



OFFICE *of* INSPECTOR GENERAL
NATIONAL RAILROAD PASSENGER CORPORATION

SAFETY AND SECURITY:

Amtrak Expects Positive Train Control will be Interoperable with Other Railroads but Could Better Measure System Reliability

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Memorandum

To: Scot Naparstek
Executive Vice President/Chief Operations Officer

From: Jim Morrison 
Assistant Inspector General, Audits

Date: December 11, 2020

Subject: *Safety and Security: Amtrak Expects Positive Train Control Will Be Interoperable with Other Railroads But Could Better Measure System Reliability (OIG-A-2021-004)*

Positive Train Control (PTC) is Amtrak's (the company) key safety system for preventing train accidents, such as the May 2015 derailment in Philadelphia that killed 8 on board and injured 185.¹ In August 2020, the company reported that it completed PTC installation on the tracks it owns or controls prior to the federally mandated deadline of December 31, 2020.² The company has invested hundreds of millions of dollars to install and operate its three systems for automatically slowing or stopping trains,³ including about \$370 million from fiscal year (FY) 2008 through FY 2020. To meet federal requirements, these systems must also be able to communicate with the systems of "host" railroads when it uses their tracks and "tenant" railroads that use the company's tracks. This is known as "interoperability."

Given this investment and the safety significance of these efforts, our audit objective was to assess the extent to which the company's systems are interoperable with its hosts

¹ The National Transportation Safety Board determined that a fully implemented PTC system would have prevented the derailment. The company's PTC did not yet cover the accident area.

² The Positive Train Control Enforcement and Implementation Act of 2015, Pub. L. No. 114-73, § 1302, 129 Stat. 568 (codified at 49 U.S.C. 20157) extended the statutory deadline for implementing PTC from December 31, 2015, to December 31, 2018, which was established by the Rail Safety Improvement Act of 2008 (Pub. L. No. 110-432, Div. A, 122 Stat. 4848). The law also authorized the Secretary of Transportation to provide further extensions on a case-by-case basis. Accordingly, the Federal Railroad Administration extended the deadline for certain railroads, including the company, to December 31, 2020.

³ The company uses three different PTC systems—one on the Northeast Corridor, one on the Michigan Service, and one on most of the company's remaining network. For more information on the company's three systems, see the Background section of this report.

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and tenants, and the company is ensuring that its systems are on and continuously operating.

To address our objective, we assessed the status of the company's interoperability through November 30, 2020. We interviewed officials from the Federal Railroad Administration (FRA), the Association of American Railroads, and five railroads that had not yet achieved interoperability⁴ when we initiated this audit. We also reviewed internal and external documents to identify interoperability risks. In addition, we reviewed company reports of reliability data to assess the completeness of these reports and determine how the company uses the data to measure system performance.⁵ We did not assess whether the systems slow or stop trains as intended;⁶ rather, we evaluated how the company measures whether systems are on and operating continuously throughout a train's route—known as "system reliability." We also interviewed the officials responsible for PTC from four other railroads⁷ to identify their practices for collecting and using system data for any potential applicability to the company. For more information on our scope and methodology, see Appendix A.

SUMMARY OF RESULTS

The company is on track to be interoperable with its host and tenant railroads by the deadline, in part because of effective program management. As of November 30, 2020, New Jersey Transit, a commuter railroad that is a tenant to Amtrak, was not yet interoperable.⁸ The company and FRA were working with the transit organization to complete the remaining activities needed to achieve interoperability when the tenant's trains are traveling on the company's tracks.⁹

⁴ The five railroads were Long Island Rail Road, Metra, Metro-North, New Jersey Transit, and New Mexico Rail Runner Express.

⁵ We selected data from February 2020 for review because it was the last month of normal train frequency before the coronavirus pandemic significantly reduced the company's operations.

⁶ FRA certifies that PTC systems are operating as designed as part of the system certification process.

⁷ The four railroads were BNSF Railway, Massachusetts Bay Transit Authority, Metrolink, and Union Pacific Corporation. External officials identified these railroads as effective users of PTC.

⁸ Program officials told us that Pan Am Railways—a Class II freight railroad that operates on Amtrak tracks between New Haven, Connecticut, and Springfield, Massachusetts—was expected to become interoperable by the deadline. During our review, neither FRA nor the company considered Pan Am Railways as "at risk" of not meeting the deadline.

