MTD Santa Barbara
Metropolitan Transit District
550 Olive Street
Santa Barbara, CA 93101
p (805) 963-3364
f (805) 962-4794
www.sbmtd.gov

Request for Proposals for AVL & ITS Management Systems (AIM)

SOLICITATION INSTRUCTIONS

Project Summary Sheet

Project Name: AVL & ITS Management Systems (AIM)

Solicitation Issuance Date: Wednesday, October 2, 2013

Project Description: MTD, a public transit operator, is requesting proposals for various Intelligent Transportation Systems (ITS) with many based on the use of automated vehicle location (AVL) technology on its transit buses. Mandatory systems include AVL and the related communications network, estimated time of arrival passenger information, route and schedule adherence database, onboard video surveillance, and a yard wireless network. Optional features include automated bus stop announcements, vehicle health monitoring, automatic passenger counting, yard location and status, computer aided dispatch (CAD), and road supervisor CAD.

Project Location: 550 Olive Street & 1020 Chapala Street, Santa Barbara, CA 93101

Pre-Proposal Meeting Date/Time: Friday, October 18, 2013 at 9:30 AM **(MANDATORY)**

Pre-Proposal Meeting Location: 550 Olive Street, Santa Barbara, CA 93101

Clarification & Change Request Deadline: Thursday, October 24, 2013

Proposal Due Date/Time: Tuesday, November 12, 2013 at 5:00 PM (local time)

Proposal Submittal Location: 550 Olive Street, 2nd Floor Reception Desk Santa Barbara, CA 93101

Proposal Evaluation Period: November 13 – December 5, 2013 (projected)

Board Award Consideration Date: Tuesday, December 10, 2013 (projected)

Project Implementation Period: January 2 – December 31, 2014 (projected)

Project Contact: Brad Davis, Assistant Controller, (805) 883-4201, bdavis@sbmtd.gov

Type of Contract: Firm Fixed Price

Bonding Required: None

Check MTD's website at http://www.sbmtd.gov/business-and-employment/active.html for updates

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SANTA BARBARA METROPOLITAN TRANSIT DISTRICT
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1. PROJECT DESCRIPTION

The Santa Barbara Metropolitan Transit District (MTD), a public transit operator, is requesting proposals for various Intelligent Transportation Systems (ITS) with many based on the use of automated vehicle location (AVL) technology on its transit buses. The project is collectively referred to as the AVL & ITS Management System, the AIM system or AIM. Mandatory systems include the vehicle AVL technology and related communications network, estimated time of arrival information, route and schedule adherence data, onboard video surveillance, and a yard wireless network. Optional features include automated bus stop announcements, vehicle health monitoring, automatic passenger counting, yard location and status, computer aided dispatch (CAD), and road supervisor CAD. Full requirements are contained in the *AIM Specifications*.

2. PRE-SUBMITTAL ACTIVITIES

2.1 RFP PACKAGE CONTENTS

These *AIM Solicitation Instructions* provide direction on preparing proposals and describe the evaluation, review, and contract award processes. Failure of an offeror to follow instructions may result in rejection or disqualification of its proposal. Attached are required forms and certifications to be completed and included as part of the proposal. The attached *AIM Specifications* describe the project requirements and deliverables. Additional terms and conditions are included in the *MTD Master Agreement*, also attached hereto.

2.2 PRE-PROPOSAL MEETING (MANDATORY)

There is a **MANDATORY** pre-proposal meeting at MTD's administrative offices at 550 Olive Street in Santa Barbara on Friday, October 18, 2013 at 9:30 AM. **MTD will not consider proposals from parties not attending the pre-proposal meeting.** Attendance at the meeting is defined as arriving and signing in at the meeting no later than **9:50** AM. The mandatory attendance is limited to those business entities that would enter into the contract with MTD if a contract is awarded. Potential key partners, subcontractors, and suppliers are strongly encouraged to attend the meeting as well. The purpose of the meeting is to review, discuss and answer questions regarding the RFP process, proposal preparation, and the project; and to inspect the facilities and a sample of vehicles subject to the project. The meeting will also include visiting the MTD Transit Center at 1020 Chapala Street, Santa Barbara, CA. Parties are strongly encouraged to submit any questions or requests in advance of the pre-proposal meeting. MTD may address questions during the meeting however **any oral response by MTD at the pre-proposal conference not confirmed by a written addendum shall not be official or binding on MTD.**

2.3 REQUESTS FOR CHANGES OR CLARIFICATIONS

All communications concerning this RFP and the project shall be directed to the Brad Davis, the project manager, via e-mail to bdavis@sbmtd.gov. Unless authorized by the project manager, offerors and their representatives shall not communicate or make contact with other MTD employees or consultants in regard to any aspect of this solicitation. Offerors may request a clarification or change to any aspect or requirement of the RFP or any addenda thereto. Such requests must be received by MTD by Thursday, October 24, 2013. To be considered, change requests must be supported with pertinent data evidencing that it is in the best interests of MTD.

2.4 RFP MODIFICATIONS & ADDENDA

MTD reserves the right to amend this RFP through written addenda. **Other than written addenda, no other form of communication with any officer, employee or agent of MTD shall be binding upon MTD**. Addenda will be posted to MTD's website and concurrently sent via e-mail to all parties known to have received the RFQ. However, MTD's e-mailing of addenda does not relieve the submitter of its responsibility to ensure that it has obtained any issued addenda by checking the MTD website. Additionally, failure of an offeror to receive an addendum shall not relieve it from any obligation under its proposal or under the RFP as clarified or modified.

3. PROPOSAL PREPARATION & SUBMITTAL

3.1 MANDATORY SYSTEMS PROPOSED

Only proposals that address all of the mandatory systems and the optional automated bus stop announcement system, including pricing, will be considered and evaluated by MTD. Proposals that do not address at least these systems will be rejected. However, the inclusion of all optional systems is strongly encouraged and may be considered in the evaluation of proposals.

3.2 PRIME OFFEROR/CONTRACTOR

MTD will enter into a contractual relationship with only one party for this project. If parties plan to partner or subcontract with one another to carry out the project, one party must act as the lead in submitting the proposal. Such party shall be the prime contractor in the event that they are awarded the contract for the project.

3.3 PROPOSAL CONTENTS

The proposal to be provided under this RFP is generally composed of two types of information: offeror-completed forms provided by MTD; and offeror-prepared documents. Offeror-prepared documents to be included in proposals shall include:

- Cover Letter
- Description of the Firm
- Prior Experience with Similar Projects
- Key Project Personnel Résumés
- Description of Key Partners, Subs & Suppliers
- Technical Proposal
- Maintenance Agreement(s)

Forms provided as part of this RFP that must be completed and submitted by the Offeror as part of its proposal include:

- Acknowledgement of Addenda
- Price Proposal
- Bidder Information
- Credit & Work References
- Partner, Joint Venture, Subcontractor Listing
- Noncollusion/Compensation Certification

3.4 OFFEROR-PREPARED DOCUMENTS

Cover Letter—Letter shall be signed by an officer authorized to bind the offeror contractually and shall address the below matters (**Review of contract documents by legal counsel is strongly advised**).

- Offeror's interest and willingness to enter into a contract with MTD to carry out the project as described in the attached *AIM Specifications*.
- Offeror's willingness to accept the contract terms and conditions included in the *MTD Master Agreement* and the *AIM Specifications*. If there are any contract terms that the offeror will not

accept or proposes modifications to, the specifics of such should be addressed in the cover letter or an attachment thereto. MTD is limited in its ability to alter the terms and will assess during the evaluation and interview process whether it would be able to contract with the offeror under the offeror's proposed contract revisions. **MTD will not negotiate contractual terms and conditions once the contract is executed unless it is in its best interest to do so.**

- Offeror's ability and willingness to obtain insurance meeting the requirements indicated in the *Master Agreement*. An insurance certificate meeting the requirements will be required prior to execution of the contract.

Description of the Firm—Proposal shall include a description of the proposing firm including its line(s) of business, size, location(s), years in business, and any other information deemed appropriate for providing a general overall picture of the firm. If a large entity, information on the division of the firm that would be responsible for the project should be emphasized. Please limit such information to a maximum of two pages.

Prior Experience with Similar Projects—Proposal shall include a description of five similar projects carried out by the offeror and three similar projects carried out by each significant subcontractor. Offeror projects shall be for those work references listed on the *Credit & Work References* form. Please limit each project description to a maximum of one page.

Key Project Personnel Résumés—Proposal shall include résumés of key project personnel with an emphasis on education and experience relevant to the project. Résumés shall be included for at least the project manager (primary MTD contact), the senior technical/design engineer, and the lead onsite installation field person. As appropriate, résumés of a similar nature shall be provided for partners and subcontractors. Please limit each résumé to a maximum of two pages.

Description of Partners, Subcontractors & Suppliers—Proposal shall include a description of all partners or joint venturers; and any significant subcontractors or suppliers that would be participating in the project. The descriptions must include all parties that would be supplying the major mandatory and optional systems. Such firms shall be included on the *Partner, Subcontractor & Supplier Listing* form discussed below. Provide the same information as that described above for the Offeror (see above) but limit information to a maximum of one page for each entity.

Technical Proposal—Proposal shall include a comprehensive Technical Proposal that describes how the offeror would meet the requirements of the *AIM Specifications* (see Section 3.1 above for information on AIM systems that **must** be included in the Technical Proposal). The Technical Proposal should use narrative descriptions, data sheets, cut sheets, catalogs, brochures, illustrations, diagrams, tables, charts, photos, etc. as necessary to enable MTD to evaluate compliance with the *AIM Specifications*. The *AIM Specifications* describe MTD's understanding of current methods, designs, technologies, or features available to meet various ITS goals for improvements to passenger service and operational efficiencies. MTD will consider alternative approaches and specifications for achieving these goals. The Technical Proposal shall identify any such variances from the requirements set forth in the *AIM Specifications* and the benefits of the alternative. To the extent feasible, Technical Proposals shall be organized to match the sequence of the *AIM Specifications*. Following are certain items that shall be addressed in the Technical Proposal. It is **not** a complete listing of Technical Proposal contents but simply a description of some items MTD deems significant for properly evaluating proposals.

- Description of systems and features that are not part of the offeror, partner, subcontractor, or supplier standard offerings and would need to be developed to meet the *AIM Specifications* (e.g., functions, hardware, software applications, databases, interfaces, reports).

- Listing, data sheets, and pictures for all significant equipment included in the proposal.
- Description of onboard equipment interface types and standards to be used. If open standards are not used, provide the rationale for the use of proprietary decision.
- If proposing a data radio system, a calculation showing the expected and worst case percent utilization for the data channel to be used for the data radio system including a narrative explaining the calculation and assumptions made.
- If proposing a cellular data service, the proposed wireless data service and a coverage map.
- Description of any proposed encryption for the data radio or cellular data service, including type of encryption used, key size and if the encryption is always active.
- Description of the algorithm for time of arrival predictions and report of the accuracy of the time of arrival predictions for previously implemented systems
- Information on Time of Arrival webpage including whether separately hosted or part of MTD website.
- Description of power and communications link with remote bus stop electronic display signs
- Analysis and calculation of the APC system accuracy from APC verification tests.
- Listing of onboard equipment to be monitored by Vehicle Health Monitoring system and specific information being monitored.
- Samples of offeror's standard reports for all relevant AIM systems. Listing of reports that must be custom developed.
- List of recommended spares and test equipment. This list shall include the equipment specified in Chapter 7 of the *AIM Specifications*.

Maintenance Agreement—Proposal shall include all maintenance, license, or other proposed agreements, including all terms and conditions, for providing the service and maintenance for the three-year period stipulated in Section 8.7.2 of the *AIM Specifications*.

3.5 MTD FORMS

Price Proposal—Proposal shall include the fully completed and signed *Price Proposal* form included in this RFP package showing the total compensation for carrying out the project under the terms of the Agreement. Failure to include a completed and signed price proposal using the provided form will render a proposal non-responsive and it will be rejected. Offerors may provide additional and/or more detailed price or cost schedules at their own discretion. The offeror's proposal, including the Price Proposal, will be valid for ninety (90) days following the proposal due date in order to provide for the proposal evaluation and contract award process.

Acknowledgement of Addenda—Offeror shall acknowledge the receipt of any addenda by including the fully completed and signed *Acknowledgement of Addenda* form with their proposal. Failure of an offeror to receive an addendum shall not relieve it from any obligation under its proposal or the RFP as clarified or modified. Failure to acknowledge receipt of addenda may disqualify a proposal.

Bidder Information—Proposal shall include the fully completed *Bidder Information* form included in this RFP package.

Credit & Work References—Proposal shall include the fully completed *Credit & Work References* form included in this RFP package. Please be certain to list appropriate and current contact names, phone

numbers, and e-mails for all parties. For the five work references listed, please include the same parties as those listed in the *Prior Experience with Similar Projects* element of your proposal.

Partner, Subcontractor & Supplier Listing—Proposal shall include the fully completed *Partner, Supplier, Subcontractor Listing* form included in this RFP package. The form shall list all partners or joint venturers; and any significant subcontractors or suppliers that would be participating in the project. The listing must include all parties that would be supplying the major mandatory and optional systems.

Noncollusion Declaration/Compensation Certification—Proposal shall include the signed and dated *Noncollusion Declaration* and *Compensation Certification* forms in included as a single page in this RFP package. The declaration and certification are required on the basis of the usage of California state funding for the project.

3.6 PROPOSAL SUBMISSION

One original and four complete copies of offeror's proposal shall be submitted in a non-transparent, sealed envelope or other appropriate packaging plainly marked on the exterior with the name of the offeror and the following: "AIM System Proposal." Proposals must be delivered to:

Santa Barbara Metropolitan Transit District
2nd Floor Reception Desk
550 Olive Street
Santa Barbara, CA 93101

If using a delivery service, proposals must be enclosed in the specified envelope packaging within the delivery service packaging. Fax or e-mail submittals will not be considered. **Proposals will be accepted by MTD until Tuesday, November 12, 2013, at 5:00 PM (local time)**. Unless due to the fault of MTD, submittals received after such time cannot be considered and will be returned to the offeror unopened. There will be no public opening of submittals at the deadline or otherwise.

3.7 WITHDRAWAL OF PROPOSAL

A bidder may withdraw a submittal any time prior to the submittal deadline by submitting a written request executed by the bidder's authorized representative. Any such withdrawal does not prejudice the right to resubmit a submittal by the submittal deadline.

3.8 PROPOSAL SUBMITTAL STIPULATIONS

Submittals submitted as a result of this solicitation become the property of MTD. MTD will not pay any cost incurred by a bidder resulting from preparation or delivery of its submittal. MTD reserves the sole right to review, accept, or reject submittals; or to cancel this solicitation in whole or in part if it is in MTD's best interest to do so.

4. PROPOSAL EVALUATION

4.1 EVALUATION PROCESS OVERVIEW

Proposals will be evaluated, negotiated, selected and any award made in accordance with procedures applicable to a competitive negotiated procurement using the "best value" selection process. All proposals found to be "responsive" received from offerors determined to be "responsible" (see §4.3 and §4.4 below) will be evaluated to determine which proposals fall within a competitive range. Discussions, demonstrations, and negotiations may then be carried out with offerors within the competitive range, after which a Best and Final Offer (BAFO) may be requested. MTD reserves the right to select a

proposal, with or without a BAFO, for award without any discussions or negotiations. Subject to MTD's right to reject all proposals, the offeror whose proposal is found to provide MTD with the most value subject to the established evaluation criteria (see §4.5 below) will be recommended to the MTD General Manager for contract award. MTD may reject any proposal that includes unacceptable deviations or is not prepared in accordance with the instructions and requirements of this RFP. MTD reserves the right to waive any defects, or minor informalities or irregularities in any proposal which do not materially affect the proposal or prejudice other offerors. If there is any evidence indicating that two or more offerors are in collusion to restrict competition or otherwise engaged in anti-competitive practices, the proposals of all such offerors shall be rejected and such evidence may be a cause for disqualification of the participants in future MTD solicitations.

4.2 PROPOSAL OPENING & CONFIDENTIALITY

Proposals will not be publicly opened. All proposals will be kept strictly confidential throughout the evaluation, negotiation and selection process. Only members of the Evaluation Committee and other MTD officials, employees and agents having a legitimate interest will be provided access to the proposals and evaluation results during this period. Except as otherwise required by law, MTD will exempt from disclosure proprietary information, trade secrets and confidential commercial and financial information (hereinafter "confidential data") submitted and identified as such in proposals. Any confidential data which an offeror believes should be exempted from disclosure shall be specifically and clearly identified and marked as such. Blanket-type confidential designations of whole pages or sections, where such areas clearly contain non-confidential data, will invalidate such designation.

4.3 RESPONSIVENESS

MTD shall examine all proposals for the purpose of ascertaining their completeness and responsiveness to the provisions of this RFP. Such process may involve requesting additional or clarifying information from an offeror. Proposals that do not contain all required materials, information or forms; or where such materials, information or forms are substantially incomplete may be considered non-responsive and rejected by MTD. In such case, MTD shall notify the offeror of it's rejection and the basis thereof.

4.4 RESPONSIBILITY

For all proposals found to be responsive, MTD shall make an initial assessment of the offeror's "responsibility." It is "initial" in that the offeror's responsibility will be further assessed as part of the proposal evaluation. For purposes of this RFP, responsibility is defined as evidence of adequate financial and technical capacity to undertake the project; and satisfactory performance in previous contracts. MTD shall use the references and insurance information included in the proposal for this initial determination. However, MTD may at it's own discretion seek and utilize other information within and outside of the proposal to assist in the determination. Such process may involve requesting additional or clarifying information from an offeror. The proposal of any offeror not found to be responsible shall be rejected. In such case, MTD shall notify the offeror of it's rejection and the basis thereof.

4.5 COMPETITIVE RANGE EVALUATION

Responsive proposals from offerors found responsible shall be subject to review by an evaluation committee composed of MTD staff members and/or agents. The ultimate purpose of such evaluation is to establish the firm that the committee believes will provide MTD with the best "value." Value, in this instance, is determined by the following factors in descending order of importance:

- Technical Proposal
- Proposal Price

- Prior Experience

Proposals will be evaluated using the above criteria to determine a relative ranking in order to ascertain those proposals which fall within the competitive range, or may reasonably be made to fall within it. Such process may involve requesting additional information from an offeror. Once the competitive range is established, MTD shall notify all offerors in writing that either: their proposal falls within or can reasonably made to fall within the competitive range and that they are proceeding to the discussion, demonstration, and negotiation stage of the process; or their proposal does not or cannot reasonably be made to fall within the competitive range and its proposal is therefore being rejected. MTD reserves the right to select a proposal for award at this point or to request Best & Final Offer(s).

4.6 OFFEROR INTERVIEW

Upon determination of the competitive range parties, the parties will be invited to MTD for interviews. Such interviews will provide MTD an opportunity to ask offerors questions and request clarifications about their proposal; provide offerors an occasion to demonstrate, promote and explain their proposal; and allow the discussion and negotiation of technical and pricing terms and conditions.

4.7 BAFO & FINAL EVALUATION

Dependent upon what is considered in its best interest, following initial interviews MTD may attempt to negotiate further or request a Best & Final Offer from one or more of the competitive range firms; or recommend award of a contract without further discussion. Once the Evaluation Committee reaches a decision as to that proposal that provides MTD with the best value, a recommendation will be forwarded to the MTD General Manager.

4.8 SINGLE PROPOSAL ANALYSIS

If only one proposal is received in response to this RFP and it is found acceptable to MTD—either initially or after discussions and negotiations with the offeror—detailed price and/or cost analysis of the proposal may be required in order to determine if the price is fair and reasonable. A price analysis involves comparison to other similar procurements with similar quantities, specifications and time frames. Where it is impossible to determine price reasonableness through price analysis, it may be necessary to conduct a cost analysis of the proposed price, which is a more detailed evaluation of the cost elements in the offeror's proposal. It is conducted to form an opinion as to the degree to which the proposed costs represent what the offeror's performance should cost; whether the offeror is applying sound management in proposing the application of resources to the contracted effort; and whether costs are allowable, allocable and reasonable. Any such analyses shall not obligate MTD to accept such a single proposal, which may be rejected at MTD's sole discretion.

