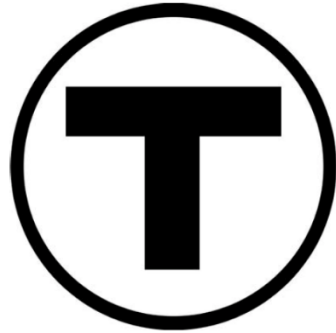




**Massachusetts Bay
Transportation Authority**

Positive Train Control (PTC) Program Update

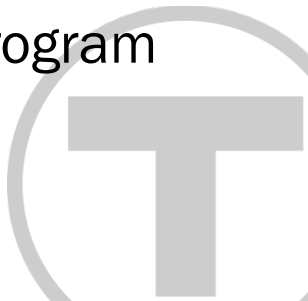
Fiscal and Management Control Board

Karen Antion

March 9, 2020

Overview

- Positive Train Control (PTC) is a **federally-mandated** safety system that will improve the safety of the MBTA Commuter Rail System. PTC enforces train speed limits to prevent train-to-train collisions, over-speed derailments, movements through misaligned switches, and uncontrolled movements through work zones.
- This presentation will provide an update regarding the current activities and progress of the MBTA's PTC Program, including implementation of the North Side Automatic Train Control (ATC) system on lines required by the Federal Railroad Administration (FRA).
 - The PTC System and the North Side ATC system implementation is required by the FRA by December 31, 2020 for a fully compliant PTC system.
- Despite the risks described in this update, **the PTC Program remains on schedule.**
 - Siemens/Hitachi Rail hardware and software issues along with Keolis signal resource limitations present a continuing risk to the program that is being closely managed at the executive level.
 - Additional funding is required for LTK Engineering Services to support the PTC Program

