THIS PRINT COVERS CALENDAR ITEM NO. : 10.6

SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

DIVISION: Capital Programs & Construction

BRIEF DESCRIPTION:

Authorizing the award of San Francisco Municipal Transportation Agency (SFMTA) Purchase Order No. 5 to SFMTA Contract No. 1226, Automatic Train Control System (ATCS) LRV4 Wayside Update project to Thales Transport & Security, Inc., located at 5700 Corporate Drive, Suite 750 Pittsburgh, PA 15237, as a sole source purchase order, to update the ATCS to ensure that the new Siemen's LRV vehicle will operate safely and efficiently in conjunction with existing LRVs in the Metro and Central Subway tunnels in the amount of $4,823,131, for a term not to exceed 820 calendar days.

SUMMARY:

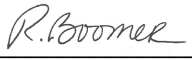
- The purpose of the contract is to design, install, test, and commission the ATCS wayside equipment hardware and software to ensure that the new Siemen's LRV vehicle will operate safely and efficiently in conjunction with existing LRVs in the Metro and Central Subway tunnels provided by Thales Transport & Security ("Thales" - formerly Alcatel Transport Automation (U.S.) Inc.).
- On April 21, 2009, the SFMTA Board approved Contract 1226 with Thales to allow the Director of Transportation to issue Purchase Orders to Thales to procure services and equipment necessary to maintain the ATCS.
- On January 5, 2010, the SFMTA Board delegated authority to the Director to approve contracts up to $500,000
- On May 21, 2015, the Director of Transportation authorized sole source negotiations with Thales for installation services related to ATCS LRV4 Wayside Update project since Thales is the only provider for this proprietary system.
- Federal and local sources are providing funds for the work.

ENCLOSURES:

1. SFMTAB Resolution
2. Project Budget & Financial Plan
3. Purchase Order No. 5

APPROVALS: **DATE**

DIRECTOR  6/9/15

SECRETARY  6/9/15

ASSIGNED SFMTAB CALENDAR DATE: June 16, 2015

PURPOSE

The purpose of this calendar item is to authorize the award of Purchase Order No. 5 to SFMTA Contract No. 1226 ATCS LRV4 Wayside Update project to Thales Transport & Security as a sole source purchase order to update the ATCS to ensure that the new Siemen's LRV vehicle will operate safely and efficiently in conjunction with existing LRVs in the Metro and Central Subway tunnels, in the amount of $4,823,131, for a term not to exceed 820 calendar days.

GOAL

Purchase Order 5 will assist in the implementation of the following goals, objectives and initiatives in the SFMTA Strategic Plan:

Goal 1: Create a safer transportation experience for everyone.

- Objective 1.3 Improve the safety of the transportation system.

Goal 2: Make transit, walking, bicycling, taxi, ridesharing & car sharing the preferred means of travel.

- Objective 2.2 Improve transit performance.

Goal 3: Improve the environment and quality of life in San Francisco

- Objective 3.1 Reduce the Agency's and the transportation system's resource consumption, emissions, waste and noise.
- Objective 3.2 Increase the transportation system's positive impact to the economy
- Objective 3.3 Allocate capital resources effectively.
- Objective 3.4 Deliver services efficiently.

DESCRIPTION

Background

The Automatic Train Control System (ATCS) was procured from Alcatel Transport Automation (since purchased by Thales Transport & Security) in 1992. The ATCS was implemented in the subway in 1998 in conjunction with the procurement of the Breda Light Rail Vehicle (LRV) fleet and the construction of the Muni Metro Turnback (MMT).

In July of 2014, the SFMTA Board of Directors authorized the Director of Transportation to execute a contract with Siemens Industry to provide up to 260 LRVs. The procurement will provide vehicles for the Central Subway, as well as replacing the existing LRV fleet.

The ATCS wayside equipment and associated software shall be updated to recognize the new Siemen's LRVs and that the new LRVs will operate safely and efficiently in conjunction with the existing LRVs in the Metro and Central Subway tunnels.

Contract No. 1226 with Thales is a Master Agreement under which the SFMTA may procure proprietary equipment and services to maintain the ATCS. Each purchase order under Contract No. 1226 shall receive sole source approval from the Director of Transportation.

Scope of Work

Thales will design, install, test and commission the ATCS system software to support the mixed fleet of existing LRV and Siemen's LRV in the Metro and Central Subway tunnels. SFMTA staff will assist in the work.

PUBLIC OUTREACH

Not applicable

ALTERNATIVES CONSIDERED

The ATCS and its components, including software, are a proprietary technology of Thales Transport & Security, Inc. ATCS equipment, software, and specialized technical service can be procured only from Thales; there is no other supplier.

This procurement meets the single source requirements for sole source contracting under federal guidelines. This process is consistent and in compliance with FTA Circular 4220.1F regarding Procurement by Noncompetitive Proposals (Sole Source).

FUNDING IMPACT

Funding for the project, which has been secured, comes from Federal FTA Section 5337 grant funds and matching local funds from the 2013 SFMTA Revenue Bond.

ENVIRONMENTAL REVIEW

This contract is categorically exempt from Environmental Review CEQA Guidelines 15301 Class 2 – (c) Replacement or reconstruction of existing utility systems and /or facilities involving negligible or no expansion of capacity.

OTHER APPROVALS RECEIVED OR STILL REQUIRED

The City Attorney's Office has reviewed this calendar item. No other approvals are required.

RECOMMENDATION

Staff recommends that the SFMTA Board of Directors authorize the Director of Transportation to award Purchase Order No. 5 for SFMTA Contract No. 1226, ATCS LRV4 Wayside Update project with Thales Transport & Security as a sole source purchase order to update the ATCS to ensure that the new Siemen's LRV vehicle will operate safely and efficiently in conjunction with existing LRVs in the Metro and Central Subway tunnels, in the amount of $4,823,131, for a term not to exceed 820 calendar days.

SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
BOARD OF DIRECTORS

RESOLUTION No. _____

WHEREAS, The Advanced Train Control System (ATCS) is a safety critical system that performs automated train control and signaling of light rail vehicles operating in the Muni Metro Tunnels, which has served to improve safety, increase speed and frequency of service, and reduce headway the subway; and

WHEREAS, The ATCS is proprietary to Thales Transport & Security ("Thales"), which is the only source for ATCS equipment and services necessary to maintain and expand the ATCS; and

WHEREAS, On April 21, 2009, the SFMTA Board of Directors approved Contract 1266 with Thales, under which the SFMTA is authorized to procure through purchase orders proprietary equipment and services; and

WHEREAS, The ATCS shall be updated to recognize the new Siemen's LRVs so that the new LRVs will operate safely and efficiently in conjunction with the existing LRVs in the Metro and Central Subway tunnels; and

WHEREAS, On May 21, 2015, the Director of Transportation authorized sole source negotiations with Thales for a purchase order under Contract 1226 for design, install, test, and commission services to update the ATCS to ensure that the new Siemen's LRV vehicle will operate safely and efficiently in conjunction with existing LRVs in the Metro and Central Subway tunnels; and

WHEREAS, Under SFMTA Board of Directors Resolution No. 10-008, contracts valued more than $500,000 require Board of Directors approval; now, therefore, be it

RESOLVED**,** That SFMTA Board of Directors authorizes the award of Purchase Order No. 5 for SFMTA Contract No. 1226, ATCS LRV4 Wayside Update Project to Thales Transport & Security, Inc., located at 5700 Corporate Drive, Suite 750 Pittsburgh, PA 15237 to update the ATCS to ensure that the new Siemen's LRV vehicle will operate safely and efficiently in conjunction with existing LRVs in the Metro and Central Subway tunnels as a sole source contract, in the amount of $4,823,131, for a term not to exceed 820 calendar days.

I certify that the foregoing resolution was adopted by the San Francisco Municipal Transportation Agency Board of Directors at its meeting of June 16, 2015.

_____
Secretary to the Board of Directors
San Francisco Municipal Transportation Agency

ENCLOSURE 2

Contract No. 1226 Purchase Order No. 5
ATCS LRV4 Wayside Update Project
Project Budget and Financial Plan

PROJECT BUDGET

Category	Budget
Predevelopment Phase Staff Support (SFMTA and Other Dept. Services)	$400,000
Design & Implementation Phase Staff Support (Professional Service Contract, SFMTA and Other Dept. Services)	$15,435,972
Total Cost	**$15,835,972**

FINANCIAL PLAN

Project Funding Source	Amount
FTA Section 5337	$12,668,778
Local Funds 2013 SFMTA Revenue Bond	$3,167,194
Total	**$15,835,972**

PURCHASE ORDER FOR WAYSIDE UPDATES OF THE ADVANCED TRAIN CONTROL SYSTEM (ATCS) FOR MIXED FLEET OPERATION OF LRV2/3 AND LRV4 VEHICLES

CONTRACT No. 1226 – PURCHASE ORDER No. 5

This Purchase Order is issued by the San Francisco Municipal Transportation Agency ("SFMTA" or "City") under the Advance Train Control System Improvement Professional Services and Equipment Purchases Agreement between the SFMTA and Thales Transport & Security, Inc. ("Thales"), Contract No. 1226, dated April 21, 2009, (the "Master Agreement") for the Work, as defined below, to update wayside elements of the Muni Metro subway ATCS system to accommodate mixed fleet operation of LRV2/3 and LRV4 vehicles. The Master Agreement is incorporated by reference as if fully set out herein. All Appendices listed below are incorporated by reference as if fully set out herein.