5. CONTRACT AWARD

5.1 AWARD PROCESS

If considered in MTD's best interest, the MTD General Manager will recommend to the MTD Board of Directors that a contract be awarded to the offeror that has submitted the proposal that is most advantageous to MTD. Accordingly, MTD may not necessarily make an award to the offeror with the highest technical ranking nor award to the offeror with the lowest price proposal if doing so would not be in the overall best interest of MTD. It is anticipated that such recommendation shall be considered by the Board at it's regular meeting of Tuesday, December 10, 2013.

5.2 CONTRACT EXECUTION

The contract will be executed, as signified by the signature of all parties to the contract, as soon as practical after contract award and receipt of a certificate of insurance meeting the requirements of the MTD Master Agreement and naming MTD as an additionally insured; a copy of City of Santa Barbara business license; or any other deliverables determined during the solicitation process. The contract shall be composed of the *MTD Master Agreement*, the *AIM System Specifications*, and relevant portions of the Contractor's proposal. In all cases, the most recent versions of the preceding documents—including any addenda thereto, as modified through negotiations, and/or submittal of a Best and Final Offer—shall be used in the final and binding agreement.

5.3 FUNDING EXPENDITURE DEADLINE

This project is funded in part from State of California Proposition 1B bonds. **$250,000 of such Prop 1B funding has an expenditure deadline of March 31, 2014. Once the contract is awarded, timing is of the essence such that sufficient project work is completed to the meet the required expenditure deadline.**

6. PROTEST PROCEDURES

MTD has established procurement protest procedures to ensure uniform, timely, and fair consideration of complaints received by MTD concerning its procurement activities. Such procedures are available on MTD's website at: *http://www.sbmtd.gov/business-and-employment/purchasing.html*

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PRICE PROPOSAL

Price Form is under development and will be provided as part of an addendum to the RFP.

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ACKNOWLEDGEMENT OF ADDENDA

The undersigned acknowledges the Bidder's receipt of the following addenda to this RFP and has incorporated information or changes in said addenda within its proposal (if no addenda were received, write "None" in the first blank):

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Note: It is the Bidder's responsibility to ensure it receives all addenda which are posted on the MTD website at *http://www.sbmtd.gov/business-and-employment/active.html.*

_____ _____

Authorized Official Signature Date of Signature

_____ _____

Authorized Official Name Authorized Official Title

_____

Business Name of Bidder

(Signer must match authorized official shown on Bidder Information form)

SANTA BARBARA METROPOLITAN TRANSIT DISTRICT
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BIDDER INFORMATION FORM

General Information

Business Name of Bidder: _____

Business Type: ☐ Corporation (State of Incorporation: _____) ☐ Partnership

☐ Sole Proprietorship ☐ Other: _____

Business Federal Tax ID Number: _____ (provide SSN if sole proprietorship)

Corporate Headquarters

Street Address: _____

City: _____ State: _____ Zip Code: _____

Local Office ☐ (check box at left & leave below blank if the local office is the HQ or there is no local office)

Street Address: _____

City: _____ State: _____ Zip Code: _____

Authorizing Contact (person authorized to bind the firm contractually, including change orders)

Name: _____ Title: _____

Location: ☐ HQ ☐ Local Office ☐ Other: _____

Telephone: _____ Cell: _____ E-Mail: _____

Project Manager (anticipated primary contact during implementation of projects)

Name: _____ Title: _____

Location: ☐ HQ ☐ Local Office ☐ Other: _____

Telephone: _____ Cell: _____ E-Mail: _____

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CREDIT & WORK REFERENCES

Business Name of Bidder: _____

Credit References

Include your primary bank and two firms that you **currently** purchase materials or services from on credit:

Bank Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Vendor Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Vendor Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Work References

Include five recent clients for which you have provided **similar services** to the project work:

Client Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Client Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Client Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Client Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

Client Name: _____ Contact Name: _____

Contact Phone: _____ Contact E-Mail: _____

SANTA BARBARA METROPOLITAN TRANSIT DISTRICT
Request for Proposals for AVL & ITS Management Systems (AIM)
PARTNER, SUBCONTRACTOR & SUPPLIER LISTING

Business Name of Bidder: ____

List all partners or joint venturers; and any significant subcontractors or suppliers that would be participating in the project. Include all parties that would be supplying the major mandatory and optional AIM systems.

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

Company Name: ______________________ Nature of Relationship: ____________

Description of Supplies/Services: ______________________________________

Contact: ________________ Phone: ______________ E-Mail: ________________

(Use additional sheets as necessary)

SANTA BARBARA METROPOLITAN TRANSIT DISTRICT

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NONCOLLUSION DECLARATION

The undersigned declares:

I am the _____ of _____,
(title) (business name of bidder)

the party making the included bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, at _____, _____.
(date) (city) (state)

_____ _____
Authorized Official Signature Authorized Official Name (printed)

COMPENSATION CERTIFICATION

I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

_____ _____
Authorized Official Signature Date of Signature

_____ _____
Authorized Official Name Authorized Official Title

SANTA BARBARA METROPOLITAN TRANSIT DISTRICT
[insert project name in caps]

MASTER AGREEMENT with [insert contractor name in caps]

THIS AGREEMENT is entered into by and between Santa Barbara Metropolitan Transit District, an incorporated transit district under Sections 95000, et seq. of the California Public Utilities Code ("MTD"), and [insert contractor name], a [insert state name] [insert business type] ("Contractor"), at Santa Barbara, California, as of the later date set forth below the signatures executing this Agreement.

WHEREAS:

A. MTD desires to engage Contractor for [insert project description](the "Project");

B. Contractor represents that it has the knowledge and experience to carry out the Project, and desires to carry out the Project pursuant to the terms and conditions hereof, and;

C. Based upon the representations made by Contractor, MTD desires to retain the services of Contractor to carry out the aforesaid Project, upon the within terms and conditions.

NOW, THEREFORE, for valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties do hereby agree as follows:

1. Effect of Recitals. The foregoing recitals are hereby made express provisions of this Agreement.

2. FTA Provisions. The Project is funded in part by the Federal Transit Administration of the U.S. Department of Transportation and, as such, this Agreement is subject to the terms and conditions contained in *Federal Transit Administration: Contract Provisions for Federal Fiscal Year [??/??]: [Contract Type Description]* which is attached hereto as Exhibit "[?]" and incorporated herein by this reference. [replace clause with "Not applicable to this agreement." if not a federally funded project]

3. Public Works Provisions. This Project is subject to the *State of California Provisions for Public Works Projects*, which is attached hereto as Exhibit "[?]" and incorporated herein by this reference. [replace clause with "Not applicable to this agreement." if not subject to CA public works laws]

4. [choose] Statement of Work [or] Technical Specifications. MTD has heretofore issued on [insert date] the [choose] statement of work [or] technical specifications contained in [choose] Invitation for Bids (IFB) [or] Request for Proposals for [insert project name], a true copy of which is attached hereto as Exhibit "[?]" and incorporated herein by this reference. [if SOW or TS amended, may need to modify]

5. [choose] Bid [or] Proposal. Contractor has heretofore submitted on [insert date] a [choose] bid [or] proposal to carry out the Project, true copies of relevant parts that are attached hereto as Exhibit "[?]" and incorporated herein by this reference. [modify clause if multiple proposals, BAFO, etc. submitted]

6. Order of Control. Contractor shall carry out the Project described in Exhibit "[?]" to this Agreement for the price quoted in Exhibit "[?]". All work and services shall be performed according to and controlled by the terms and provisions of this Agreement and the exhibits attached hereto. In the event of any conflict between the contract documents, the following order of control shall prevail: MTD Master Agreement, Exhibit "A", Exhibit "B", Exhibit "C". [modify order & add or delete exhibits as needed]

7. Contract Price. Contractor shall carry out the Project for a fixed price of [insert price] which is in accordance with Exhibit "[?]". [if pricing is more complicated, may be necessary to modify language and/or refer to bid or proposal pricing documents or exhibits]

8. Payment. Contractor shall submit invoice to MTD upon completion of the Project. Payment from MTD shall be made to Contractor no later than thirty (30) days [modify period if appropriate] after acceptance by MTD (see paragraph 15) and receipt of a valid invoice, which shall be sent to: Santa Barbara MTD, Attn: [Accounts Payable], 550 Olive Street, Santa Barbara, CA 93101. [modify clause accordingly if progress payments or other methods are utilized; must include taking title to materials for which progress payments are made if federally funded (and recommended even if not federally funded)]

9. Taxes. MTD is exempt from the payment of Federal Excise and Transportation taxes. Unless specified otherwise in the Agreement, MTD is subject to applicable California Sales Tax for Santa Barbara County which shall have been included in the Contractor's [choose] bid [or] proposal price and shall be included on the Contractor's invoice.

10. Project Schedule. [replace clause with "Not applicable to this agreement." if appropriate; otherwise, describe the schedule or refer to an exhibit]

11. Delivery & Freight. Unless specified otherwise in the [choose] statement of work [or] technical specifications, any item provided under this Agreement shall be delivered FOB Santa Barbara to 550 Olive Street, Santa Barbara, CA 93101. Any Project freight and delivery charges shall have been already included in the Contractor's [choose] bid [or] proposal price and shall not be paid otherwise by MTD.

12. Title & Risk of Loss. The Contractor shall have title to and bear the risk of any loss of or damage to any item provided hereunder until delivered and, if applicable pursuant to this Agreement or standard industry practice, installed or otherwise set up for usage. Upon such delivery and applicable installation and setup, title shall pass from the Contractor to MTD, and the Contractor's responsibility for loss or damage shall cease, except for loss or damage resulting from the Contractor's negligence. Such passing of title shall not constitute acceptance of an item by MTD. The Contractor shall further warrant that the title to any item provided hereunder is free from all claims, encumbrances and liens.

13. Damages. All losses or damages arising from any unforeseen circumstances, either natural or artificial, which may be encountered by the Contractor during the performance of the Project under this Agreement shall be sustained solely by the Contractor. This provision shall also apply to losses or damages resulting from any act or omission not authorized by this Agreement on the part of the Contractor or any agent or person employed by the Contractor.

14. Defective, Damaged or Noncompliant Work. Any items, services, work or systems acquired pursuant to this Agreement found to be defective, damaged or non-compliant with the [choose] statement of work [or] technical specifications at the time of delivery or installation shall be replaced by the Contractor without additional cost to MTD. If the Contractor should fail to promptly comply with any order to replace or repair any defective items, services, work or systems, MTD shall have the authority to deduct the cost of such replacement or repair from any compensation due or to become due to the Contractor. Nothing in this section shall limit or restrict any warranty provisions of this Agreement or any exhibits hereto.

15. Acceptance. [if appropriate, replace clause with "Terms of Acceptance are contained in the [choose] statement of work [or] technical specifications"]All items, services, work or systems to be furnished by the Contractor pursuant to this Agreement shall be subject to acceptance by MTD. MTD shall inspect such deliverables to determine acceptability no later than ten (10) [modify if appropriate] calendar days after said deliverables are received and, if applicable under the Agreement or standard industry practice, installed or otherwise set up for usage. Acceptance shall occur when it is determined by MTD that all items, services, work or systems provided pursuant to this Agreement are in compliance with the [choose] statement of work [or] technical specifications or any other applicable contract documents. Upon acceptance, formal notification thereof shall be made by MTD via notice to the Contractor.

16. Warranty. [if no warranty provisions in SOW or TS:] The Contractor shall warrant to MTD that, for five (5) years [modify period as appropriate] after MTD's full acceptance of items, services, work or systems, each shall conform with the requirements hereof and be free of defects. In addition to other remedies which may be available, MTD may at its option return any non-conforming or defective items to the Contractor and/or require correction or replacement of said item when the defect is discovered, all at the Contractor's risk and expense. If MTD does not require such correction or replacement of non-conforming or defective items, the Contractor shall repay such portion of the payment specified herein or such additional amount as is equitable under the circumstances. The rights of MTD hereunder are in addition to, and not limited by, the Contractor's standard warranties. Acceptance of items, services, work or systems by MTD, or payment therefor, shall not relieve the Contractor of its obligations thereunder. [if warranty provisions in SOW or TS:] Pursuant to the warranty provisions contained in the [choose]

statement of work [or] technical specifications, the Contractor shall warrant to MTD that, for the specified period after MTD's full acceptance of items, services, work or systems, each shall conform with the requirements hereof and be free of defects. The rights of MTD hereunder are in addition to, and not limited by, the Contractor's standard warranties. Acceptance of items, services, work or systems by MTD, or payment therefor, shall not relieve the Contractor of its obligations thereunder.

17. Changes. Any changes or modifications to this Agreement must be in writing, and agreed to by both parties.

18. Insurance.

18.1 Contractor's Insurance Representations to MTD.

It is expressly understood and agreed that the insurance coverages required herein (i) represent MTD's minimum requirements and are not to be construed to void or limit Contractor's indemnity obligations as contained in this Agreement nor represent in any manner a determination of the insurance coverages Contractor should or should not maintain for its own protection; and (ii) are being, or have been, obtained by Contractor in support of Contractor's liability and indemnity obligations under this Agreement. Irrespective of the requirements as to insurance to be carried as provided for herein, the insolvency, bankruptcy, or failure of any insurance company carrying insurance of Contractor, or the failure of any insurance company to pay claims accruing, shall not be held to affect, negate, or waive any of the provisions of this Agreement.

(a) Failure to obtain and maintain the required insurance shall constitute a material breach of, and default under this Contract. If Contractor shall fail to remedy such breach within five (5) business days after written notice by MTD, Contractor will be liable for any and all costs, liabilities, damages and penalties resulting to MTD from such breach, unless a written waiver of the specific insurance requirement(s) is provided to Contractor by MTD. In the event of any failure to Contractor to comply with the provisions of this portion of the Agreement, MTD may, without in any way compromising or waiving any right or remedy at law or in equity, on notice to Contractor, purchase such insurance, at Contractor's expense, provided that MTD shall have no obligation to do so and if MTD shall do so, Contractor shall not be relieved of or excused from the obligation to obtain and maintain such insurance amounts and coverages.

18.2 Conditions Affecting All Insurance Required Herein.

a) Cost of Insurance. All insurance coverage shall be provided at Contractor's sole expense.

b) Maintenance of Insurance. All insurance coverage shall be maintained in effect with limits not less than those set forth below at all times during the term of this Agreement.

c) Status and Rating of Insurance Company. All insurance coverage shall be written through insurance companies admitted to do business in California and with a Best's Financial Strength Rating of A- or better, as shown in the on-line version of Best's Rating & Criteria Center.

d) Restrictive, Limiting, or Exclusionary Endorsements. All insurance coverage shall be provided to Contractor Parties in compliance with the requirements herein and shall contain no endorsements that restrict, limit, or exclude coverage in any manner without the prior express written approval of MTD.

e) Limits of Liability. The limits of liability may be provided by a single policy of insurance or by a combination of primary and umbrella policies, but in no event shall the total limits of liability available for any one occurrence or accident be less than the amount required herein.

f) Notice of Cancellation, Nonrenewal, or Material Reduction in Coverage. In the event of cancellation, nonrenewal, or material reduction in coverage affecting the certificate holder, thirty (30) days prior written notice shall be given to the certificate holder by certified mail, return

receipt requested, except in the event of cancellation for nonpayment, in which event fifteen (15) days prior written notice shall be given. If insurer will not include in its coverage such written notifications, it shall be incumbent upon Contractor to comply with such written notification requirements.

g) Additional Insured Status. Additional insured status shall be provided in favor of MTD and its officers, employees and agents, including consultants, on all liability insurance required herein except workers' compensation/employer's liability and the certificate of insurance shall reflect same. Such additional insured coverage shall be primary to and shall seek no contribution from all insurance available to MTD, with MTD's insurance being excess, secondary, and noncontributing.

h) Waiver of Subrogation. All insurance coverage carried by Contractor required herein shall provide a waiver of subrogation in favor of MTD for all loss covered by such insurance, and Contractor waives all rights of action against MTD for such loss.

i) Primary Liability. All insurance coverage required herein shall be primary to and shall seek no contribution from all insurance available to MTD, with MTD's insurance being excess, secondary, and noncontributing. Where necessary, coverage shall be endorsed to provide such primary liability, and the certificate of insurance shall reflect same.

j) Deductible/Retention. All insurance required for this project shall have a maximum deductible or self-insured retention of $10,000 per policy.

k) Claims Against Aggregate. MTD must be notified in writing by Contractor at MTD's address set forth herein immediately upon knowledge of possible claims against Contractor that might cause a reduction below seventy-five (75%) of any aggregate limit of any primary policy.

18.3 Commercial General Liability Insurance.

a) Coverage: Such insurance shall cover liability arising out of all locations and operations of Contractor, including but not limited to liability assumed under this Agreement (including the tort liability of another assumed in a business contract). Defense shall be provided as an additional benefit and not included within the limit of liability.

b) Form: Commercial General Liability Occurrence form, at least as broad as an unmodified ISO CG 00 01 10 93 or its equivalent.

c) Amount of Insurance: Coverage shall be provided with limits of not less than:
   i. Each Occurrence Limit $1,000,000
   ii. General Aggregate Limit $2,000,000
   iii. Product-Completed Operations Aggregate Limit $2,000,000
   iv. Personal and Advertising Injury Limits $1,000,000
   v. Fire Damage (any one fire) $50,000
   vi. Medical Expense (any one person) $5,000

d) Required Endorsements:
   i. Additional Insured status as required in 18.2(g), above.
   ii. Notice of Cancellation, Nonrenewal, or Material Reduction in Coverage, as required in 18.2(f), above.
   iii. Personal Injury Liability: The personal injury contractual liability exclusion shall be deleted.
   iv. Primary Liability, as required in 18.2(i), above.
   v. Waiver of Subrogation, as required in 18.2(h), above.

vi. Continuing Commercial General Liability Insurance: Contractor shall maintain such insurance in identical coverage, form, and amount, including required endorsements, for at least three (3) years following the date of acceptance by MTD of the last bus built pursuant to this Agreement.

18.4 Auto Liability Insurance.

a) Coverage: Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned).

b) Form: Business Auto Form (at least as broad as an unmodified ISO CA 0001 or its equivalent).

c) Amount of Insurance: Coverage shall be provided with a limit of not less than:
   i. $1,000,000, combined single limit

d) Required Endorsements:
   i. Additional Insured status as required in 18.2(g), above.
   ii. Notice of Cancellation, Nonrenewal, or Material Reduction in Coverage, as required in 18.2(f), above.
   iii. Waiver of Subrogation, as required in 18.2(h), above.

18.5 Workers' Compensation/Employer's Liability Insurance.

a) Coverage: Such insurance shall cover liability arising out of Contractor's employment of workers and anyone for whom Contractor may be liable for workers' compensation claims. Workers' compensation insurance is required, and no "alternative" forms of insurance shall be permitted.

b) Amount of Insurance: Coverage shall be provided with a limit of not less than:
   i. Workers' Compensation: Statutory limits
   ii. Employer's Liability: $1,000,000 each accident and disease.

c) Required Endorsements:
   i. Notice of Cancellation, Nonrenewal, or Material Reduction in Coverage, as required in 18.2(f), above.
   ii. Waiver of Subrogation, as required in 18.2(h), above.

18.6 Other Insurance. MTD shall have the right, exercisable in its sole judgment at any time by giving prior written notice thereof to Contractor, to require Contractor to increase the limit and coverage amount of any insurance Contractor is required to maintain pursuant to this Agreement to an amount that MTD may, in its sole judgment, deem reasonably sufficient; and purchase other insurance and/or endorsement in such amounts or types as MTD may reasonably require from time to time.