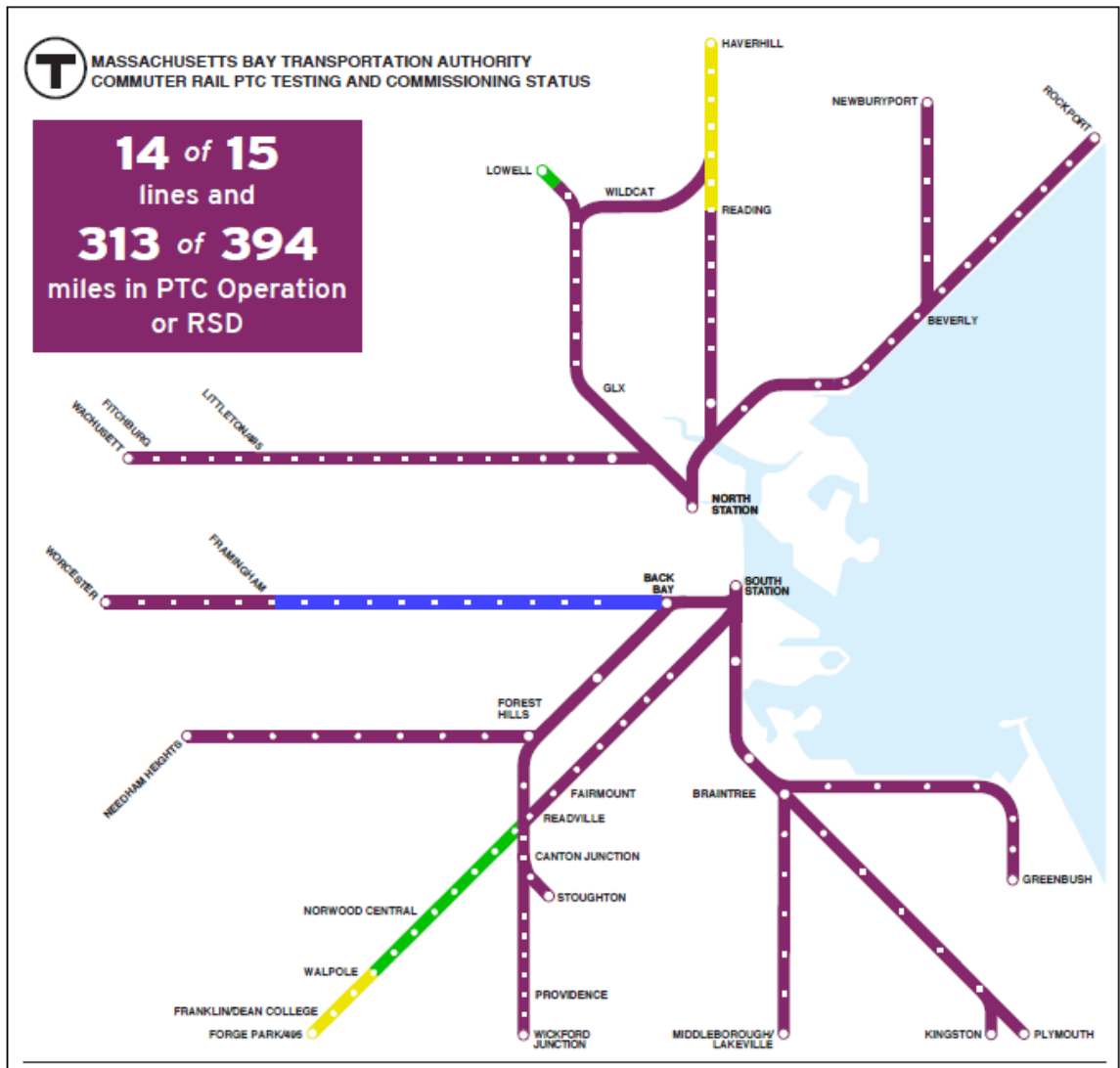


Current PTC Activities and Progress

- **PTC Safety Plan** submitted to FRA on September 30, 2019 along with request for Safety Certification of the system – FRA conditional approval required by December 31, 2020
- 14 of the MBTA's 15 commuter rail lines currently have PTC in operation (313 out of 394 route miles) and all MBTA commuter rail trains are now operating under PTC on at least some portion of their route
- Testing is underway on the Franklin, Worcester, and Haverhill lines
- ATC implementation is proceeding on three South Side lines:
 - Needham line ATC is complete
 - Franklin and Worcester line commissioning is underway



Current PTC Activities and Progress



PTC in Operations/Terminal Areas



Field Qualification Testing (FQT)
Underway



Field Integration Testing (FIT)
Underway



Level 3.2 Wiring/Cutover Testing
Underway



Siemens Hardware Issues

- Siemens, as a subcontractor to Ansaldo STS USA, Inc. (ASTS, now Hitachi Rail), supplies the PTC **transponder reader hardware** that is used on MBTA commuter rail vehicles.
 - In February and April 2019, Siemens issued a nationwide recall for components of this equipment that could be the cause of transponder reading issues that the MBTA had been experiencing, and this equipment was replaced.
 - Subsequently, MBTA experienced a high rate of failures with the replacement equipment.
 - MBTA has dedicated additional engineering resources to support the root cause analysis, testing, and replacement of this equipment.
 - The recalled equipment is scheduled to be replaced again in 2020 Q2.
 - **Additional MBTA engineering resources were required to support the identification of these defects and installation and testing of the recalled hardware. The cost of these additional resources are covered in the project engineering consultants contract (LTK Engineering Services) amendment #2 for \$2,978,999.02.**



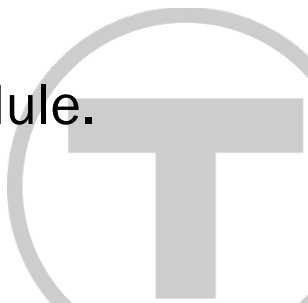
Siemens Software Issues

- Siemens, as a subcontractor to Hitachi Rail, is supplying the Advanced Civil Speed Enforcement System (ACSES) PTC software that is used on all of the MBTA's commuter rail locomotives and coaches.
 - Siemens software updates have been required to correct various functional issues that impact PTC operation on the North Side Commuter Rail lines, in particular due to the lack of ATC on those lines.
 - The first update was implemented in June 2019.
 - The second update implementation was performed January-March 2020 and is now complete.
 - The second update corrected a number of defects that were introduced in the first update resulting in system performance issues.
 - A further update is anticipated to correct remaining (minor) issues.
 - **Additional MBTA engineering resources were required to support the identification of these defects and testing of the software updates. The cost of these additional resources are covered in the project engineering consultants contract (LTK Engineering Services) amendment #2 for \$2,978,999.02.**



