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IMPLEMENTATION OF POSITIVE TRAIN CONTROL

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED FIFTEENTH CONGRESS

SECOND SESSION

MARCH 1, 2018

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED FIFTEENTH CONGRESS

SECOND SESSION

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IMPLEMENTATION OF POSITIVE TRAIN CONTROL

THURSDAY, MARCH 1, 2018

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 10:18 a.m. in room SR–253, Russell Senate Office Building, Hon. John Thune, Chairman of the Committee, presiding.

Present: Senators Thune [presiding], Wicker, Blunt, Heller, Fischer, Gardner, Nelson, Cantwell, Klobuchar, Tester, Udall, Blumenthal, Baldwin, Markey, Peters, Hassan, and Cortez Masto.

OPENING STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM SOUTH DAKOTA

The CHAIRMAN. Good morning. We convene today's hearing at a critical time for positive train control, or PTC, implementation. The victims, families, and all those affected by the overspeed derailment of Amtrak 501 in Washington and the collision of Amtrak 91 in South Carolina remain in our thoughts and our prayers. These accidents underscore the importance of implementing PTC quickly, safely, and successfully.

And while tragic grade crossing collisions like the one involving Amtrak Special Train 923 are not generally prevented by PTC, reducing the number of such incidents remains another important priority.

We are now about 10 months away from the December 31, 2018, statutory deadline for PTC, and recent reports suggest many railroads will not fully implement this safety technology by the end of the year. More alarmingly, a new report from the GAO, which I requested and which will be presented today, finds 7 to 19 commuter railroads are at risk for not even qualifying for a limited extension to work out software, testing, and interoperability issues.

The Positive Train Control Enforcement Implementation Act passed by Congress and signed into law by President Obama in October 2015 extended the original deadline of December 31, 2015, amid reports that no railroad could meet the deadline, and many railroads were contemplating halting passenger rail service or shipments of essential supplies for agricultural production and water purification.

This Committee, on a bipartisan basis, took action to avert a rail shutdown and set a realistic framework for implementation. With this realistic framework in place, railroads should be able to get the job done.

The law requires railroads to implement PTC by December 31, 2018, and allows a railroad to apply for an extension of up to 24 months to ensure that PTC works as intended if, and only if, that railroad meets important milestones like full PTC hardware installation, spectrum acquisition, and employee training, and meets other milestones, such as implementing PTC on a specific territory or initiating revenue service demonstration. For Class 1 freight railroads and Amtrak, the bar is higher: PTC must be implemented or in revenue service demonstration on a majority of the required territories or route miles.

The law is clear: for each railroad, passenger or freight, all PTC hardware must be on board or in the ground by December 31, 2018. The law also required revised PTC implementation plans to include transparent annual metrics and provide a new authority for the FRA to enforce those plans.

To date, FRA has initiated cases against 14 railroads that failed to meet hardware installation milestones or adequately report progress in a timely manner. If railroads do not comply with the law by the year's end, I expect the FRA to take the enforcement action needed to bring railroads into compliance. Railroads should not count on any extensions to the statutory framework that Congress passed in 2015.

To be sure, PTC installation is an enormously complex undertaking. To implement PTC, railroads must develop, acquire, and install new hardware components and complex software systems that are able to communicate with other railroads.

There are different PTC systems, and each system has different configurations, and yet they all must work seamlessly across our Nation's interwoven rail network. There are a limited number of PTC hardware suppliers, and there are a limited number of individuals who have the technical expertise to program that hardware. Simply put, PTC is not an off-the-shelf technology, and a railroad can't simply flip a switch.

Understanding these challenges, the Federal Government has provided substantial funding and financing to support for implementation. A new report from the Department of Transportation Office of Inspector General, which I requested, which will be also released today, shows DOT has awarded nearly $3 billion in grant and loan assistance with $2.3 billion provided to date and another $600 million on the way. This includes much of the $199 million that this Committee worked to include in the FAST Act. For instance, this financial support includes a $960 million loan and a nearly $100 million grant to support the Metropolitan Transportation Authority, one of our witnesses today.

While not all financial assistance should come from the Federal Government with a significant amount of Federal support not yet expended, it is critical that grant and loan recipients deploy resources in a timely and efficient manner in advance of the deadline.

I want to conclude my remarks by emphasizing what is at stake here. Failing to comply with the law is not an option. If commuter railroads do not meet the requirements of the law, there is a real risk of halting or reducing service. If so, millions of people who depend on commuter rail to get to work each day or to visit a doctor

or see a family member could see their lives disrupted. Those entities that aren't on track need to look at successful examples and recommit their organizations to getting the job done.

I will now turn to Ranking Member Senator Nelson for any opening remarks he might have.

Senator Nelson.

STATEMENT OF HON. BILL NELSON,
U.S. SENATOR FROM FLORIDA

Senator NELSON. Thank you, Mr. Chairman.

And before I address the topic at hand, I want to wonder, what in the world is going on at the FRA? Because it was just reported yesterday allegations by *Politico* that the acting head safety regulator, Heath Hall, Heath Hall, of the Federal Railroad Administration, is in a huge conflict because, according to the report, throughout his tenure and even at the time of the Washington State railroad crash, the Acting Administrator was doing outside work as a public relations consultant. This was a violation of his ethics agreement, and it's very alarming for the safety of our railroads, particularly as the agency is tasked with the oversight of the positive train control implementation and its task with responding to these tragic series of crashes that we've had.