19. Bonding. [if no bonding requirements:] Not applicable to this agreement. [If bonding required and the FTA provisions are incorporated:] For applicable terms, refer to Paragraph 13 (Bonding Requirements) in *Federal Transit Administration: Contract Provisions for Federal Fiscal Year [??/??]: [Contract Type Description]* which is attached hereto as Exhibit "[?]". [otherwise: add later, taking into account MTD procurement manual requirements]

20. Termination. [If the FTA provisions are incorporated:] For applicable terms, refer to Paragraph 21 (Termination) in *Federal Transit Administration: Contract Provisions for Federal Fiscal Year [??/??]: [Contract Type Description]* which is attached hereto as Exhibit "[?]". [otherwise:] *Termination for Convenience.* MTD may terminate this Agreement, in whole or in part, upon ten (10) calendar days written notice to the Contractor when it is in MTD's best interest, at MTD's sole discretion. Upon the effective date of the written notice of termination, the Contractor shall cease performance of the Project or the applicable portion thereof to the extent specified in the notice. MTD shall pay the Contractor

allowable costs and applicable profit thereon incurred to the specified date of termination, plus any costs deemed reasonably necessary to effectuate such termination. The Contractor shall promptly submit to MTD its termination claim for such costs. *Termination for Default*. If the Contractor shall breach any covenant, term or condition of this Agreement, MTD may, by written notice, notify the Contractor setting forth the manner in which the Contractor is in default. MTD's right to terminate this Agreement, in whole or in part, for default may be exercised if the Contractor does not cure the condition(s) constituting the breach within ten (10) calendar days [modify period as appropriate] after receipt of such written notice. In such case, the Contractor shall cease performance of the Project or the applicable portion thereof to the extent specified in the notice, and MTD shall pay the Contractor allowable costs and applicable profit thereon incurred to the specified date of termination. The Contractor shall promptly submit to MTD its termination claim for such costs. If it is later determined by MTD that the Contractor did not breach the Agreement and had an excusable reason for not performing, MTD may at it's sole discretion set up a revised delivery or performance schedule for the Agreement or applicable portion thereof and allow the Contractor to continue work, or treat the termination as a termination for convenience. *Excess Costs*. MTD may acquire, under terms and in the manner MTD considers appropriate, equivalent Project services and, if the Agreement or an applicable portion thereof was terminated for default, the Contractor shall be liable to MTD for any excess costs for such Project services. *Waiver of Remedies for any Breach*. In the event that MTD elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Agreement, such waiver by MTD shall not limit MTD's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Agreement. *MTD Property*. If, at termination, the Contractor has in its possession any property, whether completed or in progress, associated with the Project belonging to MTD, the Contractor shall return such property to MTD or otherwise dispense with in the manner MTD directs.

21. Liquidated Damages. [replace clause with "Not applicable to this agreement." if appropriate]It is mutually understood and agreed by and between the parties to the Contract that time is of the essence with respect to the completion of the Project and that in case of any failure on the part of the Contractor to complete the Project within the time specified as provided in [Paragraph 10 or other applicable clause] [except for any excusable delays as provided in Paragraph XX or any extension thereof], MTD will be damaged thereby. The amount of said damages being difficult if not impossible to ascertain definitively, it is hereby agreed that the amount of such damages due MTD from the Contractor shall be fixed at [$XXX.XX per calendar day per ?item?] not delivered in substantially acceptable condition. The Contractor hereby agrees to pay the said amounts as fixed, agreed and liquidated damages, and not by way of penalty, to MTD and further authorizes MTD to deduct the amount of the damages from money due the Contractor under this Agreement, computed as aforesaid. If the monies due the Contractor are insufficient or no monies are due the Contractor, the Contractor shall pay MTD the difference or the entire amount, whichever may be the case, within 30 calendar days after receipt of a written demand by MTD. The payment of aforesaid fixed, agreed and liquidated damages shall be in lieu of any damages for any loss of profit, loss of revenue, loss of use, or for any other direct, indirect, special or consequential losses or damages of any kind whatsoever that may be suffered by MTD arising at any time from the failure of the Contractor to fulfill the obligations referenced in this clause in a timely manner.

22. Infringement of Patents. The Contractor agrees that it will, at its own expense, defend all suits and proceedings instituted against MTD and pay any award of damages assessed against MTD in such suits or proceedings, insofar as the same are based upon any claim that the items, services, work, systems, or any part thereof, or any tool, or process used in or for the Project, constitutes an infringement of any legal United States copyright or patent. MTD agrees that it will give the Contractor prompt notice in writing of the institution of the suit or proceeding and permits the Contractor through its counsel to defend the same and gives the Contractor all information, assistance and authority necessary for the Contractor to do so. In case said items, services, work, systems, or any part thereof, or any tool, or process used in or for the Project, is in such suit held to constitute infringement and use of same is enjoined, the Contractor shall, at its own expense and at its option, either procure for the MTD the right to continue using said items, services, work, systems, or any part thereof, or any tool, or process used in or for the Project, or replace same with non-infringing equipment, or modify it so it becomes non-infringing. [replace clause with "Not

applicable to this agreement." if inappropriate for contract although could keep in to CYA; if a federal contract and patent issues are applicable, keep this clause in addition to the Patent & Rights in Data clause in the FTA provisions]

23. Rights in Data. *Definitions*. The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under this Agreement. Subject data includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software (including, but not limited to, source codes), engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration. *MTD Rights*. MTD reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for MTD purposes, any subject data or copyright. As used in the previous sentence, "for MTD purposes," means use only for the direct purposes of MTD. Without the copyright owner's consent, MTD may not extend its license to any other party. *Public Information*. When MTD awards a contract for experimental, developmental, or research work, it is MTD's general intention to increase transportation knowledge available to the public, rather than to restrict the benefits resulting from the work to participants in that work. Therefore, unless MTD determines otherwise, MTD and the Contractor performing experimental, developmental, or research work required by the contract agrees to permit MTD to make available to the public, either MTD's license in the copyright to any subject data developed in the course of that contract, or a copy of the subject data first produced under the contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying contract, is not completed for any reason whatsoever, all data developed under that contract shall become subject data and shall be delivered as MTD may direct. [replace clause with "Not applicable to this agreement." if inappropriate for contract; if a federal contract and data rights are applicable, keep this clause in addition to the Patent & Rights in Data clause in the FTA provisions]

24. Indemnification. The Contractor shall, to the extent permitted by law protect, indemnify, defend, and hold MTD and its officers, employees and agents, including consultants, harmless from and against any and all liabilities, damages, claims, demands, liens, encumbrances, judgments, awards, losses, costs, expenses, and suits or actions or proceedings, including reasonable expenses, costs and attorneys' fees incurred by MTD and its officers, employees and agents, including consultants, in the defense, settlement or satisfaction thereof, for any injury, death, loss or damage to persons or property of any kind whatsoever, arising out of, or resulting from, the acts, errors or omissions of the Contractor, including acts, errors or omissions of its officers, employees, servants, agents, subcontractors and suppliers; and upon receipt of notice and if given authority, shall settle at its own expense or undertake at its own expense the defense of any such suit, action or proceeding, including appeals, against the MTD and its officers, employees and agents, including consultants, relating to such injury, death, loss or damage. Each party shall promptly notify the other in writing of the notice or assertion of any claim, demand, lien, encumbrance, judgment, award, suit, action or other proceeding hereunder. The Contractor shall have sole charge and direction of the defense of such suit, action or proceeding. The MTD shall not make any admission which might be materially prejudicial to the Contractor unless the Contractor has failed to take over the conduct of any negotiations or defense within a reasonable time after receipt of the notice and authority above provided. The MTD shall at the request of the Contractor furnish to the Contractor all reasonable assistance that may be necessary for the purpose of defending such suit, action or proceeding, and shall be repaid all reasonable costs incurred in doing so. The MTD shall have the right to be represented therein by advisory counsel of its own selection at its own expense. The obligations of the Contractor under this clause shall not extend to circumstances where the injury, or death, or damages is caused solely by the negligent acts, errors or omissions of the MTD, its officers, employees, agents or consultants, including negligence in the preparation of the Contract documents, or the giving of directions or instructions with respect to the requirements of the Contract by written order.

25. Notice. Notices in connection with this Agreement shall be made in writing and may be delivered either personally, by governmental postal service (regular, certified or registered), by private delivery service, or by electronic facsimile. Receipt shall be deemed to have occurred when actually made to the party or its designated agent. Such notices shall be properly addressed to the intended party as follows:

MTD:	CONTRACTOR:
Sherrie Fisher, General Manager	[insert authorized official name & title]
Santa Barbara Metropolitan Transit District	[insert contractor name]
550 Olive Street	[insert contractor street address]
Santa Barbara, CA 93101	[insert contractor city, state & zip]
E-Mail: sfisher@sbmtd.gov	[insert contractor e-mail]
FAX: (805) 963-3365	[insert contract fax number]

26. Attorneys' Fees and Costs. In the event of a controversy (including, but not limited to arbitration or an criminal or civil filing in a Federal Court or a court of any of the United States) between the parties with respect to the enforcement or interpretation of this Agreement, the prevailing party in such controversy shall be entitled to receive, in addition to such other award as the court may deem appropriate, full reimbursement for its court costs and reasonable attorneys' fees incurred therein.

27. Negation of Partnership. This Agreement creates a relationship between two independent contractors and does not, nor may it be interpreted to, create the relationship of joint venturers, partners, employee/employer, or any other business relationship.

28. No Assignment. This Agreement is not assignable by either party, and any attempt by either party to assign its obligations hereunder shall be void ab initio at the election of the other party, which election may be made by written notice within ten (10) days of the non-assigning party's receipt of actual knowledge of such attempted assignment. Notwithstanding the foregoing, however, at the election of the other party, the obligations and burdens of a party shall bind and apply to any permitted successor in interest or assignee of the business and/or operations of a party.

29. Partial Invalidity. In the event that any portion of this Agreement or any provision hereof shall be deemed as invalid as contrary to applicable law, the balance of this Agreement shall be enforced according to its term, and that portion found unenforceable shall be interpreted and enforced to the extent that it may be within said applicable laws.

30. Disputes. This Agreement shall be construed and all disputes arising therefrom shall be settled in accordance with the laws of the State of California. Venue for any dispute arising under this Agreement shall be in Santa Barbara, California. Any controversy or claim arising out of or relating to this Agreement shall be resolved by binding arbitration before a single arbitrator in accordance with the Commercial Arbitration Rules of the American Arbitration Association ("AAA") then pertaining (available at www.adr.org), except where those rules conflict with this provision, in which case this provision controls. Any court with jurisdiction shall enforce this clause and enter judgment on any award. The arbitrator shall be selected within twenty business days from commencement of the arbitration from the AAA's National Roster of Arbitrators pursuant to agreement or through selection procedures administered by the AAA. Within 45 days of initiation of arbitration, the Parties shall reach agreement upon and thereafter follow procedures, including reasonable limits on discovery, assuring that the arbitration will be concluded and the award rendered within no more than eight months from selection of the arbitrator or, failing agreement, procedures meeting such time limits will be designed by the AAA and adhered to by the Parties. The arbitration shall be held in Santa Barbara, California and the arbitrator shall apply the substantive law of California, except that the interpretation and enforcement of this arbitration provision shall be governed by the Federal Arbitration Act. Prior to commencement of arbitration, emergency relief is available from any court to avoid irreparable harm. THE ARBITRATOR SHALL NOT AWARD EITHER PARTY PUNITIVE, EXEMPLARY, MULTIPLIED OR CONSEQUENTIAL DAMAGES. Prior to commencement of arbitration, however, the Parties must attempt to mediate their dispute using a professional mediator from AAA, the CPR Institute for Dispute Resolution, or like organization selected by agreement or, absent agreement, through selection procedures administered by

the AAA. Within a period of 45 days after the request for mediation, the Parties agree to convene with the mediator, with business representatives present, for at least one session to attempt to resolve the matter. In no event will mediation delay commencement of the arbitration for more than 45 days absent agreement of the Parties or interfere with the availability of emergency relief.

31. Prohibited Interest. The parties hereto covenant and agree that to their knowledge no board member, officer, or employee of MTD, during his/her tenure or for one year thereafter, has any interest, whether contractual, non contractual, financial or otherwise, in this transaction, or in the business of a contracting party other than MTD. If any such interest comes to the knowledge of either party at any time, a full and complete disclosure of all such information will be made in writing to the other parties, even if such interest would not be considered a conflict of interest under Article 4, Chapter 1, Divisions 4 and 4.5, Title I of the Government Code of the State of California.

32. Compliance with Laws and Regulations. Contractor shall warrant that in the performance of work under contract to MTD that they shall comply with all applicable federal, state and local laws and ordinances, and all lawful orders, rules, and regulations thereunder.

33. Audit and Inspection of Records. The Contractor shall agree that all materials supplied and services performed under the Project, facilities used in connection therewith, and records and documentation thereunto appertaining shall be subject to inspection, test, or audit by duly authorized representatives of MTD and the State of California. The Contractor agrees to maintain all required records relating to the Project for at least three years after MTD makes final payment and all other pending matters are closed.

34. Equal Employment Opportunity. [If the FTA provisions are incorporated:] For applicable terms, refer to Paragraph 24 (Civil Rights Requirements) in *Federal Transit Administration: Contract Provisions for Federal Fiscal Year [??/??]: [Contract Type Description]* which is attached hereto as Exhibit "[?]". [otherwise:]The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during their employment, without regard to their race, religion, color, sex, or national origin. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation, and; selection for training, including apprenticeship. The Contractor shall agree to post in conspicuous places available to employees and applicants for employment notices setting forth the provisions of the above paragraph. The Contractor shall insert a similar article to the above in all subcontracts entered into in connection with the contract governing this project, except subcontracts for standard commercial supplies or raw materials.

35. Entire Agreement. This Agreement and its attached exhibits constitute the entire agreement between the parties and shall be deemed to supersede and cancel any and all previous representations, understandings, or agreements between MTD and Contractor as to the subject matter hereof. This Agreement may only be amended by an instrument in writing signed by the parties.

36. No Waiver. The failure of either party at any time to require performance by the other party of any provision of this Agreement shall in no way affect that party's right to enforce such provisions, nor shall the waiver by either party of any breach of any provision of this Agreement be taken or held to be a waiver of any further breach of the same provision.

37. Counterparts: Facsimile/E-mail. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Agreement. The parties agree that a facsimile or scanned and e-mailed signature may substitute for and have the same legal effect as the original signature.

IN WITNESS WHEREOF, the undersigned have caused this Agreement to be executed.

SANTA BARBARA MTD [insert contractor name in caps]

_____	_____
Sherrie Fisher, General Manager	[insert authorized official name & title]
_____	_____
Date	Date

AVL & ITS Management (AIM) System

SPECIFICATIONS

Issued October 2, 2013

Santa Barbara Metropolitan Transit District
550 Olive Street
Santa Barbara, CA 93101

www.sbmtd.gov

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SANTA BARBARA METROPOLITAN TRANSIT DISTRICT

AVL & ITS Management (AIM) System

SPECIFICATIONS

Table of Contents

1 SCOPE OF WORK

1.1 INTRODUCTION

The Santa Barbara Metropolitan Transit District (MTD), a public transit provider, has developed these specifications for the procurement of a number of Intelligent Transportation Systems (ITS) which are collectively referred to as the *AVL & ITS Management System*. In these specifications, the *AVL & ITS Management System* project shall be referred to as the "AIM System" or "AIM." The mission of MTD is to enhance the personal mobility of South Coast residents and visitors by offering safe, clean, reliable, courteous, accessible, environmentally responsible, and cost-effective transit service throughout the service area. The AIM system is being implemented to aid MTD in fulfilling this mission. AIM shall be designed to be an efficient, effective, reliable, flexible, and expandable bus fleet management system that meets the needs of the MTD bus operators, supervisors, management, and public ridership. In an era of rapid technology advances and increasing interoperability requirements, AIM must be designed to allow it to be easily maintained, upgraded, and expanded.

1.2 SCOPE OF WORK

Contractor shall design, furnish, install, test, and make operational the AIM System for MTD. Contractor shall also provide supporting documentation, training, and technical support, as specified herein. Contractor shall be responsible for all acts, tasks, equipment, system components, and services required to provide MTD with a turnkey AIM System that is fully functional in accordance with the Contract and these specifications whether or not it is specifically identified within this Contract and these specifications. The five primary ITS enhancements or systems that AIM shall provide for MTD and its passengers are:

1. Automatic Vehicle Location
2. Time of Arrival Information
3. Route & Schedule Adherence
4. Onboard Video Surveillance
5. Yard Wireless Network

In addition to the above mandatory systems, the following additional systems or functions, in descending order of priority, will be considered as options to the core AIM System:

- Bus Stop Announcement
- Vehicle Health Monitoring
- Automatic Passenger Counter
- Yard Location/Assignment
- Computer-Aided Dispatch
- Road Supervisor CAD

1.3 SCHEDULE

The AIM System project duration from Notice to Proceed to System Acceptance shall not exceed one year. The Master Agreement contains additional terms and conditions requiring progression of the project such that certain project funding is spent prior to funding agency deadlines.

2 MTD OVERVIEW

The following sections provide an overview of MTD's existing transit service, equipment, facilities, data network, and software systems. The provision of this information by MTD does not relieve Contractor of its own information gathering and investigatory obligations. Contractor is responsible for obtaining all necessary information regarding MTD's existing systems required to perform the work.

2.1 TRANSIT SERVICE DESCRIPTION

2.1.1 Geographic Area

MTD was formed in 1968 as a California special district. The MTD service area of 52 square miles covers the populated South Coast of Santa Barbara County including the cities or unincorporated regions of Carpinteria, Goleta, Montecito, Santa Barbara, and Summerland. See *Attachment 1* for a map of the service area. Bus service is also provided to the City of Ventura via the Coastal Express Limited route.

2.1.2 Service Level & Equipment

MTD operates fixed-route transit service on 28 lines that, on an annual basis, carry 7.7 million riders while providing 200,000 hours and 2.7 million miles of revenue service. For specific route and schedule information, refer to MTD's website at http://www.sbmtd.gov/maps-and-schedules/index.html. Service is provided with a fleet of 106 revenue vehicles with a peak service requirement of 82 buses. See *Attachment 2* for a summary listing of MTD's revenue vehicle fleet and *Attachment 3* for a detailed listing. MTD has 23 service vehicles including 10 driver relief cars, 2 road supervisor SUVs, 7 shop trucks, and 43 staff cars. See *Attachment 4* for a detailed listing of MTD's service vehicles, including which will be equipped with AIM systems. MTD currently employs 208 individuals including 144 bus operators, 13 mechanics, 12 service workers, 8 supervisors, and 31 administrative staff members.

2.1.3 Facilities

MTD's combined administrative, operations, dispatch, and maintenance facility, referred to as Olive Terminal or Terminal 1, is located at 550 Olive Street in Santa Barbara. MTD facility hours of operation are from 4AM to 1 AM Monday through Friday, 5AM to midnight on Saturdays, and 5AM to 11PM on Sundays. MTD's Transit Center is the hub of the MTD system and is located at 1020 Chapala Street in downtown Santa Barbara. More than 10,000 passengers use this facility every day. MTD has approximately 750 distinct physical bus stop locations throughout the service area.

2.2 EXISTING SYSTEMS

2.2.1 Network Environment

MTD's existing server technologies are Windows DataCenter Server 2008 and Windows DataCenter Server 2012. The virtual server technology used is Microsoft HyperV. There are two physical servers running about 8 guests each. For data storage, MTD uses a Hitachi SAN. **For cost effectiveness and due to limited server room space, it is MTD's preference that Contractor use these existing MTD IT systems for the AIM data network system to the maximum extent feasible without negatively impacting the performance or functionality of either the existing MTD or the AIM System.**

2.2.2 Scheduling, Runcutting & Operations Applications

The software in use at MTD that is of primary relevance to AIM are the following Trapeze applications:

- FX 10.0.7.0 for scheduling
- OPS 10.0.24.0 for transit operations management

- Blockbuster 10.0.7.0 for runcutting.

It is not the intent of MTD to replace these Trapeze applications within the next several years.

2.2.3 Fare Collection & Passenger Counting Systems

MTD utilizes the GFI GenFare Odyssey electronic validating farebox on all revenue vehicles for collecting fare revenue and recording passenger counts. The system was implemented in 2000 and most equipment dates to that time. MTD will not be replacing the farebox system for at least several years. **As indicated later in these specifications, MTD's preference is that driver's utilize a single in-vehicle sign-on for both the AIM System and the Odyssey farebox system**.

2.2.4 Voice Radio System

To meet FCC narrowbanding requirements, MTD upgraded its two-way radio communications system in late 2012 with Motorola MOTOTRBO digital technology. Physical equipment in use is composed of:

- Two MTR3000 repeaters (one each on Gibraltar Peak and Santa Ynez Peak)
- One bi-directional repeater composed of two XPR 5550 mobile radios (in Oxnard)
- Two XPR 5550 control base stations (one each at Olive Terminal and the Transit Center)
- 129 XPR 5550 mobile radios (one each in 106 buses and 23 service vehicles)
- 15 XPR 7550 portable radios (used by operations management and supervisors)
- Five XPR 3300 non-display portable radios (used by staff)

The radio system utilizes a UHF wideband channel pair at 453.750 MHz for transmission and 458.750 MHz for reception in MTD's primary service area using the Gibraltar Peak repeater. MTD has a backup repeater on Santa Ynez Peak using 453.2375 MHz for transmission and 458.2375 MHz for reception. A simplex channel at 453.075 MHz is used to extend the coverage for buses on routes in the Ventura area using the bi-directional repeater located in Oxnard to relay transmissions onto the main MTD channels.