Keolis Support Issues

- As part of the PTC Program team, Keolis signal forces are responsible for the cutover of PTC and ATC to the live signal system.
 - Keolis' signal resources are limited.
 - The MBTA is closely monitoring Keolis' progress to mitigate delay-causing issues as quickly as possible, however, the South Side ATC work has been delayed in part due to this issue. Delays were also caused by issues with connecting to existing signal equipment and by issues with updating the Amtrak dispatch system that is used to dispatch these lines.
 - Delay to the work on any one line results in delay to the work on the following lines and the subsequent North Side ATC work.
 - MBTA has issued a work directive to Hitachi to augment ATC signal cutover resources to keep the South Side ATC work from being delayed further and to support the North Side ATC implementation.
 - Despite the delays that have occurred, the overall PTC Program remains on schedule.



North Side ATC

- ATC improves the **safety** and **reliability** of the Commuter Rail System and is required for a fully FRA-compliant PTC system.
- The FRA has granted the MBTA a conditional variance to allow our PTC system on the North Side Commuter Rail Lines to operate until ATC is implemented.
- The MBTA must implement ATC on the Lowell and Wildcat lines by December 30, 2020 for the FRA to extend the MBTA variance.
- Survey and design is underway for the first 3 lines.
- Preliminary installation work is underway on the Lowell and Wildcat Lines.
- The first signal houses are planned to be installed on the Lowell Line in May.
- Testing of the first segment of the Lowell Line is planned for June.
- Planning for weekend service diversions starting with the Lowell Line.
- **The Project is on budget and on schedule.**

