OMB Control No. 2130-0553

MBTA Annual Progress Report 2016 Rev 2

2015

Massachusetts Bay Transportation Authority (MBTA)

[FRA-2010-0030]

The Annual Positive Train Control (PTC) Progress Report is due by March 31st of each year until full PTC system implementation is complete. The Annual PTC Progress Report must cover the railroad's implementation efforts and progress from the directly previous calendar year, and must be submitted electronically to the Federal Railroad Administration (FRA) via the FRA Secure Information Repository at https://sir.fra.dot.gov.

FRA F 6180.166 (2-16)

OMB Approval Expires 9/30/2016
OMB Approval Granted 3/16/2016

Name of Railroad or Entity Subject to 49 U.S.C. § 20157(a): Massachusetts Bay Transportation Authority

Railroad Code: MBTA

Annual PTC Implementation Progress Report for: 2016

PTCIP Version Number of File with FRA (basis for goals stated): Click here to enter PTCIP Version Number.

Submission Date: 3/31/2016

Contents

1. Summary

Please provide a narrative summary of overall PTC implementation progress during the preceding calendar year (January 1 to December 31):

This report represents the progress towards implementing PTC for the year 2015 on MBTA.
In the year 2015 MBTA completed following milestones:

1. MBTA contracted Ansaldo STS as its PTC System Integrator to install ACSES II as the primary PTC system over the entire MBTA Commuter Rail territory. Ansaldo STS is also responsible for the full implementation of I-ETMS on the corridors shared with Pan Am RR and tenant freight railroads. Contract value is $389.2 million. Total Project Cost is $459.3 million. PTC is planned to be implemented in phases. Phase I – South side will be completed by the end of 2018. The South Side will be ACSES II and will include installation of ATC systems on the Franklin Branch, Needham Branch and from Cove to Framingham on the Worcester Line. Phase II – North Side will be completed by the end of 2020. The North Side will be ACSES II without ATC on all commuter lines. On a portion of the network, I-ETMS will be installed to support Pan Am through freight operations.

   The procurement process included two rounds of bid evaluations and extensive contract negotiations with two viable bidders.

   MBTA is also in the process of applying for TIFIA and RIF loans to cover the capital cost of the PTC Implementation.

2. MBTA completed its final negotiations with a 220 MHz spectrum supplier and has obtained licenses in the 220 MHz spectrum to be used for ACSES and I-ETMS. The 220 MHz licenses were granted to MBTA by FCC in July 2015.

3. MBTA contracted Jacobs Engineering to provide engineering support and oversight throughout the MBTA PTC implementation.

4. MBTA is actively participating in the AAR-coordinated Northeast Corridor Users' Group (NECU'G) meetings and is planning to integrate some of the PTC related work being performed by Amtrak on the NEC and to address interoperability issues. This is further explained in Section 2 of this report. No new PTC equipment installations were performed on MBTA locomotives in 2015. No new PTC equipment installations were performed on tenant locomotives in 2015. No tenant rolling stock modifications related to PTC are planned for the year 2016.

Category	Quantity Installed During Calendar Year	PTCIP Year End Goal (If Applicable)	Cumulative Quantity Installed at End of Calendar Year	Total Quantity Required for PTC Implementation
Locomotives Fully Equipped (note 1) The MBTA locomotive and cab car listed herein are fully equipped with PTC utilizing the 900 MHz data radios. Each vehicle will need to be modified for final PTC implementation to include new 220 MHz radio, and the change-out of 3 printed circuit boards with updated software.	0	0	115 locomotives 74 cab cars	90 locomotives 74 cab cars
Installation/Track Segments Completed (note 2) The MBTA has PTC installed and active on the Boston – Providence Line. This ACSES PTC segment is operated and maintained under contract by Amtrak.	0	0	37.75 miles	347.15 miles
Radio Towers Fully Installed and Equipped	0	0	11	TBD
Employees Trained (note 3) MBTA employees currently trained are locomotive engineers and conductors that are qualified to operate on the Boston – Providence Line.	0	0	215 employees (105 engineers and 110 conductors)	922
Route Miles In Testing or Revenue Service Demonstration	0	0	0	0
Route Miles in PTC Operation	0	0	37.75 miles	347.15 miles

2. Update on Spectrum Acquisition

Required content:

- The amount of spectrum acquired and available for use during the applicable calendar year and the cumulative amount acquired and available for use at the end of the applicable calendar year, as compared to the amount the railroad stated would be acquired and available for use by the end of that calendar year and in total for PTC implementation, in the applicable revised PTCIP, as amended
- The basis for how the railroad is determining that the acquired spectrum is available for use by PTC radios (e.g., ensuring non-interference with other radios)

Spectrum Area or Location (E.g., county)	Spectrum Acquired and Available for Use (Owned/Leased) During Calendar Year	Cumulative Amount of Spectrum Acquired and Available for Use (Owned/Leased) at End of Calendar Year	PTCIP Year End Goal for Spectrum Acquired and Available for Use	Total Spectrum Required for PTC Implementation, as Reported in PTCIP
Spectrum Coverage Area or Location†:	**Yes**	**Necessary Spectrum has been purchased**	**Activity complete no additional spectrum required to meet PTCIP**	**Necessary Spectrum has been purchased**

†Note: To add rows for additional spectrum areas or locations, click on the blue "+" symbol at the bottom right-hand corner. Please be sure to first click anywhere inside the table to activate this function.

