Communications-Based Train Control Update

March 13, 2025 | BART Board of Directors Meeting

Agenda

- The Big 4
- Modernizing BART's Train Control
- Project Sequencing
- CBTC System
- Next Steps

The Big 4 – Transbay Corridor Core Capacity Program

Additional Fleet of the Future Rail Cars

Traction Power

Program Benefits:
Relieve Crowding
Increase Reliability
More Convenient Service

Train Control
Installation of a new Communications-Based Train Control System to achieve the shorter headways for 30 train per hour service during peak periods.

Rail Car Storage

Communications Based Train Control Schedule

TCCCP = $4.3B
CBTC = $2.3B

★ **Sept 2020: Full funding Grant Agreement signed between BART & FTA**

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031

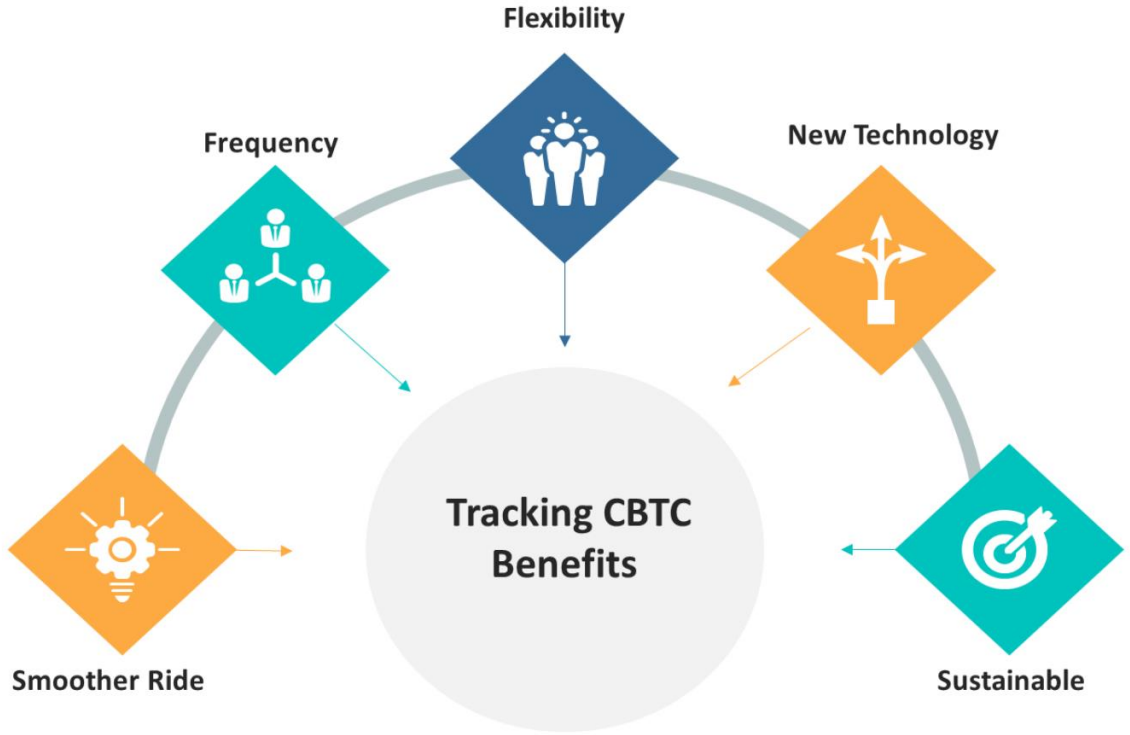
- **Fleet of the Future (FOTF) Contract Awarded**
- **Capacity Planning Board Workshop**
- **First FOTF Car Delivered**
- **Measure RR**
- **Request For Qualifications & Proposal**
- **CBTC Board Award**
- **Legacy Cars Retired**

Planning & Conceptual Design | **Design** | **Final Design/Installation** | **Installation**

Modernizing BART's Train Control

Communications-Based Train Control (CBTC)

