agreement, including, but not limited to, Contractor's use of facilities or equipment provided by City or others, regardless of the negligence of, and regardless of whether liability without fault is imposed or sought to be imposed on City, except to the extent that such indemnity is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Maintenance Agreement and except where such loss, damage, injury, liability or claim is the result of the active negligence or willful misconduct of City and is not contributed to by any act of, or by any omission to perform some duty imposed by law or agreement on Contractor, its sublicensors or either's agent or employee. The foregoing indemnity shall include, without limitation, reasonable fees of attorneys, consultants and experts and related costs and City's costs of investigating any claims against the City. In addition to Contractor's obligation to indemnify City, Contractor specifically acknowledges and agrees that it has an immediate and independent obligation to defend City from any claim which actually or potentially falls within this indemnification provision, even if the allegations are or may be groundless, false or fraudulent, which obligation arises at the time such claim is tendered to Contractor by City and continues at all times thereafter. Contractor shall indemnify and hold City harmless from all loss and liability, including attorney's fees, court costs and all other litigation expenses for any infringement of the patent rights, copyright, trade secret or any other proprietary right or trademark and all other intellectual property claims of any person or persons in consequence of the use by City, or any of its officers or agents, of articles or services to be supplied in the performance of this Maintenance Agreement.

21. Liability for Damage to Equipment. It is understood and agreed that the City is responsible for loss of or damage to any Contractor owned equipment involved, only as caused by the negligent or wrongful actions of City's officers, agents and employees.

22. Incidental and Consequential Damages. Contractor shall be responsible for incidental and consequential damages resulting in whole or in part from Contractor's acts or omissions. Nothing in this Agreement shall constitute a waiver or limitation of any rights that City may have under applicable law.

23. Liability of City. CITY'S PAYMENT OBLIGATIONS UNDER THIS MAINTENANCE AGREEMENT SHALL BE LIMITED TO THE PAYMENT OBLIGATION PROVIDED FOR IN SECTION 6 OF THIS MAINTENANCE AGREEMENT. NOTWITHSTANDING ANY OTHER PROVISION OF THIS MAINTENANCE AGREEMENT, IN NO EVENT SHALL CITY BE LIABLE, REGARDLESS OF WHETHER ANY CLAIM IS BASED ON CONTRACT OR TORT, FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, ARISING OUT OF OR IN CONNECTION WITH THIS MAINTENANCE AGREEMENT OR THE SERVICES PERFORMED IN CONNECTION WITH THIS MAINTENANCE AGREEMENT.

24. Provisions Controlling. Contractor agrees that in the event of conflicting language between this "Software Maintenance Agreement" and Contractor's printed form, the provisions of this "Software Maintenance Agreement" shall take precedence.

25. Default. Failure or refusal of Contractor to perform or do any act herein required shall constitute a default. In the event of any default, in addition to any other remedy available to the City, this Maintenance Agreement may be terminated by the City upon ten days' written notice. Such termination does not waive any other legal remedies available to the City.

26. Support Service Term and Termination for Convenience

a. **Commencement.** Support Services for the Software begin on the Effective Date for the Software.

b. **Termination for Cause.** In the event Contractor fails to perform any of its obligations under this Maintenance Agreement, this Maintenance Agreement may be terminated and all of Contractor's rights hereunder ended. Termination will be effective after ten days written notice to Contractor. In the event of such termination, Contractor will be paid for those services performed under this Maintenance Agreement to the satisfaction of the City, up to the date of termination. However, City may offset from any such amounts due Contractor any costs City has or will incur due to Contractor's non-performance. Any such offset by City will not constitute waiver of any other remedies City may have against Contractor for financial injury or otherwise.

c. **Termination for Convenience.** City shall have the option, in its sole discretion, to terminate this Maintenance Agreement, at any time during the term thereof, for City's convenience and without cause by giving Contractor thirty days written notice of such termination. In the event of such termination, Contractor will be paid for those services performed, pursuant to this Maintenance Agreement, to the satisfaction of the City up to the date of termination. In no event will City be liable for costs incurred by Contractor after receipt of notice of termination. Such non-recoverable costs include, but are not limited to, anticipated profits on this Maintenance Agreement, post-termination employee salaries, post-termination administrative expenses, or any other cost which is not authorized or reasonable under this section.

27. Rights and Duties Upon Termination or Expiration. This Section and the following Sections of the Maintenance Agreement shall survive termination or expiration of this Maintenance Agreement:

10. Submitting False Claims; Monetary Penalties
11. Taxes.
15. Payment Does Not Imply Acceptance of Work.
17. Responsibility for Equipment.
18. Independent Contractor; Payment of Taxes and Other Expenses
19. Insurance
20. Indemnification.
21 Liability for Damage to Equipment.
22 Incidental and Consequential Damages.
24. Provisions Controlling.
31. Audit and Inspection of Records.
33. Waiver.
34. Governing Law.
35. Subcontracting.
36. Assignment.
53. Entire Agreement; Modifications
55. Non-Waiver of Rights.
58. Protection of Private Information.

Subject to the immediately preceding sentence, upon termination of this Maintenance Agreement prior to expiration of the term specified in Section 3, this Maintenance Agreement shall terminate and be of no further force or effect. Contractor shall transfer title to City, and deliver in the manner, at the times, and to the extent, if any, directed by City, any work in progress, completed work, supplies, equipment, and other materials produced as a part of, or acquired in connection with the performance of this Maintenance Agreement, and any completed or partially completed work which, if the Maintenance Agreement had been completed, would have been required to be furnished to the City. This subsection shall survive termination of this Maintenance Agreement.

28. Conflict of Interest. Through its execution of this Maintenance Agreement, Contractor acknowledges that it is familiar with the provision of Section 15.103 of the City's Charter, Article III, Chapter 2 of the City's Campaign and Governmental Conduct Code, and Section 87100 et seq. and Section 1090 et seq. of the Government Code of the State of California, and certifies that it does not know of any facts which constitutes a violation of said provisions and agrees that it will immediately notify the City if it becomes aware of any such fact during the term of this Maintenance Agreement.

29. Proprietary or Confidential Information of City. Contractor understands and agrees that, in the performance of the work or services under this Maintenance Agreement or in contemplation thereof, Contractor may have access to private or confidential information which may be owned or controlled by City and that such information may contain proprietary or confidential details, the disclosure of which to third parties may be damaging to City. Contractor agrees that all information disclosed by City to Contractor shall be held in confidence and used only in performance of this Maintenance Agreement. Contractor shall exercise the same standard of care to protect such information as a reasonably prudent software developer would use to protect its own proprietary data.

30. Notices to Parties. Unless otherwise indicated elsewhere in this Maintenance Agreement, all written communications sent by the parties may be by U.S. mail, e-mail or fax, and shall be addressed as follows:

To City: Mr. Abubaker Azam, Assistant Deputy Director
San Francisco International Airport
PO Box 8097
San Francisco CA, 94128
Abubaker.Azam@flysfo.com

To Contractor: Mr. Chris Hall
TransCore, LP
9440 Carroll Park Drive, Suite 150

San Diego CA, 92121
Chris.Hall@transcore.com

Either party may change the address to which notice is to be sent by giving written notice thereof to the other party. If e-mail notification is used, the sender must specify a Receipt notice. Any notice of default must be sent by registered mail.