1. Effective Date: This Purchase Order will become effective when executed by the SFMTA and Thales in accordance with Clause 47 of the Master Agreement.
2. Scope: See Appendix A for a description of the scope of work, deliverables and constraints (collectively the "Work") to be rendered under this Purchase Order.
3. Price: The total price payable by the City in respect of this Purchase Order for the Work hereunder is Four Million Eight Hundred Twenty-Three Thousand One Hundred Thirty-One United States Dollars ($4,823,131.00 U.S.) subject to adjustment only as otherwise set forth herein or in accordance with the provisions of the Master Agreement.
4. Delivery and Payment Schedule: See Appendix B for a schedule of the dates by which Thales is required to perform the Work and included Milestones under this Purchase Order, and the respective payment schedule for the Work.
5. Warranty: Thales shall perform the Work under this Purchase Order with due care and diligence, in accordance with the terms and conditions of the Master Agreement. Thales warrants that the software supplied hereunder ("Software") shall conform to the functions described in this Purchase Order for a period of twelve (12) months after the date of Substantial Completion (as defined in Appendix A). Thales does not warrant that the Software shall be error free. During the warranty period, Thales shall, at its own expense, promptly correct or bypass any reproducible malfunction, lack of conformity with functions described in the design documents and technical specifications, and/or anomaly within a period of time to be agreed by both Parties depending on the nature and severity of malfunctions. Thales shall warrant software changed pursuant to a warranty correction under the same conditions as above, for a period expiring either simultaneously with the initial warranty of the Software, or six (6) months after acceptance of such corrected software, whichever is later. Notwithstanding any provision to the contrary, Thales shall have no obligation to repair or replace any Equipment or correct any Software if:
    a. The Equipment or Software has been modified, repaired or reworked by any party other than Contractor, without Contractor's prior written consent; or

b. The defect is the result of:
    i. any improper storage, handling or use of the Equipment or Software by City; or
    ii. any use of the Equipment or Software by City in conjunction with another equipment or software that is electronically or mechanically incompatible or of an inferior quality; or
    iii. modifications by SFMTA to the interface specifications that Contractor does not agree to; or
    iv. any damage to the Equipment or Software by power failure, fire, explosion or any act of God or other cause beyond Contractor's control;
    v. or installation not performed in accordance with the Contractor's procedures and/or instructions.

The warranties set forth herein shall be non-transferable. The fulfillment of the above obligations shall be in full satisfaction of Thales's responsibility for correction of defects in the Software and such repair or replacement constitutes the City's sole remedy with respect the repair or replacement of defective Software supplied hereunder. THALES DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, AND ANY AND ALL IMPLIED WARRANTIES THAT MAY BE APPLICABLE UNDER THE UNIFORM COMMERCIAL CODE OR OTHER APPLICABLE STATUTES, INCLUDING IMPLIED WARRANTIES ARISING BY USAGE OR CUSTOM OF TRADE.

6. Subcontractors: Thales shall use the subcontractor(s) to accomplish the Work described in Appendix A of this Purchase Order, which subcontractor(s) is/are hereby acknowledged and approved by the SFMTA. Thales shall not substitute a subcontractor without written approval from the SFMTA, which approval shall not be unreasonably withheld or delayed.
7. This Purchase Order will terminate without cost to any party if the SFMTA does not issue Notice to Proceed (NTP) to Thales by August 3, 2015.

[Remainder of this page intentionally left blank.]

8. Authorization: By their signatures below, this Purchase Order is authorized by the SFMTA's Executive Director/CEO and the President or Corporate Counsel of Thales.

Authorized:

_____
Edward D. Reiskin
Director of Transportation
Municipal Transportation Agency
City and County of San Francisco

Date: _____

Authorized:

_____
John Brohm
President
Thales Transport & Security, Inc.
5500 Corporate Drive, Suite 500,
Pittsburgh, PA 15237

Date: _____

San Francisco Municipal Transportation Agency
Board of Directors
Resolution No. _____
Adopted: _____
Attest:
_____
Secretary, SFMTA Board of Directors

Approved as to Form:

Dennis J. Herrera
City Attorney

_____
Robert K. Stone
Deputy City Attorney

Date:_____

APPENDIX A TO CONTRACT 1226, PURCHASE ORDER No. 5

1. BACKGROUND AND PURPOSE

The purpose of the ATCS Wayside Updates Project is to update wayside elements of the Muni Metro subway ATCS system to accommodate mixed fleet operation of LRV2/3 and LRV4 vehicles. The scope of this Project is updates to the ATCS VCC software and updates to the SMC software so that LRV4 vehicle operations in automatic mode under ATCS control are functionally equivalent to the operations of LRV2 and LRV3 vehicles in ATCS automatic mode under ATCS control.

2. DEFINITIONS

The meaning of the following terms, for purposes of this Purpose Order shall have the meaning set out here. These terms are in addition to the defined terms set out in the Master Agreement.

1. Additional Work – Work that is not within the scope of Work described in the Contract Documents, is not incidental to the Work described in or required under the Contract Documents.

2. As-Built Schedule - Schedule incorporating all actual activity durations, actual start and finish dates of all activities as accomplished or incurred during performance of the Work. Thales shall submit this As-Built Schedule to SFMTA at the completion of the Work as a condition of Substantial Completion.

3. Baseline Schedule -A detailed CPM schedule describing Thales' plan and timing for executing the Work. The Baseline Schedule shall conform to the requirements of the Contract Documents.

4. Codes - The latest (most recently enacted) versions of state, federal, and local regulations, ordinances, statutes, and other laws and requirements of regulatory agencies with jurisdiction of the Project that govern the design, means, and methods of construction, labor employed on the Work, the built structure, and safety and other mandates of law. Whatever reference is made to code, that reference shall be construed to mean the applicable codes, regulations, ordinances, statutes, laws and other legal requirements applicable to the Work, whether or not specified or otherwise referenced in the Contract Documents.

5. Contract Documents - This Purchase Order and all Appendices to and documents incorporated by reference therein, and Contract 1226 (the Master Agreement).

6. Current Schedule: A Current Schedule is the Contractor's periodic report of actual progress, estimated progress to completion, and any problems that cause the Work to be delayed

7. Days: Consecutive calendar days, including weekends and holidays, unless otherwise specified in this Purchase Order.

8. Engineer - A technical manager or site representative authorized to represent the SFMTA concerning technical matters of the Project.

9. Final Acceptance – Written confirmation from the SFMTA's Director of Transportation that all Work under this Purchase Order is complete and accepting the Work.

10. Final Field Report - SAT and commissioning test results. Report shall include narrative summary of Project, overall test findings, completed test forms, summary of test results, and missing, failed, not applicable, newly required, or postponed tests. Discuss non-passed test or test steps in the test documentation along with the reason for missing the test and the technical and safety consequences as well as traceable resolution.

11. Furnish - Purchase and deliver to the site, installation is not included. The term "Furnish" also means to supply and deliver.

12. Master Agreement - Contract 1226 between the SFMTA and Thales.

13. Project - The Work described herein, and all elements of that Work including incidental Work necessary for the completion of the Work, in whole or part, and the end result of the Work.

14. Provide - Furnish and install, or supply and install, complete and in place, at the site.

15. Purchase Order No. 5 - This document and documents incorporated by reference describing the Project, the Work to be performed, the furnishing of labor, materials, and equipment to perform the Work, insurance, the terms and conditions of performance, and consideration, and any properly executed and certified Contract Modification to this Purchase Order No. 5.

16. Request for Information - A document prepared by Thales requesting information from the SFMTA regarding the Work, Project, or Contract Documents.

17. Revenue Hours: Hours during which trains carry fare paying passengers operate as defined by the Current Schedule and which may be modified by the Lenox Operations Control Center (OCC), also known as "Revenue Service."

18. Safety and Functional Requirements Memorandum - Memorandum from Thales that verifies that the Project satisfies functional and safety requirements

19. SCS, Station Controller Subsystem - Equipment at wayside which provides control of signals and switches and sensing of wayside conditions over a specific area of the ATCS system.

20. SMC, System Management Center - Subsystem that provides for automatic train supervision functions within the ATCS such as such as traffic regulation and data reporting.

21. Submittal - A document, design, and schedule, shop drawings, sample, and test report, certificates of compliance, manufacturer's instructions, or other Thales Work product described herein that Thales shall submit to the SFMTA for review and approval in accordance with the agreed upon Submittal Schedule prior to continuation of or acceptance of Work. A Resubmittal is a Submittal previously rejected by the SFMTA that Thales has resubmitted for SFMTA review and approval.

22. Substantial Completion The state in progress of the Work and point of time, that Thales has completed its testing on the ATCS Wayside Updates and verified to SFMTA and SFMTA has confirmed that the SMC and VCC software has successfully operated a LRV4 vehicle with LRV2 and LRV3 vehicles in automatic mode in the Market Street tunnel with ATCS functionality equivalent to LRV2 and LRV3 vehicles, in accordance with the requirements and specifications set out in this Purchase Order. See Section 23.

23. Technical Specifications - Directions, provisions, and requirements including any plans or drawings pertaining to the performance of the Work herein required and to the furnishing of material.

24. Test Day - Calendar Day on which SFMTA is required to mobilize staff and resources to support Thales' testing and commissioning.

25. VCC, Vehicle Control Center - Computer system at central control which provides vital automatic control of train movement in ATCS.

26. Wayside ATCS - Hardware and software of SMC, VCC, SCS ATCS subsystems, their interfaces to VOBC and outside interfaces to external ATCS data clients. Hardware shall include equipment required to test and maintain wayside ATCS.

27. Wayside Updates – software updates to the VCC and SMC subsystems of the Wayside ATCS that are the subject of the Work for this Purchase Order No. 5 in accordance with Section 4B.