⁹ New Jersey Transit may not have a fully implemented PTC system on its own tracks; however, this transit organization is not a host to Amtrak.

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The company, however, cannot fully measure system reliability because it has not implemented electronic tools to allow it to easily access data on whether the systems are on and operating continuously. Instead, it must manually compile these data; as a result, its reports on system reliability are incomplete. This makes it difficult for the company to identify trends in system operations that may need attention. Program officials said they have not fully researched options for electronic tools with the company's Information Technology department, in part because of funding constraints. The company considers PTC its top safety program, however, and it may not realize the full benefits of its investment without also investing in the tools it needs to monitor and improve system performance.

The company also faces the following risks that may diminish the safety benefits PTC is intended to provide:

- The systems sometimes do not initialize prior to departure, or they disengage en route, and the company has not consistently implemented the more stringent practices FRA will begin enforcing in January 2022 to mitigate risks when such incidents occur. These practices include not departing if the system did not initialize or requiring slower speeds. Program officials pointed out that when such incidents occur, trains must still abide by traditional measures to ensure safe operations, such as obeying signaling systems and rules that guide engineers. Other railroads we reviewed, however, told us they incorporated additional measures to further reduce risks, but the company has not yet assessed whether it needs to take such measures in the interim.
- The systems require accurate data on when to enforce temporary speed restrictions or prohibit trains from entering work zone locations, but dispatchers¹⁰ must manually enter these data into the systems. The company takes steps to help ensure that the data dispatchers enter are accurate, but there is still a risk of human error.

Program officials told us the company plans to assess the significance of both risks to determine the need for additional mitigation.

To help maximize the safety benefits of PTC, we recommend that the Chief Operations Officer, in coordination with the Chief Safety Officer and the company's Information

¹⁰ On the Northeast Corridor, the company has three offices with employees—called dispatchers—who authorize train movements. These offices are in Delaware, New York, and Massachusetts.

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Technology department, research tools to access system performance data and submit the preferred options for funding consideration. In addition, we recommend that they determine what, if any, additional mitigations are needed when PTC does not operate as intended, and initiate their plan to assess the risk of incorrect data entry.

In commenting on a draft of this report, the Executive Vice President/Chief Operations Officer agreed with our recommendations and identified specific actions the company plans to complete by December 31, 2021, to implement them. These include researching options for electronic tools and submitting them for funding consideration, evaluating whether the company should implement additional mitigating actions when PTC does not operate as intended, and performing a risk assessment regarding the potential for data entry errors by dispatchers. For management's complete response, see Appendix B.