Now to the issue at hand, I certainly appreciate the Chairman for calling this hearing on positive train control. I wish I could say that this technology was in place and working so that we wouldn't have to keep having these deadly accidents, but it's not the case. Instead, we're here again after another tragic crash that has killed several people and injured dozens, which could have been prevented with positive train control technology.

In Washington State, an Amtrak train was speeding as it rounded into a curve, and it derailed onto the highway below, killing three people and injuring more than 60. The facts of the case are eerily similar to the 2015 crash in Philadelphia, where a speeding Amtrak derailed while traveling into a curve, killing eight and injuring hundreds. And just last month, an Amtrak train traveling in Florida was in a head-on collision with a CSX freight train. The engineer and the train conductor from Florida were killed in the collision, and more than 100 people were injured.

So these tragedies can be prevented, they should be prevented, and that's why the industry must do a better job of implementing positive train control and get it done quickly, and that's why the U.S. Government ought to crack down. We've heard for far too long from some in the industry that implementing positive train control is a complex and expensive process and that railroads have faced a series of challenges. We've heard this over and over and over. But more and more these arguments are becoming tiresome, especially in light of the fact that the railroads have had 10 years to get this done.

Now, I know that railroads have had to overcome challenges, but railroads like BNSF, SETPA commuter rail, and others have made significant progress toward implementation, and they should be applauded. But some railroads are way behind the curve, and, shockingly, according to the DOT, a few have made zero progress,

and, unfortunately, that includes many railroads in my state. Now, that's just simply unacceptable.

In 2015, none of the railroads were near completion. So the railroads, the commuter rails, the states, the countless others, requested an extension of positive train control, as did the administration at the time in 2015. So reluctantly, we, sitting at this dais, discussed it, we granted additional time, but demanded real action, including completion of equipping the locomotives and the tracks, significant testing and evidence that their systems work, and new penalties for the Department to ensure that the railroads are meeting their deadlines.

We provided $200 million in grant funding in addition to the more than $2 billion in Federal support that had previously been provided, and the effort was suppose to ensure that PTC was going to be done this year. We heard repeatedly that given a limited amount of time, railroads would be able to get the PTC in place, yet here we go again, just what the Chairman has said. And now it's become crystal clear that many of the railroads simply have not lived up to their agreement.

And so I'm very—well, let me just say it this way, I'm not inclined to give any more additional time because, do we want more crashes that PTC could avoid? So it means that railroads need to make sure that they're doing everything possible to meet the 2018 deadline. States and the Department of Transportation have got to come together to ensure all available resources are being directed to this task. And, finally, the Department must use its authority to hold railroads' feet to the fire.

Madam Secretary, the Department of Transportation ought to be cracking down. We have a responsibility to the traveling public to learn from these tragic crashes. We've got a responsibility to make sure that there is safety on the lines.

Thank you, Mr. Chairman.

[The prepared statement of Senator Nelson follows:]

PREPARED STATEMENT OF HON. BILL NELSON, U.S. SENATOR FROM FLORIDA

I want to thank Chairman Thune for calling today's hearing on positive train control.

We have met several times on this topic previously.

I wish I could say that this technology was in place and working, so that we wouldn't have to keep having these deadly accidents.

Unfortunately, that is not the case.

Instead, we are here again after another tragic crash that killed several people and injured dozens, and which could have been prevented with positive train control technology.

In Washington State, an Amtrak train was speeding as it rounded into a curve and derailed onto the highway below, killing three people and injuring more than sixty.

The facts of this case are eerily similar to the 2015 crash in Philadelphia, where a speeding Amtrak train derailed while traveling into a curve, killing eight and injuring hundreds.

Just last month, an Amtrak train traveling to Florida was in a head-on collision with a CSX freight train.

The engineer and a train conductor from Florida were killed in this collision and more than a hundred people were injured.

These tragedies can be prevented.

And they should be prevented.

That's why the industry as a whole must do a better job of implementing positive train control and get it done quickly.

We've heard for far too long from some in the industry that implementing positive train control is a complex and expensive process and that railroads have faced serious challenges during implementation.

But more and more these arguments are becoming tiresome, especially in light of the fact that the railroads have had ten years already to get this done.

I also know that many railroads have overcome these challenges.

Railroads like BNSF, Septa commuter rail, and others have made significant progress toward implementation and I applaud them for their work.

But some railroads are way behind the curve and, shockingly, according to the Department of Transportation, a few have made almost zero progress.

This includes railroads in my state of Florida.

This is unacceptable.

In many instances, it feels like déjà vu.

In 2015, none of the railroads were near completion.

The railroads, commuter rails, states, and countless others, including the Obama administration, requested an extension of the positive train control deadline.

Reluctantly, Congress granted additional time, but demanded real action from the railroads, including:

- Completion of equipping the locomotives and tracks
- Significant testing and evidence that their systems work, and
- New penalties for the department to ensure that railroads are meeting their deadlines.

We also provided nearly 200 million dollars in grant funding, in addition to the more than two billion dollars in Federal support that had previously been provided.

That effort was supposed to ensure that PTC would be quickly implemented.

We heard repeatedly that, given a limited amount of time, railroads would be able to get positive train control in place.

Yet, here we are again.

And it's now become crystal clear that many railroads have not lived up to their end of the bargain.

That's why I'm not inclined to give anyone additional time.

We simply must get this done.