28. Weekly Plan (Look-Ahead Schedule) - A detailed bar chart plan of the Work to be accomplished in the coming three weeks for all on-site testing activities. This is not required during the design and development phase. All activities and sub-task activities in the Weekly Plan shall be referenced with the activity numbers in the Current Schedule or schedule in effect.

29. Work - The performance by Thales of its responsibilities and obligations as specified or otherwise set forth in the Contract Documents, and the results of Thales's efforts. Work shall include, but not be limited to, providing all labor, services, materials, equipment, and documentation required by the Contract Documents as pertaining to the signaling system of the ATCS.

30. Work Day – Any calendar Day (24 hour period commencing at 12:00 AM and terminating at 11:59 PM), except Saturday, Sundays, and holidays.

31. Workshop - Formal presentation between SFMTA and Thales Project teams to discuss Project scope and Project related activities. See Section 12.

3. GENERAL DESCRIPTION OF SCOPE

A. Thales shall provide designs, plans, equipment, software, inspection, testing, and commissioning to implement VCC and SMC software changes to effect ATCS control of LRV4 in the Muni Metro subway.

B. Review ATCS documentation listed in Section 15 to determine whether the documentation accurately reflects the current condition of the ATCS at Substantial Completion of the Project and update the documentation to reflect that current condition.

C. Develop and conduct test program to verify that ATCS subsystems modified under this Purchase Order meet all operational, functional, safety, and performance ATCS requirements as specified in Tables 1 and 2 and as further developed in the course of Project design.

D. Provide Workshops for SFMTA staff during various phases of the Project as described in Section 12.

E. Provide on-site technical support during site test and site commissioning phases of the Project.

F. Support SFMTA's communications with the California Public Utilities Commission (CPUC).

4. TECHNICAL REQUIREMENTS

G. Requirements shall be flowed down to verifiable system and subsystem requirements. Thales shall list the verifiable requirements in the Project System Requirements Traceability Matrix (SRTM) and track them to verification throughout the course of the Project. The SRTM will be updated throughout the Project life cycle and will be submitted to SFMTA during different stages, including safety certification.

H. Thales shall develop detailed requirements, design, and test the Wayside Updates to effect LRV4 operation in the Muni Metro subway under ATCS control according to the technical, safety, and functional requirements shown in Table 1.

Table 1 - Market Street Tunnel

ID	Requirement	Subsystem
M-1	The Market Street Tunnel ATCS shall be able to safely operate LRV 2/3 and LRV 4 vehicles	VCC, SMC
M-2	The VCC, YDTD, SMC, TVS, and OpSim software shall be modified to perform with new LRV4 train IDs,	VCC, YDTD, SMC, TVS, and OpSim
M-3	The system will reject any attempt to issue a command to couple a train, which contains an LRV2 VOBC ID, with a train containing an LRV4 ID.	VCC, SMC
M-4	Train IDs shall be developed for the LRV 4 vehicles to differentiate between the LRV4 and LRV 2/3 fleet and NCTs	VCC, SMC
M-5	Thales shall simulate and evaluate the system impact with the LRV 4 performance characteristics and vehicle dimensions provided by Siemens to identify any further changes required.	Analysis
M-6	Thales shall update ATCS status information sent to NextBus passenger information signs, public address system, and CAD/AVL systems via the Thales Application and tenet feed to accommodate mixed LRV4 and LRV2/LRV3 operation. Thales Application requirements shall be defined by SFMTA and verified by Thales and interface documents shall be updated by Thales.	SMC
M-7	The guideway speed profiles shall be modified to reflect the permanent go-slow-zones to be provided by SFMTA (prior to PDR).	VCC, SMC
M-8	Mixed operation of LRV4 and LRV2/3 trains shall operate with equivalent ATCS functionality of the LRV 2/3 except as identified in the requirements stated in this Table 1	VCC, SMC

I. Thales shall develop detailed requirements and provide software updates, and implement design changes to Wayside Updates to accommodate LRV4 operation in the Central Subway according to the technical, safety, and functional requirements shown in Table 2.

Table 2 - Central Subway Tunnel

ID	Requirement	Subsystem
C-1	The Central Subway Tunnel ATCS shall be able to operate LRV 2/3 and LRV 4 vehicles	VCC, SMC
C-2	The Central Subway Tunnel ATCS shall be designed to support LRV 2/3 and LRV 4 vehicles. This includes loop crossovers and stopping locations.	VCC, SMC
C-3	The VCC, YDTD, SMC, TVS, and OpSim software shall be modified to accept new LRV4 train IDs	VCC, YDTD, SMC, TVS, and OpSim
C-4	The system will reject any attempt to issue a command to couple a train which contains an LRV2 VOBC id, with a train containing an LRV4 ID.	VCC, SMC
C-5	Train IDs shall be developed for the LRV 4 vehicles to differentiate between the LRV 2/3 fleet.	VCC, SMC
C-6	Thales shall simulate and evaluate the system impact with the LRV 4 performance characteristics and vehicle dimensions provided by Siemens to identify any further changes required.	Analysis
C-7	Thales shall update ATCS status information sent to NextBus passenger information signs, public address system, and CAD/AVL systems via the Thales Application and tenet feed to accommodate mixed LRV4 and LRV2/LRV3 operation. Thales Application requirements shall be defined by SFMTA and verified by Thales and interface documents shall be updated by Thales.	SMC
C-8	Mixed operation of LRV4 and LRV2/3 trains shall operate with equivalent ATCS functionality of the LRV 2/3 vehicles except as identified in the requirements stated in this Table 2	VCC, SMC

5. OVERALL PROJECT RESPONSIBILITIES

A. The following Table 3 details specific responsibilities for different scope areas of the Project.

Table 3 - Project Responsibility

Scope	Responsible Party
Software design, testing and, commissioning of VCC and SMC	Thales
Scheduling and management of regular progress meetings with SFMTA management, operations and maintenance and other SFMTA Project and transit operations staff to review Project progress	Thales
Coordination of CPUC commissioning submissions and approvals; coordination of availability of SFMTA Resources	SFMTA
NextBus, Passenger Information Signs, Third Party Vendors – Software updates	SFMTA

6. PROJECT PLANNING, PROJECT MANAGEMENT AND TECHNICAL SUPPORT

Thales shall provide and perform the following services and tasks:

A. Project Management Plan. Provide and implement a Project Management Plan that addresses: Project terms and acronyms; Project scope; resumes and qualifications of Thales's staff assigned to the Project, Project organizational structure; interfaces among contractors; Project team responsibilities and reporting relationships; Work breakdown structure for implementation of the Project; Project communications; and regular reviews by SFMTA Project and transit operations staff. Provide detailed, narrative description of Project scope, activities, and responsibilities written in non-technical language that serves as the definitive high-level description of Project scope. Terms, acronyms, and definitions in the plan shall be comprehensive and be the basis for description of the Work during the execution of the Project. Update and maintain current the plan when the Project scope, schedule, or activities deviate from the original plan.

B. Baseline Schedule. Develop a critical path-based Baseline Schedule in Microsoft Project based on the Project Management Plan. Review schedule format and Project activities indicated in the Baseline Schedule and with the SFMTA before releasing the first Current Schedule. Update the Current Schedule to include current information regarding progress of

the Project every month. As part of the Current Schedule, provide current information regarding critical and near-critical activities, milestones, Work progress, and delays and issues that are affecting or may affect the timely performance of the Work, and develop corrective action plans with each Current Schedule update. Explain delays in accompanying memorandum that discusses relevant facts and causes of delay and identifies the party responsible for delay. Thales shall report all delays and delay responsibilities to the SFMTA when Thales issues updates to the Current Schedule.

C. Technical Review Meetings. Lead Project technical review meetings every two weeks with SFMTA Project staff and transit operations staff. Report at each meeting issues concerning technical, and test issues. Prepare meeting agenda before each meeting and meeting minutes after each meeting for SFMTA's review and approval. Distribute meeting agenda to meeting participants three Work Days before meeting. Distribute draft meeting minutes within three Work Days of each meeting. SFMTA will review and provide comments to meeting agenda no later than one Work Day before the meeting. SFMTA will provide comments to draft meeting minutes within five Work Days of receipt. Thales will amend the draft meeting minutes and distribute final meeting minutes within three Work Days of receipt of completion of SFMTA review.

D. Test Results Review meeting - Lead meeting discussing results of each test phase including engineering test, factory acceptance test, unit tests, integration tests, site acceptance test, and commissioning test. Meeting shall occur prior to submittal of test report. Meeting topics shall include summary of testing, overall test findings, summary of test results, and missing, failed, newly required, or postponed tests. Provide traceable resolution for non-passed tests and test steps. Discuss incomplete tests along with the reason for missing the test and the technical and safety consequences as well as appropriate resolution. Schedule test meeting within five (5) Working Days after completion of a testing phase. This meeting can be a conference call to provide a summary of test results.

E. Project Progress Meetings. Lead Project management progress review meetings every two weeks with SFMTA Project and transit operations staff. Report on issues related to schedule, scope, and Project risks, workshop activities, document status. Review Thales' activity during past two weeks and provide three-week look ahead of any on-site Project activity (SAT or Commissioning Testing). Prepare meeting agenda before each meeting and meeting minutes after each meeting for SFMTA's review and approval. Distribute meeting agenda to meeting participants three Work Days before meeting. Distribute draft meeting minutes within three Work Days of each meeting. SFMTA will review and provide comments to meeting agenda no later than one Work Day before the meeting. SFMTA will provide comments to draft meeting minutes within five Work Days of receipt. Thales will amend the

draft meeting minutes and distribute final meeting minutes within three Work Days of receipt of SFMTA's comments.