If this function is unavailable for your document, please manually add additional rows.

Please provide any additional narrative for Spectrum Acquisition below:

MBTA has acquired spectrum in the 220 - 222 MHz band to be utilized for its PTC system. Overall, ten (10) 12.5 kHz channels and four (4) 25 kHz channel were acquired (in total 450 kHz of spectrum was acquired).

3. Quantity Update on Hardware Installation

Required content:

- Separated by each major hardware category and subcategory identified below, the amount of PTC hardware installed during the applicable calendar year and the cumulative quantity installed at the end of the applicable calendar year, as compared to the amount the railroad stated would be installed by the end of that calendar year and in total for PTC implementation, in the applicable revised PTCIP, as amended

3.1. Locomotive Status

Category / Installation Feature	Quantity Installed During Calendar Year	PTCIP Year End Goal	Cumulative Quantity Installed at End of Calendar Year	Total Required for PTC Implementation, as Reported in PTCIP
Locomotive (Apparatus)[1]				
On-board Computers (e.g., Train Management Computer) (note 4) All MBTA locomotives and cab cars that operate in PTC territory are equipped with OBCs. Modifications to the OBCs are included as part of the PTC Program.	0	0	115 locomotives 74 cab cars	90 locomotives 74 cab cars
Software For Train Management and other applications	N/A	N/A	N/A	N/A
PTC Displays (note 5) All MBTA locomotive and cab cars are equipped with ADUs. Modifications to some ADUs are included as part of the PTC Program.	0	0	115 locomotives 74 cab cars	115 locomotives 74 cab cars

[1] Railroads may elect to add categories or subcategories if more detail is desired.

Category / Installation Feature	Quantity Installed During Calendar Year	PTCIP Year End Goal	Cumulative Quantity Installed at End of Calendar Year	Total Required for PTC Implementation, as Reported in PTCIP
Locomotive (Apparatus)[1]				
Event Recorders (note 6) All MBTA locomotives and cab cars are equipped with event recorders. The recorder board will require modification as part of this PTC Program.	0	0	115 locomotives 74 cab cars	115 locomotives 74 cab cars
Onboard Antennas and/or Transponder Readers	0	0	115 locomotives 74 cab cars	115 locomotives 74 cab cars
GPS Receivers	N/A	N/A	N/A	N/A
Locomotive Radios – Primary Communications (e.g., 220 MHz radios) (note 7) As part of this PTC Program, the existing 900 MHz radios will be changed-out and replaced with 220 MHz radios.	0	0	115 locomotives 74 cab cars	115 locomotives 74 cab cars
Secondary Communications (e.g., cell or Wi-Fi communications) Equipment	N/A	N/A	N/A	N/A

Please provide any additional narrative for Locomotive Status below. If any of the information called for in Section 3.1 is unavailable to the railroad at the time it is completing and submitting this form, please insert "TBD" in the appropriate field and/or use this comment box to explain when such information will be available and when the railroad expects to submit it to FRA.

MBTA has reported above the current status of its fleet of MBTA locomotives and cab cars. MBTA has included as part of the PTC Program the equipping of 92 Pan Am locomotives with onboard PTC equipment. 25 Pan Am locomotives are to be equipped with ACSES. 67 Pan Am locomotives are to be equipped with I-ETMS. The locomotives have not yet been identified by Pan Am. As this information becomes available, MBTA will include it in future reports.

3.2. Infrastructure/Back Office Status

Category / Installation Feature	Completed During Calendar Year	PTCIP Year End Goal	Cumulative Quantity Complete at End of Calendar Year	Total Required for PTC Implementation, as Reported in PTCIP
Infrastructure (Back Office)				
Dispatching Locations (installations complete)	0	0	0	3
Physical Back Office System Equipment (installations complete)	0	0	0	3

Are the Back Office Location(s) fully operable?	No
Are the Dispatching Location(s) fully operable?	No

Please provide any additional narrative for Infrastructure/Back Office Status below:

MBTA's commuter operation is supported by 3 Back Offices and 3 Dispatching Locations.