That means railroads need to make sure that they are doing everything possible to meet the 2018 deadline.

States and the Department of Transportation must come together to ensure that all available resources are being directed to this task.

And finally, the department must use its authority to hold railroads' feet to the fire.

We have a responsibility to the traveling public to learn from these tragic crashes and to improve safety on our rail lines.

I look forward to hearing from our witnesses today on how we can meet that challenge.

The CHAIRMAN. Thank you, Senator Nelson.

I want to welcome our panel of witnesses this morning and thank them for their testimony in advance, and ask them to give their opening statements.

We first have Ms. Susan Fleming, who is the Director of Physical Infrastructure Issues at the Government Accountability Office; Mr. Barry DeWeese, who is Assistant Inspector General, Department of Transportation Office of the Inspector General; Mr. David L. Mayer, who is the Chief Safety Officer for Metropolitan Transportation Authority; and Mr. Richard Anderson, who is President and CEO of Amtrak.

We'll start on my left, and your right, with Ms. Fleming. And I would ask, if you can, to confine your oral remarks as close to 5 minutes as possible. We'll make sure that your entire statement is included in the record, and that will maximize the opportunity for members to ask questions.

Ms. Fleming, welcome, and please proceed.

STATEMENT OF SUSAN FLEMING, DIRECTOR, PHYSICAL INFRASTRUCTURE, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. FLEMING. Thank you.

Mr. Chairman, Ranking Member Nelson, and members of the Committee, thank you for the opportunity to discuss commuter railroads' implementation of positive train control, or PTC, and FRA's oversight of that effort. Despite rail safety improvements in recent years, additional accidents, including multiple fatal accidents in the past 3 months, show that more needs to be done.

PTC is not designed to and cannot prevent all rail accidents. Nonetheless, successful implementation of PTC holds significant promise in helping avoid certain types of accidents, such as potentially catastrophic train-to-train collisions or high-speed derailments. However, our broader five-year body of work on PTC has found that implementation is costly and complex, has been fraught with challenges, and progress has been slow.

While the implementation of PTC involves numerous stakeholders, my testimony today focuses on the 29 commuter railroads that transport approximately 500 million passengers each year, and FRA, which is charged with overseeing implementation.

Turning to commuter railroads' implementation progress, we found, based on third quarter 2017 data, that most of the railroads reported progress in initial implementation activities, such as installing equipment on trains alongside tracks, acquiring radio spectrum, and employee training. However, progress varied widely across individual railroads, in part, because of their varying size and unique set of circumstances. For example, equipping locomotives was one of the areas of greatest variance. Thirteen had completed equipment installation, while six had not yet started. The remaining eight fell somewhere in between.

Significant work also remains for the majority of commuter railroads to complete more technically complex and time-consuming implementation activities, such as field testing software and components, and revenue service demonstration, which tests trains operating PTC as part of regular operations. As of September, FRA had approved conditional certification for two railroads and was reviewing two other safety plans.

Digging deeper, to estimate how many commuter railroads may have insufficient time to meet the December deadline or to qualify for an RSD-based extension, we analyzed commuter railroad scheduled milestones for installing the back office server and conducting field testing, which must be completed before entering RSD. Based on railroads' experience to date, and FRA's estimate of the amount of time it can take to complete these steps, over half of commuter railroads may be at risk of not meeting the December deadline or qualifying for an RSD-based extension.

However, many factors could affect how many railroads are ultimately at risk. For example, some schedules may slip while others may benefit from applying lessons learned. FRA's resources and capacity will also affect how quickly it can review the increasing flow of submitted test plans, RSD applications, and safety plans.

Speaking of FRA, I now want to turn to its role in helping ensure PTC is successfully implemented. FRA has provided substantial information to individual and groups of commuter railroads as well

as highly praised individual assistance. However, we found two shortcomings with its approach. First, FRA has used a largely informal and often reactive communications approach. Second, many commuter railroads did not fully understand the agency's planned approach for reviewing and granting extensions or the criteria for applying for an extension. The statutory provision allowing for other alternative criteria approved by FRA instead of the RSD criteria generated the most questions.

For the long term, we found that although FRA collects individual railroads' progress information, it has not used this information to prioritize resources using a risk-based approach. This will be essential given the year-end deadline approaching and anticipated significant increase in workload and oversight responsibilities that will clearly stretch beyond 2020 and the yet to be tackled issue of interoperability.

In conclusion, there is no ignoring the fact that the clock is ticking. Ten months and considerable work remains to either complete implementation or apply for an extension. Even with sustained commitment from all 25 commuter railroads that have yet to file a safety plan, it is highly unlikely that all will meet the extension or implementation deadline. Therefore, it is critical that FRA implement our two recommendations: first, to systematically communicate deadline extension criteria information and its planned approach, including how it will handle railroads that do not meet the deadline or extension criteria; and, second, to use a risk-based approach to prioritize its recommendations and workload. FRA agreed with our recommendations.

Mr. Chairman, this concludes my statement, and I would be pleased to answer questions that you or other members of the Committee may have.