F. System Engineering Plan. Provide and implement a system engineering plan. Discuss whether any requirements of the system are changing, which requirements, and why they are changing. Update requirements documents as necessary. Requirements relevant to the Project shall be traceable and type of verification identified. The System Requirements Traceability Matrix shall be updated and provided to SFMTA at the completion of each test phase.

G. Submit and implement a written Project Safety Program plan in accordance with Appendix B that: (1) describes the process by which Project-specific safety requirements are selected; (2) describes the process by which requirements are tracked and tested; (3) assigns appropriate responsibilities for the safety program to Thales and the SFMTA. Review ATCS safety documentation to determine whether updates are necessary to reflect final as-built system. . The Safety Program Plan will concern only ATCS safety matters and will not address Work site safety and OSHA requirements.

H. QA/QC Compliance. Comply with the Federal Transit Administration's Quality Assurance and Quality Control guidelines, and develop and submit for SFMTA's review and approval a Quality Assurance and Quality Control Program for the Project. Integrate Project activities into document and relate the Project to specific phases of the Quality Assurance program.

I. Establish a systematic risk management process for the Project for issues related to the Thales scope the Wayside Updates. Base risk management processes as described in Caltrans Project Risk Management Handbook: A Scalable Approach - Ver. 1, June 2012.

7. NOT USED

8. REVIEW OF ATCS DOCUMENTATION

A. Thales shall as a condition of Substantial Completion review ATCS documentation listed in Section 15. Thales shall edit said documentation to accurately represent the final “as-built” VCC and SMC subsystems of the ATCS exists as of Substantial Completion of the Work as Installed and implemented under this Purchase Order. Provide a narrative report that describes Thales’ findings from its review of ATCS documentation.

B. Thales shall coordinate ATCS related terms and acronyms within documentation according to the ATCS Glossary of Terms. Reconcile substantially similar concepts, issues,

or equipment described by different terms or acronyms by substituting with correct term across revised documentation.

9. TESTING AND COMMISSIONING

Thales shall provide and perform the following services and tasks:

A. Provide and implement a Test and Commissioning Plan that includes a summary, narrative description of: (1) the strategy and assumptions behind the testing and commissioning program; (2) list of tests to be conducted, names and experience and qualifications of personnel involved in managing, coordinating and monitoring the testing program. Thales shall inform SFMTA immediately of changes to test staff and provide qualifications. The Test And Commissioning Plan shall include a Testing Summary Table describing test activities anticipated for each distinct test and commissioning stage. Include in that table, for each separate test stage:

1. Test stage name,
2. Test description in narrative form,
3. Test dates,
4. Test location,
5. For site testing, identify contingency plans, both technical and operational,
6. Test procedures verified (by test procedure number), and
7. SFMTA resources required.

B. Perform tests to prove that ATCS functional and safety design requirements are met.

C. At the conclusion of a testing phase, provide a report which includes narrative summary of testing, overall test findings, completed test forms, summary of test results, and missing, failed, newly required, or postponed tests. Provide traceable resolution for all non-passed tests and test steps. Discuss incomplete tests in the test documentation along with the reason for missing the test and the technical and safety consequences as well as appropriate resolution. Within ten Work Days after completion of a testing phase, Thales shall submit a report of the test results to SFMTA. Within ten Work Days of receipt of Thales's report, SFMTA shall complete its review and provide a written response.

D. The test engineer shall provide to SFMTA an email report of test activities by 12:00 PM the Work Day following a test. The email report shall include a description test procedures executed and narrative summary of test results, including failed or not applicable test steps.

E. After SFMTA's approval and prior to placing software into revenue service, Thales shall, unless the Parties otherwise agree, conduct a final commissioning test to verify the approved software functions properly.

10. GENERAL SAT AND COMMISSIONING TEST REQUIREMENTS

Thales shall provide and perform the following services and tasks:

A. Include safety and special precautions, required equipment and tools, reference drawings and manuals, acceptance criteria, estimated time to perform the test, remarks and event recording area, and required SFMTA resources, in test procedures.

B. Submit a detailed Work Plan to SFMTA for review and approval no later than 20 Days in advance of proposed SAT and commissioning stage. Work Plan information shall be in a narrative form with no outline or bullet point formatting. The SFMTA's decision to proceed with testing will be based on review and approval of site-specific Work Plan materials. The Work Plan shall include:

1. Title page,

2. Brief executive summary describing overall purpose/goals of test and activities,

3. List of Thales staff involved with brief description of their roles in testing,

4. List of SFMTA resources required with brief description of their roles in testing,

5. Test log in table format with each Day listed separately. Indicate hours, location, trains required, minimal test area required, and SFMTA staff required for each test Day, and test procedures to be conducted per test Day.

C. Provide Test Log to SFMTA, which shall include a summary of results of each test Day, information regarding any test delay or cancellation, and reason for delay or cancellation. Update at the conclusion of each test Day and forward to SFMTA for review.

D. Provide the SFMTA on-site assistance by technically qualified representatives for the duration of operational field testing. Each of said representatives shall remain on the job site while testing is being performed.

E. Provide Submittals of test procedures in PDF format.

11. SFMTA INSPECTION AND REVIEW

F. The SFMTA may delegate to a consultant the review of Project documentation, including but not limited to: design drawings, schematics, operations and maintenance documentation,

test reports, test procedures and verify that they are complete, operable, fully documented, and compliant with specifications and contract provisions. Should the SFMTA or its consultant find the documentation or the Work deficient, Thales shall make the necessary changes to correct the deficiencies. The SFMTA's consultant will be required to sign appropriate non-disclosure agreements. The SFMTA consultant shall not be a competitor of Thales. Any review by a consultant will be included within the time limits established by Section 15.B.

G. Thales's Work, as set forth in this Appendix A, shall be subject to inspection and tests by the SFMTA and by others authorized by the SFMTA. Inspectors that are not SFMTA employees will be required to sign a nondisclosure agreement to protect Thales's proprietary information. The SFMTA's tests, inspection, or review of the Work is only for the information and benefit of the SFMTA and shall not relieve Thales of its responsibility to provide quality control measures and ensure that the Work strictly complies with specifications and requirements of the Contract Documents. The SFMTA's review, inspection, or test of the Work or any part of the Work shall not constitute or imply acceptance of the Work or part of the Work. Inspections or tests shall not relieve Thales of responsibility for damage to or loss of the Work prior to acceptance or affect the continuing rights of the SFMTA after acceptance of the completed Work.

12. WORKSHOPS

Thales shall provide and perform the following services and tasks:

H. Project Scope Workshop. Develop and implement a Workshop for the SFMTA Project team. The Workshop will include a detailed review of the Project scope, materials, traceability of safety and functional requirements, design assumptions, drawings, test and commissioning plans, outside interfaces, and an on-site visit for SFMTA personnel.

I. Subsystem and interface requirements review Workshop. Develop and implement a Workshop for the SFMTA Project staff and Muni operations and maintenance staff to finalize language of detailed subsystem and interface requirements specifications.

J. SAT and Commissioning Review. Develop and implement Workshop(s) detailing the overall SAT and commissioning strategy, and describing test and commissioning procedures for SFMTA capital projects, safety, operations and signal maintenance staff.

K. Minutes and Workshop Records. Prepare meeting minutes and provide supporting documentation for Workshop records.

L. Workshop Results. Incorporate results of Workshops into design, construction, and test documents relevant to Workshop subject matter.

M. Workshop schedule:

	Workshop Description	Length	Size	Repetitions	Schedule
1.	Project scope Workshop	4 hours	10	0	Preliminary Design Review
2.	Subsystem and interface requirements review Workshop	8 hours	10	0	Preliminary Design Review
3.	SAT and commissioning review	4 hours	10	0	Final Design Review

N. Provide detailed Workshop materials for the SFMTA's review and approval ten Work Days before each Workshop. Develop notes indicating Workshop goals, discussion topics, resources required, and activities on a half-hour level for the duration of the Workshop session. Provide materials for Workshop participants to review five Work Days before the Workshop. The SFMTA's review and approval of Workshop materials may require editing of existing text, addition of text, the removal of text, re-organization of documentation sections, modification of existing illustrations and schematics or addition of illustrations and schematics for conceptual clarity, changing of page layout attributes, and wholesale revision as determined by the SFMTA. The SFMTA's decision to proceed with a Workshop will be based on review and approval of the relevant Workshop materials.

O. All Workshop materials shall become the property of SFMTA, but Thales shall continue to be the sole and exclusive owner of all intellectual property rights included in the materials. SFMTA shall have the right to use, release, disclose, copy, and reproduce the written Workshop materials solely for the SFMTA's internal operations and purposes, and as may otherwise be required by law.

13. DOCUMENT DELIVERABLES

Thales shall perform the following services and tasks and provide the documents and deliverables listed below:

A. Provide document deliverables indicated below and as described elsewhere in this Appendix

1. Project Management Plan

2. Submittal register including ATCS documentation update matrix

3. System Engineering Plan

4. QA/QC Plan

5. Safety Program Plan

6. SAT and Commissioning Test Plan

7. SAT and Commissioning Test Procedures

8. Test Final Report

9. Memorandum verifying that ATCS design and safety requirements are met

10. System Requirements Traceability Matrix

11. Common Tables Definition

12. Final Field Report

B. Thales shall update the following ATCS documents :

1. OpSim manual

2. Central Control Operator Manual Vol. 1

3. Central Control Operator Manual Vol. 2

4. Central Control Operator Manual Vol. 3

C. The following documents may need to be updated based on the changes made to the VCC and SMC software as defined in this document (Train IDs, Prevent coupling of a LRV2/3 vehicle to a LRV4 vehicle, and permanent go slow zones).