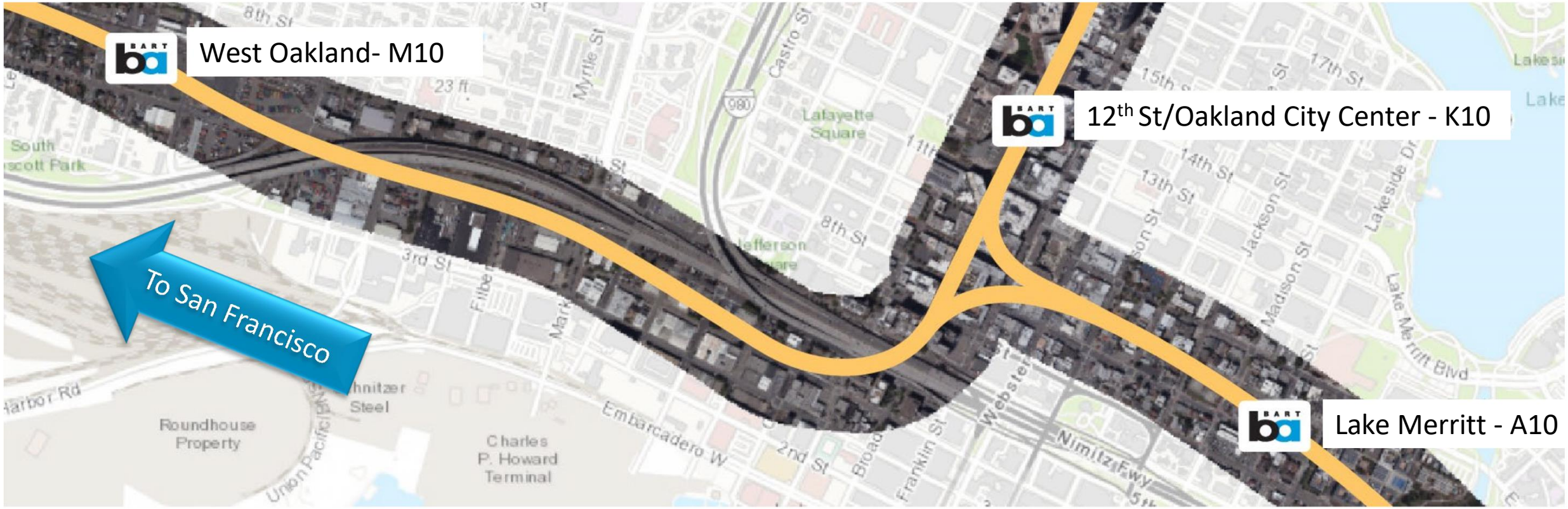
- Railway signaling system
- Allows for real-time adjustments of speed and braking to allow for safe train separation while allowing trains to get closer to each other
- Increases capacity and reduces wait times between trains
- Up to 30-trains per hour through the Transbay Tube