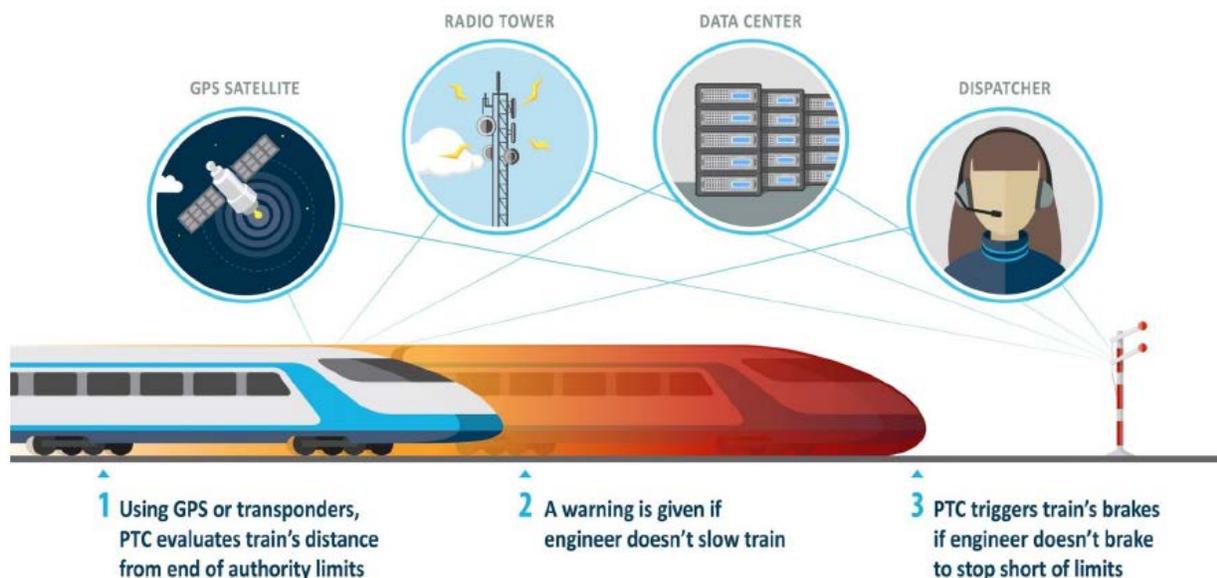
BACKGROUND

The company has identified PTC as its top safety program. This technology automatically applies brakes to slow or stop a train to prevent collisions, derailments caused by speeding, trains from entering zones where employees are working, and trains from entering a wrong track. The systems are composed of several components installed along tracks and onboard locomotives. Transponders embedded in the tracks or a Global Positioning System (GPS) transmit the direction and location of the train through a communications system (including radio towers and data centers) to railroad dispatchers. The systems then transmit safety data, such as temporary speed restrictions and work zone locations, to ensure that onboard systems can slow or stop trains before they reach the authority limits¹¹ if a locomotive engineer fails to do so. Figure 1 provides an overview of how PTC works.

¹¹ Authority limits are the specific locations where a train must slow or stop.

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Figure 1. How PTC Slows or Stops a Train



Source: Amtrak

Since 2000, the company has implemented three types of PTC systems:¹²

- **Advanced Civil Speed Enforcement System (ACSES).** This system uses track-embedded transponders to communicate the location, direction, and speed restrictions for a moving train. The company has implemented this system on the Northeast Corridor (NEC) and connecting rail corridors it owns. It has operated ACSES on parts of the NEC since 2000.
- **Incremental Train Control System (ITCS).** This system uses servers located along the tracks to communicate restrictions for a moving train. The company has operated ITCS in Michigan since 2000.
- **Interoperable Electronic Train Management System (I-ETMS).** This system relies on GPS technology. Several large freight railroads developed it five years ago, and the company has been implementing it on most of its remaining network since 2018.

¹² Most railroads install one type of PTC system on the rail lines they own or operate. Conversely, FRA provided funding for the company to develop two of its systems before Congress required PTC in 2008 to explore different PTC technologies—one for high-speed operations and one for lower-speed operations. In 2018, the company implemented a third system to enable operations on freight railroads' tracks.

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When other railroads operate on company-owned tracks, their locomotives need to be able to communicate with and respond to the applicable system that the company installed. Likewise, when the company operates on other railroads' tracks, its locomotives need to communicate with the hosts' systems.

FRA is responsible for overseeing railroads' implementation of PTC and can impose civil penalties when a railroad fails to meet certain requirements. Railroads must complete various steps that include testing to verify that each system component is functioning safely as designed, demonstrating in a test environment that the system can operate under normal operations, and submitting a safety plan to FRA for system certification. Interoperability is typically the last step that railroads complete to achieve full system implementation.

In addition, FRA requires railroads to report quarterly on "reliability incidents," which include the number of times that the following happened:

- Systems did not initialize at the beginning of a route.
- Systems disengaged while en route.
- Train engineers intentionally disengaged the systems.
- Systems experienced hardware or software malfunctions.

FRA uses these reports to track each system's performance.

This is our fourth report on the company's progress implementing PTC. We issued reports on the company's planning, installation, and progress toward achieving full implementation in 2016, 2015, and 2012.¹³ We noted challenges, including program management concerns, and recommended that the company identify a senior accountable official to be responsible for implementing the program. In response, the company assigned its Chief Operations Officer as this accountable official.

Three departments under the Chief Operations Officer—the Engineering, Mechanical,

¹³ *Safety and Security: Progress Made Implementing Positive Train Control, but Additional Actions Needed to Ensure Timely Completion of Remaining Tasks* (OIG-A-2017-001), October 6, 2016; *Safety and Security: Progress Made in Implementing Positive Train Control, but Significant Challenges Remain* (OIG-A-2015-013), June 19, 2015; and *Railroad Safety: Amtrak Has Made Progress in Implementing Positive Train Control, but Significant Challenges Remain* (OIG-E-2013-003), December 20, 2012.

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and Transportation departments—also have roles, including installing PTC hardware and reporting to FRA whether systems are operating reliably.