[The prepared statement of Ms. Fleming follows:]

PREPARED STATEMENT OF SUSAN FLEMING, DIRECTOR, PHYSICAL INFRASTRUCTURE, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

MANY COMMUTER RAILROADS STILL HAVE SIGNIFICANT ADDITIONAL IMPLEMENTATION WORK AND OPPORTUNITIES EXIST TO PROVIDE FEDERAL ASSISTANCE

What GAO Found

The Federal Railroad Administration (FRA) is responsible for overseeing railroads' (including commuter railroads') implementation of positive train control (PTC) by December 31, 2018. PTC is a communications-based train control system designed to prevent certain types of accidents and involves the installation, integration, and testing of hardware and software components. For example, railroads must install equipment on locomotives and along the track, and complete field testing, including revenue service demonstration (RSD)—an advanced form of testing that occurs while trains operate in regular service.

GAO's analysis of commuter railroads' PTC scheduled milestones for two key activities necessary to meet the 2018 deadline or qualify for an RSD-based extension (one of the statutory options) found that as many as two-thirds of the 29 commuter railroads may not have allocated sufficient time to complete these milestones. Specifically, in comparing the commuter railroads' schedules to FRA's estimates of the time required to complete these milestones and the experiences of railroads that have already completed them, GAO's analysis found that from 7 to 19 commuter railroads may not complete the milestones before the 2018 implementation deadline or qualify for an RSD-based extension. For example, FRA estimates that field testing (one of the milestones) takes at least one year, but GAO found that 14 commuter railroads plan to start this testing less than a year before the 2018 deadline, in-

creasing the potential risk that this milestone will not be completed. However, FRA has the authority to establish alternative criteria for an extension not based on RSD, and several other factors can affect commuter railroads' planned and future progress. As a result, the number of commuter railroads at risk of not meeting the deadline or qualifying for an extension could increase or decrease in the coming year.

FRA's PTC management and oversight includes monitoring commuter railroads' progress, reviewing documentation, and sharing information with them, but the agency has not systematically communicated information or used a risk-based approach to help these railroads prepare for the 2018 deadline or qualify for an extension. GAO found that FRA has primarily used informal assistance, meetings with individual railroads, and participation in industry-convened groups to share information with commuter railroads, and in some cases the information conveyed has been inconsistent according to industry representatives. Some commuter railroads also told GAO that clarification about the agency's planned process for reviewing and approving extension requests would be helpful. Federal internal control standards state that management should externally communicate the necessary quality information to achieve its objectives. While FRA officials have said they are working to identify additional ways to convey extension-related information, they have not yet done so. Moreover, although FRA receives information from commuter railroads on their progress in implementing PTC, it has not used this information to prioritize resources using a risk-based approach. With the year-end 2018 deadline approaching, and an anticipated significant increase in FRA's workload, targeting resources to the greatest risk can help better ensure that FRA effectively fulfills its oversight responsibilities and provides commuter railroads the information they need to prepare for the 2018 deadline or seek an extension.

Chairman Thune, Ranking Member Nelson, and Members of the Committee:

I am pleased to be here today to discuss our review of commuter railroads' implementation of positive train control (PTC).

In the wake of rail accidents such as the 2008 Los Angeles, California, collision between a commuter train and a freight train, resulting in 25 deaths and over 100 injuries, legislation was enacted requiring certain freight, intercity passenger, and commuter railroads [1] to implement PTC—a communications-based train control system designed to help control train movements, including braking—by December 31, 2015.[2] While the safety of the rail industry has improved in recent years, additional accidents, including the recent Amtrak derailment in Washington state in late 2017, have demonstrated the continued need for technological improvements that could help slow or stop a train to reduce the risk of certain types of accidents such as train-to-train collisions and derailments caused by exceeding safe speeds.[3] In total, 41 railroads, including 29 commuter railroads, are currently required to implement PTC. Commuter railroads provide approximately 490-million annual passenger trips over 8,440 miles of track. Their size varies significantly, from rail lines providing approximately one-million passenger trips a year to those providing over 80 million.

Our prior work on PTC implementation has found that it is a complex and lengthy process.[4] It requires the integration of various components—including communication systems, hardware on locomotives and along the side of the track, and software in centralized office locations as well as onboard the train and along the track. In order to implement PTC, railroads must design, produce, and install more than 20 major components that will ultimately communicate trains' locations, movements, and speed, and then slow or stop a train that is not being operated safely. Many of these components are new technologies being designed and developed for PTC, and railroads must integrate them with their existing systems. Full implementation of PTC involves a number of steps, including but not limited to: equipment

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[1] "Commuter rail passenger transportation" means short-haul rail passenger transportation in metropolitan and suburban areas usually having reduced fare, multiple-ride, and commuter tickets and morning and evening peak period operations. 49 U.S.C. § 24102(3).

[2] The Rail Safety Improvement Act of 2008, Pub. L. No. 110–432, div. A, 122 Stat. 4848 (2008).

[3] While the cause of the December 18, 2017, Amtrak derailment near DuPont, Washington, is currently under investigation, the National Transportation Safety Board's (NTSB) initial review indicated that speed may have been a factor. NTSB's preliminary report indicates the final recorded speed was 78 miles per hour, while the authorized speed heading into the curve where the derailment occurred was 30 mph.

[4] GAO, *Positive Train Control: Additional Oversight Needed As Most Railroads Do Not Expect to Meet 2015 Implementation Deadline,* GAO–15–739 (Washington, D.C., Sept. 4, 2015) and GAO, *Positive Train Control: Additional Authorities Could Benefit Implementation,* GAO–13–720 (Washington D.C., Aug. 16, 2013).

installation, testing, certification, and achieving interoperability. Interoperability will enable trains to move seamlessly across track owned by different railroads with potentially different PTC systems. U.S. railroads often operate their cars as "tenants" on the track of another railroad, known as the "host." The Federal Railroad Administration (FRA) is responsible for overseeing railroads' implementation of PTC.