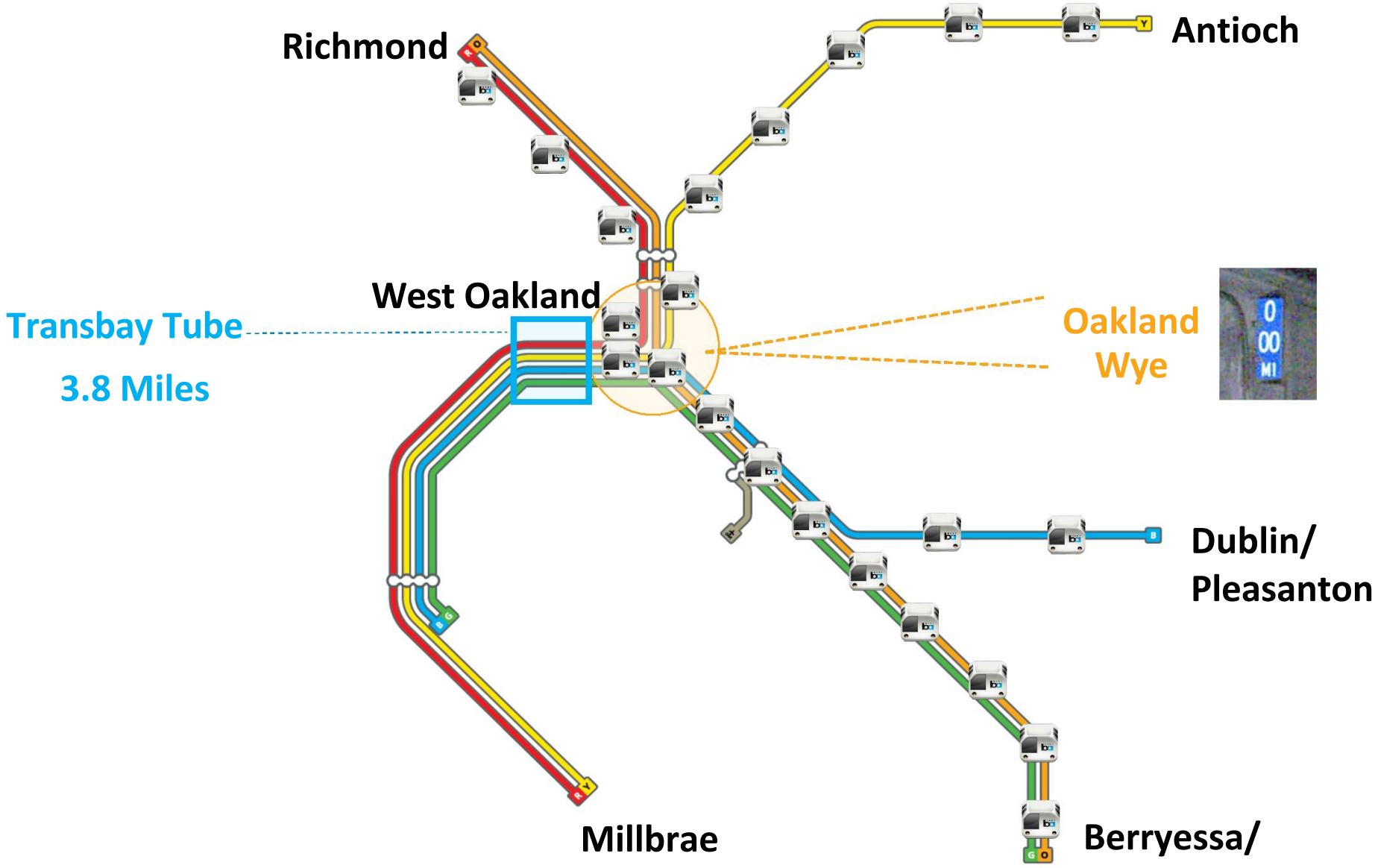
"CBTC: A modern railway signaling system using real time communications between a train and trackside equipment"

The Why of the WYE

Oakland WYE "A triangle of railroad track"



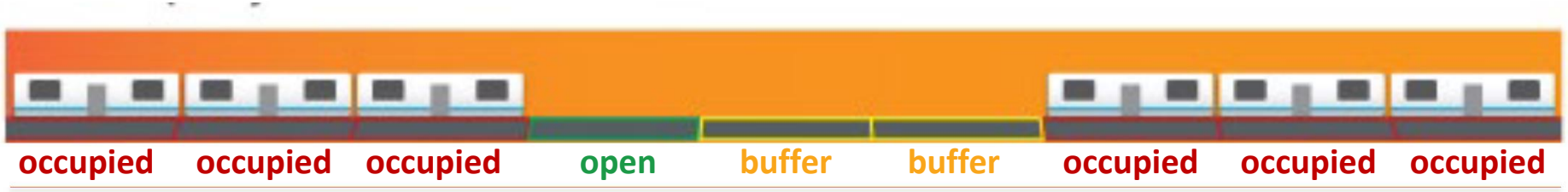
30 Trains Per Hour through the WYE only with CBTC



Fixed (Legacy) vs Moving Block (CBTC)

Existing vs Modern Train Control Systems

Fixed-Block Signaling System (Legacy)



- Legacy Train Control Technology
- 24 Trans-Bay trains per hour per direction during peak hour
- Distances maintained with safety. Capacity can not be increased, even with more trains