In 2018, the company also established a Chief Safety Officer to oversee the company's safety efforts, including certain aspects of the company's PTC program. Under this executive, the Safety, Health and Environment department is responsible for implementing the company's Safety Management System, which encompasses PTC, and for tracking data on how often the systems are enforcing safety measures such as speed restrictions.

FINAL PLANS ARE UNDERWAY TO ACHIEVE INTEROPERABILITY

As of November 30, 2020, the company was not yet interoperable with New Jersey Transit, which FRA had previously identified as being at risk of not meeting the deadline. A program official told us the company was on track to complete the remaining actions necessary for interoperability before the December 31, 2020 deadline.

The company had been working with New Jersey Transit to test its locomotives on the company's tracks. Both railroads were also working closely with FRA to ensure that the locomotives can receive critical PTC information before crossing onto the company's tracks, and on November 17, 2020, they submitted a plan¹⁴ to FRA to address this. The plan includes imposing temporary speed restrictions on each side of the boundary between the New Jersey Transit's tracks and the company's tracks to help ensure safe operations. New Jersey Transit's continued operation on the company's tracks beyond the deadline depends on FRA's approval of this plan, which company program and FRA officials told us is very likely.¹⁵ If FRA does not approve the plan, however, company executives told us they are prepared to take other measures, including not allowing New Jersey Transit to operate on its tracks, in order to ensure that the company is compliant by the deadline.

Meanwhile, the company was also addressing key remaining tasks on the NEC, including (1) upgrading its wireless communication to share security updates with host and tenant railroads and (2) implementing PTC software upgrades on its locomotives.

¹⁴ Similarly, the company previously submitted a plan for boundary issues with Long Island Rail Road, which FRA approved on October 6, 2020.

¹⁵ FRA has not certified New Jersey Transit's PTC system for its own tracks. FRA officials told us, however, that they would consider the company compliant as long as New Jersey Transit (as tenant) and the company achieve interoperability on the company's tracks.

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Company officials said that, for the wireless security upgrades, they planned to conduct additional testing in December to ensure interoperability with its hosts and tenants. For the software upgrades, the company had completed testing and, as of November 30, 2020, was in the process of installing the software on its locomotives. Program officials said the systems would ensure that train operations are safe while the company completes these upgrades. Additionally, the company submitted its I-ETMS safety plan to FRA in June, and FRA officials told us they expect to approve it before the deadline.

GOOD PROGRAM MANAGEMENT PRACTICES ADVANCED IMPLEMENTATION

In 2018, the Chief Operations Officer appointed a deputy chief engineer and an assistant vice president to be accountable for the PTC program. With additional executive oversight from the Chief Safety Officer, they formed a dedicated cross-departmental team to focus on system implementation and interoperability with other railroads. This team established the following program management practices that have helped it advance these efforts before the deadline:

- established a program charter to define roles and responsibilities
- established schedules and workplans for critical tasks to meet the deadline
- coordinated and led regular meetings with its host and tenant railroads and FRA to discuss challenges and share lessons learned
- used dashboard reporting to track progress toward implementation and interoperability, including challenges and testing schedules
- regularly reported the status of efforts and areas of concern to company leadership and external stakeholders

Officials from other railroads, as well as FRA officials, told us the meetings and project management practices the company's team established were valuable for communicating and coordinating progress. These officials said they will look to the company to help ensure that host and tenant railroads remain interoperable as software upgrades continue. Company executives also told us the project team has started planning how it will restructure the program management responsibilities to ensure effective operations going forward. This is consistent with the industry's overall focus, which FRA officials also told us is now shifting from implementation to ensuring that systems are reliable and deliver safety benefits as intended.

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COMPANY DOES NOT HAVE TOOLS TO ACCESS PTC DATA TO MORE FULLY MEASURE SYSTEM RELIABILITY

The company's PTC data are difficult to access because they are generated by three different systems and physically located in different places—on individual locomotives, on storage devices along tracks, and on a vendor's server, as Figure 2 shows.

Figure 2. Locations of PTC Data

	ACSES	ITCS	I-ETMS
Region deployed	NEC	Michigan	Rest of country
Where PTC data are stored	on individual locomotives 	on storage devices along the tracks 	on vendor's server 
Age of system ^a	20 years old	20 years old	5 years old

Source: OIG analysis of Amtrak data

Note: ^aThe company implemented ACSES and ITCS in 2000 with the primary objective of slowing or stopping trains remotely; therefore, these systems did not include data collection and reporting capabilities. The freight railroads that designed I-ETMS included data collection and reporting capabilities as key requirements.