As part of our body of work examining railroads' progress in implementing PTC, we found in September 2015 that nearly all railroads did not expect to meet the originally mandated deadline of December 31, 2015.[5] In October 2015, Congress extended the deadline to December 31, 2018, and established criteria that would enable FRA to grant railroads meeting certain requirements a further extension up to 2020.[6]

You requested that we examine commuter railroads' implementation of PTC. This statement describes the results of our review and focuses on:

- commuter railroads' progress in implementing PTC;
- how many, if any, commuter railroads may be at risk of not meeting the mandated PTC deadline or certain extension criteria, and what factors may be affecting implementation progress; and
- the extent to which FRA's management and oversight approach has helped ensure that commuter railroads either meet the deadline or qualify for an extension.

To address these objectives, we reviewed applicable laws as well as applicable FRA and PTC regulations, reports, and guidance. We also interviewed FRA officials involved in PTC monitoring, enforcement, and technical assistance. To describe commuter railroads' progress implementing PTC, we reviewed the most recent available railroad quarterly data that the 29 commuter railroads submitted to FRA that outlines installation and implementation progress in selected areas as of September 30, 2017. We assessed the reliability of the data in these reports by reviewing them for anomalies, outliers, or missing information, among other things. Based on these steps, we determined that these data were sufficiently reliable for our purposes of describing progress in PTC implementation. To identify railroads that may be at risk of not meeting the PTC deadline or qualifying for certain extension criteria, we collected additional information from all 29 commuter railroads related to their planned schedules for key implementation milestones. We then compared this information against FRA estimates for how long these milestones may take and to the experiences of commuter railroads that have already completed these milestones. To obtain perspectives on factors that may affect implementation progress and FRA's oversight approach, we interviewed representatives from 19 commuter railroads. These selected railroads include: (1) 14 railroads that according to FRA were identified in May 2017 as at risk of not meeting the 2018 full implementation deadline and not completing statutory requirements necessary to receive a deadline extension and (2) 5 other railroads that were further ahead with implementation and that varied in geographic location and size of rail system, among other factors. We also interviewed representatives from all 7 of the Class I freight railroads,[7] which are also required to implement PTC; 5 major PTC equipment suppliers and contractors identified by FRA; and 2 railroad industry associations. Information from these interviews is not generalizable to all commuter railroads or all PTC stakeholders but provide valuable insights into implementation issues. Finally, we compared FRA's management and oversight approach to Federal internal control standards related to communications and risk assessment. Appendix I describes our scope and methodology in greater detail.

We conducted this performance audit from July 2017 to February 2018 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 provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Under the Rail Safety Improvement Act of 2008, a PTC system must be designed to prevent train-to-train collisions, derailments due to excessive speed, incursions

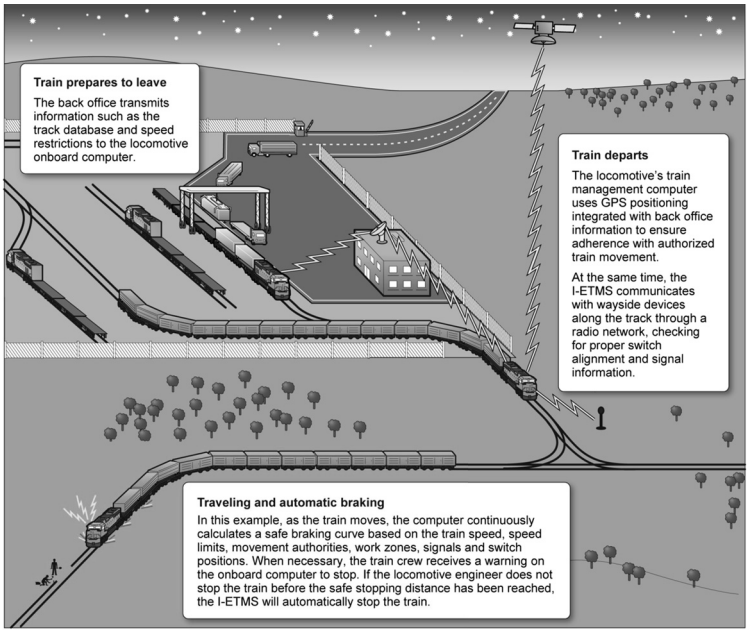
[5] GAO–15–739.

[6] The Positive Train Control Enforcement and Implementation Act of 2015, Pub. L. No. 114–73, § 1302, 129 Stat. 568, 576–582 (2015), codified at 49 U.S.C. § 20157.

[7] Freight railroads are classified by operating revenues. Class I railroads are those carriers having annual carrier operating revenues of $467 million or more.

into work zone limits, and the movement of a train through a switch left in the wrong position. Railroads may implement any PTC system that meets these requirements, and the majority of the 29 commuter railroads are implementing one of three primary types of systems: the Interoperable Electronic Train Management System (I-ETMS), the Advanced Civil Speed Enforcement System, or Enhanced Automated Train Control (E–ATC).[8] PTC's intended safety benefits can only be achieved when all required hardware has been installed and tested, and a train is able to communicate continually and in real time with the software and equipment of its own railroad and also with that of other railroads operating on the same tracks. Real-time communication is needed to account for changing track conditions, which may, for example, include temporary speed restrictions where railroad employees are conducting track maintenance. Figure 1 illustrates how one system is intended to operate.