1. The MBTA's operation on the Boston – Providence Line is dispatched by Amtrak at the South Station CETC using back office hardware and software housed at South Station. This line segment is PTC functional.
2. The MBTA's South Side operation is dispatched using 2 dispatching facilities and one back office facility. It is not PTC functional. It will be made PTC functional as part of the PTC Program.
3. The MBTA's North Side operation is dispatched using 2 dispatching facilities and two back office facilities. None of the facilities are PTC functional. It will be made PTC functional as part of the PTC Program. Included in the PTC Program is the construction of a new back office and dispatching facility for the Pan Am controlled portion of the MBTA's North Side.

3.3. Installation/Territory Status

Category / Installation Feature	Quantity Installed During Calendar Year	PTCIP Year End Goal	Cumulative Quantity Installed at End of Calendar Year	Total Required for PTC Implementation, as Reported in PTCIP
Identification of the Territory (i.e., Subdivision, District, Track Segment, Etc.)†				
Wayside Interface Units†	0	0	0	TBD
Communication Towers or Poles†	0	0	0	TBD
Switch Position Monitors†	0	0	0	TBD
Wayside Radios†	0	0	0	TBD
Base Station Radios†	0	0	0	TBD
Are all necessary communication backbone utilities for this track segment (including fiber, copper, ground wiring etc.) installed and ready for operation?† Yes				

†Note: To add rows for additional territories and associated sub-components, click on the blue "+" symbol at the bottom right-hand corner. Please be sure to first click anywhere inside the table to activate this function. If this function is unavailable for your document, please manually add additional rows.

Please provide any additional narrative for Installation/Territory Status below. If any of the information called for in Section 3.3 is unavailable to the railroad at the time it is completing and submitting this form, please insert "TBD" in the appropriate field and/or use this comment box to explain when such information will be available and when the railroad expects to submit it to FRA.

The MBTA PTC Program is entering the design phase in 2016. The quantities of WIUs, communications towers and poles, switch position monitors, wayside radios and base station radios are being developed through the design process. Once these quantities are known, they will be included in future reports.

4. Quantity Update on Employees Trained

Required content:

- Separated by each employee category identified below, the number of employees trained during the applicable calendar year and the cumulative number of employees trained at the end of the applicable calendar year, as compared to the number the railroad stated would be trained by the end of that calendar year and in total, in the applicable revised PTCIP, as amended

Employee Category[2]	Number of Employees Trained During Calendar Year	PTCIP Year End Goal	Cumulative Number of Employees Trained at End of Calendar Year	Total Reported in PTCIP
Employees who Install, Maintain, Repair, Modify, Inspect, and Test the PTC System	0	0	0	0
Employees who Dispatch Train Operations	0	0	0	0
Train and Engine (Operations) Employees	0	0	215	0
Roadway Worker Employees	0	0	0	0
Direct Supervisors of the Above Employees	0	0	0	0

Please provide any additional narrative for Employee Training below:

The MBTA PTC Implementation Plan from 2013 does not include a breakdown of employees to be trained by classification. MBTA has since determined that a total of 922 employees will require training.

5. Progress on Implementation Schedule/Milestones

Required content:

- Describe the extent to which the railroad or other entity is not complying with the implementation schedule it provided in its revised PTCIP, as amended

[2] *See* 49 C.F.R. § 236.1041(a).

MBTA is planning to have the PTC System operational in phases. Phase I will comply with the requirement that the PTC system be operational by the end of 2018.

Phase II will require significantly more development work as it is an application of ACSES II in the non-ATC mode. MBTA is planning to install a Pilot Segment on the North Side between Somerville Junction and Winchester to verify and validate system performance before installing it on the balance of the North Side. This testing will take time to accomplish but will greatly benefit the MBTA and result in a more reliable PTC System. Additionally, the North Side is complicated by the installation of I-ETMS to be co-located with ACSES on the Freight Main Line Corridor. This complexity is well-documented as it is being experienced with other railroads in the Northeast. MBTA will learn from the experiences of the other railroads and look to address technical issues before installation begins. Lastly, the construction of a new Control Center for the North Side that will accommodate both ACSES and I-ETMS will add complexity to the North Side. The above represents the primary reasons why the North Side PTC implementation is planned for the end of 2020.

6. Summary Update of Challenges/Risks

Required content:

- Any update to the summary of remaining technical, programmatic, operational, or other challenges that the railroad or other entity provided in its revised PTCIP, as amended, including challenges with availability of public funding, interoperability, spectrum, software, permitting, and testing, demonstration, and certification
- Schedule Risk Updates (e.g., funding, technology, agreements)

Please provide Summary Update of Challenges/Risks below:

MBTA has applied for TIFIA and RIF loans to fund the PTC Program. This is a protracted process which will take up to 20 months to complete. This has put a significant financial burden on the MBTA and has an impact on the Project.

