



SFMTA

# Train Control Upgrade Project

SFMTA Board of Directors  
January 17, 2023



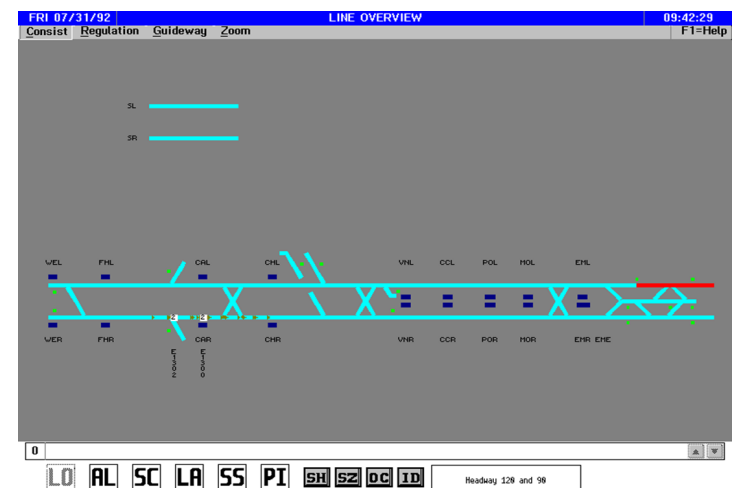
# Current conditions

ATCS approaching 30 years old,  
designed in the 1980s

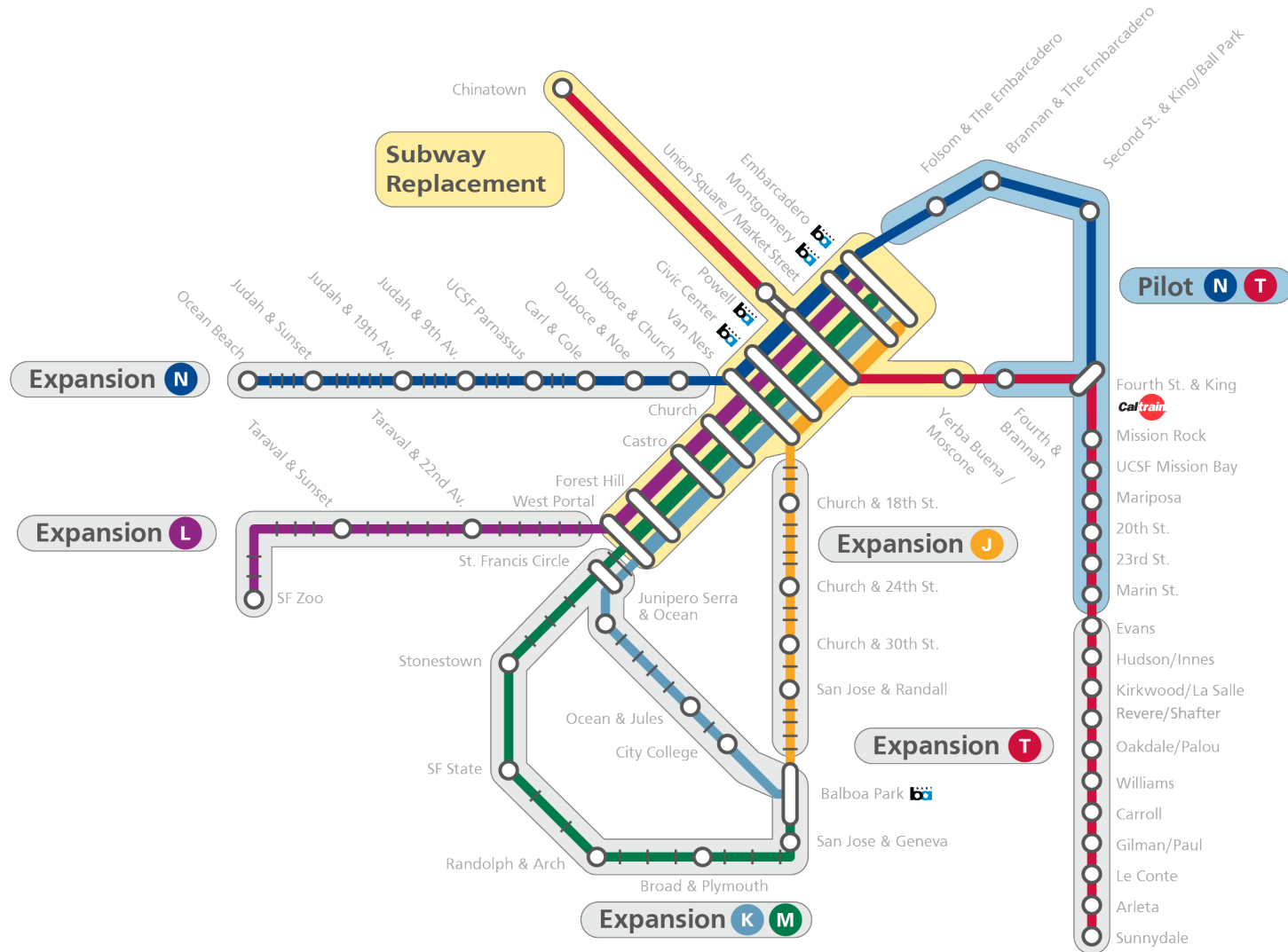
Initial procurement treated as one-time  
investment, something not to be  
touched for 30 years