1. Thales Application Interface Control

2. ATCS Integrated Operations Plan

14. MANUAL UPDATES

Thales shall provide and perform the following services and tasks:

A. Provide final copies of the Central Control Operator's Manuals as listed in Section 13.B (hereinafter "Manual(s)") printed on loose leaf 8 1/2 x 11 inch pages on presentation quality paper of at least 100 GSM and submitted in presentation standard four ring binders. Print schematic drawings and parts lists on 11 x 17 inch paper and neatly fold into binder. Provide

white binders constructed from rigid and durable PVC covered heavyweight card with titles and the volume number applied in inlaid lettering on both the spine and front cover. Provide samples of paper, samples of layout of cover and spine, and samples of the binders for SFMTA's review and approval. All other manuals or documents shall be submitted electronically.

15. SUBMITTALS

A. THALES'S RESPONSIBILITIES

1. Thales shall furnish Submittals and Resubmittals as required by the agreed upon Submittal Schedule to the SFMTA sufficiently in advance (based on the complexity and size of the Submittal) to allow SFMTA time for review, discussion and resolution. Thales shall maintain a Submittal Register as follows:

a. Maintain a Submittal register to show document deliverables requiring review and approval by SFMTA and listing the document name, version, version date, and document/review status.

b. Update Submittal register for review at progress meetings to reflect status of Submittals, late Submittals, and upcoming due Submittals.

2. Thales shall not start Work for which Submittals are required until the Submittals are approved by the SFMTA. Delays caused by substantially or materially incomplete or reasonably rejected Submittals (and Resubmittals) shall be considered Thales caused delays. Delays caused by SFMTA's failure to respond to the Submittal or Resubmittal within 15 Days of receipt, shall be considered SFMTA caused delays. Should SFMTA fail to respond within the Submittal response time limits set forth in Section 15.B.2., Thales shall notify the SFMTA's Director of Capital Projects.

3. Where a Submittal is substantively acceptable to the SFMTA but requires further clarification or is missing information, the SFMTA may respond to the Submittal with an "Acceptance with Comments," in which case Thales may proceed with the Work of the Submittal but shall resubmit the corrected Submittal within 10 Work Days.

4. SFMTA comments and responses to Thales' Submittals shall not constitute a Contract Modification or other modification of the Contract Documents. The Contract Documents may only be amended by a properly executed written contract modification.

5. The file formats of electronic versions of document Submittals shall be Adobe Acrobat 10, unsecured PDF format. Provide table of contents hyperlinked to document sections and

accessible via Acrobat bookmarks. Filenames for submitted documents shall be in the following format: documentName-documentNumberdocumentDate.PDF.

B. SFMTA REVIEW

1. Submittals will be reviewed by the SFMTA for conformance to requirements of the Contract Documents and marked with the date of review.

2. The SFMTA will respond to a Submittal within 15 Work Days after receipt or as provided in the agreed Submittal Schedule. Should SFMTA fail to respond within the stated time period, each Day after the applicable time period shall be considered a SFMTA delay. .

3. Approval of a Submittal does not constitute an authorization for or a request for a contract modification or Contract Modification. Approval of a Submittal does not excuse Thales from correcting later discovered errors or problems in a Submittal or otherwise excuse any defect in the Work.

C. RE-SUBMITTALS

1. Thales shall revise and resubmit a Submittal as required in accordance with the SFMTA's review; Thales responses shall be on a form supplied by the SFMTA.

2. Thales shall ensure that Resubmittals only contain items included in the original Submittal. Resubmittals shall be indicated by adding a sequential draft number to the original Submittal number.

3. Thales shall explain any additional changes to a Submittal (that is, changes other than those requested by the SFMTA) in an enclosed memo or where applicable in a notation on a design drawing or document that is easily identified as a change to be reviewed by SFMTA .

4. SFMTA will respond to Resubmittals in accordance with Section 15.B.2.

D. PRODUCT DATA (Not Applicable)

E. TEST PROCEDURES, CERTIFICATES, AND REPORTS

1. Thales shall provide SAT and Commissioning test procedures, reports and certificates.

2. Submitted test procedures and certificates shall:

a. Provide a concise statement of the test purpose and objective.

b. Clearly state the title(s) and procedure numbers of any prerequisite test(s) needed to be performed and provide a means to identify that those prerequisite tests were successfully completed. This requirement includes periodic calibration and re-calibration tests.

c. List all documents required to perform the test by name, document number and revision level. For example: schematics, wiring diagrams, configuration control lists.

d. All required test equipment including model numbers, if applicable, shall be clearly specified in this section. All test equipment including sensors and transducers shall be calibrated before testing commences and certificates for the same shall be enclosed with the test data sheets.

e. Describe all the steps that must be taken to safely and effectively conduct the test, including all precautions, specific placement of personnel to witness results, etc. The test sequence shall be written in a step-by-step format. Data sheets shall be attached to the test report as described below.

f. For each test, describe and list specifically the criteria upon which the equipment, system, etc. can be judged to have passed the test. Criteria shall be traceable to Specification Requirements.

g. Include test notes section to record failures, substitutions, and other pertinent notes to document problems encountered and observations made during testing that may facilitate troubleshooting in the future.

h. Include section to record action taken on all discrepancies.

i. The sheets shall identify the test, and include spaces to record test data, test date, and signatures of individuals performing and witnessing the tests. Data sheets shall be arranged in tabular form where practical.

j. Provide explanations as required in section of test procedure marked "Notes."

k. Test procedures shall contain area to show prerequisites met over multiple days of testing if multiple days are required.

3. Submitted test certificates shall:

a. Be typed or printed legibly.

b. Use nomenclature consistent with overall Project nomenclature.

c. Test results shall be stated in field test certificates and test reports as "passed," "failed" or "NA" ("Not Applicable") only. No other markings are acceptable.

d. Provide test certificate number and test date on each page.

e. Provide all detailed data required to be collected by test procedure steps. Information shall be provided where indicated on the test forms; spaces on forms shall not be left blank.

f. Provide written narrative justification for number of test cases performed if actual performed is less than total number of test cases planned.

g. Provide written narrative justification and traceable resolution for each field marked "failed" or "NA."

h. Provide written narrative justification for test prerequisites not met.

i. Provide written narrative justification for any deviation from test procedure including using data log analysis instead of visual inspection.

j. Data sheets and logs shall be referenced in the test certificate. Each attached data sheets and data log shall be labeled with test procedure number, test procedure revision, test procedure name, date, and tester. Legibly comment data sheet to indicate where in data required for each test step to be passed was verified.

k. Provide explanations as required in section of test procedure marked "Notes."

16. MISC PROVISIONS

A. The SFMTA will provide staff support to provide site and equipment access, as agreed upon in approved site specific Work plans written by Thales.

B. The SFMTA Project Engineer is solely responsible for approving the design, coordinating Workshops, authorizing Work, approving Submittals, and clarifying technical issues, unless otherwise agreed upon by the parties. Thales shall communicate with the SFMTA through the SFMTA Project Engineer concerning all technical issues.

C. The SFMTA Project Manager shall be Thales' point of contact concerning issues of price, schedule, scope of Work and Contract Modifications. Thales shall confirm with the Project Manager any understandings and agreements Thales may make with SFMTA Operations and

Maintenance personnel, which Thales shall memorialize in writing and submit to the SFMTA Project Manager.

D. The Thales Project Engineer is responsible for coordinating all technical submittals, workshops, and clarifying technical issues. SFMTA shall communicate with the Thales Project Engineer concerning all technical issues related to Purchase Order No. 5.

E. The Thales Project Manager shall be the point of contact for SFMTA concerning issues of price, schedule, scope of Work, and Contract Modifications related to Purchase Order No. 5.

F. This Purchase Order may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one of the following ways: (1) Contract Modification agreed by the parties, or (2) Directive issued by the SFMTA

G. The SFMTA reserves the right during the Work to direct Thales to replace any key personnel, upon thirty (30) Days' notice, who the SFMTA reasonably determines is unqualified or an impediment to the timely and successful completion of this Project. Thales shall be solely responsible for any costs related to the replacement of such individual(s).

17. CONTRACT MODIFICATIONS AND ADDITIONAL WORK

A. Contract Modifications shall be in writing and signed by authorized persons of both parties. If an agreed Contract Modification affects the schedule and/or price for the Work, the Contract Modification will include any necessary changes to Project schedule and/or price.

B. In the event the LRV4 vehicle does not match critical dimensions and performance characteristics of the LRV2/3 vehicle, including but not limited to antenna location, braking performance, door locations, and vehicle length. Thales shall not be liable for any resulting delays to the Project for time required to perform Additional Work to modify the ATCS to accommodate the LRV4 as delivered by Siemens. Furthermore, any and all necessary modifications to the Wayside Updates (as defined herein) due to such changes between the LRV2/3 and LRV4 vehicles shall be treated as a Contract Modification only, not a Directive, and Thales's price and schedule may be increased and extended, accordingly. The parties shall agree on the scope, price or time required for the Additional Work prior to Thales performing the Additional Work.

C. SFMTA Directives.

D. Excluding Section 17.B. above, if the parties cannot agree on the scope, price or time required for Additional Work, the SFMTA may issue a Directive directing Thales to perform the Additional Work while the parties continue negotiating the final scope, price or time requirements. A Directive must be signed by the Director of Transportation to be effective.

Thales shall perform the Additional Work required in the Directive, and shall maintain a careful accounting of its direct costs and labor, which the SFMTA shall compensate as allowed by FTA rules and regulations. No later than when the Additional Work is completed, the SFMTA and Thales shall negotiate a reasonable fixed fee that shall include reasonable profit and overhead for that Work performed under the Directive.

