

Fleet of the Future Update

November 21, 2019





Agenda

- Project Update
- Legacy Fleet Decommissioning Update
- Discussion on Original Collaborative Design Effort
- Post Delivery – Onboarding Collaborative Stakeholder Meetings



Project Update Agenda

- Budget Forecast
- Project Accomplishments
- Planned Activities Next Quarter
- Schedule
- Car Features
- Progress Photos



Budget Forecast

(Fed-MTC / State / BART / VTA Funding)

Description	Baseline Budget (775 Cars)	Expended ITD	Cost to Complete	Forecast at Completion (775 Cars)
New Car Procurement Contract	\$1,862,912,122	\$352,883,202	\$1,549,214,321	\$1,902,097,523
Vehicle Consulting Services	\$53,807,035	\$20,331,282	\$22,789,460	\$43,120,741
Professional Services Consultant	\$10,731,662	\$4,298,613	\$2,263,135	\$6,561,748
Misc. Expenses	\$5,568,150	\$1,371,078	\$4,408,848	\$5,779,926
Direct Purchase Material	\$3,098,020	\$1,212,768	\$2,474,192	\$3,686,960
Project Management	\$75,323,502	\$34,895,855	\$55,973,373	\$90,869,228
Escalation	\$326,879,920	\$1,774,805	\$159,582,713	\$161,357,517
Subtotal	\$2,338,320,410	\$416,767,602	\$1,796,706,041	\$2,213,473,644
Reserve	\$245,679,590	\$0	\$370,526,356	\$370,526,356
Total	\$2,584,000,000	\$416,767,602	\$2,167,232,398	\$2,584,000,000



Project Accomplishments

- 105 cars conditionally accepted and ready for revenue service.
- Maintenance demonstrations on going.
- Electrical and Mechanical Technician Training continues.
- Commissioning of Special Tools and Test Equipment.
- Trains are in Service on all Lines.
- Received 56% of Spare parts on option one order.
- Car 106-121 are in acceptance testing at the Hayward test track.
- Car 122- 144 are in final assembly in Plattsburgh, New York.
- Car shell 145-180 are in progress in Sahagun, Mexico.



Planned Activities Next Quarter

- Ramp up delivery rate from 10 cars to 16 cars per month.
- Continue acceptance testing.
- Start Final Assembly and Test at Pittsburg, Ca. facility.
- Complete all Maintenance Demonstrations.
- Commission subsystem bench test equipment at HMC – Component Repair Shop.



Schedule

Milestone	Approved Schedule	Bombardier Current Forecast	Actual	Status
Award of Contract	N/A	N/A	5/30/12	Complete
Complete Final Design Phase	9/30/14	9/30/14	9/30/14	Complete
Commence Pilot Vehicle Delivery	4/30/15	3/15/16	3/15/16	Complete
Complete Pilot Car Delivery	8/25/15	11/19/16	11/19/16	Complete
Delivery of First Production Vehicle	12/30/16	11/6/17	11/6/17	Complete
Complete Delivery 260 th Vehicle	9/21/18	7/2/20		In Process
Complete Delivery of 775 th Vehicle	9/27/21	4/21/23		In Process
Complete Warranty of 775 th Vehicle	10/27/25	4/20/27		In Process