Parts and software are becoming  
increasingly obsolete and difficult to  
source

Due to age, components fail regularly  
and institutional memory eroding on  
both the supplier side and at agency



# Train Control Upgrade Project: New communications-based train control (CBTC) system upgrade to improve Muni light rail service



**Reduced delays:** Customers no longer “stuck” on trains between stations due to subway congestion or slow-moving trains with a communication failure

**Reduced travel times:** Trips on Muni will be faster as trains will not have to wait for traffic lights on the surface – the train control system will talk to the signals and let them know a train is coming



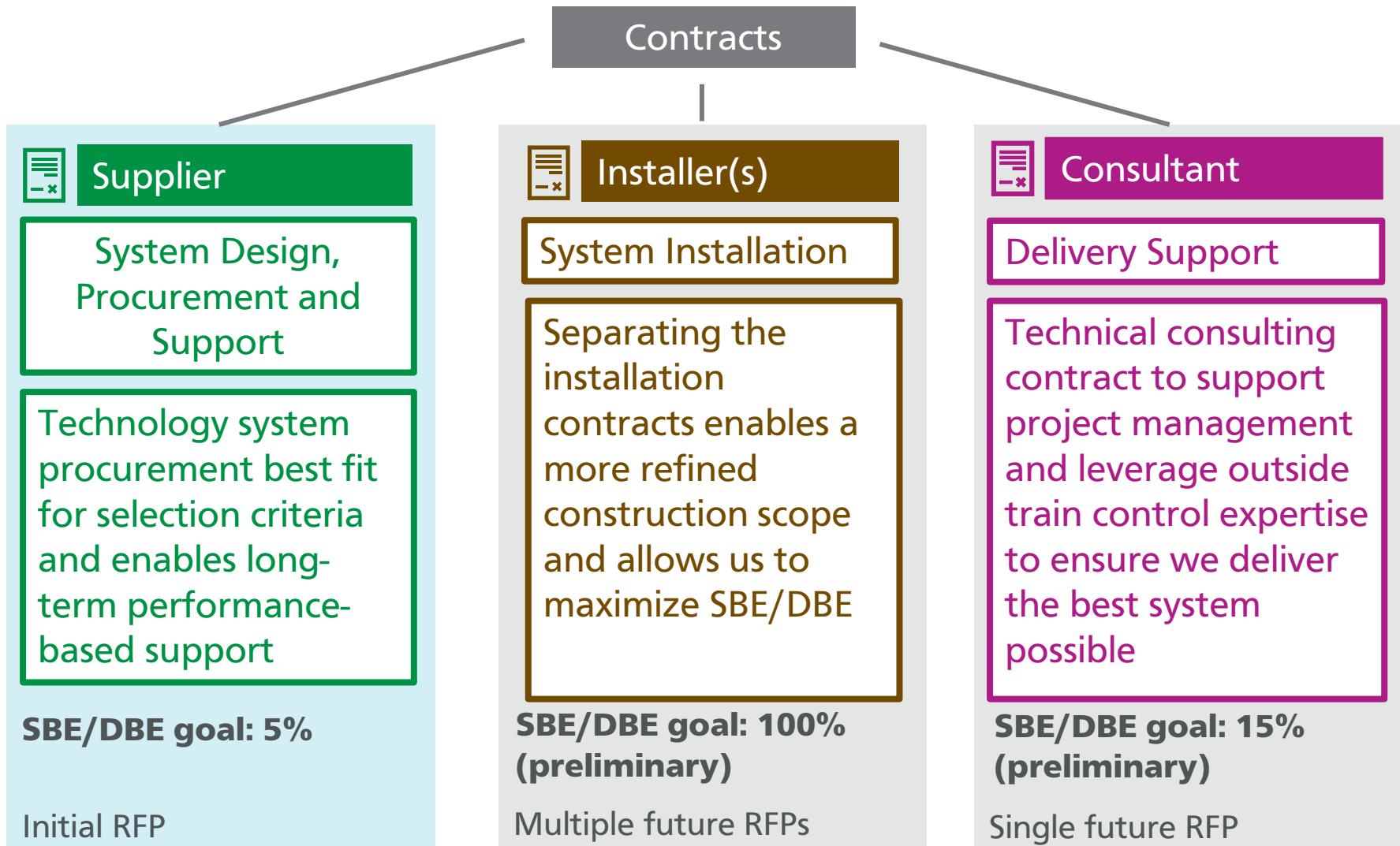
**Improved reliability:** More consistent arrival times that match the advertised frequency of trains, which makes trip-planning more reliable