31. Audit and Inspection of Records. Contractor agrees to maintain and make available to the City, during regular business hours, accurate books and accounting records relating to its work under this Maintenance Agreement. Contractor will permit City to audit, examine and make excerpts and transcripts from such books and records, and to make audits of all invoices, materials, payrolls, records or personnel and other data related to all other matters covered by this Maintenance Agreement, whether funded in whole or in part under this Maintenance Agreement. Contractor shall maintain such data and records in an accessible location and condition for a period of not less than five years after final payment under this Maintenance Agreement or until after final audit has been resolved, whichever is later. The State of California or any federal agency having an interest in the subject of this Maintenance Agreement shall have the same rights conferred upon City by this Section.

32. Section Headings. All section headings contained herein are for convenience and reference only and are not intended to define or limit the scope of any provision of this Agreement.

33. Waiver. The waiver by either party of any breach by either party of any term, covenant or conditions hereof shall not operate as a waiver of any subsequent breach of the same or any other term, covenant or condition hereof.

34. Governing Law. This Agreement shall be governed exclusively by the provisions hereof and by the laws of the State of California. Venue for all litigation relative to the formation, interpretation and performance of this Maintenance Agreement shall be in San Francisco.

35. Subcontracting. Contractor is prohibited from subcontracting this Maintenance Agreement or any part of it unless such subcontracting is first approved by City in writing. Neither party shall, on the basis of this Maintenance Agreement, contract on behalf of or in the name of the other party. An agreement made in violation of this provision shall confer no rights on any party and shall be null and void.

36. Assignment. The services to be performed by Contractor are personal in character and neither this Maintenance Agreement nor any duties or obligations hereunder may be assigned or delegated by the Contractor unless first approved by City by written instrument executed and approved in the same manner as this Maintenance Agreement.

37. Limitations on Contributions. Through execution of this Agreement, Contractor acknowledges that it is familiar with section 1.126 of the City's Campaign and Governmental Conduct Code, which prohibits any person who contracts with the City for the rendition of personal services, for the furnishing of any material, supplies or equipment, for the sale or lease of any land or building, or for a grant, loan or loan guarantee, from making any campaign contribution to (1) an individual holding a City elective office if the contract must be approved by the individual, a board on which that individual serves, or the board of a state agency on which an appointee of that individual serves, (2) a candidate for the office held by such individual, or (3) a committee controlled by such individual, at any time from the commencement of negotiations for the contract until the later of either the termination of negotiations for such contract or six months after the date the contract is approved. Contractor acknowledges that the foregoing restriction applies only if the contract or a combination or series of contracts approved by the same individual or

board in a fiscal year have a total anticipated or actual value of $50,000 or more. Contractor further acknowledges that the prohibition on contributions applies to each prospective party to the contract; each member of Contractor's board of directors; Contractor's chairperson, chief executive officer, chief financial officer and chief operating officer; any person with an ownership interest of more than 20 percent in Contractor; any subcontractor listed in the bid or contract; and any committee that is sponsored or controlled by Contractor. Additionally, Contractor acknowledges that Contractor must inform each of the persons described in the preceding sentence of the prohibitions contained in Section 1.126. . Contractor further agrees to provide to City the names of each person, entity or committee described above.

38. Local Business Enterprise Utilization; Liquidated Damages

a. **The LBE Ordinance.** Contractor, shall comply with all the requirements of the Local Business Enterprise and Non-Discrimination in Contracting Ordinance set forth in Chapter 14B of the San Francisco Administrative Code as it now exists or as it may be amended in the future (collectively the "LBE Ordinance"), provided such amendments do not materially increase Contractor's obligations or liabilities, or materially diminish Contractor's rights, under this Agreement. Such provisions of the LBE Ordinance are incorporated by reference and made a part of this Agreement as though fully set forth in this section. Contractor's willful failure to comply with any applicable provisions of the LBE Ordinance is a material breach of Contractor's obligations under this Agreement and shall entitle City, subject to any applicable notice and cure provisions set forth in this Agreement, to exercise any of the remedies provided for under this Agreement, under the LBE Ordinance or otherwise available at law or in equity, which remedies shall be cumulative unless this Agreement expressly provides that any remedy is exclusive. In addition, Contractor shall comply fully with all other applicable local, state and federal laws prohibiting discrimination and requiring equal opportunity in contracting, including subcontracting.

b. **Compliance and Enforcement.** If Contractor willfully fails to comply with any of the provisions of the LBE Ordinance, the rules and regulations implementing the LBE Ordinance, or the provisions of this Agreement pertaining to LBE participation, Contractor shall be liable for liquidated damages in an amount equal to Contractor's net profit on this Agreement, or 10% of the total amount of this Agreement, or $1,000, whichever is greatest. The Director of the City's Human Rights Commission or any other public official authorized to enforce the LBE Ordinance (separately and collectively, the "Director of HRC") may also impose other sanctions against Contractor authorized in the LBE Ordinance, including declaring the Contractor to be irresponsible and ineligible to contract with the City for a period of up to five years or revocation of the Contractor's LBE certification. The Director of HRC will determine the sanctions to be imposed, including the amount of liquidated damages, after investigation pursuant to Administrative Code §14B.17. By entering into this Agreement, Contractor acknowledges and agrees that any liquidated damages assessed by the Director of the HRC shall be payable to City upon demand. Contractor further acknowledges and agrees that any liquidated damages assessed may be withheld from any monies due to Contractor on any contract with City. Contractor agrees to maintain records necessary for monitoring its compliance with the LBE Ordinance for a period of three years following termination or expiration of this Agreement, and shall make such records available for audit and inspection by the Director of HRC or the Controller upon request.

39. Nondiscrimination; Penalties

a. **Contractor Shall Not Discriminate.** In the performance of this Agreement, Contractor agrees not to discriminate against any employee, City and County employee working with such contractor or subcontractor, applicant for employment with such contractor or subcontractor, or against any person seeking accommodations, advantages, facilities, privileges, services, or membership in all business, social, or other establishments or organizations, on the basis of the fact or perception of a person's race, color, creed, religion, national origin, ancestry, age, height, weight, sex, sexual orientation, gender identity, domestic partner status, marital status, disability or Acquired Immune Deficiency Syndrome or

HIV status (AIDS/HIV status), or association with members of such protected classes, or in retaliation for opposition to discrimination against such classes.

b. **Subcontracts.** Contractor shall incorporate by reference in all subcontracts the provisions of Sections 12B.2(a), 12B.2(c)-(k), and 12C.3 of the San Francisco Administrative Code (copies of which are available from Purchasing) and shall require all subcontractors to comply with such provisions. Contractor's failure to comply with the obligations in this subsection shall constitute a material breach of this Agreement.

c. **Nondiscrimination in Benefits.** Contractor does not as of the date of this Agreement and will not during the term of this Agreement, in any of its operations in San Francisco, or where work is being performed for the City elsewhere in the United States, discriminate in the provision of bereavement leave, family medical leave, health benefits, membership or membership discounts, moving expenses, pension and retirement benefits or travel benefits, as well as any benefits other than the benefits specified above, between employees with domestic partners and employees with spouses, and/or between the domestic partners and spouses of such employees, where the domestic partnership has been registered with a governmental entity pursuant to state or local law authorizing such registration, subject to the conditions set forth in Section 12B.2(b) of the San Francisco Administrative Code.

d. **Condition to Contract.** As a condition to this Agreement, Contractor shall execute the "Chapter 12B Declaration: Nondiscrimination in Contracts and Benefits" form (form HRC-12B-101) with supporting documentation and secure the approval of the form by the San Francisco Human Rights Commission.

e. **Incorporation of Administrative Code Provisions by Reference.** The provisions of Chapters 12B and 12C of the San Francisco Administrative Code are incorporated in this Section by reference and made a part of this Agreement as though fully set forth herein. Contractor shall comply fully with and be bound by all of the provisions that apply to this Agreement under such Chapters of the Administrative Code, including but not limited to the remedies provided in such Chapters. Without limiting the foregoing, Contractor understands that pursuant to §§12B.2(h) and 12C.3(g) of the San Francisco Administrative Code, a penalty of $50 for each person for each calendar day during which such person was discriminated against in violation of the provisions of this Agreement may be assessed against Contractor and/or deducted from any payments due Contractor.

