



# NYCT CBTC Program Update

 Construction & Development

March 6, 2024

 NORDIC SIGNALS

# Agenda – New York MTA CBTC Program

- **CBTC to date**
- **Program acceleration: new strategy**
- **Key ongoing and future actions**
- **Organizational Improvements**

# CBTC Program initial vision

## In 1991, NYCT launched its signal modernization program

- **CBTC:** Direct jump to the emerging technology at that time
- **I2S:** MTA-owned specs with qualified suppliers called **Interoperability Interface Specifications**
- **AWS:** CBTC overlay of a reduced conventional signal system called **Auxiliary Wayside System**



# Current status – Successful transition

## The transition from conventional signaling to CBTC is a success

- First brown field heavy rail CBTC project in the world
- CBTC adopted by NYCT operation
- Canarsie L and Flushing 7 performance dramatically improved



# Current status – Interoperability is a reality

## Interoperability is a reality

- Homogenous system across the network
- Long term competitive market
- In-service on the Queens Boulevard West **EFMR** line
- Three fully engaged qualified suppliers



# Current status – The program is accelerating

## The program is accelerating




- Four lines in construction
- Two additional lines in the pipeline
- Full CBTC conversion of the B Division fleet in progress
- ATS-B is in-service ready to support further expansion of CBTC on the B Division
- **New CBTC strategy to accelerate the program**






# Strategy Implementation – Crosstown

Crosstown  sn't just the latest CBTC project. It reflects a completely transformed approach to delivering signal modernization

## Procurement

-  • Implement design-build with performance requirements
-  • Long-term maintenance part of the procurement
-  • Minimize non-signals

## Technical

-  Simplify the system specifications
-  Reduce legacy wayside equipment (CBTC-Centric approach)
  - New CBTC Radio based on IP standard
-  Virtual testing through cloud-based Enhanced Integration Test Facilities (EITF)

# CBTC Technology Strategy – CBTC-Centric

## Challenge:

Legacy AWS faces increased implementation and maintenance challenges.

## Solution:

Through a **CBTC Centric** approach, legacy AWS functions will be fulfilled through a unified CBTC system, with wayside equipment interfacing directly.

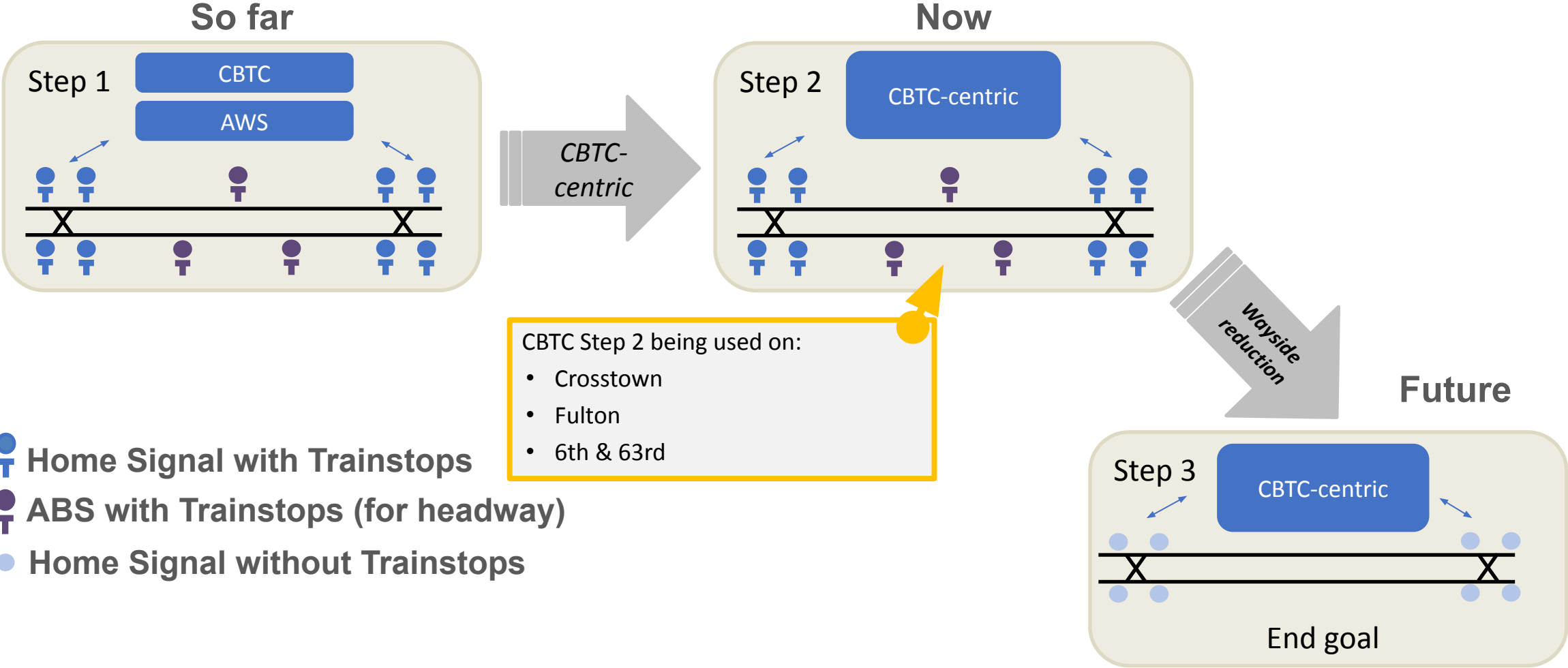
This will allow us to implement modern optimized solutions and eliminate the dependency on a shrinking pool of AWS competency.