To assess PTC performance, employees manually compile data from sources other than the three systems, including the following:

- manual reports that dispatchers compile from information that engineers self-report and verbally share on reliability incidents¹⁶
- emails to the company from host railroads identifying instances when the hosts' systems applied brakes to slow or stop one of the company's trains

This manual process is inefficient and prone to errors. For example, company staff reviewed documents from dispatchers for February 2020 and identified 18 reliability incidents for trains on the NEC. We reviewed the same source documents, however, and found at least twice as many. We also identified additional incidents that

¹⁶ Assessing the extent to which engineers self-report reliability incidents was outside the scope of our review.

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dispatchers did not include in their reports when we reviewed other documents that the company's train engineers, conductors, and mechanical employees prepared, such as reports on train delays and system malfunctions. Company officials told us it would be time-consuming and impractical to manually review multiple sources to assess system reliability with the limited staff available to support this work.

As a result, neither the company nor FRA has complete reports to assess the reliability of the company's systems. The company's top priority is operating safely, but incomplete reports hamper its ability to identify incidents and trends that may require prompt or long-term attention. In addition, not addressing reliability problems could result in trains operating without PTC and the safety benefits it provides. Without a more efficient, automated way to access system data and accurately count incidents, however, this problem will persist.

The four railroads we benchmarked implemented systems that the company uses, and each had electronic capabilities to easily collect and directly access data that helped them assess and improve their systems' reliability. This included the ability to easily identify the percentage of miles that trains travelled with PTC operating—a key metric for monitoring the coverage the systems provide and ensuring improved reliability over time.¹⁷

Program officials acknowledged the need for electronic tools but told us they have not worked with the Information Technology department to fully research options for each system because they have been focused on implementation before the deadline. They also noted that the company has significant funding constraints as a result of the pandemic. We recognize these constraints, but we also recognize that the company has already spent hundreds of millions of dollars on PTC. The company may not realize the full benefits of this investment unless it also invests in the electronic tools needed to measure system performance.

COMPANY IS ASSESSING THE NEED FOR MITIGATING ACTIONS WHEN PTC IS NOT OPERATING AS INTENDED

When PTC does not initialize or operate continuously on a train's route, trains must still abide by traditional practices to ensure that operations are safe, such as obeying

¹⁷ Incomplete data also limits the company's ability to identify training needs for engineers who were supposed to slow or stop their trains and did not, requiring the systems to do it for them.

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signaling systems and rules that guide engineers. On January 1, 2022,¹⁸ however, FRA will require railroads to restrict their practices to (1) no longer permit trains to depart their initial stations or points of crew change if PTC does not initialize, and (2) require engineers to operate at slower speeds if the system disengages or is disengaged en route. The company has not opted to implement these requirements before this deadline, but it is assessing the extent to which it faces safety risks that it should mitigate in the interim, which would be consistent with actions that other railroads are taking to further reinforce safety.

For example, if the newer I-ETMS system that the company operates off the NEC does not initialize prior to departure, the company permits dispatchers to decide whether the train can still depart if addressing the failure will cause more than a 10-minute delay. In February 2020—the last full month of operations before reducing service in response to the pandemic—the company allowed trains on I-ETMS routes to run without the system initialized 37 times (less than one percent of train activity on these routes). Three of the four companies we benchmarked, however, told us they took additional actions, including not permitting this practice, replacing the locomotive when the system does not initialize,¹⁹ and requiring senior leadership to approve a dispatcher’s decision to depart without initialization. During our review, the Chief Safety Officer and Chief Operations Officer agreed that a more detailed assessment could help identify whether additional actions are needed and told us that a review is underway to assess the company’s processes when PTC does not operate as intended.

COMPANY PLANS TO ASSESS THE NEED TO MITIGATE RISKS OF POSSIBLE DATA ENTRY ERRORS

The company relies on dispatchers to manually enter any changes to the data they want PTC to enforce, such as temporary speed restrictions and the location of work zones where track access must be prohibited. Engineering department supervisors who oversee track work orally communicate these changes by either radio or telephone to dispatchers who manually enter them into the systems that control the trains. Such manual data sharing and entry pose the risk of human error and, therefore, the risk that

¹⁸ FRA is providing a one-year grace period after the implementation deadline for railroads to improve the reliability of their systems before it enforces more stringent operating practices if PTC systems fail.