MTD does not presently utilize the data capabilities (e.g., messaging, GPS) of the MOTOTRBO system. **For cost effectiveness and space utilization issues, it is the preference of MTD that, if possible, onboard AIM systems utilize the data communications capabilities of the MOTOTRBO system**.

3 AIM DESIGN & COMMUNICATIONS

3.1 DESIGN REQUIREMENTS

3.1.1 Capacities & Expandability

AIM shall be designed to facilitate future expansion in functionality and transit operating conditions through the use of open, fully documented interfaces. Compliance shall be demonstrated as part of the Acceptance Testing included in these specifications. AIM shall permit expansion without upgrading initial hardware or software systems provided for the project and with no more than 5% degradation in the latency of data to support the following:

- 1,000 driver operators identified by up to 5 alphanumeric characters (currently 200)
- 200 buses in operation identified by up to 5 alphanumeric characters (currently 106)
- 200 lines/routes identified with up to 5 alphanumeric characters (currently 50)
- 2,000 runs (daily driver assignments) using up to 6 alphanumeric characters (currently ??)
- 2,000 bus stops using up to 4 alphanumeric characters (currently approximately 750)
- 10 Road Supervisor Subsystems in simultaneous operation (currently 2 road cars)
- 8 CAD consoles in simultaneous operation (currently 2 dispatch consoles)
- 4 management consoles in simultaneous operation
- A scheduled operating day that extends beyond 24 hours

AIM shall be designed to permit the addition of new functional capabilities over its lifetime without significant replacement of existing components. In particular, functions designated in these specifications as future or options shall be readily added to the system during its lifetime without costly rework or replacement of existing system components.

3.1.2 Nomenclature & Familiar Terms

Text for labeling, messages, etc., shall use terminology that is consistent with existing MTD terminology. Contractor shall verify such terms with MTD during system setup.

3.2 OPEN SYSTEM ARCHITECTURE

AIM shall be designed using off-the-shelf hardware and software to the maximum extent feasible and shall be designed using open system architectures. Open systems architectures, as used in the context of AIM, means the use of:

- Components with interfaces that are fully documented, non-proprietary, and based on a standard recognized by a standards-making body, such as IEEE, ANSI, SAE, and CCITT.
- Components manufactured by several sources or are readily commercially available.
- Components whose internal workings are fully documented and understood by a significant user and support community.
- Custom components that were developed and documented in accordance with recognized programming architecture and standards and quality assurance procedures.

3.2.1.1 Software

All software, including firmware, (other than off-the-shelf operating system software from third parties) furnished as part of AIM shall be developed in accordance with IEEE software quality assurance procedures and shall utilize modern software engineering techniques, such as client-server and object-

oriented software architecture. Current standard operating systems such as Windows 7 and 2008 Server, or later, shall be utilized. Microsoft operating systems are preferred. A common high-level language, such as ANSI Standard C++, shall be utilized.

Complete tools and all necessary files for managing, building, and testing software shall be included. Facilities shall be provided to support building and testing without impacting MTD operations. Installation tools shall be provided to enable coordinated, rapid, and secure updates at all sites and vehicles as further defined in these specifications.

3.2.1.2 Data Protocols

Data communications shall be based on standard, open protocols that conform to the Open Systems Interconnection (OSI) seven-layer model. These protocols shall include the following:

- The use of 802.3 - 2008 IEEE Standards for Local and Metropolitan area networks and IEEE Wireless LAN 802.11n–2009 or later
- The use of IP for wide area network communications.
- The use of TCIP, SAE, and EIA protocols for vehicle area network communications.

Protocols used for data radio communications, if used, may be implemented in the radio or an external modem. Open protocols are preferred. Documentation of the protocol shall be provided.

3.2.1.3 Databases

AIM shall retain and manipulate data as relational files using common database routines for definition and access. All parameters needed for administration shall be available through system administrator console operation. Contractor shall provide tools for performance measurement and analysis. Databases shall be ODBC compliant and allow multiple users to access data without significant impact on performance. Microsoft SQL databases are preferred.

3.2.1.4 National ITS Architecture

AIM shall comply with the intent of the National ITS architecture. Use of NTCIP framework and data dictionaries as per TCIP Standards 1400 through 1408 and SAE J2496, inclusive, is desired for open standards compatibility. For onboard equipment, use of SAE Standards J1708, J1939, and J1587 shall also be acceptable for open systems, particularly for interfaces to existing onboard equipment that are compatible with these standards. New data elements not covered by these standards shall be compatible within the framework of these protocols.

3.2.2 Reliability & Maintainability

AIM shall include provisions to achieve high availability for critical functions through reliability of systems and system components, elimination of single points of failure, self-diagnostics, and reporting of failures, and maintainability of AIM. Such provisions shall include but not be limited to:

- No single point of failure shall disable data communications between a Dispatch Center and the bus fleet, other than failure of Onboard AIM equipment on a single bus or the data link with the radio site or internet site for the cellular carrier, whichever is relevant.
- No single point of failure shall disable radio communications at more than one dispatch console.
- AIM shall include self-diagnostics and shall automatically report and log failures for each onboard subsystem.
- Console equipment shall be replaceable without disruption to other consoles or AIM as a whole.

3.2.3 Response Times

AIM shall be designed and utilize systems and components that, operating under full design capacity, minimize response times such that system users may continue their work in normal continuous progression without excessive delays.

3.2.4 AIM Interfaces

AIM shall interface with existing MTD systems, applications, software, hardware, and vehicle systems as necessary to meet these specifications. Integration, coordination, scheduling, and communications for such interfaces shall be managed by Contractor.

3.2.4.1 MTD Network & Transit Database

AIM shall share real-time data with the applications that reside on the MTD network via a Transit Database (TDB). The Contractor-provided, ODBC-compliant TDB shall provide for bi-directional data transfer to support multiple applications, as detailed in these specifications. Contractor shall furnish to MTD the definitions of and a data dictionary for AIM data on the TDB. The data shall be in a form that is accessible through SQL. Contractor shall provide all necessary conversion utilities to provide data to the TDB in a format usable by MTD applications and to read data provided by the MTD applications to the TDB. Interfaces shall be configured such that AIM automatically initiates requests for information and completes data transfers without manual intervention. Contractor shall utilize a firewall to protect against unauthorized access to or modification of the MTD network from the AIM network. The firewall shall be based on current technology and accommodate AIM under full design capacity.

3.2.4.2 Vehicle Equipment

AIM shall interface to multiple existing equipment onboard MTD buses as required to meet these specifications. These include, but are not limited to, fareboxes, public address equipment, headsigns, engine control computers, transmission control computer, driver interface computers, and odometers. Contractor shall develop, document, and implement such interfaces and be responsible for all work necessary for seamless interface with existing bus equipment.

3.2.5 Utilities & Third Party Services

Contractor shall be responsible for coordinating any utility or other third party services required for the implementation and operation of AIM. Such services may be related but are not limited to telephone lines; wireless, cellular or radio communications; and provision of electrical power. Any third-party agreements for such ongoing services must be approved by MTD (the costs of such services—whether fixed or estimated, one time or monthly—and the party responsible for payment thereof shall have been determined as part of the review and negotiation process resulting in the contract for this project).

3.2.6 Log-in Device

It is MTD's strong preference that operator onboard sign-in be through a single input device for both AIM and the GFI farebox. This may be accomplished through either the farebox or a separate mobile data terminal (MDT). **If the MDT is used in lieu of the farebox control head, the MDT must accommodate all entries normally carried out through the farebox (e.g., passenger counts and types)**. See related requirements in Sections 4.9.1.3 and 5.3.1.2.

3.3 VEHICLE DATA COMMUNICATIONS

3.3.1 General

As necessary for AIM systems provided by Contractor to meet these specifications, Contractor shall implement a wireless data communications system between MTD vehicles in the field and MTD fixed facilities systems (the requirements and specifications for wireless communications within the MTD yard are contained in Section 4.5). **It is MTD's strong preference that the method of such data communications minimize ongoing operating costs for the provision of such communications.**

AIM shall communicate with each active (powered-up) vehicle at least once every thirty seconds. AIM shall have the ability to enable fast polling for selected vehicles. AIM shall use an efficient means of controlling this periodic reporting such as group or synchronized polling. Traditional single vehicle poll-respond cycles are not efficient and shall not be acceptable. The time period for reporting shall be adjustable by the system administrator.

3.3.2 Onboard Equipment

Onboard data communications equipment including, but not limited to, radio or cellular transceivers, modems, and antennae shall be of rugged construction suitable for the public transit environment. Vehicle modems may be integrated with the onboard AIM processor, integrated within the data radio or cellular device, or as a physically separate device.

3.3.3 Data Radio System

If a data radio system is implemented for AIM, the requirements in this section shall apply. **To the extent feasible, Contractor shall utilize MTD's existing frequencies and Motorola MOTOTRBO radio system for the data radio system.** The existing system is described in Section 2.2.4. The data radio system shall use protocols optimized for the short message length typical of this type of system. Long modem training times and extensive pre-ambles shall be avoided. The protocol shall provide for efficient reporting of changes of state in real time and shall also provide for regular status checks of all mobile units to verify that data communications is functioning properly. Allocation of the data channel utilization shall be dynamic so as to maximize throughput under the actual current conditions. Allocation of the data channel utilization shall provide sufficient message slots for real-time messages to support all operator messages during pullout of the maximum design fleet, while continuing to support specified response times for all other functions. The data radio system shall utilize a bit rate sufficient to fulfill the needs of the AIM systems under the anticipated maximum communications level.

3.3.4 Cellular Service System

If a cellular system is implemented for communications, upon approval by MTD, Contractor shall arrange and implement the necessary cellular data service. Contractor's price shall have included any setup, installation or other cellular service provider one-time fees. MTD shall be fully responsible for paying any ongoing data communications service fees charged by the cellular service provider.

4 AIM SYSTEMS

This chapter describes the functions and features of the differing AIM systems. The Automatic Vehicle Location system is not a feature per se, but is critical to the functionality of most AIM systems. The time of arrival, route and schedule adherence, onboard video surveillance, and yard wireless network systems are mandatory features of AIM. The automatic voice annunciator, vehicle health monitoring, automatic passenger counter, yard location/assignment, computer-aided dispatch, and road supervisor CAD systems are considered options to the AIM System. Their ultimate inclusion as part of the Work shall primarily be dependent upon budgetary constraints.

4.1 AUTOMATIC VEHICLE LOCATION

4.1.1 General

MTD bus location information is integral to several AIM systems and hence critical to the overall success of the AIM project. Contractor shall provide an Automatic Vehicle Location (AVL) system that will determine, store, and regularly update real-time vehicle location information of MTD buses and other selected service vehicles. The AVL system shall utilize GPS technology and have the location accuracy necessary to meet the requirements of these specifications. The mobile AVL system shall be installed in all 106 MTD buses and two road supervisor vehicles. The mobile AVL system shall be considered **optional** for 16 of the remaining 21 service vehicles (see *Attachment 4* for optional vehicles).

4.1.2 AVL Database

AIM shall provide, maintain, and update a database of the real-time vehicle location information determined by the AVL system. Such database shall be sufficiently detailed to meet the requirements of these specifications including for use by both onboard and facility AIM systems; for real-time AIM applications; and for later analysis and reporting by AIM. Contractor shall determine the most efficient means and timing of storing and communicating the AVL data between mobile and fixed systems. The fixed AVL database shall be considered part of the TDB, which shall maintain at least six months of historical date, time, and location data for each AVL equipped vehicle.

4.1.3 GIS & Geocoding

Contractor shall provide and customize a geographic information system (GIS) database of the MTD service area as necessary to meet the requirements of the AVL system and these specifications. Any required geocoding of MTD bus stops, routes, and yard locations for the GIS and AIM shall be the responsibility of Contractor. MTD maintains geocoding information in Trapeze for MTD bus stops which is available for use by Contractor for AIM systems. However, MTD shall not guarantee the suitability or usability of the existing bus stop data for AIM. **MTD shall be required to maintain only one bus stop geocoding database for usage by both Trapeze and AIM.** Contractor shall provide the software applications, licenses, etc. necessary to enable MTD to use the customized GIS database for non-AIM systems and applications.

4.1.4 GPS Receiver

A GPS receiver and antenna suitable for meeting AIM system requirements shall be provided, configured, and installed in MTD buses and applicable service vehicles. It shall be designed for use with AVL applications and be of rugged design suitable for a transit environment. The GPS receiver shall be the time source for all onboard AIM systems and devices, and for time-tagging all recorded events. Data output format shall use a documented, non-proprietary protocol. The GPS receiver shall meet or exceed the following standards:

- GPS Data Update Frequency: once per second
- Location Accuracy: 5 meters
- Velocity Accuracy: 0.1 meter per second
- Time: 1.5 microseconds
- Cold Start Acquisition Time: 4 minutes
- Warm Start Acquisition Time: 30 seconds
- Reacquisition Time: 2 seconds

4.1.5 Ventura Route AVL (option)

As an option, AVL shall be expanded to cover the geographic area traveled by the Coastal Express Limited bus route, which includes downtown Ventura. Such option shall address and accommodate usage of applicable AIM systems (e.g., time of arrival information, bus stop announcements, etc.).

4.2 TIME OF ARRIVAL INFORMATION

4.2.1 General

AIM shall determine dynamic estimated time of arrival to the next bus stop for each bus based on data from the AIM AVL system. The time of arrival information shall be available for electronic display signs and monitors, internet access including MTD's public website, the computer-aided dispatch (CAD) and telephone interactive voice response (IVR) systems (options), the TDB, and the MTD network. AIM shall be capable of providing AVL and time of arrival information for all buses in XML format for a future interface to a regional 511 system.

4.2.1.1 Algorithm

The time of arrival information shall be determined using a predictive algorithm that utilizes the current AVL information for the approaching buses to a bus stop. AIM shall calculate the arrival times for the next three buses that will arrive at each stop for all routes and directions serving that stop. The time of arrival information shall be updated at least every thirty seconds and made available to the systems using such information within one second after the AIM server receives a location update. AIM shall also calculate time of departure information and provide MTD the option to display time of arrival or departure information or both. The accuracy of the predictive algorithm shall be such that the average predicted error shall be less than two minutes 90% of the time when a bus is between five to eight minutes or less from a stop; and less than one minute 90% of the time when a bus is five minutes or less from a stop. The AIM predictive algorithm shall be a learning algorithm that is based on historical data for the stop location, route, and the time of day, day of week, and week of year.

4.2.1.2 Source Information

MTD maintains its bus stop and schedule databases in applicable Trapeze applications, which shall be the source of data used for time of arrival calculations. **MTD shall be required to maintain only one bus stop and schedule database for usage by both Trapeze and AIM.**

4.2.2 Webpage

Contractor shall develop a webpage accessible from MTD's public website for accessing estimated time of arrival information. The website shall provide a real time map display of all current MTD lines and bus stops with vehicle locations updated at least every 30 seconds. If the computer-aided dispatch (CAD) system is obtained as part of AIM, there shall be a single map database to maintain for both the webpage and CAD. The dynamic time of arrival information shall be accessible directly from the map

display when a user clicks or mouses over a bus stop icon or by user entry or selection of pertinent data (i.e., bus stop ID, line number, etc.) If a dynamic time of arrival prediction is not available for a stop, the website shall display the Trapeze schedule data with a note indicating that the information is not dynamic. Other map display features and requirements include:

- Clearly visible street names, bus stop icons, vehicle icons, and local landmarks
- Ability for user to zoom in and out and pan the map display
- Allow MTD posting of real time messages for public service announcements, detours, etc.
- Ability for user to select a single line to be displayed
- Development of mobile device-optimized webpage version for smartphones, tablets, etc.
- Webpage management tools to edit, add, or delete lines, bus stops, landmarks, etc.

4.2.3 E-Mail & Wireless Messaging

The Time of Arrival Information system shall enable MTD to manage and send announcements and alerts to the public through e-mail, wireless text messaging, and social media applications (e.g., Facebook and Twitter). Such messages may be developed and sent automatically by AIM or manually by MTD. The emphasis of such messages shall be on estimated time of arrival information and alerts, including late arrivals. The system shall also enable the sending of public service announcements, newsletters, or other information of MTD's choice. The Time of Arrival Information webpage shall enable users to sign up to receive such messages for the topic and via the medium of their choice.

4.2.4 Bus Stop Codes

AIM shall include the means for both smartphones and non-smartphones to easily obtain dynamic time of arrival predictions at all MTD bus stops. This may include listing the address and/or content of a text message or providing a QR code to be scanned for accessing the information. MTD will consider alternatives to these methods. Contractor shall establish a database for the text message address/content, QR codes, etc. and their associated bus stops and bus service, and mount such information at the bus stops along with instructions on how to use it to obtain time of arrival information.

4.2.5 Electronic Display Signs

Contractor shall provide and install electronic display signs showing estimated time of arrival information at the MTD Transit Center (TC). Such information shall be visible in both the interior and exterior passenger waiting areas of the TC. Signage shall include the ability to display public service or other static or video announcements of MTD's choosing. The time of arrival information displayed shall be of sufficient size, sharpness, contrast, color, and brightness to provide ease of visibility and meet any applicable ADA requirements. Contractor shall provide software on the AIM network and any equipment necessary to configure the display signs.

4.2.5.1 Installation

Contractor shall work with MTD to determine the location of the TC electronic display signs and shall perform all tasks necessary for their implementation including obtaining necessary local permits, licenses, and approvals; provision of power to the displays from the existing TC building electrical system; and the necessary data communications link between AIM and the electronic display signs.

4.2.5.2 Physical & Environmental Requirements

The displays shall be of rugged construction, reliable, maintainable, and suitable for the designated installation location. Contractor shall utilize vandal resistant enclosures and the faceplate shall be scratch

resistant. Cable connections to the signs shall be concealed to the extent feasible. All exposed surfaces of the system components shall be unaffected by brushes, detergents, and cleaning solvents normally used by maintenance crews. All exposed surfaces shall also be resistant to ultraviolet radiation and air contaminants. Electronic displays signs and monitors shall be certified to function in the given environment and shall not be affected by the following environmental conditions:

- Temperature: 20°F to 120°F for outdoor displays, 50°F to 100°F for indoor displays
- Relative humidity (non-condensing): 15% - 95% for outdoor displays; 20% - 80% for indoor
- Rainfall: up to 6 inches per hour, for outdoor displays
- Freezing precipitation: up to 1 inch per hour, for outdoor displays
- Wind speed: up to 80 mph, any direction, for outdoor displays
- Sunlight: None to full, direct, for outdoor displays
- Pollutants: Characteristic of the area, including salt, dust and corrosive or base chemicals.

4.2.5.3 Remote Bus Stop Displays

As an option, Contractor shall provide signage for five non-TC bus stops. Such signage shall be suitable for remote, outside locations in addition to meeting the requirements of the TC exterior displays. Contractor shall not be responsible for the installation, permitting, power, or communications of the remote displays, which shall not be considered part of these specifications (such services may be added to the Contract later through a change order or through a separate competitive solicitation).

4.2.6 Interactive Voice Response (IVR) (Option)

The AIM Interactive Voice Response system shall receive telephone calls from MTD clients and provide them with dynamic time of arrival information for the bus stop ID entered. The IVR subsystem shall provide dynamic time of arrival predictions for the next three buses for each route that is serving the bus stop location, including direction of travel and destination.

Management tools shall enable MTD staff to create, edit, or delete audio files for bus stop names and locations, public service announcements, menu items, and real time messages, and to schedule when the messages shall be displayed. The management tools shall enable MTD staff to add menu items, and to monitor and display call traffic and telephone line activities. Contractor shall provide IVR management tools to edit, add, or delete bus stop information in MTD's bus stop database. The IVR system shall:

- Automatically recover from power failures.
- Include a call logging feature that keeps a record of call details by menu options.
- Include a selectable option for the caller to be connected to a live telephone receptionist.
- When certain bus stop IDs are entered, automatically connect caller to a live person.
- Allow recording of and option to play general service announcements.
- Offer more detailed instructions if caller fails to enter in bus stop ID within settable time period.
- Offer static time of arrival information for arrivals beyond a settable threshold from current time.
- Include a methodology to assist the caller in determining the stop ID number.
- Provide the caller with an option to hear the information in Spanish.
- Include text to speech capability for the creation of announcement and stop location recordings.
- Include speech recognition.
- Include the capability to play advertisements based on the location of the stop ID.
- Provide users of TTY/TDD devices with automated access to time of arrival information.