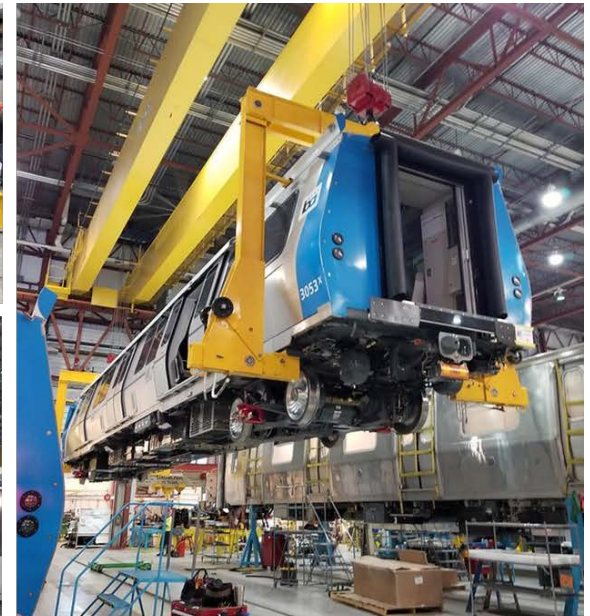


Progress Photos





Progress Photos



Lifting Hooks Tested in
Plattsburg



Progress Photos



New Pittsburg, CA
Facility





Legacy Fleet Decommissioning

- First of 10 Cars Decommissioned November 8th as part of pilot
- Decommission 2-3 more cars by the end of 2019
- Submit decommissioning plan to FTA for approval: Dec 2019
- Evaluate Viability of Other Proposals (Individual inquiries, Emergency Responders, Museums)
- Decommission remainder of cars on 10 pilot car: Jan-Feb 2020.
- Draft new contract language for large scale decommissioning: Jan 2020
- Present Pilot results and request Board approval for full scale decommissioning: Mar 2020
- Commence with Full Scale Decommissioning: Aug 2020



Original Collaborative Design: Stakeholders

- Public
- BART Police
- Maintenance and Engineering
- Shop Personnel
- Union Leadership
- Marketing
- Transportation
- System Safety
- Operations Planning



Examples of Collaborative Design Process

- New Car team held regular stakeholders meetings for input to the vehicle specification.
- Union leadership was included in the new car design effort.
- All conceptual (CDR) and preliminary (PDR) design documents were routed to the shops for distribution and comments from frontline employee experts for each subsystem.
- Sent Mechanics to Montreal to provide input on the undercar equipment layout.
- Had Car Cleaners test samples of the vehicle seats for ease of cleaning.
- Mechanics and Electronic Technicians provided improvements to the material handling equipment and special tools.



New Car Safety Upgrades

- Camera feed from active passenger intercom to Train Operator
- Remote Video Monitoring
- Longer floor burn-through time (meets latest APTA Standard)
- Improved materials to reduce smoke/flame/toxicity
- Improved Crash Worthiness (meets the latest APTA Standard)
- Automated messaging over PA
- External PA Speakers
- Active Maps/ Destination Signs
- Significant noise reduction
- Improved HVAC
- Improved passenger compartment lighting



Design Improvements for D Car

- Portable Radio Charging Station in Cab
- Eliminate flipper doors
 - Improved Reliability
 - Reduced Train Operator Injuries
- Improved conditions for Train Operators
 - Isolated cab area / no passenger access
 - Ergonomic Train Operator Seating
 - Improved Cab Environmental Controls
 - System failures shown for individual cars on T.O. screen
 - Horizontal Sliding windows to reduce T.O. injuries
 - Redundant train operation displays
 - Three front windows for better visibility
- Nod to BART's Iconic Sloped-Nose over C Car Design



CPUC Safety Certification Process

- CPUC checklist has 1,872 elements requiring 2,864 documents to confirm adherence & validation against safety requirements
- Failure Modes Effects Criticality Analysis: 6,126 components analyzed
- Fault Tree Analysis: more than 40 event hazards modelled and analyzed
- Hazard and Vulnerability Tracking Matrix: More than 400 hazard analyzed
- Coupler Pin Assignment Analysis: More than 100 combinations of consequence of shorted coupler pins have been analyzed



Post Delivery - Ongoing Stakeholder Meetings

Participants:

- Train Operators
- ATU Leadership
- Transportation Training
- Transportation Leadership
- FOTF Project Team
- RS&S Engineering
- RS&S Leadership
- BART Police
- Fire Life Safety
- System Safety

Current Focus:

- Ergonomics
- Train Configuration
- D to D Threshold/ Scenarios
- Train Operator Procedures
- Cab Access & Security



Stakeholder Procedure Review and Update

- The stakeholder group has undertaken a methodical review of existing procedures
- Procedures are being revised to reflect mutual understanding of actual conditions
- The revisions of updated procedures are shared with ATU Leadership for review and input.
- Fire Life Safety drills addressing working scenarios are planned to begin in January 2020



Stakeholder Improvements Underway

- Allow the Train Operator to make PA announcement utilizing their portable radio when the operator leaves the cab
- Updating placards next to cab door indicating non pass through
- Creating a plank to be placed between D and D or D and E cars to assist for passenger movement from one segment to another
- Videos on train to educate passengers regarding evacuation procedures
- Emergency reference page in Train Operator Display



Stakeholder Improvements Still Under Evaluation

- Installation of a Secondary Lock for Cab Door
- Installation of a Security Cover for Interior Crew Door
- Repositioning of Latch and/or Hinge to Improve Access to Exterior Crew Door Release Compartment
- Adding an Intercom sign advising passengers to press button to speak to Train Operator and request BPD assistance