40. Earned Income Credit (EIC) Forms. Administrative Code section 12O requires that employers provide their employees with IRS Form W-5 (The Earned Income Credit Advance Payment Certificate) and the IRS EIC Schedule, as set forth below. Employers can locate these forms at the IRS Office, on the Internet, or anywhere that Federal Tax Forms can be found. Contractor shall provide EIC Forms to each Eligible Employee at each of the following times: (i) within thirty days following the date on which this Agreement becomes effective (unless Contractor has already provided such EIC Forms at least once during the calendar year in which such effective date falls); (ii) promptly after any Eligible Employee is hired by Contractor; and (iii) annually between January 1 and January 31 of each calendar year during the term of this Agreement. Failure to comply with any requirement contained in subparagraph (a) of this Section shall constitute a material breach by Contractor of the terms of this Agreement. If, within thirty days after Contractor receives written notice of such a breach, Contractor fails to cure such breach or, if such breach cannot reasonably be cured within such period of thirty days, Contractor fails to commence efforts to cure within such period or thereafter fails to diligently pursue such cure to completion, the City may pursue any rights or remedies available under this Agreement or under applicable law. Any Subcontract entered into by Contractor shall require the subcontractor to comply, as to the subcontractor's Eligible Employees, with each of the terms of this section. Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Section 12O of the San Francisco Administrative Code.

41. Requiring Minimum Compensation for Covered Employees

a. Contractor agrees to comply fully with and be bound by all of the provisions of the Minimum Compensation Ordinance (MCO), as set forth in San Francisco Administrative Code Chapter 12P (Chapter 12P), including the remedies provided, and implementing guidelines and rules. The provisions of Sections 12P.5 and 12P.5.1 of Chapter 12P are incorporated herein by reference and made a part of this Agreement as though fully set forth. The text of the MCO is available on the web at www.sfgov.org/olse/mco. A partial listing of some of Contractor's obligations under the MCO is set forth in this Section. Contractor is required to comply with all the provisions of the MCO, irrespective of the listing of obligations in this Section.

b. The MCO requires Contractor to pay Contractor's employees a minimum hourly gross compensation wage rate and to provide minimum compensated and uncompensated time off. The minimum wage rate may change from year to year and Contractor is obligated to keep informed of the then-current requirements. Any subcontract entered into by Contractor shall require the subcontractor to comply with the requirements of the MCO and shall contain contractual obligations substantially the same as those set forth in this Section. It is Contractor's obligation to ensure that any subcontractors of any tier under this Agreement comply with the requirements of the MCO. If any subcontractor under this Agreement fails to comply, City may pursue any of the remedies set forth in this Section against Contractor.

c. Contractor shall not take adverse action or otherwise discriminate against an employee or other person for the exercise or attempted exercise of rights under the MCO. Such actions, if taken within 90 days of the exercise or attempted exercise of such rights, will be rebuttably presumed to be retaliation prohibited by the MCO.

d. Contractor shall maintain employee and payroll records as required by the MCO. If Contractor fails to do so, it shall be presumed that the Contractor paid no more than the minimum wage required under State law.

e. The City is authorized to inspect Contractor's job sites and conduct interviews with employees and conduct audits of Contractor

f. Contractor's commitment to provide the Minimum Compensation is a material element of the City's consideration for this Agreement. The City in its sole discretion shall determine whether such a breach has occurred. The City and the public will suffer actual damage that will be impractical or extremely difficult to determine if the Contractor fails to comply with these requirements. Contractor agrees that the sums set forth in Section 12P.6.1 of the MCO as liquidated damages are not a penalty, but are reasonable estimates of the loss that the City and the public will incur for Contractor's noncompliance. The procedures governing the assessment of liquidated damages shall be those set forth in Section 12P.6.2 of Chapter 12P.

g. Contractor understands and agrees that if it fails to comply with the requirements of the MCO, the City shall have the right to pursue any rights or remedies available under Chapter 12P (including liquidated damages), under the terms of the contract, and under applicable law. If, within 30 days after receiving written notice of a breach of this Agreement for violating the MCO, Contractor fails to cure such breach or, if such breach cannot reasonably be cured within such period of 30 days, Contractor fails to commence efforts to cure within such period, or thereafter fails diligently to pursue such cure to completion, the City shall have the right to pursue any rights or remedies available under applicable law, including those set forth in Section 12P.6(c) of Chapter 12P. Each of these remedies shall be exercisable individually or in combination with any other rights or remedies available to the City.

h. Contractor represents and warrants that it is not an entity that was set up, or is being used, for the purpose of evading the intent of the MCO.

i. If Contractor is exempt from the MCO when this Agreement is executed because the cumulative amount of agreements with this department for the fiscal year is less than $25,000, but Contractor later enters into an agreement or agreements that cause contractor to exceed that amount in a fiscal year, Contractor shall thereafter be required to comply with the MCO under this Agreement. This

obligation arises on the effective date of the agreement that causes the cumulative amount of agreements between the Contractor and this department to exceed $25,000 in the fiscal year.

42. MacBride Principles—Northern Ireland. Pursuant to San Francisco Administrative Code §12F.5, the City and County of San Francisco urges companies doing business in Northern Ireland to move towards resolving employment inequities, and encourages such companies to abide by the MacBride Principles. The City and County of San Francisco urges San Francisco companies to do business with corporations that abide by the MacBride Principles. By signing below, the person executing this agreement on behalf of Contractor acknowledges and agrees that he or she has read and understood this section.

43. Requiring Health Benefits for Covered Employees. Contractor agrees to comply fully with and be bound by all of the provisions of the Health Care Accountability Ordinance (HCAO), as set forth in San Francisco Administrative Code Chapter 12Q, including the remedies provided, and implementing regulations, as the same may be amended from time to time. The provisions of section 12Q.5.1 of Chapter 12Q are incorporated by reference and made a part of this Agreement as though fully set forth herein. The text of the HCAO is available on the web at www.sfgov.org/olse. Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Chapter 12Q.

a. For each Covered Employee, Contractor shall provide the appropriate health benefit set forth in Section 12Q.3 of the HCAO. If Contractor chooses to offer the health plan option, such health plan shall meet the minimum standards set forth by the San Francisco Health Commission.

b. Notwithstanding the above, if the Contractor is a small business as defined in Section 12Q.3(e) of the HCAO, it shall have no obligation to comply with part (a) above.

c. Contractor's failure to comply with the HCAO shall constitute a material breach of this agreement. City shall notify Contractor if such a breach has occurred. If, within 30 days after receiving City's written notice of a breach of this Agreement for violating the HCAO, Contractor fails to cure such breach or, if such breach cannot reasonably be cured within such period of 30 days, Contractor fails to commence efforts to cure within such period, or thereafter fails diligently to pursue such cure to completion, City shall have the right to pursue the remedies set forth in 12Q.5.1 and 12Q.5(f)(1-6). Each of these remedies shall be exercisable individually or in combination with any other rights or remedies available to City.