E. Clarifications and Submittals. The requirements of this Purchase Order may be supplemented, and minor variations and deviations in the Work may be authorized only in the following ways: (1) a Clarification, written interpretation or other bulletin issued by the SFMTA; or (2) the SFMTA's review and acceptance of a shop drawing or sample or other Submittal. A Clarification shall not constitute a modification of the Contract or Purchase Order but is only a statement of the SFMTA's interpretation of the Contract Documents upon which Thales may rely. The SFMTA's response to an RFI or Submittal, so long as it meets the requirements set forth in Section 15.B.2, shall not modify the Contract Documents, but only clarifies the meaning of a Contract Document, upon which Thales may rely as to the specific matter addressed in the response.

18. TIME ALLOWANCE FOR COMPLETION OF WORK (SEE ALSO APPENDIX B – PERFORMANCE AND PAYMENT SCHEDULE)

A. Time and minimum interference with SFMTA transit services and inconvenience to the public are of the essence in Thales' performance and completion of the Work.

B. Thales shall complete all remaining Work within thirty (30) Days of the Substantial Completion date.

C. Thales shall be responsible for maintenance and protection of the completed Work until the SFMTA acknowledges that the Work has reached Substantial Completion.

D. When performing testing or other Work in the tunnels, on track way, or in equipment rooms, or performing other Work that disables train control, Thales shall set a checkpoint within the designated period to perform that Work at which time Thales will assess and confirm whether Thales can complete the Work or whether the Work shall be suspended so that train control is timely returned to normal function and scheduled trains and transit service are not delayed.

E. Thales shall not schedule testing or otherwise interfere with Muni’s transit operations on the following holidays and events:

1. Nike Women’s Marathon
2. Halloween

3. New Year's Eve and Day
4. Chinese New Year Parade
5. Saint Patrick's Day Parade
6. Bay to Breakers Weekend
7. Cinco de Mayo Celebration and Carnival Parade
8. Pride Parade Weekend
9. July 4th
10. SF Marathon
11. All Giant's Baseball Home Games
12. Fleet Week
13. Other Official City Holidays

19. CONSTRUCTION COORDINATION REQUIREMENTS

A. Thales is advised that there may be outside contractors or City employees working within areas to which Thales requires access. Thales shall be responsible for coordinating access to such areas through the SFMTA Project Manager.

20. SCHEDULE AND DELAY MANAGEMENT

A. Responsibility for delays concerning access to SFMTA resources:

1. Thales shall no less than monthly provide an updated Current Schedule and monthly progress report. Thales shall include a Weekly Plan (three-week rolling look ahead Work schedule) with the Current Schedule update when on-site activities start in a format approved by the SFMTA.
2. Delays to the Work arising from SFMTA changes in availability of SFMTA personnel and equipment (collectively "Resources") made by the SFMTA less than 21 Days from a scheduled test date that cannot be accommodated by Thales, shall be considered SFMTA caused delays. Delays to the Work solely arising from changes to Thales Resources made by Thales less than 21 Days from a scheduled test date that cannot be accommodated by SFMTA, shall be considered Thales caused delays. For any change in Resources, Thales shall provide a revised test schedule within one Work Day of notice from the SFMTA of a change in Resource availability.

3. For all delays, Thales shall propose a recovery plan in writing to minimize delay to completion of Project Milestones.

4. For any change to the Project schedule milestone dates, whether caused by SFMTA or Thales delays, Thales shall provide a retrospective time impact analysis within five Work Days of the delay . This analysis shall describe the causes of the delay and include a recovery plan and a revised Current Schedule,

5. Thales acknowledges and agrees that demands for SFMTA Resources by transit operations may cause delay to the Work. Therefore, Thales shall assume and include in the Project schedule 24 hours of delays attributable to SFMTA, for which Thales shall receive no additional compensation or extension in time to complete the Work.

6. Any Day where less than 50 percent of contractually mandated test time is available to Thales due to changes in SFMTA Resources is considered a cancelled test Day and any resulting delay shall be deemed an SFMTA caused delay. Any Day where less than 50 percent of contractually mandated test time is available to Thales due to changes in Thales' availability or resources is considered a cancelled test Day and any resulting delay shall be deemed a Thales-caused delay. Any Day in which more than 50 percent but less than 100 percent of contractually mandated test time is available, the percentage of non-available test time due to changes in SFMTA Resources shall be deemed a SFMTA-caused delay. Any Day in which more than 50 percent but less than 100 percent of contractually mandated test time is available, the percentage of non-available test time due to changes in Thales Resources shall be deemed a Thales-caused delay.

7. SFMTA shall be responsible for Thales's costs arising from SFMTA caused delays in excess of the 24 hours provided in Section 20.A.5 above. This includes but is not limited to, other scheduled or unscheduled SFMTA maintenance activities, construction activities, testing activities regarding other SFMTA projects or SFMTA's lack of available staffing or resources necessary to for Thales to perform a delayed test or inspection. For SFMTA caused delays in excess of the 24 hours provided in Section 20.A.5 above or other SFMTA delays set forth in this Purchase Order No. 5, Thales reserves it right to assert a claim for additional time and/or expenses in accordance with Section 17.b of the Master Agreement.

8. With the exception of the 24 hours of delay described in Section 20.A.5, any float identified in the Baseline or Current Schedule is jointly owned by SFMTA and Thales. Thales shall notify the Engineer of any use of float, which shall be subject to SFMTA review and approval as part of the SFMTA's review of the Current Schedule.

9. Scheduling constraints, such as start on dates, finish on dates, and sequencing other than finish to start, start to start, start to start with lag time, and finish to finish, shall be clearly identified and shown in the Baseline Schedule and Current Schedule updates.

B. General Schedule Requirements

1. Description

    a. This Section specifies the requirements for Project planning, scheduling, and progress reporting that are to be performed by Thales, and the qualifications and requirements of Thales's Scheduler.

    b. Thales shall employ Critical Path Method scheduling (CPM) for planning, scheduling and reporting the progress of the Work.

2. Scheduling Software

    a. Thales shall use Microsoft Project scheduling software for computer generated tabular reports and logic network graphics.

3. Schedule Submittal Procedure

    a. Within 10 Days of NTP, Thales shall submit for SFMTA review and approval a proposed Baseline Schedule. SFMTA shall review and provide comments within 10 Work Days of receipt thereof.

    b. No less than monthly Thales shall submit a Current Schedule (as described in Section 20.B.5) in two successive parts:

        i. A preliminary update Current Schedule, which is an update of the previous month's Current Schedule, shall be submitted prior to schedule and progress review meeting to indicate what has changed from the previous month's Current Schedule.

        ii. The Current Schedule, which shall incorporate the comments from the schedule and progress review meeting, shall be submitted as the final Current Schedule.

4. Schedule meetings

a. Initial Schedule Meeting

i. The initial schedule meeting will be held no later than ten Work Days after the SFMTA issues Notice to Proceed. At this meeting, Thales shall submit a general time-scaled logic diagram displaying the major activities and sequence of planned operations and shall be prepared to discuss the proposed Work plan and schedule methodology. Thales shall assign a unique alphanumeric identifier for each Project activity and shall track each activity by that identifier in the Baseline Schedule. Thales shall incorporate comments from meeting into the Baseline Schedule and add, delete, or modify activities as necessary in the Current Schedule.

5. Current Schedule Meeting

a. The Current Schedule is to be submitted for SFMTA's review and to resolve any schedule activity delays. A satisfactory updated Current Schedule shall meet the following minimum conditions:

i. Current Schedule shall consist of the updated overall CPM Logic Network and relevant supporting reports and documentation.

ii. Meets all Contract requirements.

iii. The Current Schedule must show the actual start dates of all activities. If an activity is not been completed as of the update date, a percent completion and remaining duration shall be indicated for that activity. All completed activities shall indicate the actual completion dates and 100% completion.

iv. The approved Contract completion date shall be shown.

v. If the Current Schedule shows a Contract completion date that is earlier than the approved Contract completion date, the time difference shall be considered Project float. The Contractor agrees that if all Contract Work is accomplished on or prior to the approved Contract completion date, the Contractor is not entitled to any damages, loss of profit or any additional compensation because of SFMTA's action or inaction in maintaining the Current Schedule.

vi. If the Current Schedule shows a later completion date than the approved Contract completion date, the Contractor will propose ways to overcome the delay at the next schedule and progress review meeting. If, after the meeting and updating of the Current Schedule, the completion date is still later than the approved Contract completion date, the Contract is considered behind schedule, however, liquidated damages may only be assessed in accordance with Section 22.

b. Thales shall submit a Current Schedule showing relevant schedule updates, and shall meet with SFMTA Project staff to review the progress of the Work at the progress review meetings held no less frequently than every two weeks, as required by the Engineer.. Thales shall provide PDF copies of the schedule as part of each update. Prior to each meeting, Thales shall update the prior month's Current Schedule. Appropriate subcontractors, suppliers, utilities representatives and other City agencies may be asked to attend.

c. During the schedule and progress review meeting, the Preliminary Current Schedule including any required Supplemental Schedules and all relevant events affecting the schedule will be discussed in detail. SFMTA may request Thales to revise or correct the data for the Current Schedule due to any inaccuracies or conflicts with the Contract Documents, and suggest ways to modify the schedule because of schedule activity delays. SFMTA's participation in the schedule review process shall not relieve Thales from the approved completion dates in effect

d. SFMTA does not approve a Current Schedule submittal. SFMTA may reject a Current Schedule when SFMTA finds that the Current Schedule does not meet the minimum conditions listed in Section 20 B.5.a.i through 5.a.vi above. If SFMTA rejects such Current Schedule submittal, SFMTA will inform the Contractor the reasons for such rejection and request a resubmittal. If the Contractor disagrees with SFMTA's reasons for rejection, the Contractor shall resubmit the Current Schedule, revised as requested by SFMTA, and explain the disagreements in written narrative form. If the Contractor refuses to resubmit, the Contractor is deemed not in compliance.