Communications-Based Train Control

- Needed to Increase Capacity & Assure Reliability
- 30 Trans-Bay trains per hour per direction during peak hour
- Trains constantly communication to maintain safe distances and allow more trains to run closer together

Project Sequencing

Proof of Concept (Phase 0)
- Conceptual Design
- Product Identification
- Installation/Testing at Hayward Test Track

Supervision Software (Phase 1)
- Automatic Train Supervision (ATS)
- Shadow Capability
- In the Operations Control Center (OCC) views and controls train movements, routes, and speeds.
- Additional computer racks
- Enhanced Dispatch interface
- State-of-the-art technology

W-Line Install Phase (Phase 2)
- First mainline location taking our CBTC system from Colma to Millbrae

Phase 3 - 10

CBTC Elements

Software/Hardware

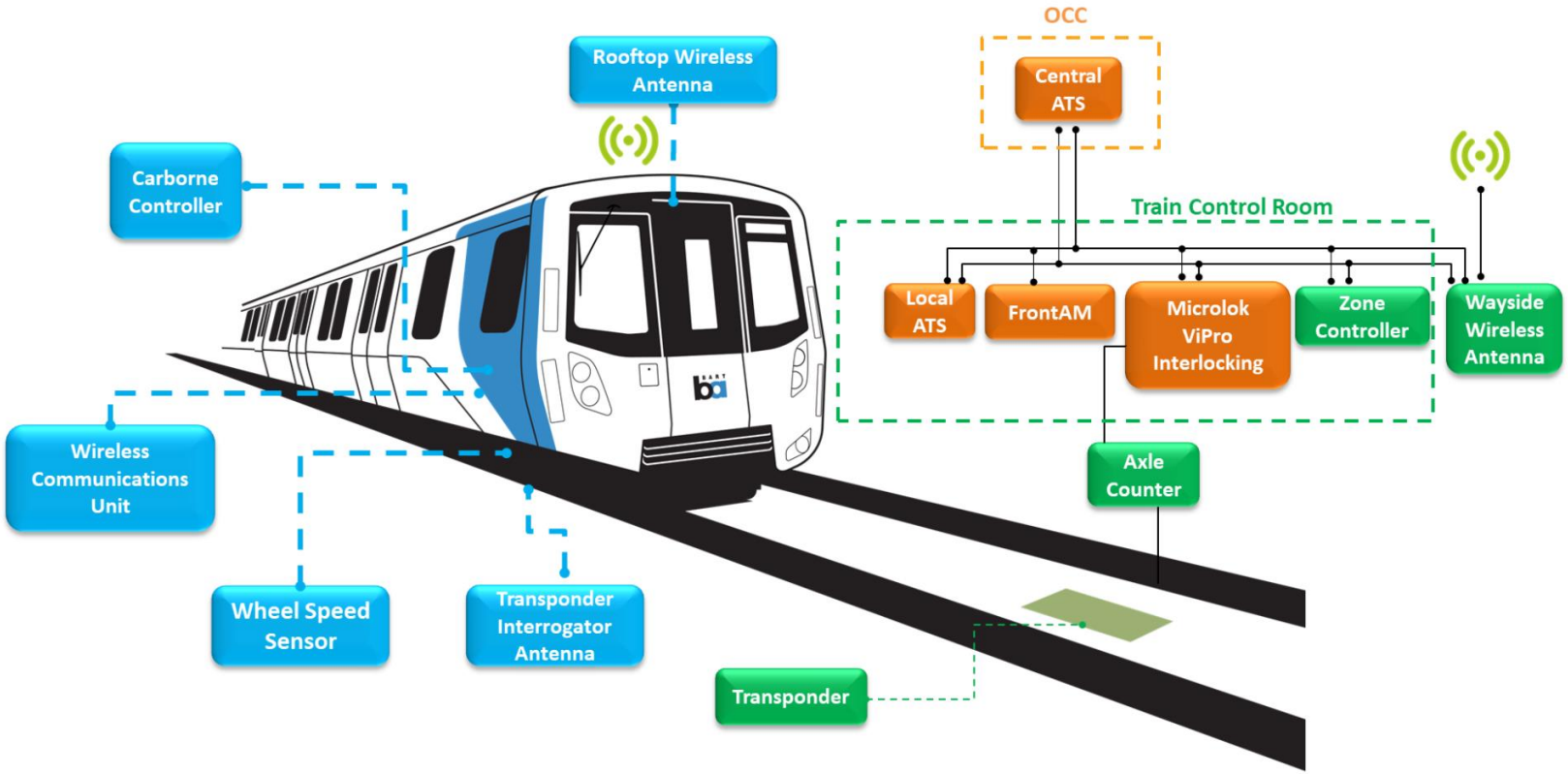