Additional risks to the project include the challenges associated with installation of a complex system while operating a vital commuter network. The service to the MBTA's passengers comes first as it is a vital component to the economic engine of the region. Weather will also play a significant role is the ability of the PTC contractor to perform field installation work.

7. Progress on Revenue Service Demonstration (RSD) or Implementation

Required content:

- The total number of route miles on which PTC has been initiated for revenue service demonstration or implemented, as compared to the total number of route miles required to have a PTC system (see Section 1 Summary Table)

- Estimated start date (month and year) for RSD

Segment Identification[3]	Number of Route Miles in Segment	Status at End of Calendar Year *Current status of installation/track segment.* ***Choose one:***	Estimated Start Date for Revenue Service Demonstration (if not already completed)
Segment *(add additional rows for segments as necessary):*		⦿ Not Started ○ Installing ○ Testing ○ Operational/Complete	

Note: To add additional rows, click on the blue "+" symbol at the bottom right-hand corner. Please be sure to first click anywhere inside the table to activate this function.

If this function is unavailable for your document, please manually add additional rows.

Please provide any additional narrative for Revenue Service Demonstration or Implementation below:

RSD testing has not started.

8. Update for Intercity or Commuter Rail Passenger Transportation (if applicable)

If this section is not applicable to your railroad, please mark N/A.

Required content (if applicable):

- For each entity providing regularly scheduled intercity or commuter rail passenger transportation, a description of the resources identified and allocated to implement PTC

[3] Segment identification should be consistent with segments listed in Section 3.3.

Please provide Update for Intercity or Commuter Rail Passenger Transportation below, if applicable:

MBTA has a dedicated Project Team including a Project Director, M. Sekkat and a consultant services team, Jacobs Engineering and LTK Engineering.

9. Update on Interoperability Progress and Other Formal Agreements

Required content:

- For host railroads: provide updates to any agreements and key milestones for all tenant operations
- For tenant railroads: provide updates to any agreements and key milestones for all operations over tracks hosted by another railroad

Host and Tenant Railroads: Please provide a general update on interoperability in the textbox below.

No updates at this time.

Host Railroads Only: For each tenant, please provide additional tenant information below.

Tenant Identification *(Please add rows for additional tenants as necessary)*	**Estimated Tenant Locomotive Fleet** *(if the tenant does not have a separate PTCIP on file)*	**Current Tenant Implementation Status** ***Choose one:***
Amtrak	Has its own PTCIP on file. PTC operation on NEC since 2000. Testing is ongoing for 220 MHz radio network.	○ Not Started ○ Installing ⦿ Testing ⦿ Operational/Complete
CSX	Has its own PTCIP on file. PTC operation on NEC has been in place since 2000.	○ Not Started ○ Installing ○ Testing ⦿ Operational/Complete

Tenant Identification *(Please add rows for additional tenants as necessary)*	**Estimated Tenant Locomotive Fleet** *(if the tenant does not have a separate PTCIP on file)*	**Current Tenant Implementation Status** ***Choose one:***
Pan Am	Has its own PTCIP on file.	⦿ Not Started ○ Installing ○ Testing ○ Operational/Complete
Mass Coastal	Part of MBTA PTCIP	⦿ Not Started ○ Installing ○ Testing ○ Operational/Complete

Note: To add additional rows, click on the blue "+" symbol at the bottom right-hand corner. Please be sure to first click anywhere inside the table to activate this function.

If this function is unavailable for your document, please manually add additional rows.

10. Estimated PTC Safety Plan (PTCSP) Submission Date (if not already submitted)

If this section is not applicable to your railroad, please mark N/A.

PTCSP Submission Date
Q1 2018 for South Side Q1 2020 for North Side

Please provide any additional narrative for PTCSP Submission below:

MBTA plans to submit a PTCSP for the South Side to correspond with South Side PTC Implementation.

MBTA will file a separate PTCIP for the North Side to correspond with the North Side PTC Implementation.

11. Testing and Integration Efforts (if applicable, laboratory, integration, and revenue service demonstration)

Please provide Update on Testing and Integration efforts below:

No new information to report.

12. Updated Information That FRA Can Use to Maintain Its Geographic Information System (GIS) Database – Segments Complete and Operable

In its annual progress reports, a subject railroad or entity may submit a geographic information system (GIS) shapefile to indicate where various rail segments that must have PTC are located, as long as it includes the following fields: (1) a PTC attribute field (coded with "Y" if line segment is to have PTC installed, otherwise left blank); (2) a SUBDIV attribute field (populated with subdivision name); (3) a MONTH attribute field (populated with the month in which PTC is to be installed); and (4) a YEAR attribute field (populated with the year in which PTC is to be installed). A railroad may submit this information by means other than shapefile format.

Please provide any additional narrative for GIS Information below:

No new information to report.