**Better service:** the new system will give train controllers more flexibility to manage bunching and gaps

# Project strategy centered on culture of risk mitigation

## Focused on proactive management and risk mitigation from onset

- ➔ Decision to embark on competitive upgrade based on risk analysis of doing nothing and limitations of sole source upgrade
- ➔ Project phasing developed to minimize risk
- ➔ Contracting strategy offers best chance of beneficial partnership with supplier
- ➔ Risks considered early and incorporated into RFP and project team will continue to update risk assessment at key project milestones



# Ordinance allowing multi-year contract and negotiated procurement

Improves price and terms because firms are in competition with peers

## Key elements linked to strategic goals:



Performance-based support fee creates contractual elements for supplier to build reliability into initial design



Vendor-Managed Spares Inventory designed to incentivize reduced parts replacement



Regular software updates keeps hardware and software up to date

We have consulted with several American, Canadian and international agencies and our project approach is informed by our shared experiences

### American peers

**MBTA Green Line**  
**BART**  
**New York City Subway**



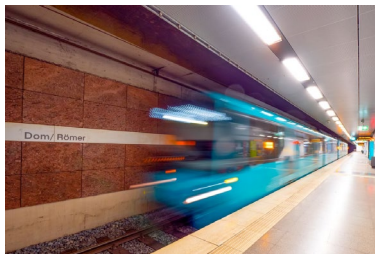
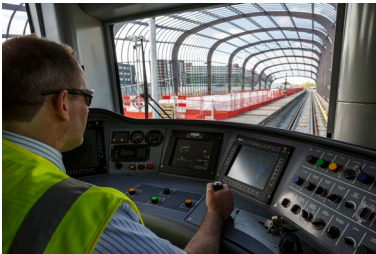
### Canadian peers