**Actions implemented:** **1)** For Crosstown and all future projects, CBTC centric design is required. **2)** I2S updates ongoing to specify system-level signaling functional requirements

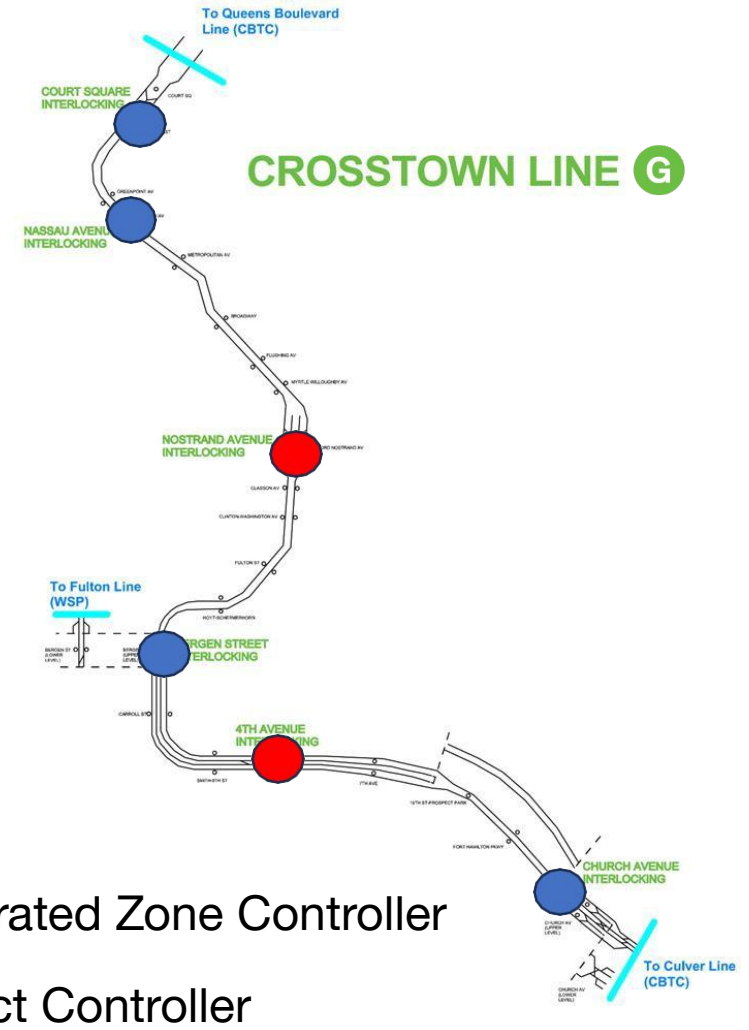
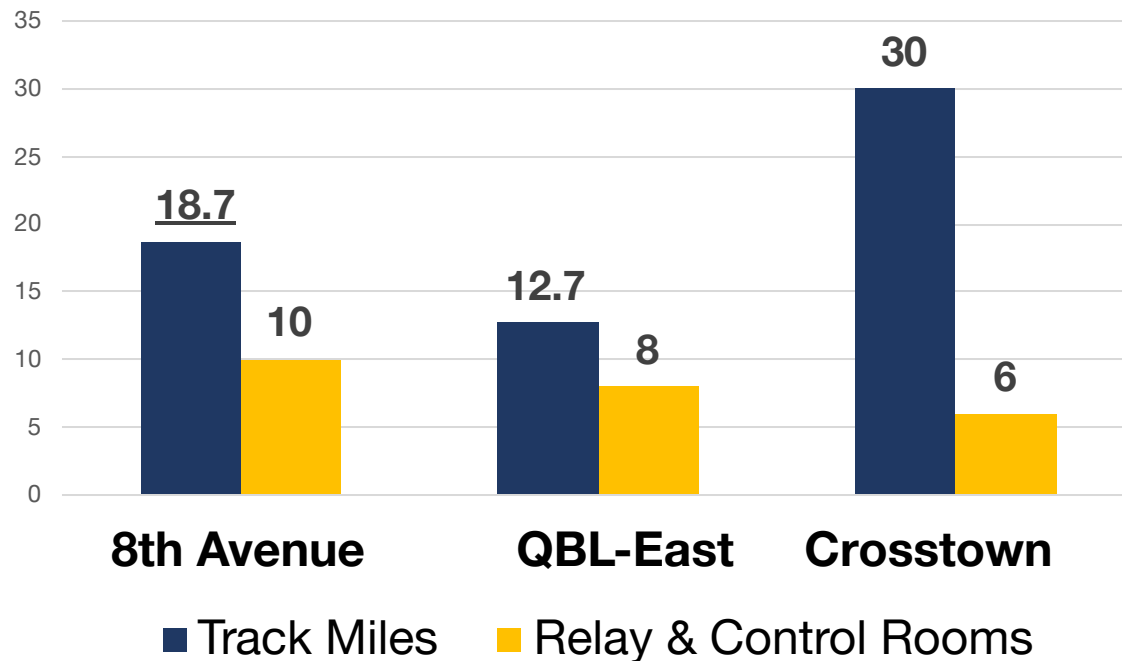


# CBTC Technology Strategy – CBTC-Centric



# Reduce Legacy Wayside Equipment

Despite Crosstown's ambitious scale, equipment needs have been reduced dramatically



# CBTC Technology Strategy – CBTC Radio

## Challenge:

The current I2S Radio will not be supported in the medium-term and must be replaced.