Connecting Legacy to CBTC Subsystems

Wayside

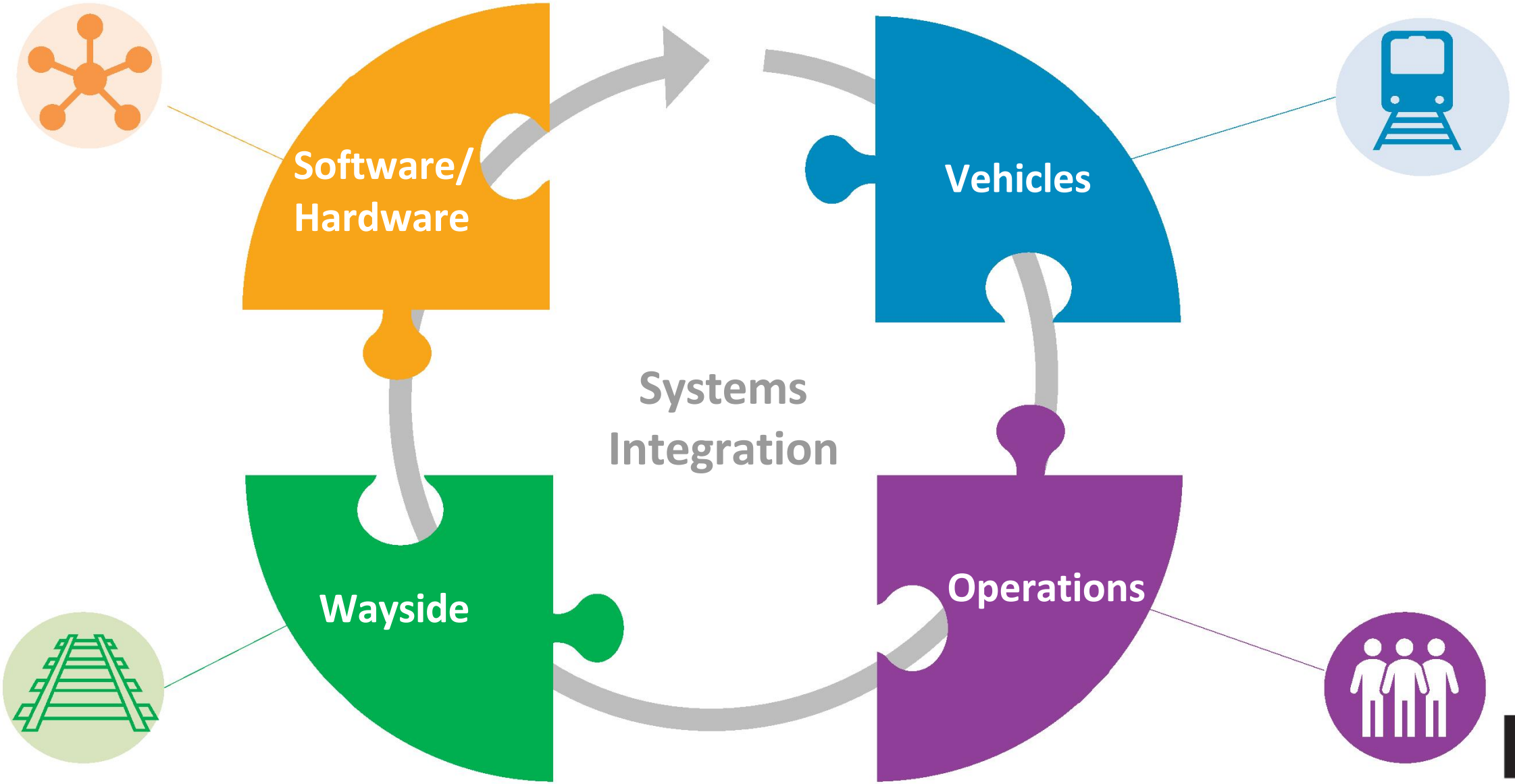
Install CBTC equipment on trackway

Vehicles

Install CBTC equipment on trains

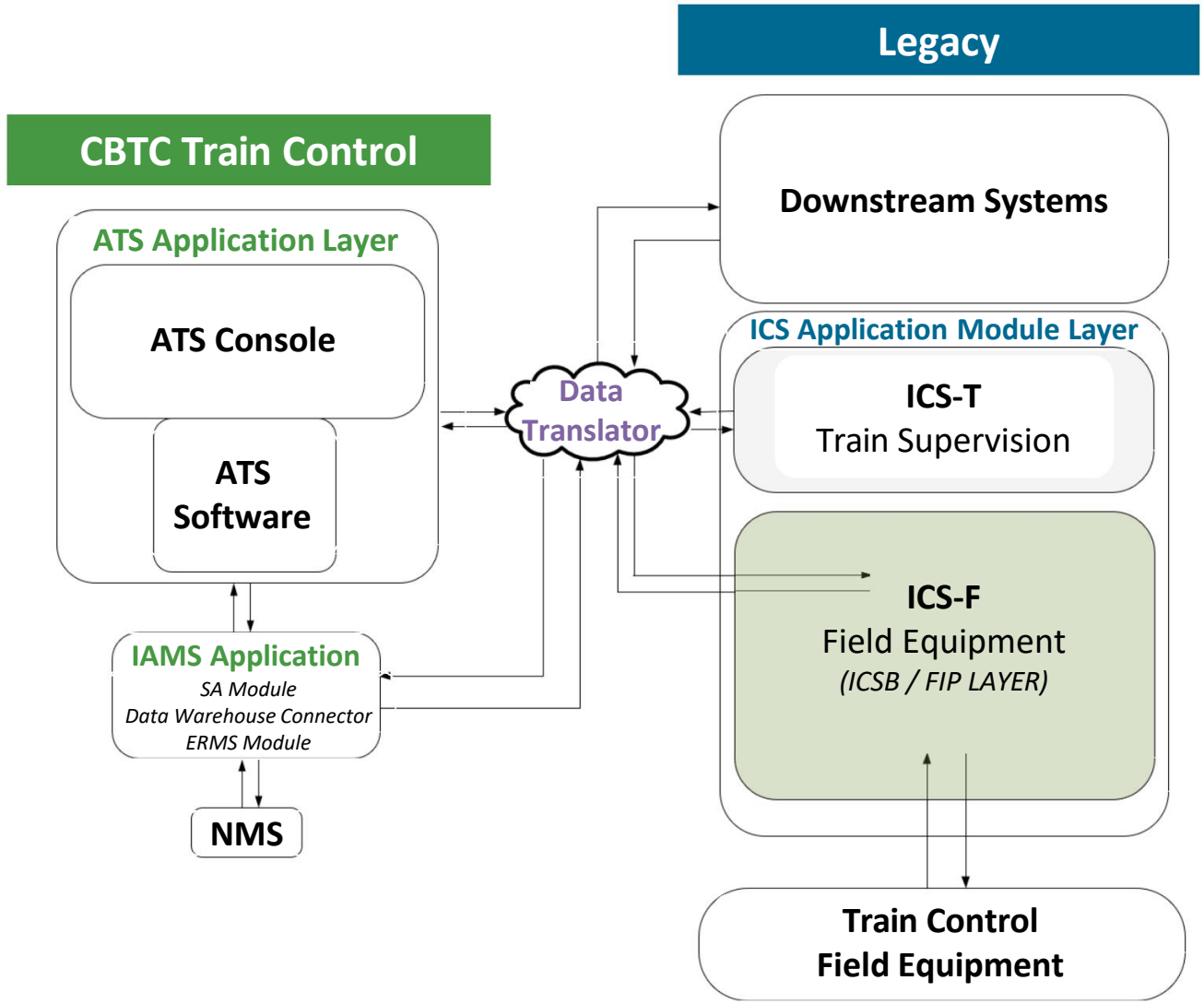


CBTC System


Software/
Hardware
Vehicles
Systems
Integration
Wayside
Operations

Software Improvements

- **ATS:** Automatic Train Supervision
  Hitachi/CBTC automatic train supervision software