d. Any Subcontract entered into by Contractor shall require the Subcontractor to comply with the requirements of the HCAO and shall contain contractual obligations substantially the same as those set forth in this Section. Contractor shall notify City's Office of Contract Administration when it enters into such a Subcontract and shall certify to the Office of Contract Administration that it has notified the Subcontractor of the obligations under the HCAO and has imposed the requirements of the HCAO on Subcontractor through the Subcontract. Each Contractor shall be responsible for its Subcontractors' compliance with this Chapter. If a Subcontractor fails to comply, the City may pursue the remedies set forth in this Section against Contractor based on the Subcontractor's failure to comply, provided that City has first provided Contractor with notice and an opportunity to obtain a cure of the violation.

e. Contractor shall not discharge, reduce in compensation, or otherwise discriminate against any employee for notifying City with regard to Contractor's noncompliance or anticipated noncompliance with the requirements of the HCAO, for opposing any practice proscribed by the HCAO, for participating in proceedings related to the HCAO, or for seeking to assert or enforce any rights under the HCAO by any lawful means.

f. Contractor represents and warrants that it is not an entity that was set up, or is being used, for the purpose of evading the intent of the HCAO.

g. Contractor shall maintain employee and payroll records in compliance with the California Labor Code and Industrial Welfare Commission orders, including the number of hours each employee has worked on the City Contract.

h. Contractor shall keep itself informed of the current requirements of the HCAO.

i. Contractor shall provide reports to the City in accordance with any reporting standards promulgated by the City under the HCAO, including reports on Subcontractors and Subtenants, as applicable.

j. Contractor shall provide City with access to records pertaining to compliance with HCAO after receiving a written request from City to do so and being provided at least ten business days to respond.

k. Contractor shall allow City to inspect Contractor's job sites and have access to Contractor's employees in order to monitor and determine compliance with HCAO.

l. City may conduct random audits of Contractor to ascertain its compliance with HCAO. Contractor agrees to cooperate with City when it conducts such audits.

m. If Contractor is exempt from the HCAO when this Agreement is executed because its amount is less than $25,000 ($50,000 for nonprofits), but Contractor later enters into an agreement or agreements that cause Contractor's aggregate amount of all agreements with City to reach $75,000, all the agreements shall be thereafter subject to the HCAO. This obligation arises on the effective date of the agreement that causes the cumulative amount of agreements between Contractor and the City to be equal to or greater than $75,000 in the fiscal year.

44. Tropical Hardwood and Virgin Redwood Ban. Pursuant to §804(b) of the San Francisco Environment Code, the City and County of San Francisco urges contractors not to import, purchase, obtain, or use for any purpose, any tropical hardwood, tropical hardwood wood product, virgin redwood or virgin redwood wood product.

45. Drug-Free Workplace. Contractor acknowledges that pursuant to the Federal Drug Free Workplace Act of 1989, the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited on City premises. Contractor agrees that any violation of this prohibition by the Contractor, its employees, agents or assigns shall be deemed a material breach of contract.

46. Compliance with Americans with Disabilities Act. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a contractor, must be accessible to the disabled public. Contractor shall provide the services specified in this Maintenance Agreement in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under this Maintenance Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns will constitute a material breach of this Maintenance Agreement.

47. Sunshine Ordinance. In accordance with Section 67.24(e) of the San Francisco Administrative Code, contracts, Contractors' bids, responses to RFPs and all other records of communications between City and persons or firms seeking contracts shall be open to inspection immediately after a contract has been awarded. Nothing in this provision requires the disclosure of a private person's or organization's net worth or other proprietary financial data submitted for qualification for a contract or other benefit until and unless that person or organization is awarded the contract or benefit. Information provided which is covered by this paragraph will be made available to the public upon request.

48. Public Access to Meetings and Records. If the Contractor receives a cumulative total per year of at least $250,000 in City funds or City-administered funds and is a non-profit organization as defined in Chapter 12L of the San Francisco Administrative Code, the Contractor shall comply with and be bound by all the applicable provisions of Chapter 12L. By executing this Agreement, the Contractor agrees to open its meetings and records to the public in the manner set forth in Sections 12L.4 and 12L.5 of the Administrative Code. The Contractor further agrees to make-good faith efforts to promote community membership on its Board of Directors in the manner set forth in Section 12L.6 of the Administrative Code. The Contractor acknowledges that its material failure to comply with any of the provisions of this paragraph shall constitute a material breach of this Agreement. The Contractor further acknowledges that such material breach of the Agreement shall be grounds for the City to terminate and/or not renew the Agreement, partially or in its entirety.

49. First Source Hiring Program

a. **Application of Administrative Code Provisions by Reference.** The provisions of Chapter 83 of the San Francisco Administrative Code apply to this Agreement. Contractor shall comply fully with, and be bound by, all of the provisions that apply to this Agreement under such Chapter, including but not limited to the remedies provided therein. Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Chapter 83.

b. **First Source Hiring Agreement.** As an essential term of, and consideration for, any contract or property contract with the City, not exempted by the FSHA, the Contractor shall enter into a first source hiring agreement ("agreement") with the City, on or before the effective date of the contract or property contract. Contractors shall also enter into an agreement with the City for any other work that it performs in the City. Such agreement shall:

1) Set appropriate hiring and retention goals for entry level positions. The employer shall agree to achieve these hiring and retention goals, or, if unable to achieve these goals, to establish good faith efforts as to its attempts to do so, as set forth in the agreement. The agreement shall take into consideration the employer's participation in existing job training, referral and/or brokerage programs. Within the discretion of the FSHA, subject to appropriate modifications, participation in such programs maybe certified as meeting the requirements of this Chapter. Failure either to achieve the specified goal, or to establish good faith efforts will constitute noncompliance and will subject the employer to the provisions of Section 83.10 of this Chapter.

2) Set first source interviewing, recruitment and hiring requirements, which will provide the San Francisco Workforce Development System with the first opportunity to provide qualified economically disadvantaged individuals for consideration for employment for entry level positions. Employers shall consider all applications of qualified economically disadvantaged individuals referred by the System for employment; provided however, if the employer utilizes nondiscriminatory screening criteria, the employer shall have the sole discretion to interview and/or hire individuals referred or certified by the San Francisco Workforce Development System as being qualified economically disadvantaged individuals. The duration of the first source interviewing requirement shall be determined by the FSHA and shall be set forth in each agreement, but shall not exceed 10 days. During that period, the employer may publicize the entry level positions in accordance with the agreement. A need for urgent or temporary hires must be evaluated, and appropriate provisions for such a situation must be made in the agreement.

3) Set appropriate requirements for providing notification of available entry level positions to the San Francisco Workforce Development System so that the System may train and refer an adequate pool of qualified economically disadvantaged individuals to participating employers. Notification should include such information as employment needs by occupational title, skills, and/or experience required, the hours required, wage scale and duration of employment, identification of entry level and training positions, identification of English language proficiency requirements, or absence thereof, and the projected schedule and procedures for hiring for each occupation. Employers should provide both long-term job need projections and notice before initiating the interviewing and hiring

process. These notification requirements will take into consideration any need to protect the employer's proprietary information.