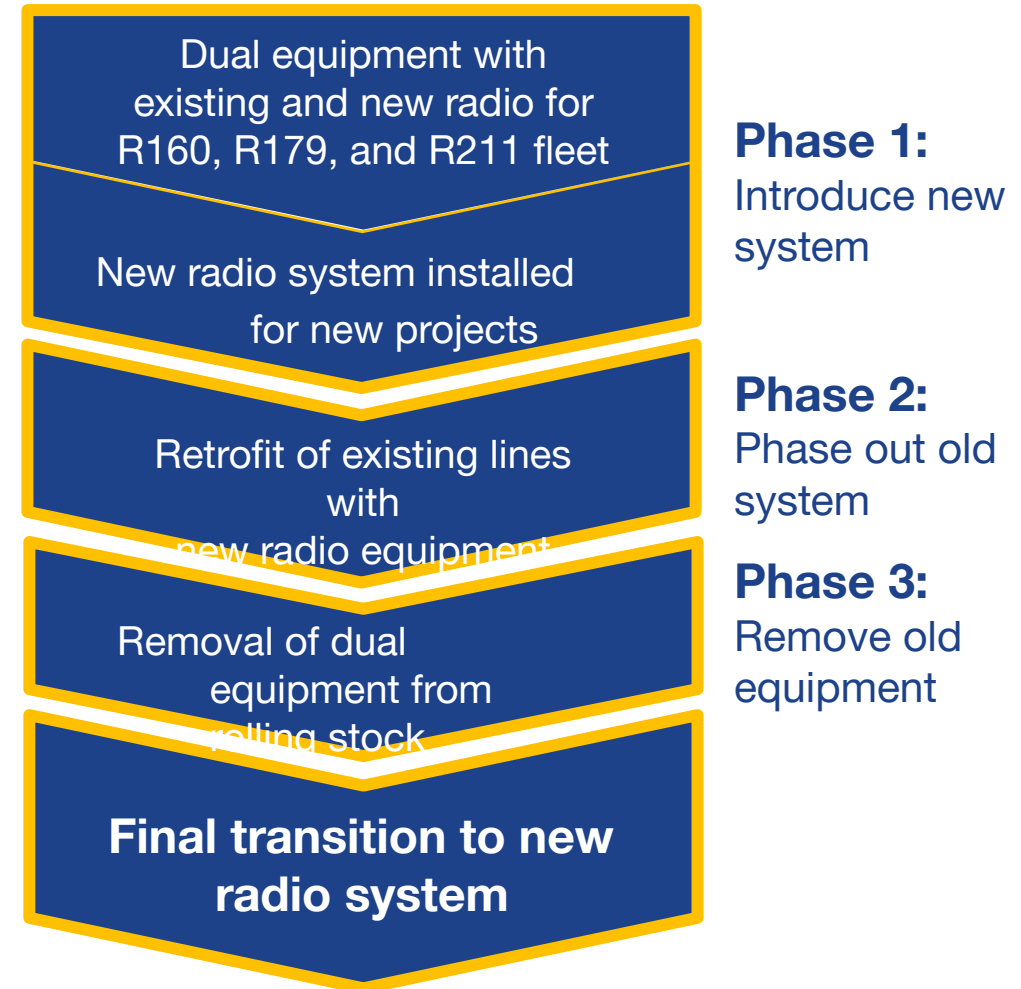
## Solution:

Transition to a new **CBTC radio** system that meets MTA requirements, including:

- IP-based technology with a transparent medium
- System-wide deployment strategy
- Robust protection against public interference and state-of-the-art cybersecurity

## Actions implemented:

- 1) 5G IP Radio operating under the MTA licences N79 band (4.94-4.99 GHz) included in Crosstown and future CBTC procurements
- 2) I2S updates ongoing for IP Radio communication



# Action #1 – RAM Growth

## Challenge:

Even as CBTC has improved the operation on the Canarsie Line and Flushing Line, some concerns about its perceived dependability have lingered.

## Solution:

Organizational changes to improve CBTC's **Reliability, Availability, and Maintenance** on existing lines.

- Add stringent gates and long-term incentivized maintenance support to **project setup**
- Strengthen internal **tracking of the performance** of the systems in deployment and in-service
- **Design changes** leading to the simplification of the system and the improvement of the system operation and maintenance

**Action items: 1)** RAM task force ongoing to characterize and quantify failures on CBTC lines (Canarsie, Flushing and QBL). **2)** Make recommendations for system specification changes, HW/SW corrections or operating procedures changes. **3)** Implement these items in partnership with suppliers and users.

# Action #2 – Equipment of the work trains

## Challenge:

Even as the revenue fleet is equipped, work trains need CBTC functionality to allow for a complete transition.