- **IAMS:** Intelligent Asset Management Software
- **NMS:** Network Management Software
- **ICS:** Integrated Computer System
  BART developed legacy train control system software
- **Data Translator:** Converts real-time data back and forth and provides both systems diagnostic systems and maintenance tools



Software/Hardware

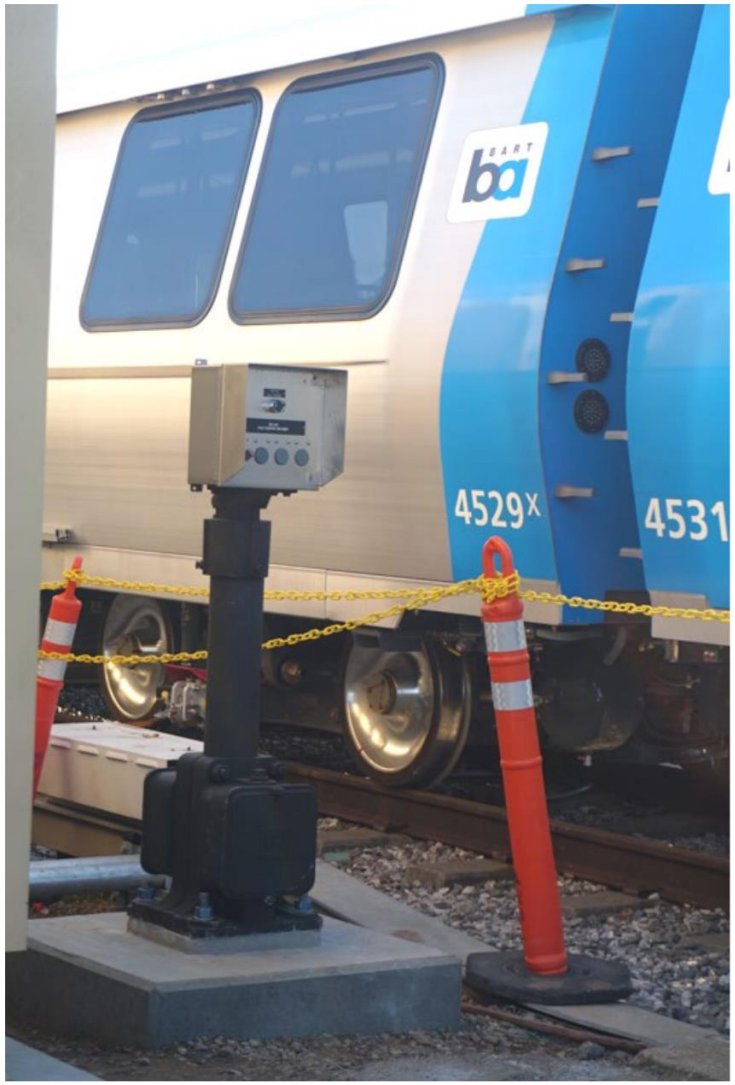
CBTC Cabinet Assembly for Factory Acceptance Testing