¹⁹ If the other two systems the company has been operating longer fail to initialize, the company either replaces the locomotive or annuls the trip.

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systems are operating without the correct data to prevent potentially catastrophic accidents, such as incursions into work zones.

Company officials told us that to reduce the risk of data entry errors, they have implemented additional controls, such as requiring dispatchers to repeat the requested changes back to the track foremen before entering them into the systems. They also require placement of a shunting device on the track, which communicates to the PTC systems and the dispatcher that a section of track is occupied. They acknowledged, however, that errors are still possible and told us they intend to assess the level of risk this situation poses and if it warrants mitigation. They told us that they will do this as part of their company-wide assessment of opportunities to mitigate the risk of human errors, which is scheduled for 2022.

CONCLUSIONS

Over the past two years, the company has made significant progress advancing PTC—an example of what the company can accomplish when it establishes active program management and executive oversight to administer a key program. Now that the company has started planning how it will operate these systems as implementation efforts near completion, the company can take additional actions to maximize PTC operations to protect passengers, employees, and assets. These include identifying tools to more fully measure how reliably the systems are working and ensuring that it understands and mitigates as needed the risks to system operations.

RECOMMENDATIONS

To ensure that PTC is operating reliably, we recommend that the Chief Operations Officer—in coordination with the Chief Safety Officer—take the following actions:

1. Work with the company's Information Technology department to research electronic tools to access and report on PTC data and submit preferred options for funding consideration.
2. In the short-term, determine what, if any, additional mitigations the company should implement when PTC does not operate as intended.
3. Document and initiate its plan to assess the risk of incorrect data entry related to PTC.

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MANAGEMENT COMMENTS AND OIG ANALYSIS

In commenting on a draft of this report, the Executive Vice President/Chief Operations Officer agreed with our recommendations and identified specific actions the company plans to implement them, which we summarize below.

- **Recommendation 1:** Management agreed with our recommendation to work with the company's Information Technology department to research electronic tools to access and report on PTC data and submit preferred options for funding consideration. The target completion date is June 30, 2021.
- **Recommendation 2:** Management agreed with our recommendation to, in the short-term, determine what, if any, additional mitigations the company should implement when PTC does not operate as intended. The target completion date is February 15, 2021.
- **Recommendation 3:** Management agreed with our recommendation to document and initiate its plan to assess the risk of incorrect data entry related to PTC. The target completion date is December 31, 2021.

For management's complete response, see Appendix B. Management also provided technical comments that we have incorporated in this report as appropriate.

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APPENDIX A

Objective, Scope, and Methodology

This report provides the results of our audit of the company's PTC program. Our objective was to assess the extent to which the company's systems are interoperable with its hosts and tenants, and the company is ensuring that its systems are on and continuously operating. Our scope included reviewing implementation plans, schedules, safety controls, and operational processes in place as of November 30, 2020. We performed our audit work from April 2020 through November 2020.

To assess the company's interoperability efforts, we completed the following actions to identify the progress the company has made and the challenges that remain in meeting the December 31, 2020 deadline:

- interviewed senior company executives and program officials
- interviewed external officials from FRA, the Association of American Railroads, and the Government Accountability Office, which also tracks the industry's PTC efforts
- reviewed company documents, including implementation plans, quarterly reports to FRA, and monthly status reports
- interviewed officials from five commuter railroads—Long Island Rail Road, New Jersey Transit, Metra, New Mexico Rail Runner Express, and Metro-North—that, as of July 2020, company and railroad industry officials had identified as at risk of not achieving interoperability with the company by the deadline

For the interviews of these five railroads, we developed interview questions and a questionnaire to obtain their insights on interoperability challenges, steps needed to address them, projected milestone dates, and coordination with the company.

To assess company efforts to ensure that its systems are on and operating continuously, we completed the following actions:

- interviewed senior company executives and program officials

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- reviewed company documents, including policies and procedures; reports from dispatchers that noted reliability incidents; and reports on train delays and system malfunctions that the company's train engineers, conductors, and mechanical employees prepared
- reviewed company reports of PTC reliability data from February 2020—the last month before the coronavirus pandemic significantly reduced the company's train operations—to determine how complete they were and how the company uses them to measure system reliability
- compared company practices to its internal goals and external requirements for reliability reporting
- interviewed officials from four railroads that external officials identified as effective users of PTC—BNSF Railway, Massachusetts Bay Transit Authority, Metrolink, and Union Pacific Corporation—to identify practices for operating and measuring system performance to benchmark to company practices

For these benchmarking interviews, we developed interview questions and a questionnaire to obtain insights on topics such as how well PTC is operating, ongoing challenges, data collection efforts, and performance metrics. We analyzed the results of these interviews to determine key practices for operating and measuring system performance, which we identify as opportunities for improvement in this report.