4.3 ROUTE & SCHEDULE ADHERENCE ANALYSIS

Contractor shall provide tools for the analysis and reporting of route and schedule adherence data collected by the AVL system. Such system is separate and distinct from the CAD system route and schedule adherence incident reporting. Key areas that the analytical tools and standard reports shall address or include:

- Selectable by bus, bus stop, line, run, block, time, or date
- Reporting on detailed and/or summary level
- Calculation of average, mean, variance, standard deviation, or other analytics
- Reporting on exception basis with user selectable exception levels or ranges
- Reports addressing vehicle travel, revenue, and dwell time
- Reports addressing vehicle adherence to schedule timetable
- Reports addressing vehicle adherence to route path
- Creation of custom reports
- Tools for management and archival of AVL route and schedule database

4.4 ONBOARD VIDEO SURVEILLANCE

4.4.1 General

Contractor shall provide and install a Video Surveillance System (VSS) composed of fixed video cameras and digital recorders on all MTD buses. Key VSS features include:

- Capability of recording video at up to 30 frames per second
- Installation of 8 cameras on buses greater than 25 feet in length and 5 on buses less than 25 feet
- Recording of video at all times that bus operator master switch is turned to the "ON" position
- Provision of evidence acceptable in the State of California criminal courts
- Provision of G-force sensor indicating vehicular accidents for incident tagging purposes
- Provision of covert microphones for recording of audio under MTD-determined conditions

4.4.1.1 Incident Tagging & Audio

The VSS shall provide the capability for tagging incidents on the onboard video recorder. The VSS shall tag recorded video (and audio) as an incident by either manual initiation by operator or dispatcher; or automatic initiation by a G-force sensor. Upon initiation of and throughout incident tagging, the VSS shall record audio through the covert microphones. Camera-integrated microphones are preferred. Other requirements, capabilities, or features related to incident tagging and audio recording shall include:

- Initiation of incident tagging by operator through the silent alarm system.
- Initiation of incident tagging by dispatcher through AIM Computer-Aided Dispatch system.
- Immediate dispatcher notification, including audio alarm, of initiation through CAD system.
- Increase of camera and recording speed to 30 frames per second during incident tagging event.
- Set video tag to user-settable time period prior to activation of initiation of incident tagging.
- Continue incident tagging and audio recording until the SAS or Incident Tagging is cleared.
- Discontinue incident tagging after thirty minutes if not cleared by operator or dispatcher.

4.4.1.2 Video Surveillance System Integration

The VSS shall interface with AIM to the extent necessary to meet the requirements of the VSS. AIM shall automatically upload tagged video and audio data via the wireless LAN at the bus yard.

4.4.2 Cameras

4.4.2.1 Specifications

Cameras shall be day/night type generally using color during the day and black & white at night and applicable low light conditions. Cameras shall be sufficiently durable for usage in the transit bus environment. Other requirements, capabilities, or features of the cameras include:

- Be NTSC compatible with 1/3" or larger CCD imager and fixed length lens.
- Capable of speeds of up to 30 frames per second.
- Have integrated microphones to be used for audio recording.
- Use an automatically adjusting iris.
- Use camera-lens combinations that maximize image quality by location, conditions, and purpose.
- Use focal length and f/stop selected to maximize viewable area by location.
- Be housed in vandal-resistant enclosure using tamper-proof screws.
- Accommodate normal and wide-angle lenses.
- Have minimum resolution of 720p.

4.4.2.2 Locations

MTD shall consider Contractor recommendations on camera locations. However, MTD anticipates locating cameras to at least provide surveillance of the following areas and/or purposes:

- Operator compartment facing forward through front windshield
- Front door with emphasis on passenger boarding and alighting
- Rear door with emphasis on passengers alighting
- Farebox area with emphasis on passenger fare transactions
- Operator compartment with perspective from upper right side location
- Rear passenger area with emphasis on detecting window and seat vandalism

4.4.3 Recording Unit

The VSS recording unit shall be capable of digitizing video and audio from eight cameras, provide compression of the video and audio, and store the video and audio on a removable hard drive. Other requirements, capabilities, or features of the recording unit include:

- There shall be a minimum of eight video inputs.
- Video shall be recorded in NTSC format in either black & white or color.
- Images shall be digitized with at least 720p resolution.
- Video from each input shall be recorded at 15 frames per second in normal mode.
- Video from each input shall be recorded at 30 frames per second in incident tagging mode.
- Video compression shall use the H.264/MPEG-4 AVC standard with a 3Kb file size.
- On-bus storage capacity shall be for seven days at 18 hours per day in normal mode.
- The oldest video stored shall be automatically over-written when storage is at capacity.

- The storage format shall use encoding such that alteration to the images can be detected.
- Video that is tagged shall not be over-written until after the tag is removed.
- Recorder shall synchronize internal clock to the GPS provided for the AVL system at least daily.
- Recorder shall watermark and date/time stamp all recorded video using GPS clock time.
- Recording unit shall have a digital output port for downloading video via the yard wireless LAN.
- Hard drive shall be designed for rapid removal and installation.
- Hard drive shall be housed in a ruggedized enclosure that locks to the recording unit.
- Hard drive shall automatically connect and synchronize to the VSS.
- A common key shall be used for removing and installing all VSS hard drives.

4.5 YARD WIRELESS SYSTEM

Contractor shall provide, configure, and install an AIM Wireless Yard System to facilitate and manage the transfer of data between buses and applicable service vehicles in the yard at Terminal 1 and the fixed AIM local area network (LAN). **As an option**, the Wireless Yard System shall indicate and manage the location, status, and assignment of buses within the yard.

4.5.1 AIM Data Transfer

The yard data transfer function shall be accomplished using a wireless local area network (WLAN) for the uploading and downloading of AIM system data between vehicles and the fixed AIM data network.

4.5.1.1 WLAN Design

The design characteristics and capacities of the WLAN shall accommodate the data transfer needs of AIM without delays or excessive administration affecting the efficiency of overall MTD operations. The final WLAN design shall be dependent upon the AIM systems ultimately provided by Contractor. The WLAN shall utilize one or more fixed wireless access points (AP) located in the MTD yard which shall communicate with vehicles via appropriate onboard wireless communications systems and hardware. Other requirements, capabilities, or features of the WLAN shall include:

- Adequate WLAN coverage to accommodate efficient data transfer with vehicles throughout the bus yard and maintenance shop
- Equipment using IEEE 802.11n specification preferably on the 5 GHz frequency
- Equipment that conforms to the Wireless Ethernet Compatibility Alliance certification standards for interoperability among IEEE 802.11n High Rate products from multiple manufacturers
- Wireless AP(s) of rugged construction suitable for fixed installation in a bus yard, transit fueling building, and maintenance area environment
- Usage of encryption of WPA2 or better including logging of unauthorized access attempts
- Management tools that monitor and maintain the WLAN including reports on client status, fault indications, and log of files uploaded and downloaded by vehicle
- Automated initiation of efficient sequence of data transference by bus, time, and data type
- Administrator ability to manage or manually override automated settings

4.5.1.2 Full Video Upload Option

For the video surveillance system, Contractor shall assume that the wireless upload of video (and related audio) shall be restricted to incidents that have been tagged. **As an option**, the WLAN design shall accommodate the nightly upload of all new video from all buses to the AIM server. Such design shall

address and include any additional AIM system requirements including sufficient storage capacity to accommodate six months of recorded video.

4.5.1.3 Access Point Network Interface

Interface with the fixed AIM LAN shall be via a "master" access point located on the Administration Building exterior hardwired to the Server Room. The interface shall incorporate protocol filters and broadcast traffic filters with adjustable bandwidth allocation. The broadcast filter shall block broadcast messages from the wireless LAN. Network bridging shall be configured to allow communication only with clients that the AP knows to exist in the Wireless LAN behind the wireless bridge.

4.5.2 Yard Location & Status (option)

The Yard Wireless System shall maintain a yard plan showing the current bus locations, IDs, availability status, and assignments by operator and run; and provide for bus status updates by the Maintenance Department. The yard plan and vehicle status shall be available to the Dispatch Center console and to selected pre-existing Maintenance Department workstations. Other requirements, capabilities, or features of the Wireless Yard Location system shall include:

- Display yard plan in graphical format matching the actual layout of the yard.
- Automatically record movements of a bus in, out of, and within the yard.
- Provide for scheduling future vehicle status such as holding vehicles for maintenance, etc.
- Provide standard reports on vehicle movements and status.

4.5.3 Bus Assignments (option)

The Yard Wireless System shall make bus assignments based upon the next bus available in a preferred bus series at a ready line at least sixty minutes prior to the time the operator is ready and scheduled to pull out. Other requirements, capabilities, or features of the bus assignment system shall include:

- Accept a list and changes to the list of preferred series for each line.
- Select first available bus in the highest available preferred series to assign to the line/operator.
- Alternatively, make assignments based only upon pullout schedule.
- Accept or automatically make assignments of buses to unscheduled work assignments.
- Allow holding of bus assignments by the Dispatch Center or Yard workstation.
- Send alert to Dispatch Center if a pullout is not made within a settable time after it is due.

4.6 AUTOMATIC VOICE ANNUNCIATORS (OPTION)

Contractor shall provide an Automatic Voice Annunciator (AVA) system in each bus that shall automatically audibly and visually announce bus stops and stop requests; and change exterior electronic headsigns. The AVA system shall determine where or when to make bus stop announcements and headsign changes using AVL system data and pre-defined location or time parameters. Once the bus operator is logged into AIM, the AVA system shall be fully automatic requiring no driver interaction.

4.6.1 Announcements

4.6.1.1 Destination Announcements

When a bus is approaching a bus stop, one or more announcements shall be made for such approaching bus stop. Requirements, capabilities, or features of the announcement system shall include:

- Meet Americans with Disabilities Act (ADA) requirements for the bus stop announcements.

- Make line and destination location announcements prior to and upon arriving at bus stops.
- Include pre-defined announcements in Spanish in addition to English.
- Allow administrator to program:
  - Bus stops at which announcements will be made.
  - Distance or time of announcement(s) prior to the bus stop.
  - Multiple occurrences of announcement for a given bus stop, including upon arrival.
  - Type of announcement (visual, interior audio, and/or exterior audio) by bus location.
  - The use or non-use of the Spanish language announcements.
  - Disabling of exterior audio announcement by time of day.
  - Destination description by street, intersection, location, or landmark.
- If bus goes off-route, disable announcements until bus returns to the assigned route.
- If an unscheduled stop is made, continue to make correct next bus stop announcements.
- Make audio and visual "Stop Requested" announcements and clear when a door is opened.
- Display time and/or operator name periodically or at pre-defined locations.
- Automatically make other pre-defined announcements periodically or at pre-defined locations.
- Allow operator to manually invoke the pre-defined announcements.
- Allow operator to disable AVA system in the event of malfunction.

4.6.1.2 Stop Announcement Database

The AVA system shall include a database of the audio and visual bus stop and other pre-defined announcements. Contractor shall initially set up the database including all announcements, which shall be subject to review and approval by MTD. The database shall include necessary administrative tools for MTD to easily modify announcement parameters for individual bus stops including but not limited to announcement content, location, frequency, and type. The AVA announcements shall be resident on the onboard systems. Any modifications to the database shall be updated via the Yard Wireless System.

4.6.1.3 Visual Announcement Signs

Contractor shall provide and install inside each bus one electronic variable display sign for visual bus stop and other pre-defined announcements. Requirements or capabilities of the signage shall include:

- Mount sign above and behind the driver compartment facing the rear of the bus.
- Use text of sufficient size, brightness, contrast, and clarity to be readable by persons with normal vision from anywhere in the bus under typical day and night ambient lighting conditions.
- House sign in a vandal-resistant enclosure with a scratch resistant faceplate lens.
- Conceal cable connections to the sign enclosure behind the sign.

4.6.1.4 Audio Announcement Equipment

Audio announcements shall be made using the existing public address (PA) system and equipment onboard each bus. The Clever Devices SpeakEasy II hands-free announcement system is installed on all buses except the Nova and electric shuttle fleets. The AVA system shall be interfaced with the PA system to control interior and exterior announcements to the correct speakers. MTD shall retain responsibility for the condition of the existing PA system to the extent that it is not damaged by the Contractor. Requirements, capabilities, or features of the audio announcement system shall include:

- Use ambient noise measurements to automatically control volume for audio announcements.

- Allow operator to override ongoing audio announcement through driver PA system.
- Allow operator to override AVA-determined volume level within a specified range.

4.6.2 Headsign Control

Using information from the AVL system, the AVA system shall control existing MTD electronic headsigns on buses so equipped to automatically display the correct bus line, general service message, or out-of-service status. Such control shall be of all exterior headsigns including those on the front, side, or rear of the bus. Requirements, capabilities, or features of the headsign system shall include:

- Provide the drivers and data in the format necessary to control and interface with the headsigns.
- Not inhibit or degrade the use or performance of the existing headsign system.
- Allow administrator to program and modify the location at which headsign changes shall occur.
- Modify the Nova fleet headsign ODK's to include a J1708 interface.

4.7 VEHICLE HEALTH MONITORING (OPTION)

4.7.1 General Description

The Vehicle Health Monitoring subsystem (VHM) shall continuously monitor the functionality, performance, and operation of onboard equipment that is equipped with a programmable controller for operator-controlled functions and indications. VHM shall provide detailed operational vehicle fault, alarm, and performance information that allows Operations and Maintenance to efficiently respond to maintenance issues. At a minimum, VHM shall interface with, monitor, collect and report data for the following systems that are equipped with digital interfaces:

- All Onboard AIM subsystems
- Electronically-controlled engines & transmissions
- Brakes (anti-lock and condition monitoring)
- Air conditioners
- Electric vehicle battery monitoring and management systems
- Fire suppression and event data recorder systems
- Multiplex-interfaced equipment (e.g., doors, wheelchair lifts, lights, etc.)

4.7.2 Data Collected

Equipment data collected shall generally fall into four categories: status, performance, code-generated events, and alarm-generated events. MTD understands that the categories, detail, and frequency of information collected by VHM will be limited to that generated by each particular onboard equipment type. At a minimum, it is expected that VHM shall collect and report the following information:

- Any codes generated by interfaced equipment
- Engine and transmission temperature
- Engine, transmission, and radiator fluid pressures and/or levels
- Air, charging, interlock, and A/C system status
- Vehicle speed
- Throttle and brake position activity

4.7.2.1 Alarm Reporting

Contractor shall determine which VHM data collected shall be defined as an alarm-generating event that necessitates immediate notification to Operations and Maintenance for consideration of a roadcall. Such determination shall be in consultation with MTD and using manufacturers' recommendations. VHM shall immediately transmit and display such alarms to the onboard MDT, the Dispatch Center, and to the Maintenance workstation.

4.7.2.2 Data Communication

VHM shall communicate collected information to AIM servers and the TDB via the Yard system WLAN. VHM data shall also be directly available on each bus through connection to a laptop computer. As indicated above, alarms shall be immediately reported to Operations and Maintenance which shall be via the wireless data radio/cellular communications system.

4.7.2.3 Administration & Monitoring Points

VHM settings and reports shall be accessed and managed through fixed AIM consoles. VHM shall provide for the configuration of monitoring points for relevant data collected (e.g., set the oil pressure level at which an alarm shall be generated) which shall be disseminated to the fleet via the yard WLAN. VHM shall employ frequency and duration threshold algorithms to ensure that false positives and nuisance codes are eliminated based upon MTD experience.

4.7.3 Onboard Interfaces

VHM shall include on each bus a vehicle logic that supports seamless integration with onboard systems via a digital interface. VHM shall function with mobile equipment that is equipped with a programmable controller and a SAE J1587/J1708/CAN or SAE J1939 communications link. The VHM subsystem shall also be capable of communicating with devices using the APTA-TCIP_S-01 3.0.3 protocols. Fleet vehicles with multiplex systems shall be monitored via J1708/J1939 and/or RS232/485 utilizing multiplex gateways. Fault data captured shall be associated with flash codes and fault descriptions from the sub-system manual to expedite the diagnostics and troubleshooting process. Contractor shall provide any proprietary gateways or translator boxes needed to translate the data into a format that can be read and manipulated by the applications resident on the MTD Network.

4.8 AUTOMATIC PASSENGER COUNTERS (OPTION)

4.8.1 General

Contractor shall provide, configure, and install an Automatic Passenger Counter (APC) system on all MTD buses that shall automatically collect passenger boarding and alighting counts. Requirements, capabilities, or features of the APC system shall include:

- Keep count of all passengers boarding and alighting by each doorway for each door open/close cycle by date, time, and location.
- Keep separate count of all wheelchair passengers boarding and alighting for each wheelchair lift or ramp cycle by date, time, and location.
- Correlate and store passenger/wheelchair counts by bus, run, trip, line, schedule, and bus stop.
- Include a comprehensive set of passenger data reports including detailed and summary passengers by bus, run, trip, line, bus stop, including on a per hour and mile basis.
- Include and indentify counts from unscheduled locations, including detours.
- Store and retain onboard fourteen days of recorded APC data.

- Upload and save all APC data collected in an APC database on the fixed AIM network.
- Provide accurate passenger accumulated count data that shall be within 5% accuracy for each 1,000 consecutive boardings and each 1,000 consecutive alightings.
- Provide accurate stop-by-stop count data that shall be fully accurate for 85% of all door cycles; within one passenger for 90% of all door cycles; and within two passengers for 97% of all door cycles. This shall include stops for which there was no observed boarding or alighting activity.
- Remove clearly erroneous or other data that would otherwise improperly affect statistical results due to sensor failures and temporary or unanticipated changes to scheduled routes.
- Provide means of setting various filtering thresholds for determining erroneous data.

4.8.2 AIM Interface

The APC system shall interface with the Onboard AIM system to determine, record, and store passenger count data. Such interface shall correlate the counts to the bus, run, trip, line, schedule (time), and bus stop (location) using the AVL and other pertinent AIM systems as necessary. The APC system shall use the AIM Yard WLAN to upload passenger count data from the buses and to download new schedule and route information to the buses.

4.8.3 National Transit Database

The APC system collect passenger data that is in compliance with the FTA's National Transit Database (NTD) requirements. Contractor shall perform all tasks required by the FTA to certify the APC system.

4.9 COMPUTER AIDED DISPATCH (OPTION)

The AIM computer-aided dispatch (CAD) system shall enable core Dispatch Center tasks to be carried out via an AIM Dispatch Console, which shall be located at the Terminal 1 Dispatch office and at the Transit Center. See Section 5.2 for Dispatch Console hardware requirements. The Dispatch Console shall be the primary means of assigning, overseeing, and communicating with buses in revenue service; preparing and processing incident reports; and managing voice radio communications. AIM shall support multiple user groups (e.g., driver supervisors, operations managers, system administrator) with settable system rights and privileges. Dispatch Center Console functionality shall be available on other MTD workstations of MTD's choosing via a web-based application or similar means.

4.9.1 Dispatch Assignment & Oversight

4.9.1.1 Integration with Trapeze

AIM shall have the ability to import and export pertinent data with MTD transit scheduling software, which presently is Trapeze OPS. AIM shall also have the capability to input changes to the line, pattern and schedule data from a console for full or ad-hoc changes and detours at the trip, run and line levels. Contractor shall be sufficiently knowledgeable of the transit scheduling software to carry out the required integration for meeting these CAD system specifications. Such bidirectional data transfer and synchronization with the TDB, Trapeze, or other AIM systems shall occur either automatically or upon user initiation, dependent upon system administrator settings.

4.9.1.2 Status Notifications

Operations status entries shall be generated automatically by AIM when an out-of-tolerance condition is detected. AIM shall generate notifications for a number of bus conditions that shall include at a minimum: off route, schedule adherence variance, out late, missed relief, voice or data communications failure, and vehicle movements without a valid logon. Tolerances for determining abnormal conditions

and the recipient and type of the resulting notifications shall be settable by the system administrator. Enabling, disabling, or changing the threshold for reporting of each condition shall be settable by the Dispatch Supervisor based on lines, vehicles, and times. Other requirements, capabilities, or features related to notifications shall include:

4.9.1.3 Operator Log-In

Contractor shall establish an interface between AIM and the farebox to enable a single login for both systems. **If the MDT is used in lieu of the farebox control head, the MDT must accommodate all entries normally carried out through the farebox (e.g., passenger types)**. Additionally, AIM shall:

- Validate bus operator-entered identification against assignment, line, run, and vehicle.
- Report entry of invalid bus operator identification to dispatch console.
- Enable remote bus logon and the correction of invalid bus data at the dispatch console.
- Allow disabling of vehicle location information (e.g., for AVL system failure).
- Support automatic or manual control of AIM devices from the dispatch console.