Wayside

Axle Counter Sensor

Transponder

Maintenance of Way Push Button



Signal

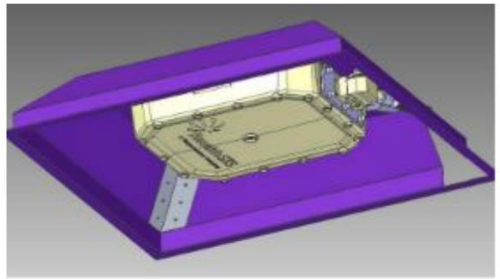
Wayside Access Box

Vehicles

CBTC Temp Locker for Carborne Controller Rack

Speed Sensor

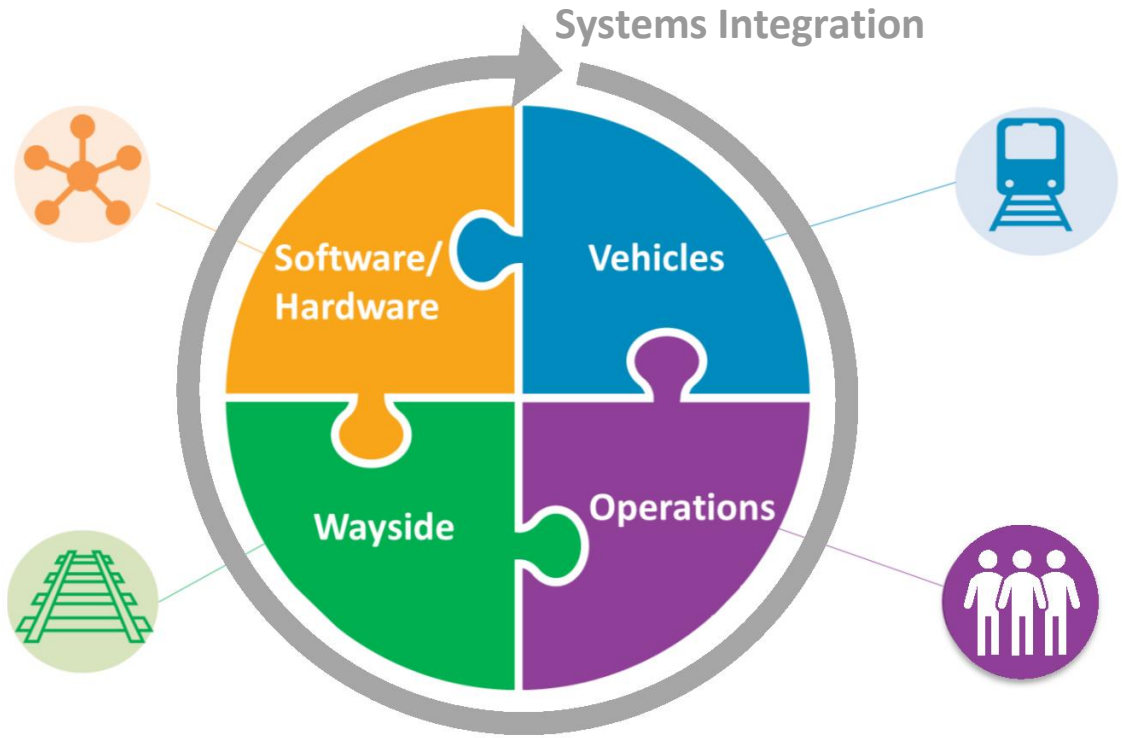
Transponder Interrogator Antenna

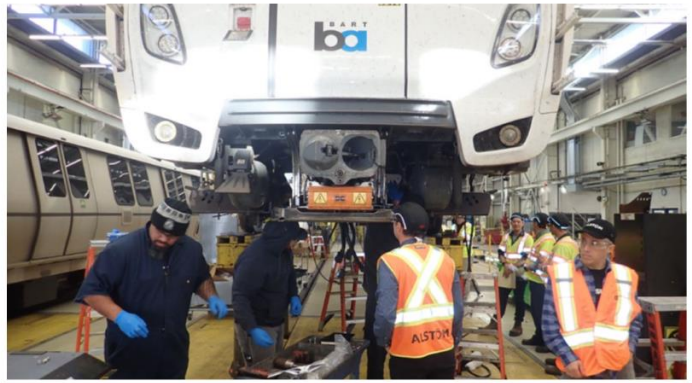


Radio Antenna

Next Steps

- W & Y Line Wayside Installation
- ★ Change Order for Systems Integration
- Pilot Vehicle Installation & Testing
- Optimization of Installation Activities





Completed Hayward Test Track Installation

[Video]

Thank You