Figure 1: Basic Operation of the Interoperable Electronic Train Management System (I–ETMS)

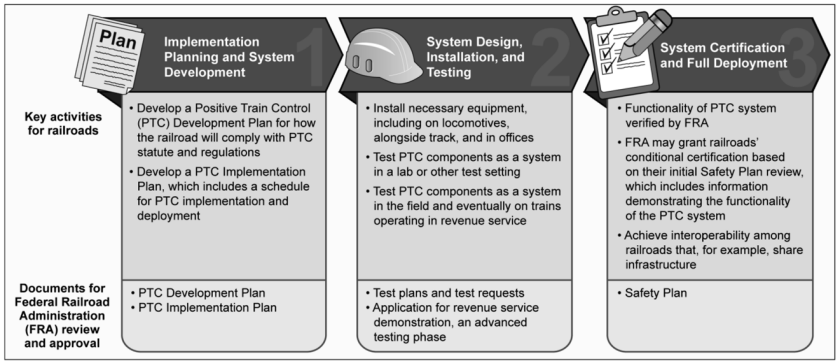


Source: GAO./GAO-18-367T

PTC's multi-step implementation process can be grouped into three primary phases (see fig.2). Each phase involves key activities for railroads to complete—such as installing PTC equipment—as well as the submission of key documents for FRA review and approval—such as test plans. Based on railroad data reported to FRA, most commuter railroads are currently in the second phase, which involves system design, installation, and testing. According to a recent FRA presentation, completing key activities within this phase is the near-term focus for many commuter railroads.

[8] Fifteen commuter railroads are implementing I–ETMS—the main system used by freight railroads. Six commuter railroads—located throughout the United States—are implementing E–ATC, and 5—on the Northeast Corridor between Boston and Washington, D.C.—are implementing forms of the Advanced Civil Speed Enforcement System. Two of the remaining commuter railroads are implementing different types of PTC systems, and one has yet to determine what PTC system it will implement.

Figure 2: Key Activities Railroads Must Complete to Implement Positive Train Control (PTC)



Source: GAO analysis of Federal Railroad Administration information./GAO-18-367T.

According to FRA officials, railroads must complete certain implementation steps sequentially, while other activities can be worked on simultaneously; for example, railroads may work to finish installing locomotive and wayside equipment while also beginning testing on an initial track segment.[9] Furthermore, based on railroads' PTC implementation plans, the scale of implementation activities can vary by railroad, based on the size of the railroad and the number of components to be installed. For example, one relatively large commuter railroad must install computer hardware on 528 locomotives and 789 wayside units along 218 route miles, while one relatively small commuter railroad's installation is limited to 17 locomotives and 35 wayside units along 32 route miles.

According to FRA, full implementation of PTC is achieved when a railroad's system is FRA-certified and interoperable, and all hardware, software, and other components have been fully installed and in operation on all route miles required to use PTC. The PTC system is required to be interoperable, meaning the locomotives of any host railroad and tenant railroad operating on the same track segment will communicate with and respond to the PTC system, including uninterrupted movements over property boundaries.[10]

In early 2016, railroads required to install PTC had to submit revised implementation plans to FRA that included a schedule and milestones for specific activities, such as installing locomotive and wayside hardware, acquiring radio spectrum (if necessary), and training employees who will have to use and operate PTC systems.[11] Railroads are required to report annually to FRA certain information on their implementation progress.[12] As part of overseeing railroads' PTC implementation, FRA established a PTC Task Force in May 2015 to track and monitor individual railroads' progress. Railroads are also required to report quarterly to FRA on the status of PTC implementation in several areas such as: locomotives equipped,

[9] In this statement, we use the term locomotive generally to refer to any of the variety of vehicles, such as cab cars and electric multiple unit trains, that commuter railroads may need to equip. Wayside units, located along the side of the track, include equipment such as communication towers or poles, switch position monitors, wayside radios, wayside interface units, and base station radios.

[10] *See* 49 U.S.C. § 20157. With certain exceptions, full implementation requires all controlling locomotives to be equipped with a fully operative and functioning onboard PTC apparatus, including the controlling locomotives of each host railroad and each tenant railroad operating on a PTC-equipped track segment. 49 C.F.R. § 236.1006.

[11] The Rail Safety Improvement Act of 2008 required that railroads submit an implementation plan for installing PTC by April 16, 2010. When the PTC implementation deadline was extended to 2018 under the PTC Enforcement and Implementation Act of 2015, railroads were required to submit a revised implementation plan by January 27, 2016, to outline how and when each railroad plans to achieve full PTC implementation.