4.9.1.4 Geographic Display

AIM consoles shall display a geographic map representation of the MTD service area and route configurations that includes icons representing the real time location of MTD buses and applicable service vehicles. Such maps shall meet the following requirements:

- Include an up to date map of all public freeways, streets, and roads by name
- Permit zooming, panning and scrolling of the geographic display
- On highest-level map, show full MTD service area
- On lowest-level map, show all streets, roads, railroad tracks, water boundaries, jurisdictional boundaries, bus stops, transfer points, and significant landmarks within the displayed area
- Allow centering geographic display on and automatically tracking a specified vehicle
- Automatically center the display on a vehicle with an SAS status while the SAS is active.
- Allow centering on specified lines, stops, and time points.
- Use easily legible text without overlap at the lowest scale including within high-density areas where many buses will frequently appear in the same area
- Automatically adjust minor vehicle location discrepancies to show vehicle icons on streets
- Allow selection of vehicle icon to display text/tabular display data about such vehicle

4.9.1.5 Text/Tabular Display

AIM shall display the conditions, location, and route/schedule adherence of buses at the dispatch console. The display shall be a combination of geographic and text/tabular presentation. AIM shall display selected lists of data, including bus schedules, bus operator identification, assignments and schedules, pull-in/layover status, back in service time/place, schedule and route adherence, and passenger loading. AIM shall display assignments of operators to lines/runs, or vehicles on the Dispatch Center consoles, when selected from any console and at appropriate display detail levels.

4.9.1.6 Reporting

AIM shall collect operation and performance data and send to the TDB. AIM shall produce standard fleet management reports and a reporting tool for custom queries and reports. CAD shall collect

information for and produce by user selectable time period or other parameters the following standard reports in tabular and graphical format:

- Bus Operations
  - Trip information including line, run, direction, vehicle, operator, miles, passenger boardings and alightings, wheelchair boardings and alightings, and revenue collected
  - Stop information including line, run, direction, vehicle, operator, miles, passenger boardings and alightings, wheelchair boardings and alightings, and revenue collected
  - Timepoint data including trip vehicle, line, run, and time of timepoint passage
  - Vehicle data including location, AIM equipment status, alarms, passenger counts, and schedule adherence
  - Summary data on trip number, line, run, day of week, time period, operator ID, vehicle ID, schedule adherence, passenger boardings and alightings, wheelchair boardings and alightings, and revenue collected. Summaries shall be for weeks, months, quarters, and years
  - Road call information and status
  - Terminal supervisor information such as bus and line assignments, action events such as bus calls and alarms, and terminal supervisor responses, all with time tags for analysis.
  - Current status of service showing active SAS, number of buses currently on routes, percent of fleet on time, percent of fleet late, and total number of calls currently in queues.

- Fleet Management
  - Revenue and non-revenue miles and hours
  - Schedule adherence
  - Bus assignments including changes
  - Run cancellations
  - Out late buses
  - Service delays, including type, reason, length of delay, service loss, mileage lost
  - Dispatch performance measured by call processing time categorized by problem type
  - Passenger loading and alighting counts and door open/close times for each stop (option)
  - Data for FTA NTD Report including passenger miles (option) and vehicle miles
  - Bus availability, including reasons for unavailability
- Employee Management
  - Operator assignments and assignment fulfillment
  - Incident Reports involving operator error
  - Accident Reports
  - SAS reports by operator and line

AIM shall enable ad hoc selective retrieval of event records of bus, operator, driver supervisor, and terminal supervisor activities, by bus, operator, route, terminal supervisor, driver supervisor, and event type or time interval. Retrieval shall be by user-specified criteria, including the use of the logical operators. AIM shall make the selected event record available both at the console and to the TDB.

4.9.2 Incident Reporting

AIM shall support automatic and manual collection and entry of bus information for Incident Reports. For each Incident Report, AIM shall automatically record bus status, run, line, schedule deviation, time, bus operator identification, location, alarm status, other pertinent bus information, system date and time, console identification, and supervisor. Incident Reports shall accept from a console and record manually entered text, coded, combo-boxed or check-boxed notes, and an indication that the incident is closed or the report cancelled. The CAD Incident Report subsystem shall also include the following features:

- Automatically assign a unique alpha-numeric identification to each created Incident Report.
- Utilize at least three levels of MTD-defined alpha-numeric incident codes.
- Be searchable by any Incident Report data field.
- Automatically update vehicle status for applicable Incident Report codes.
- Send notifications for follow-up action to appropriate AIM of TDB systems (e.g., roadcalls).
- Allow recording of free-form text comments (i.e., memo field)
- Be exportable in a various formats (e.g., comma delimited, PDF, and MS Office applications).
- Maintain a log of Incident Report creations and modifications by user, date, and time.

4.9.3 Call Routing (CAD option)

AIM shall have the ability to manage two-way radio voice communications and other communications features provided as part of AIM (e.g., text messaging). Given MTD's relatively low call volume, direct voice communications from any system radio is allowed. While MTD does not presently use a queued Request to Talk (RTT) system, AIM shall provide for such capability for future use. CAD call routing shall include the following features:

- Patching of selected radio calls and intercom channels.
- Selection of audio output of call to either console headset or primary console speaker.
- Selection and playback of at least the last five radio connections.
- Transfer of a selected call recording to another console for playback.
- Option to bypass CAD call routing and directly use the existing Motorola two-way radio system.

4.9.3.1 Call Queue Management

AIM shall route specific vehicle or supervisor radio calls and messages to specific consoles as defined by users. Any unassigned calls or messages shall be automatically assigned to an active console by AIM. AIM shall provide functionality to transfer a terminal supervisor's work assignment and calls to another terminal supervisor if the first terminal supervisor must temporarily leave his or her console.

AIM shall manage the stream of voice radio calls made to the Dispatch Center, data messages from operators, bus alarms and similar events, and Incident Report reminders ("callbacks"), and present these as a queue to the assigned console(s). AIM shall provide comprehensive user tools for selecting the detailed methodology of handling calls within queues.

- Calls shall be sorted by priority by type (e.g., SAS, PRTT, RTT, Data, etc.)
- SAS calls shall always have top priority and shall generate an audible alarm.
- Supervisors shall have the ability to select any call in the queue at any time.
- The queue information shall be displayed in a scrollable window.
- For each call, the terminal supervisor shall have the option of opening an incident report.

4.9.3.2 Outgoing Calls

AIM shall enable console action to initiate a call, announcement, or text message to a selected vehicle, supervisor, or talk group either by entering the bus number, line/run number, operator identification, or by selecting from a list in a tabular display or an icon on a graphical display.

4.9.3.3 Text Messaging

AIM shall accept both keyboard-entered and selected pre-defined text messages at a dispatch console, and transmit those messages to the selected buses or supervisor vehicles. AIM shall allow terminal supervisors to append pre-defined text messages. AIM shall maintain a visible list of unacknowledged text messages, and shall inform the console user when the acknowledgement has not been received within a time determined by the system administrator.

4.9.4 Silent Alarm System (CAD Option)

CAD shall accept a silent alarm system (SAS) request activated from a covert switch on the bus. Ideally, the SAS shall be integrated with the existing two-way radio system SAS. Buses shall have at most one physical SAS switch. If the SAS option is selected, it shall be installed on all 106 MTD buses and two road supervisor vehicles. SAS shall be considered an option for 16 of the remaining 21 service vehicles (see *Attachment 4* for optional vehicles).When activated, the SAS shall:

- Issue an emergency alarm, including vehicle location, to the Dispatch Center Consoles (DCC).
- In buses so equipped, initiate covert microphones for continuous audio to the DCCs.
- Discreetly display the SAS activation to the bus operator.
- Cause exterior headsigns to display an emergency message.
- Update the vehicle location to the DCCs no less than every 15 seconds.
- Send discrete visual signal to operator when a DCC acknowledges receipt of SAS.
- Disable all DCC incoming calls, messages, audible alerts, etc. while SAS is active.
- Allow supervisor to override and disable an SAS using the DCC.

4.10 ROAD SUPERVISOR SYSTEM (OPTION)

The AIM Road Supervisor System shall enable supervisors in road supervisor vehicles to manage fleet operations with the same functionality as the Computer-Aided Dispatch (CAD) system. The interface for such functionality shall be a Mobile Data Computer (MDC) mounted in each road vehicle. In addition, road supervisor vehicles shall include the AVL and data communications systems utilized by buses.

4.10.1 Mobile Data Computers

The Road Supervisor System shall include a mobile data computer (MDC) that enables a road supervisor to manage fleet operations and perform dispatching duties. Subject to any limitations inherent with a portable, mobile device, MDCs shall meet the same functional and display requirements as the CAD dispatch consoles specified in this document. These functions include dispatch assignment and oversight, incident reporting, and call routing. The physical configuration of the MDC shall be that of a laptop computer that is sufficiently robust for its intended use. MDC devices shall meet the following requirements:

- Utilize a commercially available operating system such as Windows 7.
- Use current commercial technologies for all components including the processor, RAM, hard drive, video/audio cards, and DVD/CD-RW drive.

- Include manual controls to adjust audio level, video display intensity, keyboard lighting and LED or indicator intensity.
- Have an automatic (timed) and manual screen saver and sleep mode.
- Use a standard QWERTY keyboard with lighted or back-lit keys for night use that is protected from dust, particles, moisture and spills.
- Have at least one parallel and three 2.0 USB connections.
- Have required GIS software installed for CAD map viewing capabilities.
- Allow data entry and word processing without active wireless communications with AIM.
- Keep an audit log file of all communications.

4.10.1.1 Environmental Requirements

MDCs shall meet the following environmental and associated requirements:

- Meet operational requirements while exposed to temperatures from 45 to 105 degrees F and withstand 20 to 140 degrees F while not operational.
- Meet operational requirements while exposed to humidity of 30 to 80% and withstand 30 to 90% while not operational.
- Withstand exposure to dust conforming to MIL-STD-810E 510.3.
- Withstand exposure to liquids conforming to MIL-STD-810E 506.3.
- Withstand vibration of 3g and shock of 20g and conform to MIL-STD-810E 516.4.
- Not adversely affect vehicle electronics nor be adversely affected by vehicle electronics.
- Meet or exceed EIA204 and RS-374 mobile radio standards.
- Not emit signals that interfere with AM/FM radio reception or with portable/mobile voice radios.
- Shielded to protect from signals emitted by vehicle, other in-vehicle equipment (including cellular phones), and external EMI sources such as power lines.
- Capable of being mounted in vehicles with driver and passenger airbags and be airbag compliant.
- Operate with the standard vehicle electrical system without the need for converters or inverters.
- Conserve vehicle battery, including use of semi-active modes similar to Onboard AIM systems.
- Shut down X minutes after ignition shut off, where X shall be a system settable parameter.
- Provide short-term battery backup or equivalent to preserve critical information during brief power failures or during vehicle start-up.
- Full functionality during starter motor operation.

4.10.1.2 Vehicular Mounting

The MDC shall not in any way interfere with vehicle operation or create a hazard to personnel who need to exit the vehicle from any position in the vehicle. To deter theft, the MDC mounting shall be semi-permanent and require special tools or a key to remove the unit. Swivel mounted MDCs are shall have a positive means of locking in the desired position.

4.10.2 Automatic Vehicle Location

The Road Supervisor System shall include the same AVL subsystem used for the MTD buses and shall meet the same the requirements. AIM shall track the road supervisor locations with a reporting cycle of thirty (30) seconds or less. The AVL subsystem shall be integrated with the mobile computer and

interface with the AIM GIS/mapping software applications. The GPS receiver shall meet the same requirements as the GPS receivers onboard the buses.

4.10.3 Wireless Data Communications

The MDCs shall be connected to AIM via a wireless data service. The Supervisor subsystem shall utilize the same data radio system or cellular data network used by the MTD buses for data communications. Such data communication equipment for the Supervisor subsystem shall meet the same requirements as the data communication equipment onboard the buses.

All control of the modem such as channel selection shall be handled automatically by the modem. No manual channel selection by the user shall be required. Contractor shall be responsible for registering the modems with the service provider for the communications service and obtaining and programming the IP address and multicast address for each modem. All modems shall be configured for the same multicast group. Contractor shall act as liaison to the service provider services for MTD. Contractor shall interface with the designated service provider to establish the data service.

If necessary Contractor shall provide and install a mobile antenna that is compatible with the data modem and durable to withstand the rigors of the public transportation environment.

5 AIM HARDWARE

5.1 AIM NETWORK

AIM shall include a separate local area network (LAN) that shall be housed in the MTD server room on the 2nd floor of the Administration Building. As indicated in Section 2.2.1, it is MTD preference that Contractor make use of existing MTD network equipment to the extent feasible. Also see Section 3.2.4.1 for related information concerning the AIM network interfaces. If required, Contractor shall use standard networking hardware, including switches, bridges, and routers that incorporate SNMP management. The AIM LAN shall be configured for high availability and operational flexibility, using the most current commercial technologies. It shall be designed to operate seven days per week, twenty-four hours per day. The AIM LAN hardware shall be capable of being managed from the Server Room and up to two designated workstations in the Administration Building.

5.2 DISPATCH CENTER CONSOLES

5.2.1 Workstations

The dispatch and Transit Center supervisors shall each utilize a single MTD-provided workstation to carry out AIM CAD system functions as well as all other supervisor computer-related tasks (e.g., e-mail, word processing, Trapeze OPS, etc.), **Such workstations, other than the displays or any ancillary audio devices for the CAD voice radio system, shall be provided by MTD and not be the responsibility of the Contractor.** The MTD workstation shall have the specifications listed below. If these specifications are deemed insufficient for meeting the demands of the Dispatch Center Consoles, Contractor shall inform MTD of the deficiencies which shall be upgraded by MTD.

- Intel i7 quad processor
- Add-in graphics card with two HDMI connectors
- 8GB of random access memory
- SATA III storage device on 6GB bus

5.2.2 Displays

Contractor shall provide new display screens for each Dispatch Center Console. The screens shall be of sufficient quantity, size, and resolution to simultaneously carry out both CAD and non-AIM functions.

5.2.3 Console Audio Hardware

If the CAD voice radio control option is selected, then the following audio-related hardware specifications and requirements shall apply.

5.2.3.1 Audio Jacks

Contractor shall provide two headset interface jacks with each console. The jacks shall be located at a convenient location in the supervisor area. The jacks shall include a volume-control adjustment with a minimum-volume stop and shall include a pre-amplifier for the headset microphone.

5.2.3.2 Speakers

Contractor shall provide speakers which shall be located on the work surface of the console. Select and unselect audio speakers shall have individual volume controls located on the enclosure. Mute capability shall be provided for the unselect speaker. Each select and unselect audio speaker shall be a 5-watt (min), 8-ohm speaker.

5.2.3.3 Microphone

Contractor shall provide a noise-canceling, gooseneck microphone for use with the console.

5.2.3.4 Headsets

Contractor shall furnish Plantronics-style headsets that meet the following requirements:

- Headset coil cord shall measure 15 feet.
- Microphone shall be a noise canceling type compatible with the audio preamp.
- Ear set shall be a 300-ohm receiver with cushioned earpieces.
- Microphone and ear set shall be attached to a padded, adjustable leather headband.
- Coil cord plug shall match the audio jack receptacle type.

5.3 ONBOARD EQUIPMENT

5.3.1 Control Devices

5.3.1.1 Onboard AIM Processor

In these specifications, the Onboard AIM Processor is considered the onboard electronic processor that controls some or all onboard AIM system functions. The Onboard AIM Processor shall:

- Be of sufficient computational capacity to support all onboard AIM systems plus 50%.
- Provide for multi-protocol communications with all in-vehicle AIM devices, and external devices.
- Maintain and provide precise timing to all in-vehicle components, utilizing GPS time from the AVL subsystem as the synchronization reference.
- Collect data from other elements, determine status of the bus and shall control communication of this information via the data radio or cellular data modem.
- Use self-diagnostic software and that includes self-restarting of processes. Stability of the software shall be enforced through rigorous testing, as per IEEE quality assurance requirements.

In addition to other functions delineated throughout these specifications, the Onboard AIM processor shall monitor onboard AIM systems to detect failures, disconnected equipment, or missing equipment. The nature of any detected failure, including its location and time, shall be logged on the bus and reported to the Dispatch Center in real-time, as requested, or as scheduled. This data shall be downloaded to the AIM network at the end of the day when the bus returns to the yard.

5.3.1.2 Mobile Data Terminal

Should a mobile data terminal (MDT) in the bus operators compartment be required for the onboard AIM system, the following requirements shall be applicable:

- MDT mounting location shall be reviewed with and subject to approval by MTD.
- If MDT is mounted via a flexible arm, such arm shall be lockable into a given position and designed to prevent autonomous swaying, movement or vibration throughout its useful the life.
- Vehicle wiring connections to the MDT shall be to connectors exterior to the MDT. Cable “stub outs” are unacceptable.
- Contractor shall furnish the complete software, instructions, test procedures, tools, and data to re-load the MDT.

- Contractor shall furnish a mechanism for loading software updates into all vehicles in a managed process within a three- hour period, via the wireless LAN.

5.3.2 Environmental Requirements

All Onboard AIM equipment shall be suitable, designed, built, and installed for the harsh bus rapid transit operating environment. The AIM onboard equipment shall operate properly under the environmental conditions pertaining to temperature, humidity, dust, dirt, power variations, vibration, condensation, and electrical interference. All Onboard AIM equipment housings shall be weather and dust-proof to prevent degradation from exposure to moisture or dust raised by interior cleaning. Any equipment installed on the exterior of the bus (including cable runs under the floor) shall be thoroughly sealed in a manner approved by MTD, to prevent leakage of rain or bus washing water, detergent and solvents into the bus throughout the life of the installation.

The Onboard AIM bus equipment shall be designed to operate on buses providing 12 VDC and 24 VDC. The equipment shall operate reliably from the bus' direct current power source of 10 to 18 VDC and 20 to 36 VDC, without malfunction. 12 VDC and 24 VDC is available for the Onboard AIM equipment on the diesel and hybrid buses. 12 VDC is available on the electric shuttles.

5.3.2.1 Energy Conservation

The Onboard AIM equipment shall be designed to conserve vehicle battery power. Equipment shall have the ability to enter a "sleep" or idle mode when the vehicle run switch is turned off or after a predetermined time thereafter. Contractor shall submit to MTD for approval current draw information for the Onboard AIM equipment while the Onboard subsystem is in active, idle, and "sleep" mode.

5.3.2.2 Power Conditioning

The Onboard AIM equipment power supply shall include adequate filters and components to regulate the voltage supplied by the bus and render it devoid of power spikes and noise which could contribute to erroneous registration, data generation and recording. Provisions shall include elimination of electronic interference caused by such items as, but not limited to florescent light power units, bus alternators, air conditioning units, fare collection equipment, and other accessories characteristic of MTD buses. Adequate protection against transient surges on the bus power supply shall be incorporated to the extent necessary to prevent damage to electronic components. All J1708 devices shall be of a wide DC input range covering 8-36 VDC input. Contractor shall be required to access fused power from a location identified by MTD for the Onboard AIM equipment. Suitable wiring shall be identified by Contractor and approved by MTD prior to installation of the wiring by Contractor.

5.3.2.3 Electromagnetic Interference

Contractor shall ensure that the electrical and electronic components and subsystems shall operate without being affected by or causing harmful electromagnetic interference (EMI). Protection shall be provided against radio frequency interference (RFI) emission sources, as well as internal conductive or inductive emissions. The Onboard AIM equipment shall be unaffected by interference such as radiation from bus equipment, including radio, lights, farebox, electronic destination signs, air conditioners, and generators. With the exception of the equipment required for radio communications, the AIM equipment shall not emit measurable EMI or RFI capable of interfering with any other onboard electronic device or system. If, following installation of onboard equipment, it is determined that there is unacceptable EMI, Contractor shall implement corrective measures to reduce EMI as necessary.