6. Approval and Revision of Schedule

a. Failure by Thales to include any element of Work required for the performance of the Project shall not excuse Thales from completing all Work required within any applicable milestone completion date, notwithstanding the Engineer's approval of the CPM diagrams. Items not specifically stated in the schedule or description of a Milestone shall, if reasonably applicable, be deemed incidental Work and not critical activities. If activities are found to be missing from the schedule after the Engineer's approval, Thales shall submit a revised schedule to include those items. The revised schedule shall be subject to review and approval by the Engineer as described in "Revised Schedule" provisions of this Purchase Order. No extension of time will be granted because of errors or omissions on the schedule unless the Parties agree otherwise. Thales shall incorporate all necessary activities to complete the Work.

b. The CPM schedule and analysis when approved by the Engineer shall constitute the agreed Work Schedule throughout the construction period. No alteration of the logic, duration of activities, etc. will be allowed without the approval of the Engineer.

7. The Baseline Schedule shall comply with the following:

a. A maximum of twenty (20) Work Days duration shall be given to each CPM activity. Any activity in excess of the twenty (20) Days shall be broken down in detail so that each detail activity will not exceed the twenty (20) Work Day maximum.

b. All activities shall have succeeding activities except Project Milestone 7 per Appendix B (Final Acceptance). Thales shall demonstrate the necessity of having any dummy activities.

c. The schedule shall include separate activities indicating:

i. Preparation and submittal of submittals.

ii. Review of submittals by SFMTA

iii. Software development and testing activities

iv. System integration and integration testing activities

v. Interface development and testing activities

vi. System and subsystem requirements development activities

vii. SFMTA review and approval of Submittals.

viii. SFMTA inspection of Work and review of documentation and certificates for Substantial Completion

ix. Training

x. Punch list

d. Where the SFMTA is responsible for an activity, Thales shall discuss the preceding activities, succeeding activities, duration, and constraints of the activity with SFMTA during the Baseline Schedule review meeting.

e. Negative float will not be allowed on the CPM schedule on the initial Submittal. Initial CPM schedule with negative floats shall be rejected. Thales shall provide sufficient resources, personnel and hours (including extended hours) to perform the Work within the completion time and price stated in the Purchase Order.

f. The CPM schedule's critical activities shall not exceed fifteen percent (15%) of the number of activities. Critical activities are those that have less than five (5) Days float.

8. Requirements of the Project scheduler

a. The Contractor's Project Scheduler shall attend all Project and schedule related meetings that have a direct or indirect impact on the Project schedule.

21. TIME ALLOWANCE FOR TRACK SHUTDOWNS DURING TESTING

A. Thales shall complete all Work, including Work under allowances subject to the following shutdown periods:

1. Thales shall schedule all Work that requires a subway clearance such as wayside access, modification of signaling equipment, testing of wayside equipment, or requires use of a test train to be performed between the hours of 1:30 a.m. to 3:00 a.m. Monday thru Friday, 1:30 a.m. to 4:00 a.m. Saturday, and 1:30 a.m. to 6:00 a.m. Sunday. Any Work done during these windows shall be completed and tested within these windows so that the Muni Metro lines can be returned safely to Revenue Service. The SFMTA will endeavor to extend the duration and frequency of the testing windows listed below as authorized by Muni Central Control and as the track way is available, but additional testing time is not guaranteed.

a. The aggregate duration of field testing when the LRVs are not in service (as listed above) will not exceed 480 hours. The aggregate duration of revenue

field testing of the Work will be in accordance with approved Work plans and schedules.

b. For the duration of commissioning testing requiring test trains, SFMTA will provide a minimum two testing windows per week of 90 minutes duration each during weekday nights (Monday AM through Friday AM), and one night of extended testing on a weekend night (Saturday AM and Sunday AM), for the duration of the field testing. Extended testing on a weekend night will be at least 3 hours. Weekday night and weekend night testing shall be three consecutive nights. Total aggregate non-revenue field testing per week will be at least six hours. But if the SFMTA provides Thales less than 10 hours per week of tunnel access, Thales will not be responsible for delay resulting from that lack of access. If LRV4 vehicles will be tested during revenue hours in the Market Street tunnel, Thales will be able to conduct tests related to Wayside Updates as part of the LRV4 vehicle testing.

c. Before the end of each phase of Work at each location, Thales shall allow sufficient time to perform LRV testing so that Muni can resume normal rail operation as scheduled.

d. Thales shall design the Work to occupy minimum test area and subway resources.

2. Work not requiring subway clearances may occur during revenue hours.

22. LIQUIDATED DAMAGES

A. General

1. If the Substantial Completion of the Work is delayed by Thales or if Thales otherwise fails to meet its obligations under the Agreement to perform the Work as detailed herein that will minimize interference with transit operations, the City will suffer damages including but not limited to additional staff costs, loss of public use, and delays to follow-on projects. The fact of the occurrence of damages and the actual amount of the damages that the City will suffer if the Work is not completed within the specified time periods set forth in this Purchase Order are dependent upon many circumstances and conditions, which could prevail in various combinations. SFMTA and Thales agree that it would be impracticable and extremely difficult to fix the City's actual damages that might arise from Thales's delay.

2. Thales and City agree that the amount of liquidated damages set forth herein is not a penalty, but represents the parties' reasonable estimate of the approximate damages that the City will sustain for failure of Thales to complete the Work within the times specified.

B. Liquidated Damages for Delay in Substantial Completion:

Notwithstanding any Substantial Completion date stated in the Baseline Schedule or any Current Schedule, Thales shall bring the Work to Substantial Condition within one hundred fifty-five (155) Days after SFMTA makes two LRV4 vehicles available to Thales for SMC and VCC software testing. Thales shall pay the sum of Eight Thousand Dollars ($8,000) per Day for each and every Day of delay to Substantial Completion solely and directly attributable to Thales, beginning on the one hundred fifty-sixth (156th) Day after SFMTA made two (2) LRV4 vehicles available to Thales for SMC and VCC software testing.

C. The Engineer will furnish Thales with a weekly progress report showing the date, period of violation, and the assessed liquidated damages. If Thales disagrees with the assessment liquidated damages or disagrees with the amounts assessed, Thales shall file a written protest within fifteen (15) Work Days from the issuance of the weekly progress report. Such protest shall explain the basis for disputing the assessment of the liquidated damages.

D. The amount of liquidated damages shall be deducted from the progress and/or final payments to be made to Thales.

E. To the extent that any delays are not solely attributable to Thales, including but not limited to delays due to the SFMTA, City, other contractors, or force majeure events, Thales shall not be subject to liquidated damages or any additional charge or liability. In the event the LRV4 vehicle does not match critical vehicle dimensions, physical layout, and performance characteristics of the LRV2/3 vehicle, including but not limited to antenna location, braking performance, door locations, vehicle length, stopping location. Thales shall not be subject to liquidated damages or any additional charge or liability.

F. Notwithstanding anything to the contrary, in no event shall Thales be liable for liquidated damages exceeding, in aggregate, ten percent (10%) of the total value of this Purchase Order. The liquidated damages contained in this article are the City's sole remedy for Thales's delay, and Thales's sole liability for delay.

23. SUBSTANTIAL COMPLETION

A. Thales shall notify the SFMTA in writing when Thales considers that the Work has reached Substantial Completion and request that the SFMTA inspect the Work and prepare a Notice of Substantial Completion. Completion of start-up services; close-out of all non-compliance reports; and Submittal of warranties, guarantees, and record documents shall be a condition precedent to requesting an inspection for and the SFMTA's issuing a notice of Substantial Completion. Thales shall attach to its request a preliminary punch list of items expected be completed or corrected before Final Acceptance.

B. Within ten (10) Work Days from receipt of Thales's written notification, the SFMTA will make an inspection to determine whether the Work is has reached Substantial Completion. If the SFMTA determines that the Work is not substantially complete, the SFMTA will provide Thales with a list of deficient Work (incomplete or non-conforming Work) that that Thales shall correct or complete before the SFMTA may determine whether the Work has reached Substantial Completion.

C. When Thales has completed all items on the list of deficient Work, Thales shall request a second inspection by the SFMTA to verify that the Work has reached Substantial Completion. If the SFMTA determines that the Work is not substantially complete, the SFMTA will follow and repeat the same procedure as for first inspection until the Work has reached Substantial Completion or the SFMTA has determined that Thales cannot or will not complete the Work.

D. When the SFMTA determines that the Work has reached Substantial Completion, the SFMTA will issue a Notice of Substantial Completion, which shall establish the date of Substantial Completion.

E. At the time of delivery of the Notice of Substantial Completion, the SFMTA will deliver to Thales a written determination as to the division of responsibilities regarding close-out requirements including, but not limited to, security, operation, safety, maintenance, insurance, and warranties.

24. FINAL ACCEPTANCE; FINAL ESTIMATE, AND PAYMENT

A. Within ten (10) Work Days from receipt of Thales's written notification that all Work has been completed according the requirements of this Agreement, the SFMTA will make an inspection to confirm whether the Work is has been fully completed. If the SFMTA determines that the Work is not complete, the SFMTA will provide Thales with a list of deficient Work (incomplete or non-conforming Work) that that Thales shall correct or complete before the SFMTA may determine that the Work has reached Final Completion.