4) Set appropriate record keeping and monitoring requirements. The First Source Hiring Administration shall develop easy-to-use forms and record keeping requirements for documenting compliance with the agreement. To the greatest extent possible, these requirements shall utilize the employer's existing record keeping systems, be nonduplicative, and facilitate a coordinated flow of information and referrals.

5) Establish guidelines for employer good faith efforts to comply with the first source hiring requirements of this Chapter. The FSHA will work with City departments to develop employer good faith effort requirements appropriate to the types of contracts and property contracts handled by each department. Employers shall appoint a liaison for dealing with the development and implementation of the employer's agreement. In the event that the FSHA finds that the employer under a City contract or property contract has taken actions primarily for the purpose of circumventing the requirements of this Chapter, that employer shall be subject to the sanctions set forth in Section 83.10 of this Chapter.

6) Set the term of the requirements.

7) Set appropriate enforcement and sanctioning standards consistent with this Chapter.

8) Set forth the City's obligations to develop training programs, job applicant referrals, technical assistance, and information systems that assist the employer in complying with this Chapter.

9) Require the developer to include notice of the requirements of this Chapter in leases, subleases, and other occupancy contracts.

c. **Hiring Decisions.** Contractor shall make the final determination of whether an Economically Disadvantaged Individual referred by the System is "qualified" for the position.

d. **Exceptions.** Upon application by Employer, the First Source Hiring Administration may grant an exception to any or all of the requirements of Chapter 83 in any situation where it concludes that compliance with this Chapter would cause economic hardship.

e. **Liquidated Damages.** Contractor agrees:

1) To be liable to the City for liquidated damages as provided in this section;

2) To be subject to the procedures governing enforcement of breaches of contracts based on violations of contract provisions required by this Chapter as set forth in this section;

3) That the contractor's commitment to comply with this Chapter is a material element of the City's consideration for this contract; that the failure of the contractor to comply with the contract provisions required by this Chapter will cause harm to the City and the public which is significant and substantial but extremely difficult to quantity; that the harm to the City includes not only the financial cost of funding public assistance programs but also the insidious but impossible to quantify harm that this community and its families suffer as a result of unemployment; and that the assessment of liquidated damages of up to $5,000 for every notice of a new hire for an entry level position improperly withheld by the contractor from the first source hiring process, as determined by the FSHA during its first investigation of a contractor, does not exceed a fair estimate of the financial and other damages that the City suffers as a result of the contractor's failure to comply with its first source referral contractual obligations.

4) That the continued failure by a contractor to comply with its first source referral contractual obligations will cause further significant and substantial harm to the City and the public, and that a second assessment of liquidated damages of up to $10,000 for each entry level position improperly withheld from the FSHA, from the time of the conclusion of the first investigation forward, does not exceed the financial and other damages that the City suffers as a result of the contractor's continued failure to comply with its first source referral contractual obligations;

5) That in addition to the cost of investigating alleged violations under this Section, the computation of liquidated damages for purposes of this section is based on the following data:

(a) The average length of stay on public assistance in San Francisco's County Adult Assistance Program is approximately 41 months at an average monthly grant of $348 per month, totaling approximately $14,379; and

(b) In 2004, the retention rate of adults placed in employment programs funded under the Workforce Investment Act for at least the first six months of employment was 84.4%. Since qualified individuals under the First Source program face far fewer barriers to employment than their counterparts in programs funded by the Workforce Investment Act, it is reasonable to conclude that the average length of employment for an individual whom the First Source Program refers to an employer and who is hired in an entry level position is at least one year;

Therefore, liquidated damages that total $5,000 for first violations and $10,000 for subsequent violations as determined by FSHA constitute a fair, reasonable, and conservative attempt to quantify the harm caused to the City by the failure of a contractor to comply with its first source referral contractual obligations.

6) That the failure of contractors to comply with this Chapter, except property contractors, may be subject to the debarment and monetary penalties set forth in Sections 6.80 et seq. of the San Francisco Administrative Code, as well as any other remedies available under the contract or at law; and

Violation of the requirements of Chapter 83 is subject to an assessment of liquidated damages in the amount of $5,000 for every new hire for an Entry Level Position improperly withheld from the first source hiring process. The assessment of liquidated damages and the evaluation of any defenses or mitigating factors shall be made by the FSHA.

f. **Subcontracts.** Any subcontract entered into by Contractor shall require the subcontractor to comply with the requirements of Chapter 83 and shall contain contractual obligations substantially the same as those set forth in this Section.

50. Preservative-treated Wood Containing Arsenic. Contractor may not purchase preservative-treated wood products containing arsenic in the performance of this Agreement unless an exemption from the requirements of Chapter 13 of the San Francisco Environment Code is obtained from the Department of the Environment under Section 1304 of the Code. The term "preservative-treated wood containing arsenic" shall mean wood treated with a preservative that contains arsenic, elemental arsenic, or an arsenic copper combination, including, but not limited to, chromated copper arsenate preservative, ammoniacal copper zinc arsenate preservative, or ammoniacal copper arsenate preservative. Contractor may purchase preservative-treated wood products on the list of environmentally preferable alternatives prepared and adopted by the Department of the Environment. This provision does not preclude Contractor from purchasing preservative-treated wood containing arsenic for saltwater immersion. The term "saltwater immersion" shall mean a pressure-treated wood that is used for construction purposes or facilities that are partially or totally immersed in saltwater.

51. Prohibition on Political Activity with City Funds. In accordance with San Francisco Administrative Code Chapter 12.G, Contractor may not participate in, support, or attempt to influence any political campaign for a candidate or for a ballot measure (collectively, "**Political** Activity") in the performance of the services provided under this Maintenance Agreement. Contractor agrees to comply with San Francisco Administrative Code Chapter 12.G and any implementing rules and regulations promulgated by the City's Controller. The terms and provisions of Chapter 12.G are incorporated herein by this reference. In the event Contractor violates the provisions of this section, the City may, in addition to any other rights or remedies available hereunder, (i) terminate this Maintenance Agreement, and (ii) prohibit Contractor from bidding on or receiving any new City contract for a period of two years. The Controller will not consider Contractor's use of profit as a violation of this section.

52. Compliance with Laws. Contractor shall keep itself fully informed of the City's Charter, codes, ordinances and regulation of the City and of all state, and federal laws in any manner affecting the

performance of this Maintenance Agreement, and must at all times comply with such local codes, ordinances, and regulations and all applicable laws as they may be amended from time to time.

53. Entire Agreement; Modifications. The Maintenance Agreement, together with the Appendices and/or Appendices hereto, constitutes the entire Maintenance Agreement between the parties and this Maintenance Agreement may not be modified, nor may any of its terms be waived, except by written instrument executed and approved in the same manner as this Maintenance Agreement. All agreements between the parties are included herein and no promises or statements have been made by either party unless endorsed hereon in writing. No change or waiver of any provisions hereof shall be valid unless made in writing with the consent of both parties and executed in the same manner as this Maintenance Agreement. Should the application of any provision of this Maintenance Agreement to any particular facts or circumstances be found by a court of competent jurisdiction to be invalid or unenforceable, then (a) the validity of other provisions of this Maintenance Agreement shall not be affected or impaired thereby, and (b) such provision shall be enforced to the maximum extent possible so as to effect the intent of the parties and shall be reformed without further action by the parties to the extent necessary to make such provision valid and enforceable. Subject to the specific provisions of this Maintenance Agreement, this Maintenance Agreement shall be binding upon and inure to the benefit of the parties and their respective successors and assigns.