5.3.2.4 Testing Standards

The Onboard AIM equipment provided by Contractor shall comply with the following standards:

Test/Standard	MIL-STD 810C	MIL-STD 810D	MIL-STD 810E
Low Pressure	500.1/Procedure 1	500.2/Procedure 1	500.3/Procedure 1
High Temperature	501.2/Procedure 1,2	501.2/Procedure 1,2	501.3/Procedure 1
Low Temperature	502.1/Procedure 1	502.2/Procedure 1,2	502.3/Procedure 1
Solar Radiation	505.1/Procedure 1	505.2/Procedure 1	505.3/Procedure 1
Rain	506.1/Procedure 2	506.2/Procedure 2	506.3/Procedure 2
Humidity	507.1/Procedure 2	507.2/Procedure 2	507.3/Procedure 2
Salt Fog	509.1/Procedure 1	509.2/Procedure 1	509.3/Procedure 1
Dust	510.1/Procedure 1	510.2/Procedure 1	501.3/Procedure 1
Vibration	514.2/Procedure 8,10	514.3/Procedure 1	510.3/Proc 1, Cat 10
Shock	516.2/Proc 1,2,3,5	516.3/Proc 1,3,4,5,6	516.4/Procedure 4
Applicable Environmental Standards:		EIA 316-B Shock, Vibration, Dust, and Humidity	

5.4 INSTALLATION

5.4.1 General Requirements

Contractor shall be responsible for the proper installation of all AIM equipment including necessary labor, mounting devices, wiring, fasteners, materials, supplies, and tools. Such installation shall be performed in a workman-like and expeditious manner using industry standard practices and procedures. MTD shall have the right to inspect installations for quality and workmanship, notwithstanding that such inspection or failure to conduct such inspection shall not relieve Contractor of any responsibilities under this Agreement or Specification. MTD reserves the right to specify installation details on the job site.

5.4.2 Yard WLAN

Contractor shall provide a detailed description of installation plans for the Yard wireless LAN subject to approval by MTD. Design drawings shall show installation details of all equipment, cables, conduits, power connections, and associated work. Contractor shall coordinate the schedule for installations at the yard with MTD, giving at least seven days notice prior to installation. The AIM Yard Subsystem shall be installed in a manner to protect the equipment from vandalism and the elements, and yet provide reasonable access. Connectors that are exposed to the elements shall be of the weather pack type.

5.4.3 Onboard Equipment

Contractor shall provide a detailed description of installation plans by class of vehicle. This shall include location of drilled holes, power feeds, and final location of all AIM equipment, and final location of the MDT (if required) in relation to the operator's position. The installation plan shall be submitted for MTD's approval no less than 30 days prior to installation of the AIM equipment. One prototype installation of all Onboard AIM equipment shall be made on each MTD vehicle type. MTD shall have the right to inspect and approve this installation before any other installation work is performed.

5.4.3.1 Wiring

All wiring in buses shall be properly grounded and protected from chafing, and installed in the plenum (air handling) spaces, except as approved by MTD. Cabling shall be appropriately rated for the plenum installation. No PVC jacketed cable shall be utilized within the vehicles. Any undercarriage wiring shall be suitably protected against the road elements and fastened in a manner so as not to sag or interfere with normal bus operation and/or maintenance. No "butt connectors" shall be utilized under the bus. Exposed wire bundles inside the vehicle shall be securely anchored and carried in loom, plastic sleeve, or tightly laced. All cable assemblies shall be secured to minimize failure due to vibration and chafing. Grommets shall be used in all holes used by Contractor to minimize cable damage due to chafing. All wiring exposed within the passenger compartment of any bus shall be armored, isolated, and protected when going through drilled holes, through bulkheads, and within brackets.

Contractor shall install or verify previously installed DC wiring to ensure integrity, fusing and current capacity for the installation. All DC wiring shall be direct from the battery distribution block and shall include both A+ and A- cables. Further, both A+ and A- cables shall be adequately fused at both the battery end and the AIM end with replaceable fuses. Signal and power cables shall not be intermingled in cable runs.

5.4.3.2 Bus Availability & Installation Log

All vehicle installations shall be performed at MTD's Olive Terminal unless otherwise approved by MTD. MTD shall make vehicles available for installation to the maximum extent feasible although a maximum of two bays with hoists shall be available at any given time. No less than three buses shall be available at any given time during regular service weekdays between 6 AM and 7 PM. Greater numbers of vehicles can be made available during nights and weekends. An MTD employee will be made available to move buses for installation within the yard for installation purposes.

Contractor shall maintain a log of installation events by vehicle that shall include shall include equipment model and serial numbers, date, and software version (if applicable). The log shall be available for review by MTD and shall be delivered to MTD in electronic form when the mobile installation work is complete.

5.4.3.3 Equipment Modification & Removal

If the installation of any AIM equipment requires modification or replacement of bus equipment (e.g., handrails, power supplies, mounting brackets, etc.) Contractor shall be fully responsible to provide and install such replaced or modified equipment. Any equipment permanently removed from vehicles under the project shall be labeled by vehicle number and boxed in containers for storage by MTD unless directed otherwise by MTD. Contractor shall use care in removing equipment in order to maintain the intrinsic value for later sale or disposal and shall not damage the vehicle or other MTD property. Cables shall be removed intact where possible and severed only when necessary.

5.5 DELIVERY

MTD shall be notified in writing at least one week in advance of each proposed delivery date of AIM equipment, materials, and supplies. Equipment shall be delivered to MTD FOB Santa Barbara in heavy-duty boxes labeled to identify the equipment type enclosed. Equipment shall be delivered to an inside location designated by MTD. Each shipment shall be accompanied by an inventory list showing the quantities, serial numbers, and brief description of all items.

6 TRAINING & MANUALS

6.1 TRAINING

6.1.1 General Requirements

Contractor shall provide training on the setup, installation, configuration, administration, operation, and maintenance of all AIM systems and equipment. General training requirements include the following:

- All training shall be onsite at MTD's Olive Terminal.
- Training courses shall have been professionally developed.
- Course materials shall accurately reflect the MTD-specific policies and equipment configuration.
- Training shall be hands-on using the same equipment and configurations that will be used live.
- Contractor shall provide training materials, tools, and equipment in sufficient quantity to support effective, hands-on training for all course attendees.
- Course documentation shall be of sufficient quality for long-term usage.

6.1.2 Training Plan

Contractor shall submit a proposed training plan to MTD at least one month prior to the beginning of training. The training sessions shall be scheduled to be as close to but not before any AIM systems go live. The training plan shall include the following information:

- A proposed schedule for all training sessions taking into account employee availability
- A copy of actual training documentation and materials to be used in each course
- A list of Contractor-provided equipment, tools and test equipment, manuals, etc. to be used
- A list of any training site requirements (e.g., class sizes, equipment needs, internet access, etc.)

6.1.3 Courses & Trainees

Contractor shall base training courses on the manual types and user groups identified in Section 6.2 below. There shall be two exceptions:

- The *Onboard Equipment & Systems Operation* class shall be with up to five MTD trainers rather than directly with bus operators. MTD trainers shall be responsible for providing driver training.
- There shall be an additional course for managers that provides an overview of the AIM systems including capabilities and limitations, data collected, and how to access and run reports.

6.2 MANUALS

6.2.1 General Requirements

Contractor shall provide manuals that shall support MTD personnel in the setup, installation, configuration, administration, operation, and maintenance of all AIM systems and equipment. Manual shall meet the following requirements:

- Be organized in a clear, logical fashion with table of contents, index, and definitions.
- Be sufficiently comprehensive and detailed to enable MTD to fully operate and maintain AIM systems with little or no assistance from or reference to outside sources.
- Be specific to the MTD installation and incorporate information gathered during installation and acceptance testing.

- Provide MTD unlimited rights for duplicating and disseminating manual information for purposes related to the MTD AIM installation.
- Include safety procedures and precautions necessary to prevent damage to equipment, injury to personnel, and unsafe operational conditions.

6.2.1.1 Hardcopies

Contractor shall deliver to MTD the quantities of manuals specified in Section 6.2.2 in hardcopy format. Manuals shall be designed for continuous, long term service in its intended environment (e.g., a bus or shop). Manuals shall be double-sided, lie flat when opened; and permit adding and replacing pages.

6.2.1.2 Softcopies

Contractor shall deliver to MTD an electronic version of all manuals that are equivalent to the hardcopy versions. The files shall be in Adobe PDF format created from original electronic documents, not from scanned documents. Two full sets of the electronic manuals shall be provided via CD-ROMs or DVD-ROMs which shall be accessible on an MS Windows-based personal computer.

6.2.2 Manual Types & Users

Manuals for AIM systems shall be developed with specific MTD user groups in mind differentiating between administration, operation, and maintenance. The types should generally cover the following:

Manual Type	Primary User Group	Copies
Onboard equipment & systems operation	Bus Operators	170
Dispatch Center equipment & systems operation	Driver Supervisors	25
Onboard equipment & systems operation	Road Supervisors	25
Yard location equipment & systems operation	Driver Supervisors & Mechanics	38
Onboard & yard equipment maintenance	Mechanics	20
Report creation, generation & administration	IT & Staff (varies by AIM System)	tbd
AIM system applications administration	IT & Staff (varies by AIM System)	tbd
Server, network, database admin & maintenance	IT Personnel	3

7 SPARES & TEST EQUIPMENT

7.1 SPARES

Spare equipment and components shall be provided as described below. Such equipment shall include all required connectors, cables and mounting hardware. All equipment shall have been factory tested per the requirements of Chapter 8 of these specifications. Each shipment shall be accompanied by an inventory list showing the quantities, serial numbers, and brief description of all devices.

- Ten (10) full Onboard AIM systems sufficient to fully equip ten MTD buses
- One (1) Onboard Supervisor subsystem sufficient to fully equip one road supervisor vehicle
- One (1) Transit Center passenger information system electronic display sign
- One (1) wireless LAN Access Point of type implemented in bus yard

7.2 TEST EQUIPMENT

7.2.1 Mobile Test Sets

Contractor shall furnish a complete mobile test set. The mobile test set shall include a fully functioning set of mobile equipment with a power supply mounted on a cart. The Onboard AIM subsystem components shall be mounted on shelves such that each component shall be easily removable so that units under test can be quickly substituted and functional checks performed. All connectors shall be clearly and permanently labeled. The mobile test set shall also be used for training purposes.

7.2.2 Mobile Programming Sets

Contractor shall provide a rugged duty laptop computer with licensed software, interfaces, and connector cables as necessary for programming and optioning of all mobile equipment for the buses and supervisor vehicles, and for database downloads. The programming and optioning software shall be conveniently organized so that technicians can rapidly and efficiently set up a complete Onboard AIM system, or any additional component as needed.

7.2.3 Fixed Radio Programming Set

If a data radio system is implemented, Contractor shall furnish a laptop computer with software, interfaces, and connector cables as necessary for programming and optioning of all fixed radio equipment, including base stations. The laptop processor, memory, and hard disc capacity shall be as necessary to store and download software.

8 PROJECT MANAGEMENT

8.1 PROJECT MANAGEMENT PERSONNEL

8.1.1 Project Manager

Contractor shall establish a Project Manager who shall be highly responsive to the needs of AIM as required in these specifications. The Project Manager shall provide or meet the following requirements:

- Coordinate design and engineering activities and provide a technical liaison to MTD.
- Have the authority to assign and schedule Contractor personnel to perform all of the work required by this Specification.
- Provide a single point of contact for MTD to resolve all issues related to the Contract.
- Be responsible for directing all Subcontractors' designs and work.
- Conduct project status meetings with MTD staff.
- Have a full and complete understanding of the contract documents and site conditions sufficient to provide adequate direction for coordination of work.
- Have at least three years experience in the implementation and management of mobile ITS projects and have completed at least one such project for a fleet in excess of 50 vehicles.
- Be on site during all significant project events including installation and testing and as necessary to facilitate meetings, project activities, and information flow between Contractor and MTD.

8.1.2 Senior Technical Staff Member

Contractor shall establish a Senior Technical Staff Member (STSM). The STSM shall provide or meet the following requirements:

- Act as a technical resource for coordinating all system design and implementation issues.
- Check each technical submittal prior to its being sent to MTD for approval.
- Check factory wiring and field work to assure quality.
- Have sufficient understanding of the technical requirements of these specifications and site conditions to provide design direction and determine compliance of design submittals and work.
- Be a licensed professional engineer qualified to practice electrical engineering, or an engineer who qualifies as acceptable to MTD.
- Have a minimum of three years of experience in coordinating engineering and administrative support activities for similar projects.
- Be on site during all significant project events and as necessary to facilitate meetings, project activities, and information flow between Contractor and MTD.

8.2 PROJECT MEETINGS

8.2.1 Types & Frequency

Project Manager and STSM shall arrange and conduct meetings with MTD or its agents as follows:

- Project kickoff meeting
- Monthly progress meetings
- Weekly teleconference calls
- Additional meetings, as necessary or reasonably requested by MTD

8.2.2 Location

Progress meetings shall be held at MTD facilities unless otherwise specifically approved by MTD. Other meetings shall be held at a mutually agreeable location, conducive to the topic of the meeting. For any project meetings conducted by conference call, Contractor shall, at Contractor's expense, provide a conference call-in number.

8.2.3 Meeting Minutes

Contractor shall prepare minutes for each meeting, unless specifically instructed otherwise by MTD. Contractor shall distribute the minutes to attendees within one week of the meeting. Minutes of the meetings shall include names of attendees, significant proceedings, decisions, unresolved issues, follow-up actions, and a list of information requested by MTD. The minutes shall include a summary of open action items, the party responsible for each, scheduled date for the action, and the respective resolution.

8.2.4 Agenda

Contractor shall provide a draft agenda to MTD at least two days prior to each meeting and request that MTD add any additional items. Review of the previous meeting minutes and any outstanding action items shall be included on the agenda for each meeting.

8.3 SCHEDULE

8.3.1 Detailed Contract Schedule

Contractor shall develop, maintain, and update a detailed critical-path-method contract schedule using Microsoft Project or other similar software. The schedule shall show each activity, including interface activities, for completion of the work, and shall be properly ordered and sequenced. An electronic copy of the schedule shall be submitted for MTD review within 30 calendar days after NTP. The schedule shall meet the following requirements:

- Be sufficiently detailed to preclude the use of activity durations greater than 20 working days. Activity durations shall include allowances for lost time and inefficiencies.
- For each task designation, delineate the phase of the work, and the component of the work such as design, submittal, review, procurement, fabrication, delivery, installation, and testing.

8.3.2 Updates

The schedule shall be updated monthly to show actual progress and changes to projected dates. Each update shall include a narrative describing the changes made since the last update. Each update shall be provided to MTD within 5 working days from month end and submitted with each invoice.

8.4 SUBMITTALS

8.4.1 General Requirements

This section describes requirements and procedures for preparing and transmitting information to MTD for review, acceptance or approval. General requirements are as follows:

- Transmit submittals sufficiently in advance of Contract requirements to permit at least fourteen (14) calendar days for review, checking and appropriate response by MTD.
- Use transmittal forms that are sequentially numbered and include revisions levels (A, B, C, etc.) for resubmittals;

- Examine submittal for accuracy and stamp and sign each submittal as follows: "Having checked this submittal, we certify that it conforms to the requirements of the Contract, except as otherwise indicated".
- Provide all submittals in electronic and hardcopy format. Unless indicated otherwise in these specifications, two full-sized hardcopies of each submittal will be provided.
- Industry-prevalent software shall be utilized for preparing all submittals. Drawings shall be submitted in AutoCAD 2007 or later, or DXF format. Contractor shall furnish to MTD two fully licensed copies of all software necessary for viewing and marking up submittals.

8.4.2 MTD Review

MTD will review and approve or take other appropriate action upon Contractor's submittals. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor. MTD review will not constitute approval of safety precautions or, unless specifically stated by MTD, of any construction means, methods, techniques, sequences, or procedures.

Upon review of contractor submittals, one of the following dispositions will be sent to Contractor:

- APPROVED: Work may proceed, provided it complies with the Contract. The approval of documents, shop drawings and samples shall not be construed as:
  - Permitting any departure from the Contract requirements;
  - Relieving Contractor of responsibility for errors and omissions, including details, dimensions, and quantity of materials; or
  - Approving departures from details furnished by MTD.
- APPROVED AS NOTED (Correct and resubmit): Work may proceed, provided:
  - It complies with the Contract as well as the corrections on the submittals, and Contractor resubmits within seven (7) calendar days corrected copies of the documents, shop drawings, working drawings, or miscellaneous submittals for final approval; and
  - Work performed by Contractor prior to receiving final approval will be at Contractor's risk.
- DISAPPROVED (Revise and Resubmit): Work is not recognized as being able to proceed. Revise submittal in accordance with notations thereon, and resubmit without delay. Contractor shall handle re-submittals in the same manner as first submittals, except designated with suffix A, B, C, etc. to indicate the resubmittal. On resubmittals, direct specific attention in writing on resubmitted documents to the most recent revisions.

8.4.3 Drawings

Contractor shall be responsible for accuracy and correctness of all drawings. Contractor's Project Manager and STSM shall initial each drawing after checking it, indicating that it complies with all requirements of these specifications and accurately reflects intended or actual field conditions. Drawings that require a Professional Engineer’s seal per California State Law shall be sealed and signed by Contractor’s Professional Engineer before submittal.

Contractor shall prepare design, working, and shop drawings as are necessary to adequately perform the work. Mounting and installation drawings shall be accurately scaled. All symbols and abbreviations used shall be defined on each drawing or on a master symbol sheet.

8.4.4 Product Data

A submittal shall be prepared for each major piece of material or equipment. These product submittals shall contain a list of any parameters for which the submitted products do not meet these specifications and a description of how these changes will affect system design. Each submittal shall contain a description of any changes in design or products that the submitted products will cause. Each submittal shall contain sufficient information to determine that the system component complies with these specifications. All closely related products shall be submitted as a single package. When pre-printed material is used in a submittal, the specific model number and options to be furnished shall be clearly identified. Standard manufacturer data sheets can be used provided data that is not applicable to the project is deleted or marked as such.

8.4.5 Testing

Contractor shall develop testing procedures and carry out testing as appropriate for a project of this scope. Each test form shall include the following information which shall be made available to MTD upon request:

- Test description and purpose
- The manufacturer, model number and calibration date of each piece of test equipment
- A table to record individual readings taken and inspections performed for each unit tested, identified by the serial number of the unit tested.
- An indication that the unit has passed or failed each individual test
- The signature of the technician performing the test and date of the test

8.5 AS-BUILT DOCUMENTATION

As a condition of acceptance, Contractor shall provide as-built documentation and drawings based on the actual design and installation plans for all AIM systems.

8.5.1 As-Built Drawing Submittals

Each design, working and shop drawing that was submitted for approval shall be modified to reflect the actual installed condition. Such drawings shall comply with the following:

- All nomenclature and labels shall correspond to the actual labels on the installed equipment.
- Each connection to each piece of equipment, junction box, or terminal block shall be identified by function and color code.
- All dimensions, physical details, connections, and other information pertinent to system diagnostics, maintenance or troubleshooting shall be shown.
- All drawings germane to a subject shall be submitted as a package with a cover sheet, index, and symbols and abbreviations table.

Final versions of the as-built drawings shall be submitted within two weeks after acceptance testing or maintenance training, whichever is later. Three hardcopies and an electronic version of final as-built drawings shall be submitted to MTD.

8.5.2 As Built Software Documentation

Contractor shall provide all software and data to allow MTD to fully maintain and update all applications software which shall include as-built versions of:

- Software Requirements Specification;

- Software Version Description Document, or equivalent;
- All "batch" or equivalent files, and all object libraries and "include" files, for editing, compiling, linking, and installing application software. Corresponding instructions shall also be provided.
- All files required to define, allocate, and load the database, and any other data files required to define, configure, load, or operate the system. Corresponding instructions shall also be provided.
- A list of the configuration parameters and their values including a list of potential problems if the configuration parameters are set to extreme values.

Contractor shall provide source code and sufficient source code documentation in Escrow to permit modification of the delivered software without the necessity of contacting Contractor in the event Contractor is unwilling or unable to undertake such modifications.

8.6 PROJECT CLOSEOUT

8.6.1 Initial Survey

Prior to requesting an initial closeout survey of AIM, Contractor shall ensure that the following conditions have been met:

- System acceptance tests have been conducted.
- Contractor has listed those items yet to be completed or corrected and has submitted a detailed plan of action and schedule for completion of the outstanding items.
- Contractor has submitted special guarantees, warranties, maintenance agreements, final certifications and similar documents.
- Contractor has obtained and submitted operating certificates, if required, final inspection and test certificates, and similar releases enabling full and unrestricted use of the work.
- Contractor has submitted operations and maintenance manuals and final as-built documentation.
- Contractor has delivered tools, including special tools, test equipment, standby equipment, and similar items.