During our work to assess how the company uses PTC data, we identified operating risks, which we noted in our report. Our work was limited to those risks. We did not conduct a full risk assessment of PTC operations, assess the company's operating rules in the event of all PTC failures, or assess whether the systems enforce the rules they are intended to enforce.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provided a reasonable basis for our findings and conclusions based on our audit objective.

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Internal Controls

We reviewed the internal controls the company had in place for achieving interoperability by the deadline and using data to ensure that PTC is operating reliably. Specifically, we assessed the internal control components and underlying principles and determined that all five of the internal control areas were significant to our audit objective:

- **Control environment.** Management should establish an organizational structure, reporting lines, and appropriate authorities and responsibilities in the pursuit of objectives.
- **Risk assessment.** Management should assess and respond to the risks facing the company as it seeks to achieve its objectives.
- **Control activities.** Management should develop and implement activities through policies and procedures to ensure that the company achieves its objectives.
- **Information and communication.** Management should provide quality information to achieve the entity's objectives.
- **Monitoring.** Management should assess the quality of performance over time and address identified issues.

We developed audit work to ensure that we reviewed each of these control areas, including assessing the following:

- program management controls for establishing clear roles and responsibilities and developing detailed plans to meet the deadline
- risk assessments and mitigation plans related to interoperability
- policies and procedures to guide PTC use and operations
- the quality and completeness of PTC data and controls regarding the company's use of PTC information systems to achieve safety objectives
- company efforts to use data to monitor the implementation and operations of PTC

Because our review was limited to these internal control components and underlying principles, it may not have disclosed all the internal control deficiencies that may have existed at the time of this audit.

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Computer-Processed Data

To determine the completeness of company reports of PTC reliability data, we obtained computer-processed data for February 2020 from two company information systems:

- the On-Time Performance system, in which conductors record the reasons for train delays in text fields
- the Work Management System, in which Mechanical department employees create incident reports with text descriptions of PTC problems that train engineers encounter

We reviewed the text fields and characterized the various types of reported PTC incidents. We discussed the raw data with program officials to ensure that we understood them and that they were reliable. We also validated our analysis with these officials to ensure that it was sound and reasonable, and we limited our reporting to these data. We determined that the analysis and underlying data were reliable for the purposes of our audit.

Prior Reports

In conducting our analysis, we reviewed and used information from the following reports:

Amtrak Office of Inspector General

- *Safety and Security: Progress Made Implementing Positive Train Control, but Additional Actions Needed to Ensure Timely Completion of Remaining Tasks* (OIG-A-2017-001), October 6, 2016
- *Safety and Security: Progress Made in Implementing Positive Train Control, but Significant Challenges Remain* (OIG-A-2015-013), June 19, 2015
- *Railroad Safety: Amtrak Has Made Progress in Implementing Positive Train Control, but Significant Challenges Remain* (OIG-E-2013-003), December 20, 2012

Government Accountability Office

- *Positive Train Control: Railroads Generally Made Progress, but Several Must Meet Compressed Schedules to Meet Implementation Date* (GAO-20-516R), April 30, 2020

Amtrak Office of Inspector General
**Safety and Security: Amtrak Expects Positive Train Control will be Interoperable with
 Other Railroads but Could Better Measure System Reliability**
 OIG-A-2021-004, December 11, 2020

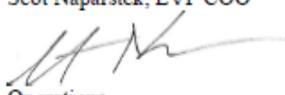
APPENDIX B

Management Comments

NATIONAL RAILROAD PASSENGER CORPORATION

Memo



Date	December 9, 2020	From	Scot Naparstek, EVP COO
To	Jim Morrison, Assistant Inspector General, Audits	Department	Operations
		cc	 William J. Flynn, President & CEO Eleanor Acheson, EVP General Counsel Stephen Gardner, Sr. EVP COCO Carol Hanna, VP Controller Roger Harris, EVP Marketing & Revenue Dennis Newman, EVP Strategy & Planning Steven Predmore, EVP CSO Mark Richards, Sr. Director Amtrak Risk & Controls Qiana Spain, EVP CHRO Tracie Winbigler, EVP CFO Christian Zacariassen, EVP CIO Justin Meko, VP Operations Safety Chris Jagodzinski, AVP Operations Judith Apshago, AVP IT Corp & Ops Tech