B. When all Work has been satisfactorily completed in accordance with the requirements of this contract, the SFMTA will pay to Thales the amount listed in Milestone #7 (5% of contract value):

1. The SFMTA shall have no obligation to make final payment until Thales furnishes the SFMTA with the following: (a) All Drawings, records, documentation, information, Workshop materials and spare parts as required herein; (b) Original signed copy of an acknowledgment that, on condition of final payment, there are no outstanding claims and release or statement of claims related to the Purchase Order;

(c) Evidence satisfactory to SFMTA to establish that Thales is not delinquent in payments to its employees and/or creditors for labor and materials included in the payments; (d) Releases for any unpaid or otherwise unresolved stop notices or other liens actions.

25. SAFETY CERTIFICATION SUPPORT

A. The SFMTA shall have primary responsibility for obtaining CPUC approvals and safety certification of the Work. The SFMTA may contract with an outside consultant to manage the safety certification of this Project.

B. Thales shall provide the following services regarding the safety certification of the Work :

1. Review of safety documents, defined as original Preliminary Hazard Analysis (PHA), Fault Tree Analysis, Failure Mode and Effects Analysis, and safety requirements to evaluate the impact of the Wayside Updates Project.

2. Review of additional documentation as required to understand scope of the Project and Project requirements.

3. Prepare an update to the original safety documents to update the issues identified in safety analysis review and safety workshop.

4. Document and track hazards and their resolutions and provide finalized hazard documentation with resolutions for each hazard at completion of the Project.

5. Implement actions required to address safety issues during the design and development phase of the Project.

6. Provide Design support to verify necessary safety functions have been incorporated into the software/hardware design. Thales shall to provide safety requirements, test certificates, test analyses, and related documentation for review by SFMTA during testing.

7. Participate in safety certification review committee meetings through Substantial Completion of the Project. Safety certification review committee meetings will be held no less than every four weeks and as deemed necessary by the SFMTA's Project Manager.

8. Review and provide comments on SFMTA communications with CPUC to demonstrate adequacy of the Project safety testing, commissioning and certification procedures and results. When deemed necessary by the SFMTA, attend meetings

with CPUC representatives to explain changes to the ATCS implemented by the Project and verify test results and documentation.

9. Verify through design review and audit that safety, consistent with the requirements of the Safety Requirements, is designed into the system.

10. Verify through design review and audit that hazards associated with the ATCS are identified, evaluated and eliminated, or the associated risk reduced to a level as defined in the safety documents.

11. Verify actions taken to eliminate hazards or reduce risks to an acceptable level are implemented and documented.

12. Thales shall permit SFMTA's consultants to review Thales' safety related factory acceptance test and safety related site acceptance test procedures and test certificates to verify that tests are conducted and documented in the proper manner. The Consultant will have the same time limit (15 Days) as SFMTA in reviewing deliverables as defined in Section 15.B. The scope of the review shall be limited to the documentation related to the Wayside Updates Project.

13. Thales shall not be responsible for costs of the SFMTA's Consultant. If the Consultant requests to witness a scheduled test but is not able to attend, and SFMTA requires Thales to repeat the test for the Consultant, the SFMTA shall compensate Thales for the costs of the additional test and any unavoidable delay.

26. RISK MANAGEMENT

Thales shall provide the following:

A. Establish a systematic risk management process for the Project using the risk management processes described in Caltrans Project Risk Management Handbook: A Scalable Approach - Ver. 1, June 2012.

B. Perform risk analyses and prepare a Risk Management and Risk Mitigation Plan for the Project integrated with the Baseline Schedule, that identifies, ranks and provides mitigation measures for major risk elements. The Plan shall describe: the process for analyzing initial risk factors; the process for ongoing identification, analysis, and treatment of risk factors throughout the life cycle of the Project; risk management Work activities, and the procedures and schedules for performing those activities; documentation and reporting requirements; personnel responsible for performing specific activities; procedures for communicating risks and risk status among the various SFMTA Project and transit operations staff. Thales shall prepare an initial risk register for SFMTA's review and approval.

C. Create a Risk Register to identify and document known risk factors using Qualitative Risk Analysis – Level 2, as defined in Caltrans Project Risk Management Handbook: A Scalable Approach - Ver. 1, June 2012 . After the SFMTA's review and approval of a draft risk register, Thales shall lead a risk management Workshop (included in Workshops #2 and #3 listed in Section 12) with SFMTA Project and transit operations staff to review and finalize the Risk Register. Project risks shall be updated and reviewed with SFMTA Project and transit operations staff every two weeks, Current Schedule updates shall include any Risk Register updates.

D. Manage the risk management process, including on-going monitoring of the resolution of risk related issues.

E. Submit a Risk Register addressing resolution of Project risks as a Project deliverable at substantial completion. Discuss unresolved medium and high level risks with the reason for lack of resolution and the technical and safety consequences.

F. The responsibility for managing risk is shared between Thales and the SFMTA However, decision authority for selecting whether to proceed with mitigation strategies and implement contingency actions, especially those that have an associated cost or resource requirement, will rest with the SFMTA.

27. TRAINING

A. Thales shall provide on-site training for SFMTA central operations staff.

B. Training shall include:

Overview of changes to SMC and VCC commands, displays, and functionality in two (2) 4-hour sessions for Control Operators

C. The SFMTA may video record training sessions. The SFMTA shall use the recorded training sessions only for staff refresher training and to train newly hired personnel, and for no other purpose. SFMTA acknowledges that the training sessions may present only general principles regarding ATCS familiarization and operation, and may not cover all possible situations or problems that might arise. The SFMTA will not rely on recorded training sessions as a replacement for direct consultation with Thales to resolve ATCS problems. SFMTA will treat the recorded training sessions as Thales' confidential information. SFMTA acknowledges that only qualified individuals who are familiar with ATCS functions, requirements, and operation should perform work associated with ATCS software or equipment. Thales will not be responsible for the SFMTA's misuse or misapplication of the information contained in a recorded training program.

APPENDIX B TO CONTRACT 1226 PURCHASE ORDER No. 5

DELIVERY AND PAYMENT SCHEDULE

PAYMENT MILESTONES AND DESCRIPTION OF WORK:

The City shall pay Thales according the following Payment Schedule for Work completed by Thales under each of the Milestones described below.

PAYMENT SCHEDULE AND REQUIREMENTS:

1. Payment Schedule

#	Milestone Description	Payment Percentage
1	Project Plans (90% on Submittal, 10% on Acceptance)	5%
2	Safety, QA/QC Project Plans and Preliminary Design Documentation, including workshop materials (90% on Submittal, 10% on Acceptance)	10%
3	Final Design Documentation (90% on Submittal, 10% on Acceptance)	10%
4	Completion of FAT Testing	15%
5	Complete of SAT Testing with LRV 2/3 Vehicles	27.5%
6	Substantial Completion of SAT Testing with LRV 4 vehicles	27.5%
7	Final Acceptance	5%

2. The Price for this Purchase Order is a firm fixed price for all Work described herein.

3. Payment will be made within thirty (30) days of SFMTA receipt of Thales's invoice for each of the aforementioned Milestones following SFMTA's review and acceptance of Thales's Work, not to be unreasonably withheld. Payment of progress payments does not constitute acceptance of the Work completed under any Milestone or Final Acceptance, and such payment does not relieve Thales of any obligation.

V. DESCRIPTION OF WORK AND SCHEDULE:

Milestone 1 Work:

Due: 30 Work Days from NTP
Deliverables:

1. Program Management Plan
2. System Engineering Plan
3. Project Schedule

Milestone 2 Work:

Due: 60 Work Days from NTP: Completion by Thales and acceptance by SFMTA of draft subsystem requirements and completion of first requirements Workshop.

Deliverables:

A. Plans

1. System Engineering Plan
2. QA/QC Plan
3. Safety Program Plan

B. Workshop #1 with SFMTA Project Team

1. Initial Design Documentation
2. Workshop Materials addressing:
    a. Project Scope
    b. Subsystem and Interface Requirements

Milestone 3 Work:

Due 180 Work Days from NTP: Completion of second requirements Workshop and acceptance by SFMTA and baselining of subsystem and interface requirements.

Deliverables:

A. Workshop #2 with SFMTA Project Team

1. Updated Design Documentation
2. Testing Plans and Procedures
3. Updated Safety Documentation
4. Workshop Materials
    a. SAT and Commissioning Review

B. Workshop #3

Milestone 4 Work:

Due 260 Work Days from NTP: Completion of factory acceptance test review meeting and SFMTA acceptance of factory acceptance test certificates and report.

Deliverables:

- FAT Test Certificates and Report

Milestone 5 Work:

Due 320 Work Days from NTP: Completion of site acceptance test result meeting and SFMTA acceptance of site acceptance test certificates and report.

Deliverables:

- LRV 2/3 Vehicle SAT Test Certificates and Report
- Safety Certification Letter

Milestone 6 Work:

Due 155 Days from the date SFMTA makes 2 LRV4 vehicles available to Thales for SMC and VCC software testing: Thales completion and SFMTA acceptance of as-built documentation and updated manuals.

Deliverables:

- LRV4 Vehicle SAT Test Certificates and Report Updated Safety Certification Letter
- As built documentation and updated manuals

Milestone 7 Work:

Due 30 Work Days from completion and acceptance of Milestone 6: Thales completion and SFMTA acceptance of factory acceptance test certificates and report for Central Subway software.

Deliverables:

- FAT test certificates and report for Central Subway Software
- Close out of punch list items