[12] Each railroad is required to annually report to FRA on PTC implementation progress in areas such as spectrum acquisition, installation progress, and the total number of route miles where revenue service demonstration has been initiated or PTC is in operation. *See* 49 U.S.C. § 20157(c)(1); 49 C.F.R. § 236.1009(a)(5).

employees trained, territories where revenue service demonstration (RSD) has been initiated, and route miles in PTC operation.[13]

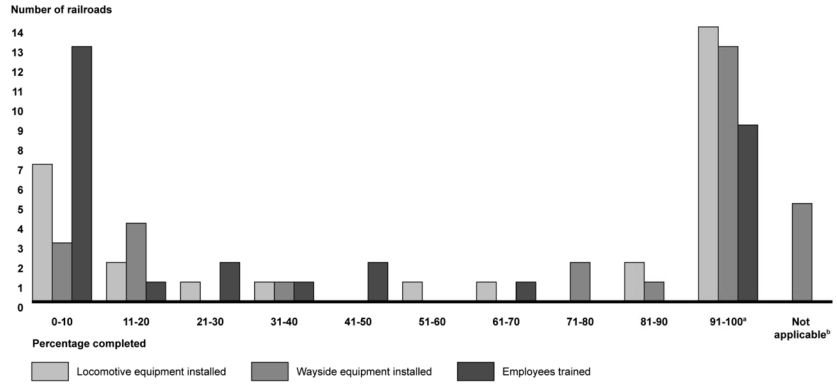
FRA's oversight tools include assessing civil penalties if a railroad fails to comply with legal requirements, including a railroad's failure to comply with its implementation plan.[14] FRA has a national PTC director, designated PTC specialists in the 8 FRA regions, and a few additional engineers and test monitors responsible for overseeing technical and engineering aspects of implementation and reviewing railroad submissions of documents and test requests. FRA officials told us they conduct various types of PTC-related work simultaneously, such as providing technical assistance to railroads, addressing questions, and reviewing documentation submitted by railroads. As railroads progress with testing and before completing implementation, FRA must review and approve a safety plan for each railroad and certify the PTC system.[15]

Commuter railroads that will not be able to implement a PTC system by December 31, 2018, may receive a maximum 2-year extension if they meet six criteria set forth in statute. Specifically, commuter railroads must demonstrate, to the satisfaction of the Secretary of Transportation, that they have: (1) installed all PTC system hardware; (2) acquired all necessary spectrum;[16] (3) completed required employee training; (4) included in a revised implementation plan an alternative schedule and sequence for implementing their PTC system as soon as practicable; (5) certified to FRA that they will be in full compliance with PTC requirements by the date provided in the alternative schedule and sequence; and (6) either initiated RSD on at least one territory [17] required to have operations governed by a PTC system or "met any other criteria established by the Secretary." [18]

Progress Reported in Some Implementation Areas, but Significant Work Remains

Most of the 29 commuter railroads have reported progress in some of the key areas of PTC implementation that FRA monitors, such as locomotive and wayside equipment installation, but the amount of progress reported varies across individual railroads (see fig. 3 below).

Figure 3: Status of Commuter Railroads' Installation of Locomotive and Wayside Equipment and Training of Employees Reported as of September 30, 2017



[13] To effectively monitor each railroad's progress implementing PTC, FRA requires the submission of quarterly progress reports under its investigative authorities. *See,* e.g., 49 U.S.C. §§ 20107, 20902, 20157(c)(2); 49 C.F.R. § 236.1009(h).

[14] 49 U.S.C. § 20157(e).

[15] 49 C.F.R. § 236.1015.

[16] Radio frequency spectrum is the medium for wireless communications and supports a vast array of commercial and governmental services. Commercial entities use radio frequency spectrum to provide a variety of wireless services, including mobile voice and data, paging, broadcast television and radio, and satellite services.

[17] FRA defines a territory as an entire installation/track segment as identified in a railroad's PTC implementation plan (*e.g.,* a track segment, territory, subdivision, district, etc.). *See, e.g.,* 49 U.S.C. § 20157(a)(3)(B)(vi); 49 C.F.R. §§ 236.1003, 236.1011(a)(5).

[18] These criteria are contained in 49 U.S.C. § 20157(a)(3)(B)(i)-(v), (vii).

Source: GAO analysis of commuter railroad data submitted to the Federal Railroad Administration./GAO-18-367T

[a] Two railroads reported over 100 percent of wayside equipment installed, and three railroads reported over 100 percent of employees trained. We included these railroads in the 91–100 percent complete bin.

[b] Some commuter railroads reported that wayside installation was not applicable because they operate as a tenant railroad and that their host railroad is responsible for installing wayside equipment.

Over half of the commuter railroads reported that they have made substantial progress in some initial implementation activities, while other railroads reported that they have made much more limited progress or have yet to begin equipment installation or employee training. For example, as of the end of September 2017:[19]

- *Locomotive Equipment Installation:* 18 commuter railroads reported 50 percent or more of their locomotive PTC equipment was installed, and of these, 13 had completed installation. In contrast, 6 railroads reported that they had not started installation of locomotive equipment.
- *Wayside Equipment Installation:* 16 commuter railroads reported 50 percent or more of their wayside PTC equipment was installed, and half of them reported that they had completed installation. In contrast, 7 reported that less than 20 percent of this equipment was installed.
- *Employee Training:* 11 commuter railroads reported completing PTC training for 50 percent or more of their employees requiring training. Of these, four reported that they had completed employee training. Thirteen commuter railroads had completed 10 percent or less of their employee training, and of these, 11 reported that they had not started training their employees. However, some commuter railroad representatives we spoke with stated that they are waiting to conduct training until their PTC system is closer to deployment. For example, representatives from one railroad told us they are waiting to conduct training so employees will be recently trained and familiar with PTC as the system is rolled out.