## Solution:

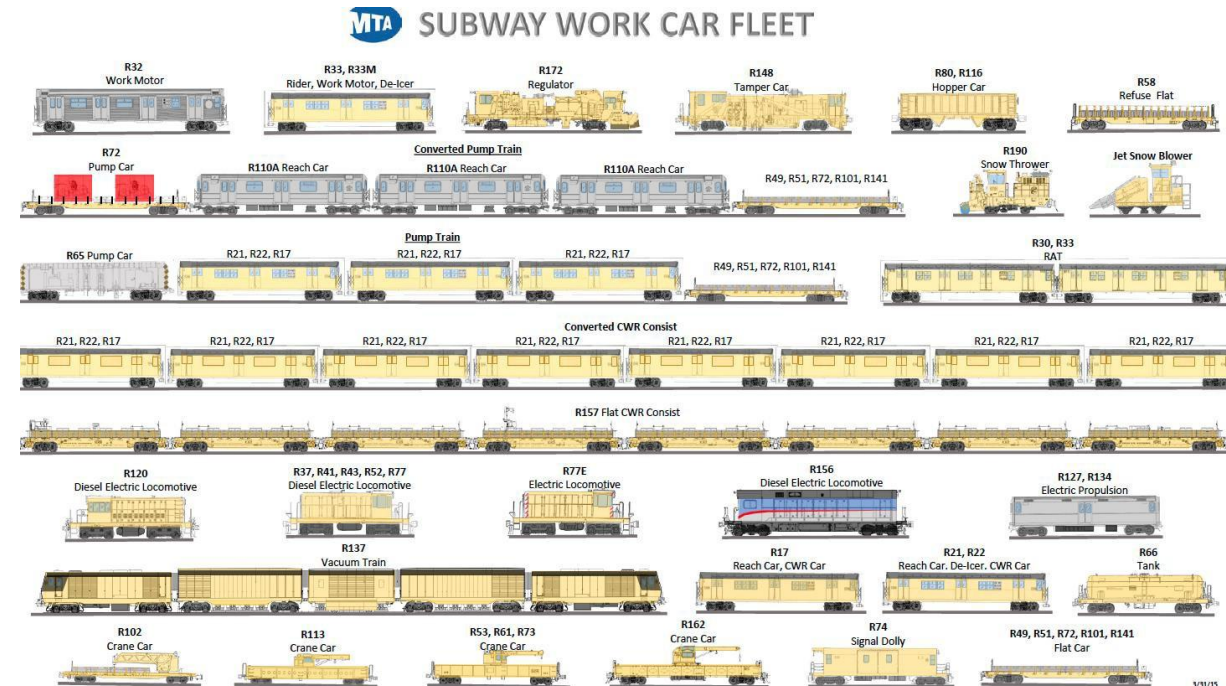
**Equip work trains** to operate on CBTC-centric lines without legacy signalling equipment and train stops.

The development will be in two steps:

1. Explore technology options for new train-positioning system (avoid use of balises and tachometers)
2. Full CBTC-integration with the new train-positioning system

Eventually work trains will be equipped by CBTC suppliers under separate contracts.

**Action item:** planning procurement for equipping work trains with CBTC using new train-positioning system



# Action #3 – Explore the retrofit of A-Division fleet

## Challenge:

The signaling equipment on the A-Division will exceed its normal end of useful life before all new rolling stock will be available.

## Solution:

Actively explore retrofitting R142/R142A rolling stock with CBTC, using new technologies to streamline the effort.

- Action item: 1)** Request for Information to investigate retrofit technologies has been done.
- 2)** Leverage on new Train-Positioning system for work trains fleet.



# Building the organization

These technical actions are critical. But **building the organization** to implement them is just as important.

We acknowledge the challenge of CBTC projects. With the increased pace, we need to build our organizational capacity to improve Program Execution and Operations and Maintenance. This means:

- Recognize CBTC as a **technology project**, rather than a construction project
- Treat CBTC deployments as **interdependent**, rather than individual projects
- Structure Operations and Maintenance around a **digital railroad**, rather than older components-based strategies

# Building the organization: Operational Readiness

Beyond design details or technical specifications, **operational readiness**

must be the cornerstone of all stages of project delivery.

CBTC System	Organizational Structure
Hardware	Capacity of C&D delivery
Software	Capacity of NYCT operation & maintenance
Fulfilling functional requirements	Integration between the two

**Action item:** In the CBTC Contracts, the MTA has formalized structures to establish operational readiness requirements to system performance throughout the development phase via Stage Gates.



# Thank you!

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