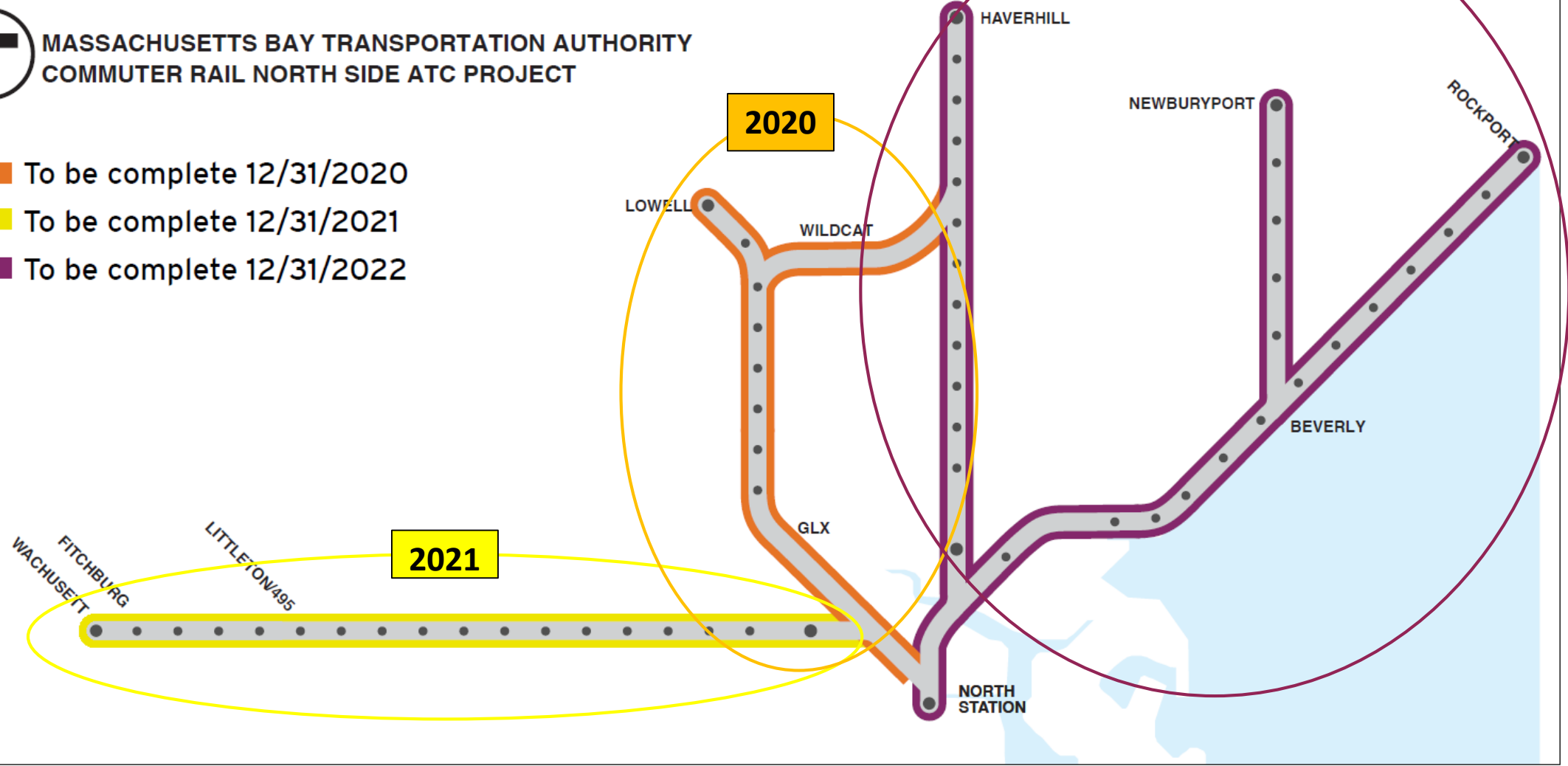


North Side ATC



MASSACHUSETTS BAY TRANSPORTATION AUTHORITY COMMUTER RAIL NORTH SIDE ATC PROJECT

-  To be complete 12/31/2020
-  To be complete 12/31/2021
-  To be complete 12/31/2022



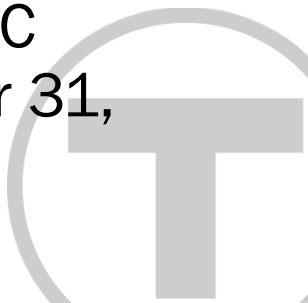
LTK Engineering Services – X60PS02 Amendment 2

- LTK serves as the MBTA's Engineering Advisor for the PTC Program
- LTK has been essential in supporting MBTA in resolving the Siemens hardware and software issues as well as with additional South Side ATC design review and testing support to prevent Program delays and meet the FRA deadlines.
- Base Contract: \$6,954,338.00 August 2017
 - Engineering and Technical Support Services
 - Systems Integration, Testing and Installation Oversight and Technical Support
 - Quality Assurance and Installation Oversight
- Amendment #1: \$2,603,191.30 May 2019
 - Enhanced engineering services to support PTC system integration, PTC subsystem design revisions, Quality Assurance, testing and commissioning on the MBTA Commuter Rail Network.
 - Support of the development of the Safety Case materials to be presented to the FRA as part of the PTC Safety Plan.



LTK Engineering Services – X60PS02 Amendment 2

- Additional LTK services are required due to unanticipated technical issues that were encountered and which required additional resources beyond what was anticipated:
 - Onboard PTC Hardware Issues – equipment recalls and transponder reading failures
 - Onboard PTC Software Issues – defects in software releases
 - Wireless Security Issues – functionality required for interoperability is still in development
 - South Side ATC Upgrades and Rework – engineering support for this effort was not included in the previous contract scope
 - Additional Project Support for PTC system turnover
- LTK has provided additional engineering support to identify issues, evaluate proposed solutions, review test procedures and reports, and witness testing
- **Amendment #2** provides additional LTK services required to complete the PTC program implementation in the amount of \$2,978,999.02 through December 31, 2020. There is no time extension proposed as part of this action.



Request of the Fiscal and Management Control Board

Staff request that the Fiscal and Management Control Board authorize the General Manager, or his designee, to award and execute Amendment #2 with LTK Engineering Services to provide technical support services to the MBTA for the PTC system on the commuter rail network for an amount not to exceed \$2,978,999.02.