**Vancouver SkyTrain**  
**Edmonton**  
**Toronto (Eglinton LRT)**



### International peers

**London (LU and DLR)**  
**Amsterdam**  
**Frankfurt VGM**





## Special SFMTA Board Subcommittee

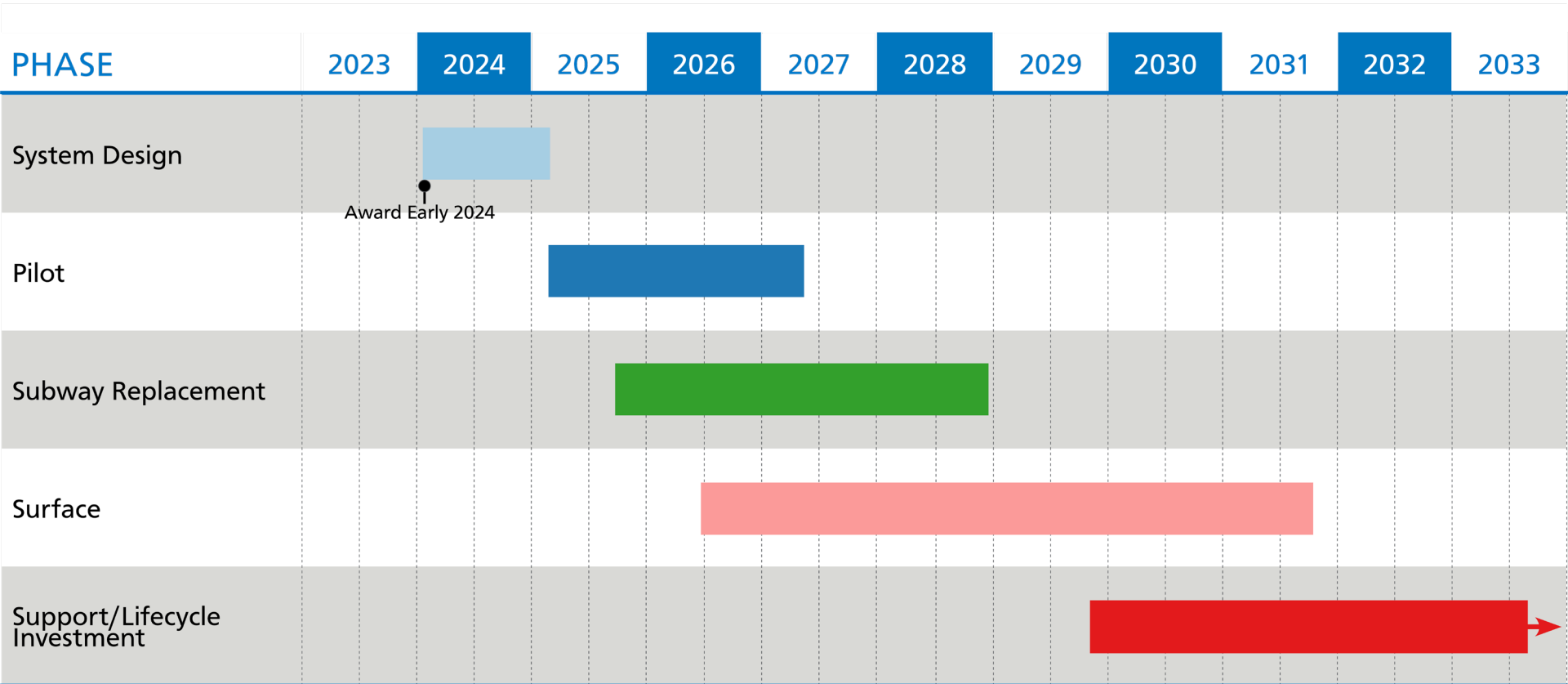
- ➔ Ad hoc committee to review and inform project purpose and objectives
- ➔ Meetings have reviewed contracting approach, schedule, funding, risk assessments, and project delivery lessons learned
- ➔ Allows for deeper dive on specific project topics such as the risk assessment and provides a platform for board feedback
- ➔ Committee will continue through procurement and help inform key project milestones



Funding Source	FY23-27 CIP	Project Total
Operating (prior)	N/A	\$2,095,000
Revenue Bond (prior)	N/A	\$5,405,000
General Funds (prior)	N/A	\$340,000
Transp. Sustainability Fee (prior)	N/A	\$10,000
Revenue Bond	\$35,595,000	\$35,595,000
Prop K	\$41,077,378	\$41,077,378
General Funds	N/A	\$25,830,132
Transportation Sustainability Fee	N/A	\$8,785,609
Operating Fund	N/A	\$8,000,000
AB 664	N/A	\$7,490,752
Caltrans (STIP)	\$15,793,794	\$24,394,000
Caltrans (TIRCP)	\$28,364,282	\$100,576,000
SB1 – State of Good Repair	N/A	\$30,000,000
FTA (Transit Capital Priorities)	\$165,001,159	\$317,054,941
<b>Grand Total</b>	<b>\$285,831,613</b>	<b>\$606,653,812</b>



### Proposed Project Schedule



# Questions?



# Muni's train control today

## Subway Automatic Train Control System (ATCS)

- Went into service in 1998
- System keeps vehicles safely spaced
- Operators open/close doors, but all other movements are automated
- ATO (automatic train operation) significantly improved Muni Metro performance
- Increased throughput and reliability in the tunnel over previous manual operations

## Surface Independent Operation

- Vehicles on the surface are fully controlled by operator
- Signals and switches are activated by operators and controlled by independent wayside computers
- Routes are requested as trains are detected by the "VETAG" signal priority system, and assigned first come, first serve
- Limited tools for spacing management

# Current conditions

Before the pandemic, Muni Metro service regularly experienced delays and crowding, in large part due to the design and the age/condition of the train control system

## Design

**Non-communicating  
trains**

**Bunching/gaps**

**Subway  
congestion**

**Inflexibility of  
software**

## Age/condition

**ATCS computer  
failures**

**Communication  
failures (ATCS)**

**Availability Of  
parts**

**ATCS wayside  
failures (age)**

# Lessons Learned



**SFMTA draws from multiple sources of “lessons learned” to set up Train Control for success including:**



Major SFMTA capital projects like Central Subway and Van Ness BRT



Peer agencies – North America and Europe



Past SFMTA technology projects



Current ATCS system