Upon receipt of the request for initial survey, MTD will schedule a time for MTD and Contractor to inspect the work and prepare a list of exceptions, if any.

8.6.2 Final Survey

Contractor shall perform the work necessary to complete and correct the items noted during the initial survey. Contractor shall provide written notice to MTD that the items have been completed and AIM is ready for final survey. Upon receipt of the notice, MTD will schedule a final survey to verify that all of the work items have been completed satisfactorily.

8.7 SYSTEM SUPPORT

8.7.1 Prior to System Acceptance

MTD intends to begin operating AIM after completion of the first incremental acceptance. At such time—after incremental acceptance and prior to System Acceptance—Contractor shall provide support for the maintenance and operation of installed AIM subsystems; repair AIM equipment; and assist with data management and report generation. All requests by MTD for assistance shall be answered within one hour of a phone call, text message, or email from MTD. If necessary, on-site support shall be provided within two hours.

8.7.2 Post System Acceptance

MTD shall carry out basic system administration, maintenance, and repairs/swap outs for which Contractor training is provided. Beyond these basic tasks, **Contractor shall provide on-call and on-site support as necessary for a period of three years commencing with system acceptance.**

8.8 QUALITY ASSURANCE

8.8.1 Program Plan

Contractor shall submit to MTD within sixty days of the NTP, a Quality Assurance (QA) Program Plan designed to ensure the quality of all activities—including design, purchasing, inspection, handling, assembly, fabrication, testing, storage, shipping, and warranty/repair work. The plan shall describe all quality control procedures of Contractor and any sub-suppliers. Contractor shall conduct regular inspections in accordance with guidelines defined by the QA Program Plan. Performance of any manufacturing or construction work shall not commence until the QA Program Plan relating to such work has been accepted by MTD. Upon request, Contractor's QA records shall be made available to MTD for inspection. Such QA activities performed (or not performed) by MTD shall not reduce nor alter Contractor's QA responsibilities or its obligation to meet the requirements of this document. At any time during the manufacturing process, MTD may choose to visit Contractor's facility or a subcontractor's facility during normal working hours to audit the manufacturing and quality control processes.

8.8.2 System Components

Contractor shall conduct regular inspections and audits in accordance with guidelines defined by the QA Program Plan. Contractor's Project Manager shall establish a quality assurance process and assign qualified professionals to check all system components for compliance with the AIM specifications and consistency in production quality.

8.8.3 Manufactured Products

Contractor shall utilize products manufactured by companies that utilize formal, documented quality assurance practices that meet or exceed the standard of care established by the industry. Contractor shall proactively monitor each supplier's quality system. Quality systems that conform to ISO 9000 practices are preferred.

9 DESIGN REVIEW

This chapter defines the requirements regarding submittals and formal design reviews. Additional submittals are required as appropriate to the work. The format for submittals shall be as per Section 8.4.

9.1 PRELIMINARY DESIGN SUBMITTAL

Contractor shall provide a detailed preliminary design submittal within sixty (60) calendar days of the Notice to Proceed. This submittal shall be reviewed with MTD to verify that all aspects of Contractor's design are in conformance with the specifications. The preliminary design submittal shall include a complete description and functionality of each AIM system and system component, updates to any technical information submitted with the proposal, and a detailed project schedule. Some of the key elements of the preliminary design submittal shall include but are not limited to:

- A draft software requirements specification document for any new functionality that is being developed for AIM with an emphasis on the user interfaces and interfaces to external systems.
- Data sheets for all major hardware and off-the-shelf software components.
- Description of the computer subsystem including servers, dispatcher workstations, monitoring workstations, yard workstation, interfaces, data archival, TDB, and installation information.
- Description of radio or wireless data communications systems including anticipated coverage maps. If applicable, the coverage map shall indicate the overlap coverage areas and areas where phasing delay will inhibit data.
- A description of the methodology for maintaining MTD's current route and schedule database in Trapeze and its interface with AIM. This description shall include how the database will be edited, handled, and interfaced to AIM; and the methodology for providing the database onboard each bus for tracking route and determining schedule adherence.
- Scaled drawings showing details of the passenger information electronic display sign hardware. The submittal shall also include a description of the display interface with the wired and/or wireless data network used to provide data to the sign and the details for the data network.
- Mockups of web pages for the time of arrival passenger information including a description of the website, a list of the pull down menus and items, a sample map display time of arrival tables.
- A description of the CAD user interface including AVL map displays, tabular displays, incident reports, SAS functionality, data communication functions, fleet management reports, AVL playback, incident reports, sample screens, a list of the pull down menus and items.
- Scaled drawings of the MDT with the exact key labeling and typical screen displays; and a description of the operator interface with the MDT including all prompts, displays, and menus.

9.2 FINAL DESIGN SUBMITTAL

Contractor shall provide a detailed final design submittal within three (3) months of the Notice to Proceed. This submittal shall be reviewed with MTD to verify that all aspects of Contractor's design are in conformance with the specifications. The final design submittal shall include a complete description of each AIM system and system component, updates to the technical information submitted in the preliminary design submittal, and an updated detailed project schedule. At a minimum, the overview shall provide details of each system and discuss any changes and updates that have been made since the preliminary design submittal.

9.3 DESIGN REVIEWS

Contractor shall conduct formal presentations of the Preliminary Design and the Final Design submittals for AIM. The design review presentations shall be scheduled approximately one week after the presentation materials have been submitted to MTD for review. Each design review shall be conducted according to the following agenda:

- Contractor shall present the design submittal in sufficient detail to demonstrate details of achieving compliance with the specifications. Use of mock-ups, samples, and demonstrations of the user graphical user interfaces is encouraged.
- MTD shall present issues and concerns for discussion.

Contractor shall furnish minutes of the design review meetings. MTD will follow up each design review with written comments on the design deliverable. Contractor shall address all of the MTD's issues and concerns in writing. At the sole discretion of MTD, if the issues and concerns warrant it, MTD may require an additional design review presentation or design review submittal.

10 TESTING & ACCEPTANCE

10.1 OVERVIEW

Contractor shall test all AIM systems, subsystems, components, equipment, hardware, software, interfaces, databases, reports, networks, communications coverage, map accuracy, or any other items or services provided under this Contract to assure that the system is compliant with these specifications, approved design concepts, and is free of manufacturing and/or material defects. Such tests shall be conducted in a multi-tiered program intended to identify and correct any deficiencies as early as practical so that overall impacts to the implementation of AIM are minimized. Successful test results shall be integral to the acceptance process by MTD. Contractor shall furnish all test equipment and test personnel. The test personnel shall be properly trained, experienced technicians who are familiar with the system.

10.2 TESTING PHASES

10.2.1 Pre-Delivery

Applicable individual system components and subsystems shall be inspected and tested at Contractor's or manufacturer's factory prior to shipment to MTD. These factory tests shall fully exercise functionality of the systems in order to prove out design and interface characteristics. Factory testing shall be intended to simulate the installed environment as closely as practical. These inspections and tests shall verify that all system components contain the correct materials, are assembled properly, and function properly. Complete records shall be kept of all production inspections and tests that are performed including any failures and subsequent corrective measures. Such records shall be available to MTD upon request.

10.2.2 Core First Article Testing

Core First Article (CFA) testing shall be conducted onsite with components installed on a selected set of MTD buses and service vehicles in order to demonstrate substantial progress and to identify and document the installed system component physical configuration. Such field testing shall prove out the system functionality prior to introduction to revenue service. CFA testing shall be performed with the AIM computer and communications systems implemented and interconnected via the AIM and MTD networks. Contractor shall provide MTD with a minimum of one week advance notice of CFA testing and shall provide MTD the opportunity to observe such testing.

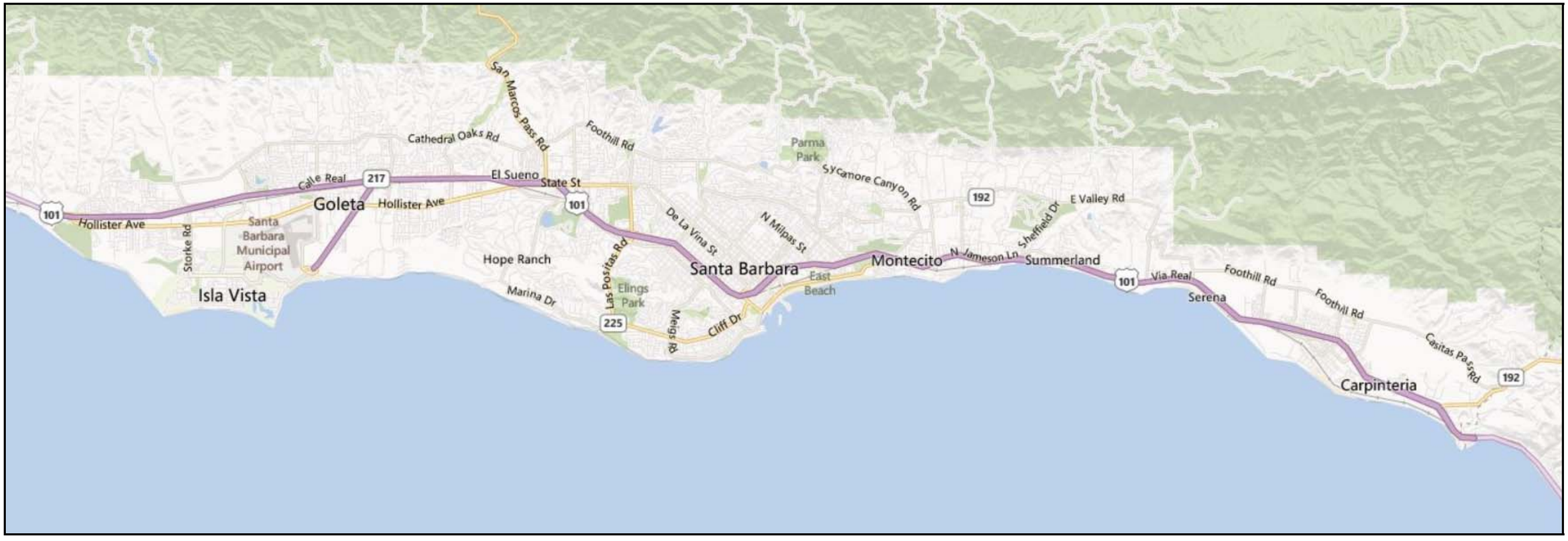
Repeated malfunctions of similar system components or subsystems shall be considered as a Class Failure. In the event of a Class Failure, CFA testing shall be terminated and the cause of the Class Failure shall be determined and corrected. All system components that experience a Class Failure during testing shall be replaced by Contractor prior to acceptance by MTD. Following successful CFA testing, AIM shall be implemented on the full MTD fleet.

10.2.3 Final Acceptance

Final acceptance testing shall be performed upon completion of the AIM installation while AIM is being used to support revenue service. Such testing shall be carried out over a minimum of 30 days with the goal of demonstrating that the entire fully integrated AIM system is in compliance with these specifications. Following acceptance testing, contractor shall prepare a report assessing the system performance indicating any deviations from these specifications. Corrective actions shall be suggested for any such deviations. MTD will review the recommended corrections and provide guidance to Contractor regarding Contractor's actions to correct any deficiencies.

Attachment 1

MTD Service Area Map*



* MTD also operates the Coastal Express Limited route which travels between Goleta/Santa Barbara to and from the City of Ventura via Highway 101, which extends southeast beyond this map.

Attachment 2

Revenue Vehicle Summary

Bus Type	E-Bus	SV*	Nova	Gillig	MCI	Total
22' Electric Shuttle	14	6				20
29' Low-Floor Bus				17		17
40' Low-Floor Bus			14	50		64
40' Commuter Coach					3	3
45' Commuter Coach					2	2
Grand Totals	14	6	14	67	5	106

* Specialty Vehicle

Attachment 3

Revenue Vehicle Detail Listing

(Page 1 of 2)

Veh	Year	Make	Model	Description	Type	VIN	License
3	1992	Specialty Vehicle	n/a	22' Electric Shuttle	Battery	1S9BR14F1NC143507	354671
4	1992	Specialty Vehicle	n/a	22' Electric Shuttle	Battery	1S9BR14F5NC143509	354674
5	1992	Specialty Vehicle	n/a	22' Electric Shuttle	Battery	1S9BR14F1NC143510	354675
6	1992	Specialty Vehicle	n/a	22' Electric Shuttle	Battery	1S9BR14F3NC142511	354676
8	1992	Specialty Vehicle	n/a	22' Electric Shuttle	Battery	1S9BR14F9NC143523	354701
11	1992	Specialty Vehicle	n/a	22' Electric Shuttle	Battery	1S9BR14F3NC143508	1069351
12	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS3123YC248028	1036203
13	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS3123YC248029	1036206
14	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS3128YC248026	1036226
15	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS312XYC248027	1036225
16	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS312XYC248030	1036231
17	2001	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS3121YC248031	1052152
18	2001	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS31251C248050	1052154
19	2001	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS31271C248051	1052155
20	2001	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS31291C248052	1052156
21	2001	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS31201C248053	1052157
26	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS312X1C248034	
27	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1EBS31231C248036	
28	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1EBS31211C248035	1284494
29	2000	E-Bus	n/a	22' Electric Shuttle	Battery	1E9BS31271C248038	
401	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82PXW3000027	39694
402	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P6W3000011	39693
404	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P8W3000009	39698
405	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P2W3000006	39699
407	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82PXW3000013	44050
409	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P4W3000007	44052
410	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82PXW3000030	407418
411	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P9W3000004	44053
413	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P3W3000015	44055
414	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P5W3000016	44056
416	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P3W3000029	44059
417	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P7W3000017	44061
418	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82POW3000019	44060
419	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P1W3000028	44062
420	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P1W3000014	44063
421	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P4W3000024	44064
422	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVLY82P2W3000023	44066
424	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P9W3000018	44069
426	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P9W3000021	44085
427	1998	Nova	LFS 40102	40' Low-Floor Transit Bus	Diesel	2NVYL82P6W3000025	44086
429	2000	Nova	LFS 40102	40' Low-Floor Commuter Coach	Diesel	2NVYL82P4Y3000172	1036217
431	2000	Nova	LFS 40102	40' Low-Floor Commuter Coach	Diesel	2NVYL82PXY3000175	1036219
432	2000	Nova	LFS 40102	40' Low-Floor Commuter Coach	Diesel	2NVYL82P1Y3000176	1036220
433	2000	Nova	LFS 40102	40' Low-Floor Commuter Coach	Diesel	2NVYL82P8Y3000174	1036221
600	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201341074592	1110396
601	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201341074593	1180415
602	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201541074594	1180416
603	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201741074595	1180420
604	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201941074596	1180419
605	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201041074597	1180423
606	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201241074598	1180426
607	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201441074599	1180428
608	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201741074600	1180430

Appendix 3

Revenue Vehicle Detail Listing

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Veh	Year	Make	Model	Description	Type	VIN	License
609	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201941074601	1180429
610	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201041074602	1180432
611	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201241074603	1180431
612	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201441074604	1180434
613	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201641074605	1180436
614	2004	Gillig	G20D102N4	40' Low-Floor Transit Bus	Diesel	15GGD201841074606	1180441
615	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD271XB1178923	1299918
616	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2711B1178924	1299919
617	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2713B1178925	1299923
618	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2715B1178926	1299920
619	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2717B1178927	1299921
620	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2719B1178928	1299922
621	2011	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2710B1178929	1299924
622	2013	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	15GGD2716D1182759	1370669
623	2013	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel	1566D271D1182760	1370670
624	2013	Gillig	G27D102N4	40' Low-Floor Transit Bus	Diesel		new
700	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191041090906	1180417
701	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191041090907	1180418
702	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191241090908	1180424
703	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191441090909	1180427
704	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191041090910	1180435
705	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191241090911	1180437
706	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191441090912	1180440
707	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191641090913	1180447
708	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191841090914	1180448
709	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191X41090915	1180449
710	2004	Gillig	G19E102R2	29' Low-Floor Transit Bus	Diesel	15GGE191141090916	1180450
711	2006	Gillig		29' Low-Floor Transit Bus	Diesel	15GGE191261090944	1215267
712	2006	Gillig		29' Low-Floor Transit Bus	Diesel	15GGE191461090945	1215268
713	2006	Gillig		29' Low-Floor Transit Bus	Diesel	15GGE191661090946	1215269
715	2009	Gillig	G30E102N2	29' Low-Floor Transit Bus	Hybrid	15GGE301591091440	
716	2009	Gillig	G30E102N2	29' Low-Floor Transit Bus	Hybrid	15GGE301791091441	1247230
717	2009	Gillig	G30E102N2	29' Low-Floor Transit Bus	Hybrid	15GGE301991091442	
800	2004	MCI	D4500	45' Commuter Coach	Diesel	1M8PDMPA14P056374	1180451
801	2004	MCI	D4500	45' Commuter Coach	Diesel	1M8PDMPA34P056375	1180452
802	2004	MCI	D4000	40' Commuter Coach	Diesel	1M8SDMPA24P056376	1180455
803	2004	MCI	D4000	40' Commuter Coach	Diesel	1M8SDMPA44P056377	1180454
804	2004	MCI	D4000	40' Commuter Coach	Diesel	1M8SDMPA64P056378	1180453
900	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191771077738	1215279
901	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191771077739	1215278
902	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191371077740	1215280
903	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191571077741	1215281
904	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191771077742	1215283
905	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191971077743	1215284
906	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191071077744	1215282
907	2007	Gillig	G19D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD191271077745	1215285
908	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD3011B1179197	1299917
909	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD3013B1179198	1299928
910	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD3015B1179199	1299927
912	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD301XB1179201	1299930
913	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD3011B1179202	1299926
914	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD3013B1179203	1299929
915	2011	Gillig	G30D102N4	40' Low-Floor Transit Bus	Hybrid	15GGD3018B1179200	1299925

Appendix 4

Service Vehicle Listing

Veh ID	Year	Make	Model	Description	Miles	AVL	SAS	RSS
S89	2006	Ford	F-250 Utility	Bus Stop Truck	83,087	option	option	no
S91	2007	International	Tow Truck	Tow Truck	10,427	option	option	no
S94	2007	Toyota	Prius Hybrid	Staff Vehicle (Morris)	114,266	no	no	no
S95	2007	Toyota	Prius Hybrid	Staff Vehicle (Morse)	85,181	no	no	no
S97	2010	Ford	F-150 Pick Up	Shop Truck (Cardona)	54,597	no	no	no
S98	2011	Ford	F-350 Stakebed	Shop Truck	5,169	option	option	no
S99	2011	Ford	F-350 Utility	Shop Truck	2,921	option	option	no
S100	2010	Ford	Explorer	Supervisor Road Vehicle	84,816	yes	yes	yes
S101	2010	Ford	Explorer	Relief Vehicle	175,657	yes	yes	yes
S102	2010	Ford	Fusion	Relief Vehicle	34,715	option	option	no
S103	2010	Ford	Fusion	Relief Vehicle	34,059	option	option	no
S104	2010	Ford	Fusion	Relief Vehicle	35,756	option	option	no
S105	2010	Ford	Fusion	Relief Vehicle	37,913	option	option	no
S106	2010	Ford	Fusion	Relief Vehicle	36,771	option	option	no
S107	2010	Ford	Fusion	Relief Vehicle	35,879	option	option	no
S108	2010	Ford	Fusion	Relief Vehicle	37,937	option	option	no
S109	2010	Ford	Fusion	Relief Vehicle	17,370	option	option	no
S110	2013	Ford	Fusion	Relief Vehicle	1,391	option	option	no
S111	2013	Ford	Fusion	Staff Vehicle (Admin)	2,501	option	option	no
S112	2013	Toyota	Highlander	Fare Security Vehicle	1,833	option	option	no
S113	2013	Toyota	Highlander	Supervisor Road Vehicle	11,013	option	option	no
S114	2013	Toyota	Camry Hybrid	Staff Vehicle (Zielinski)	5,894	no	no	no
S115	2013	Toyota	Camry Hybrid	Staff Vehicle (Fisher)	7,549	no	no	no

AVL: Automatic Vehicle Location System (mandatory in 106 buses and two road supervisor vehicles; optional in 16 service vehicles)

SAS: Silent Alarm System (optional feature within optional CAD system; if selected, mandatory/optional vehicles match those for AVL)

RSS: Road Supervisor System (optional system; if selected, mandatory in two road supervisor vehicles)