Subject Management Response to *SAFETY AND SECURITY: Amtrak Expects Positive Train Control Will Be Interoperable With Other Railroads But Could Better Measure System Reliability* (Draft Audit Report for Project No. 010-2020)

This memorandum provides Amtrak's response to the draft audit report titled, "*SAFETY AND SECURITY: Amtrak Expects Positive Train Control Will Be Interoperable With Other Railroads But Could Better Measure System Reliability*." Management appreciates the opportunity to respond to the OIG's recommendations. As indicated in our responses, we agree with each of the OIG recommendations and will initiate actions to address each in a timely manner.

To ensure that PTC is operating reliably, the OIG recommends that the Chief Operations Officer – in coordination with the Chief Safety Officer – take the following actions:

Recommendation 1:

Work with the company's Information Technology department to research electronic tools to access and report on PTC data and submit preferred options for funding consideration.

Management Response/Action Plan: The Operations, Safety, and IT Departments will continue to collaborate to define the appropriate PTC reporting solution for Amtrak. To accomplish this, the team will:

Amtrak Office of Inspector General
Safety and Security: Amtrak Expects Positive Train Control will be Interoperable with Other Railroads but Could Better Measure System Reliability
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NATIONAL RAILROAD PASSENGER CORPORATION

1. Define requirements and capabilities necessary to ensure accurate and timely performance reporting for Amtrak's PTC systems (IETMS, ACSES, and ITCS);
2. Identify viable solutions to meet reporting requirements; and
3. Review and evaluate the options and present findings to the appropriate Amtrak Leadership team for funding consideration as a part of the FY22 Annual Operating Plan.

Responsible Amtrak Official(s): Chris Jagodzinski, AVP Operations and Judith Apshago, AVP IT Corporate & Ops Technologies

Target Completion Date: June 30, 2021

Recommendation 2:

In the short-term, determine what, if any, additional mitigations the company should implement when PTC does not operate as intended.

Management Response/Action Plan: Amtrak will identify and evaluate potential mitigations. Appropriate mitigations will subsequently be implemented.

Responsible Amtrak Official(s): Justin Meko, Vice President Operations Safety; and Chris Jagodzinski, Assistant Vice President Operations

Target Completion Date: Mitigations will be identified and evaluated no later than (NLT) February 15, 2021. Approved mitigations will be implemented commencing NLT March 30, 2021 with appropriate time and attention given to the deployment of more complex mitigations.

Recommendation 3:

Document and initiate its plan to assess the risk of incorrect data entry related to PTC.

Management Response/Action Plan: Amtrak will perform a risk assessment evaluating the hazards attributed to single points of failure related to manual inputs into the computer aided dispatch system (CAD) associated with PTC enforcements.

Responsible Amtrak Official(s): Justin Meko, Vice President Operations Safety; and Chris Jagodzinski, Assistant Vice President Operations

Target Completion Date: Risk assessment will be completed NLT December 31, 2021

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APPENDIX C

Abbreviations

ACSES	Advanced Civil Speed Enforcement System
FRA	Federal Railroad Administration
FY	fiscal year
GPS	Global Positioning System
I-ETMS	Interoperable Electronic Train Management System
ITCS	Incremental Train Control System
NEC	Northeast Corridor
OIG	Amtrak Office of Inspector General
PTC	Positive Train Control
the company	Amtrak

Amtrak Office of Inspector General
***Safety and Security: Amtrak Expects Positive Train Control will be Interoperable with
Other Railroads but Could Better Measure System Reliability***
OIG-A-2021-004, December 11, 2020

APPENDIX D

OIG Team Members

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OIG MISSION AND CONTACT INFORMATION

Mission

The Amtrak OIG's mission is to provide independent, objective oversight of Amtrak's programs and operations through audits and investigations focused on recommending improvements to Amtrak's economy, efficiency, and effectiveness; preventing and detecting fraud, waste, and abuse; and providing Congress, Amtrak management, and Amtrak's Board of Directors with timely information about problems and deficiencies relating to Amtrak's programs and operations.

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or

800-468-5469

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