54. Force Majeure. Contractor shall not be liable for failure to maintain software or equipment when such failures are due to causes beyond its reasonable control, such as acts of God, acts of civil or military authority, fires, strikes, floods, epidemics, quarantine, war, riot, delays in transportation, care shortages, and inability due to causes beyond its reasonable control to obtain necessary labor, materials or manufacturing facilities, and in such event Contractor shall perform as soon as such cause is removed.

55. Non-Waiver of Rights. The waiver by either party of any breach by either party of any term, covenant or conditions hereof shall not operate as a waiver of any subsequent breach of the same or any other term, covenant or condition hereof.

56. Construction. All section headings contained herein are for convenience and reference only and are not intended to define or limit the scope of any provision of this Maintenance Agreement.

57. Administrative Remedy for Agreement Interpretation. Should any question arise as to the meaning and intent of this Maintenance Agreement, the question shall, prior to any other action or resort to any other legal remedy, be referred to Purchasing who shall decide the true meaning and intent of this Maintenance Agreement.

58. Protection of Private Information. Contractor has read and agrees to the terms set forth in San Francisco Administrative Code Sections 12M.2, "Nondisclosure of Private Information," and 12M.3, "Enforcement" of Administrative Code Chapter 12M, "Protection of Private Information," which are incorporated herein as if fully set forth. Contractor agrees that any failure of Contractor to comply with the requirements of Section 12M.2 of this Chapter shall be a material breach of the Contract. In such an event, in addition to any other remedies available to it under equity or law, the City may terminate the Contract, bring a false claim action against the Contractor pursuant to Chapter 6 or Chapter 21 of the Administrative Code, or debar the Contractor.

59. Graffiti Removal. Graffiti is detrimental to the health, safety and welfare of the community in that it promotes a perception in the community that the laws protecting public and private property can be disregarded with impunity. This perception fosters a sense of disrespect of the law that results in an increase in crime; degrades the community and leads to urban blight; is detrimental to property values, business opportunities and the enjoyment of life; is inconsistent with the City's property maintenance

goals and aesthetic standards; and results in additional graffiti and in other properties becoming the target of graffiti unless it is quickly removed from public and private property. Graffiti results in visual pollution and is a public nuisance. Graffiti must be abated as quickly as possible to avoid detrimental impacts on the City and County and its residents, and to prevent the further spread of graffiti. Contractor shall remove all graffiti from any real property owned or leased by Contractor in the City and County of San Francisco within forty eight (48) hours of the earlier of Contractor's (a) discovery or notification of the graffiti or (b) receipt of notification of the graffiti from the Department of Public Works. This section is not intended to require a Contractor to breach any lease or other agreement that it may have concerning its use of the real property. The term "graffiti" means any inscription, word, figure, marking or design that is affixed, marked, etched, scratched, drawn or painted on any building, structure, fixture or other improvement, whether permanent or temporary, including by way of example only and without limitation, signs, banners, billboards and fencing surrounding construction sites, whether public or private, without the consent of the owner of the property or the owner's authorized agent, and which is visible from the public right-of-way. "Graffiti" shall not include: (1) any sign or banner that is authorized by, and in compliance with, the applicable requirements of the San Francisco Public Works Code, the San Francisco Planning Code or the San Francisco Building Code; or (2) any mural or other painting or marking on the property that is protected as a work of fine art under the California Art Preservation Act (California Civil Code Sections 987 et seq.) or as a work of visual art under the Federal Visual Artists Rights Act of 1990 (17 U.S.C. §§ 101 et seq.). Any failure of Contractor to comply with this section of this Maintenance Agreement shall constitute a material breach of this Maintenance Agreement.

60. Food Service Waste Reduction Requirements. Contractor agrees to comply fully with and be bound by all of the provisions of the Food Service Waste Reduction Ordinance, as set forth in San Francisco Environment Code Chapter 16, including the remedies provided, and implementing guidelines and rules. The provisions of Chapter 16 are incorporated herein by reference and made a part of this Maintenance Agreement as though fully set forth. This provision is a material term of this Maintenance Agreement. By entering into this Maintenance Agreement, Contractor agrees that if it breaches this provision, City will suffer actual damages that will be impractical or extremely difficult to determine; further, Contractor agrees that the sum of $100 liquidated damages for the first breach, $200 liquidated damages for the second breach in the same year, and $500 liquidated damages for subsequent breaches in the same year is reasonable estimate of the damage that City will incur based on the violation, established in light of the circumstances existing at the time this Maintenance Agreement was made. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with this provision.

61. Cooperative Drafting. This Agreement has been drafted through a cooperative effort of both parties, and both parties have had an opportunity to have the Agreement reviewed and revised by legal counsel. No party shall be considered the drafter of this Agreement, and no presumption or rule that an ambiguity shall be construed against the party drafting the clause shall apply to the interpretation or enforcement of this Agreement.

62. PA - DSS Compliance. The Airport is required to adhere to the Payment Card Industry Data Security Standard Requirements ("PCI DSS"). Contractor agrees to maintain the Port's System in a manner that is consistent with Payment Application Data Security Standard ("PA-DSS") guidelines as applicable under the Airport's PCI - DSS Certification requirements.

As of the effective date of this Contract, Contractor certifies that it has complied with all applicable requirements to be considered PA-DSS compliant, and has performed the necessary steps to validate its compliance with the PCI Standards Council through is PA-DSS Certification.

Contractor will supply the current status of Contractor's PA-DSS compliance status, and evidence of its most recent validation of compliance, upon execution of this Contract and at least annually thereafter.

Contractor will immediately notify the Airport if it learns that it is no longer PA- DSS compliant and will immediately provide the Airport with the steps being taken to remediate the non-compliance status. In no event should Contractor 's notification to the Airport be later than seven (7) calendar days after Contractor learns it is no longer PA-DSS compliant.

Contractor's failure at any time during the term of this Contract to remain PA-DSS compliant will be considered an act or omission for purposes of Contractor's indemnification obligations and will represent a material breach of this Contract.

63. Public Works. No public works is contemplated as part of the scope of work for this Maintenance Agreement.

64. Airport Intellectual Property. Pursuant to Resolution No. 01-0118, adopted by the Airport Commission on April 18, 2001, the Airport Commission affirmed that it will not tolerate the unauthorized use of its intellectual property, including the SFO logo, CADD designs, and copyrighted publications. All proposers, bidders, contractors, tenants, permittees, and others doing business with or at the Airport (including subcontractors and subtenants) may not use the Airport intellectual property, or any intellectual property confusingly similar to the Airport intellectual property, without the Airport Director's prior consent.

65. Labor Peace / Card Check Rule. Without limiting the generality of other provisions herein requiring Contractor to comply with all Airport Rules, Contractor shall comply with the Airport's Labor Peace / Card Check Rule, adopted on February 1, 2000, pursuant to Airport Commission Resolution No. 00-0049 (the "Labor Peace / Card Check Rule"). Capitalized terms not defined in this provision are defined in the Labor Peace/Card Check Rule. To comply with the Labor Peace/Care Check Rule, Contractor shall, among other actions: (a) Enter into a Labor Peace/Care Check Rule Agreement with any Labor Organization which requests such an agreement and which has registered with the Airport Director or his / her designee, within thirty (30) days after Labor Peace/Care Check Rule Agreement has been requested; (b) Not less than thirty (30) days prior to the modification of this Agreement, Contractor shall provide notice by mail to any Labor Organization or federation of labor organizations which have registered with the Airport Director or his / her designee (registered labor organization"), that Contractor is seeking to modify or extend this Agreement; (c) Upon issuing any request for proposals, invitations to bid, or similar notice, or in any event not less than thirty (30) days prior to entering into any Subcontract, Contractor shall provide notice to all registered Labor Organizations that Contractor is seeking to enter into such Subcontract; and (d) Contractor shall include in any subcontract with a Subcontractor performing services pursuant to any covered Contract, a provision requiring the Subcontractor performing services pursuant to any covered Contract, a provision requiring the Subcontractor to comply with the requirements of the Labor Peace/Card Check Rule. If Airport Director determines that Contractor violated the Labor Peace/Card Check Rule, Airport Director shall have the option to terminate this Agreement, in addition to exercising all other remedies available to him / her.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day first mentioned above.

CITY AIRPORT COMMISSION CITY AND COUNTY OF SAN FRANCISCO By: _____ John L. Martin, Airport Director Attest: By _____ Jean Caramatti, Secretary Airport Commission Resolution No: _____ Adopted on: _____ Approved as to Form: Dennis J. Herrera City Attorney By _____ Stacey Lucas Deputy City Attorney	**CONTRACTOR** By signing this Agreement, I certify that I comply with the requirements of the Minimum Compensation Ordinance, which entitle Covered Employees to certain minimum hourly wages and compensated and uncompensated time off. I have read and understood paragraph 35, the City's statement urging companies doing business in Northern Ireland to move towards resolving employment inequities, encouraging compliance with the MacBride Principles, and urging San Francisco companies to do business with corporations that abide by the MacBride Principles. _____ Authorized Signature _____ Printed Name _____ Title TransCore, LP Company Name _____ City Vendor Number _____ Address _____ City, State, ZIP _____ Telephone Number _____ Federal Employer ID Number

Appendices

A: Services to be provided by Contractor
B: Calculation of Charges

Appendix A

Services to be provided by Contractor

A. OVERVIEW. The City and County of San Francisco (City) owns and operates a Ground Transportation Management System/Taxi Management System (GTMS/TMS) at its facilities located at San Francisco International Airport (Airport).

The GTMS/TMS replaced the Airport's Automated Vehicle Identification System (AVI) and the Taxi Revenue System (TRS) and upgraded the Airport's ground transportation and taxi management hardware and software. The GTMS/TMS has been designed and installed to fully address operational security by detecting and preventing evasion of vehicle tracking and associated fees.

The GTMS/TMS includes hardware and a variety of proprietary and commercial off-the-shelf software. The intent of this agreement is to establish a viable maintenance plan for continued support of the GTMS/TMS.

B. GENERAL PROVISIONS. This Description of Services has been prepared to establish the guidelines for after-warranty work needed to properly support the GTMS/TMS at the Airport. This includes maintenance service for all software and hardware and includes, but is not limited to, spare parts, materials, labor, software, testing equipment, tools, etc. necessary to fully support the GTMS/TMS. Full maintenance shall be available twenty-four (24) hours a day, seven days a week (24/7), and three hundred sixty-five (365) days per year. The response times stated below shall be maintained at all times.

For software applications the Contractor shall provide all preventative, routine, and emergency maintenance services. Qualified, authorized representatives of the Contractor shall perform diagnosis and repair. If so requested, the Contractor shall provide written documentation of technician certification. Preventative maintenance services shall be provided in accordance with the provisions of a Contractor's maintenance manual for each component or subsystem of the System. Preventative maintenance services shall include but are not limited to software/firmware updates. Routine maintenance services shall include scheduled overhauls as recommended by the software manufacturer. Emergency services shall include inspections and necessary tests to determine the causes of significant software malfunction or failure. The emergency services shall also include the furnishing and installation of software changes required to replace malfunctioning system elements.

For all non-software components, the Contractor shall provide level 3 maintenance services. Qualified, authorized representatives of the Contractor shall perform level 3 diagnoses and repair. If so requested, the Contractor shall provide written documentation of technician certification. The Contractor shall ensure that designated Airport maintenance personnel are fully trained and kept up to date on all required preventative maintenance services. Preventative maintenance shall be provided in accordance with the provisions of a Contractor's maintenance manual for each component or subsystem of the System. Level 3 maintenance services shall include but are not limited to software/firmware updates, component level repair and scheduled overhauls as recommended by the manufacturer. Emergency services shall include inspections and necessary tests to determine the causes of component malfunction or failure. The emergency services shall also include the furnishing and installation of repaired or replacement components required to correct malfunctioning system elements.

The Contractor shall be responsible for repair to the component level of replaceable, functional modules. The Contractor shall provide adequate spare modules and repair turn around to assure that spare modules

are available on site to accommodate repair of a failure to a 99% confidence level. All necessary steps shall be made to achieve the least amount of time that a component is inoperable.

The Contractor shall take any action required to expedite receipt of any required parts and shall provide a full written report to the Airport detailing why the part or any portion of such part is not available, and what corrective actions are being taken to avoid reoccurrences of this event.

C. RESPONSE TIMES

1. Major System Failure Response. A Major System Failure shall be defined as a failure that adversely impacts revenue control or customer service. Contractor shall respond to a Major System Failure and commence appropriate remedial action within 30 minutes during Normal Business Hours (between 8:00 a.m. and 6:00 p.m. Monday through Friday), and within three (3) hours outside of Normal Business Hours and holidays, upon notification by the Airport that remedial maintenance for a Major System Failure is required. Contractor shall correct major failures within 2 hours. In the event that a Major System Failure is not cured within two (2) hours, Airport may escalate the failure to Contractor's Operations Manager and require Contractor to continuously apply additional and/or more expert resources to rectify the failure.

2. Minor System Failure Response. A Minor System Failure shall be defined as a failure of a single component, device or subsystem that does not affect the operation of a particular facility or the parking operation as a whole, has no customer service or revenue control impact. Contractor shall respond to Minor System Failures within 30 minutes during Normal Business Hours, and within eight (8) hours outside of Normal Business Hours and holidays, upon notification by the Airport that remedial maintenance for a Minor System Failure is required. Contractor shall correct minor failures within twenty-four (24) hours of the time the Airport notifies Contractor of a Minor System Failure.

D. MAINTENANCE AND REPAIR LEVELS. There are three levels of non-software application related service contemplated by the Parties for the GTMS/TMS. They are:

Level 1: Preventative, comprised of cleaning, routine diagnostics, and field adjustments; and

Level 2: System wide Troubleshooting, comprised of power, connectivity, and supporting infrastructure; field repair, removal and replacement of defective parts and returning the GTMS/TMS to service; and

Level 3: Repair, comprised of shop repair, PCB and Contractor furnished hardware level repair, module adjustments, all software and firmware maintenance, component and sub component level troubleshooting, and repair and returning the GTMS/TMS to service within six (6) hours of notification by the Airport.

Level 1 & 2 Services for non-software application maintenance are not covered under this Agreement.

For non-software application maintenance, this Agreement consists of a Level 3 base service package that includes full maintenance coverage excluding Level 1 services, and Level 2 repairs.

The Level 3 base service package module establishes the City or its representative as the primary maintenance agency responsible for Level 1 and Level 2 system support of the GTMS/TMS equipment. The Agreement establishes the Contractor as the primary agency responsible for Level 3 system support for all systems, sub-systems, software and components of the currently installed GTMS/TMS at the Airport. The Level 3 module is the foundation for services rendered by the Contractor for this Agreement in all contract years.

E. HARDWARE MAINTENANCE AND REPAIR. For the duration of this Agreement, TransCore shall provide services at Level 3, 'shop' repair for all installed hardware, roadside equipment (Readers, Antennas, Enclosures, LPRs, Surveillance Cameras, AVMs, CIDs, DMS displays), Handheld devices, SFO & SFMTA Administrative & Taxi Office Terminal equipment and hardware, and Network/Backend Hardware (Servers, UPS, Switches, & DVRs).

1. Spare Parts. The spare parts inventory will be established and agreed to by the Airport as Spare Modules and Parts List (CDRL 46) of the Agreement between TransCore and the City, identified as Contract 8841R.

2. Additions, Relocations, Removals

Additions, relocations, and removals of system equipment are not covered under the scope of work within this contract. Upon request by City, Contractor shall provide such services as are necessary and available with respect to the system to expand or modify the GTMS/TMS to meet City's requirements. The City agrees to pay additional charges for such services at Contractor's then current rate.

In the first month of each contract year, Contractor shall schedule and complete an annual equipment review, which shall provide the City with a then-current list of all installed GTMS/TMS equipment. The City will participate in the equipment review with Contractor. Contractor shall provide pricing for the inclusion of any equipment added to the current GTMS/TMS into the coverage of this Contract no later than the third month of that year.

Contractor will ensure that any additions to the GTMS/TMS made by Contractor or their subcontractors are documented in accordance with the provisions of Section F of this Agreement or as otherwise required.

F. SOFTWARE MAINTENANCE

1. Services. The support to be provided by Contractor under this agreement is designed to provide the City with complete integrated systems software support for the GTMS/TMS. Contractor shall provide City's technicians and staff with access to Contractor Certified Support Technicians (hereafter called "CST") who are trained and certified by Contractor to provide total system software support as specified in this Appendix. Access to a Contractor certified CST includes contact by telephone, mail, and on-site as needed to provide the levels of support defined within this contract. Software support required by this contract are sub-categorized and defined below.

a. Emergency Service Response. Emergency response will be provided when service is required due to the failure of a critical software component of the system that significantly impairs the operation of the system as determined by the City. Emergency response will only be required when the failure of a critical component or sub-system creates a situation for the City that substantially hinders Airport operations, negatively impacts Airport safety or security, or results in revenue loss to the City. When an emergency response is required, as determined by the City, the City is directed to call the emergency contact number for Contractor at any time, 24 hours per day, 7 days per week, 365 days per year. All emergency calls will receive a response call from the Contractor within one (1) hour of the notification by the City. Contractor will use good faith efforts to respond on site to all emergency calls within six (6) hours after receiving a request for emergency service. Contractor will work diligently, on or off site to provide the City complete problem resolution. The Contractor Emergency Hotline number is:_____

b. Routine Software Service Response. Routine Service will be provided for requirements of a non-emergency nature that require service by the Contractor during normal operating hours. Routine service will normally be provided during the next normal business day. When service is required of a routine nature, the City is directed to contact Contractor during normal business hours at the designated contact number provided by Contractor. The designated contact number for a routine service request is: _____

c. Non-Emergency Software Remote Response. Non-Emergency remote response is provided for by this contract for those items requiring remote system support from Contractor of a non-emergency nature. Contractor will provide remote support via dial-up or dedicated network connectivity through their headquarters in _____and their worldwide headquarters in _____. The local California office initiates this remote support. Contractor will respond to requests for remote service within twenty-four (24) hours of notification of the requirement or by the next regular business day to schedule a completion date for the work.

d. Software Preventative Maintenance Services. A schedule of performance task sheets outline the preventative maintenance services to be provided (Appendix ___). All such maintenance shall be performed during off-peak periods at least four times per year (quarterly). The Contractor shall coordinate with the Airport to establish appropriate off-peak lane-activity periods. The Airport shall make a reasonable attempt to accommodate the need to conduct preventative maintenance according to the required schedule. The Contractor's staff shall also be provided access to the Facility Management Software to aid in determining appropriate times for servicing devices.

e. City will ensure that only authorized employees will contact the Contractor service hotline to initiate service requests. The intent of this provision is to reduce or eliminate unnecessary service calls and interventions onsite. A list of all individuals authorized to place requests for service has been included as Appendix ___ to this Agreement and will be updated as required by the City.

2. Software Updates. During the term of this Agreement, Contractor will offer software patches or corrections to errors developed by Contractor for all software elements provided by Contractor for the GTMS/TMS. The costs of these updates are included in the basic cost of this Agreement. The Airport will be noticed of availability of such updates and will approve the timing and scheduling of the updates; the Contractor will provide standard documentation and training, if necessary.

G. MAINTENANCE DOCUMENTATION. The Contractor shall maintain a written or electronic Maintenance Log of all preventative maintenance and corrective/repair services performed during the term of the Agreement. The log shall be organized in manner that allows technician personnel to readily identify chronic or recurring service problems by component or lane. The log shall include entries for any upgrades performed on any component so any unforeseen negative effects may be quickly isolated and reported. The log shall be in a format approved by the Airport and shall be available for inspection by the Airport at any time. The log shall be turned over to the Airport at the end of the Agreement. The Contractor shall also submit monthly maintenance reports (in a format approved by the Airport) based on the content of the Maintenance Log. Such reports shall include a discussion of equipment availability and serviceability data over time (trend analysis).

H. TRAINING. Except as otherwise provided in Section ____ (Software Upgrade), training is not included as part of this Agreement. Pricing for training can be provided as required by contacting Contractor.

I. WARRANTY. Contractor represents and warrants that all services to be performed by its technicians or authorized service representatives as contemplated under this Agreement will be performed in a competent and workmanlike manner by individuals of appropriate training and experience. The Contractor's personnel or factory-certified technicians shall either perform the work on site, or the Contractor shall accept all costs associated with removal, shipping and handling. Technical support from factory-certified personnel shall be available from the Contractor within four (4) hours of the time the service call is first placed. During the contract term, updates and corrections to all equipment firmware and software shall be provided to the Airport at no additional charge.

All work performed by Contractor shall be warranted to be free of defects. Any indication of programming or software malfunction shall be repaired or replaced at no additional expense to the City. All repairs made under the terms of this contract will receive a warranty from Contractor. For the service work performed under this contract, the warranty period shall be thirty (30) days starting at the day the work was completed and accepted by the City.

Expressly excluded from the service warranties provided for under this Agreement are repair parts or services due to damage to or failure of the system resulting from: third-party software defects, misuse, negligence, accident, abuse, fire, storms, flood, wind, acts of God or public enemy, lightning or alteration by anyone other than authorized City's technicians, or Contractor technicians and its authorized subcontractors.

J. ADDITIONAL DOCUMENTATION REQUIREMENTS:

Contractor will provide detailed documentation of routine and emergency maintenance performed on the system equipment and software. Documentation shall include a description of the services provided, the location of the service provided, date and time that service was requested, date and time service was completed, and an itemized list of parts used to repair the system.

Appendix B

Calculation of Charges

In no event shall the amount of this Maintenance Agreement exceed the previously negotiated price of Two Hundred Forty-Eight Thousand Nine Hundred Seventy-Three Dollars ($248,973) per year paid in monthly installments of $20,747.75.