Notably, commuter railroads reported that they have made the most progress in obtaining spectrum, which allows PTC components to transmit information about a train's movements and location. Specifically, 15 of the 17 railroads that require spectrum reported that they have obtained it.[20] The two other railroads reported that they are in discussions to obtain leased spectrum.[21]

Beyond the initial implementation activities, much work remains for the majority of commuter railroads to complete other key PTC activities that will enable them to complete implementation. PTC implementation requires many additional steps to integrate equipment and software systems that go beyond installing equipment and training employees, and the majority of commuter railroads reported that they continue to work to complete these steps, which are technically complex and time consuming. For example, as of the end of September 2017:

- *Locomotives Fully Equipped and PTC-Operable:* Fifteen commuter railroads reported that half or more of their locomotives were fully equipped and PTC-operable, meaning that all necessary onboard hardware and software is installed and commissioned, and is capable of operating over a PTC-equipped territory. Eight commuter railroads reported that none of their locomotives were fully equipped and operable.
- *Field Testing:* Thirteen railroads reported that they had begun field testing—a key implementation milestone that precedes RSD and allows railroads to assess how PTC components and software function together.[22] FRA officials said

[19] Railroads submitted quarterly implementation progress information to FRA for the period ending September 30, 2017. At the time of our review, this was the most recent information available.

[20] Twelve of the 29 commuter railroads do not require spectrum because, for example, they are implementing a PTC system that does not use spectrum or because they operate as a tenant-only railroad.

[21] The 7 Class I railroads created a consortium—PTC 220 LLC—to purchase radio frequency spectrum licenses that would address their needs, and in some cases, the consortium can lease radio frequency spectrum to non-Class I railroads for a fee. Most commuter railroads installing the I–ETMS system have opted to lease spectrum from PTC 220 LLC.

[22] During the American Public Transportation Association's Commuter Rail Summit in summer 2017, FRA noted that railroads should, at that time, have been installing their systems as well as beginning testing, based on the agency's anticipated time frames necessary to complete the milestones necessary for an extension.

that the testing phase can be a long and difficult process, as data obtained during field testing must prove the functionality of the system and be included as part of a railroad's application to enter RSD.

- *RSD:* Following successful field testing, FRA may grant a railroad approval to enter the next level of testing, RSD. In RSD, testing is performed on trains operating PTC as part of regular operations. According to FRA, RSD is the final phase of testing that a railroad completes in order to validate and verify its PTC system, and the results from RSD, along with earlier testing, are to be included in the safety plan a railroad submits to FRA. While six commuter railroads reported that they have begun RSD,[23] most had not yet reached this key milestone—including some of the largest commuter railroads.
- *Conditional Certification:* Once FRA approves a railroad's safety plan, the railroad receives a PTC system certification.[24] According to FRA officials, as of September 30, 2017, only two commuter railroads were conditionally certified—meaning FRA has reviewed their safety plans and granted conditional approval for PTC operations, and the railroads are providing regular service in PTC operations—and two additional commuter railroads had submitted a safety plan for FRA review.[25]

Given the variation in commuter railroads' progress, especially related to completing later-stage PTC activities such as testing and developing safety plans, 13 of 29 commuter railroads told us they planned to seek a deadline extension, and the remaining 16 told us they do not intend to seek an extension. However, the number of commuter railroads planning to seek an extension is subject to change before the end of 2018.

Over Half of Commuter Railroads May Be at Risk of Not Meeting the 2018 Deadline or Criteria for RSD-based Extension, Though Numerous Factors Create Uncertainty

Based on our analysis of the PTC schedules of the 29 commuter railroads, over half may not have sufficient time to complete activities needed to implement PTC by the end of 2018 or to qualify for an extension of that deadline by meeting criteria based on initiating RSD—for the purposes of this statement, referred to as an RSD-based extension. In particular, our analysis focused on the time likely needed for railroads to conduct RSD activities, because RSD is both the final step of field testing required by the 2018 deadline as well as one of the statutory options railroads have in seeking a deadline extension. For our analysis, we compared the amount of time railroads plan for completing two key milestones—installing the back office server and conducting field testing—to the amount of time FRA officials estimate is required for each milestone and to the experiences of railroads that have already completed RSD. However, it is important to recognize that numerous factors could affect railroads' planned and future progress. For example, commuter railroads could face delays due to unexpected issues with PTC components or FRA reviews of documents submitted by the railroads.

Over Half of Commuter Railroads May Be at Risk

In May 2017, FRA sent letters to 14 commuter railroads and their respective state departments of transportation and governors informing the recipients that they had not installed at least 50 percent of their required locomotive and wayside equipment. In these letters FRA raised concerns that these railroads were at risk of not meeting the 2018 deadline and not completing requirements for a deadline extension.[26] Subsequently, in January 2018, FRA applied a more stringent benchmark—whether a railroad had installed at least 65 percent of all equipment—and determined that 13 commuter railroads remained at risk.[27] Using this more stringent cri-

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[23] As of the end of September 2017, six commuter railroads reported that they had begun RSD on at least one track segment. Five of these railroads reported that all of their track segments were in RSD, while the other railroad reported that it had initiated RSD on 90 percent of its track segments.

[24] 49 C.F.R. §§ 236.1009(d), 236.1015. A PTC safety plan may include, among other things, a risk assessment, a hazard mitigation analysis, and a complete description of the railroad's training plan for employees and supervisors.

[25] One of the two commuter railroads submitted its safety plan jointly with the Class III railroad that provides freight service on the line.

[26] FRA used railroads' equipment installation data as of the end of calendar year 2016 to make its determinations.

[27] FRA used railroads' data as of the end of September 2017 to make determinations, and our analysis confirmed this finding.

terion, only one railroad had made enough progress installing equipment to no longer be classified as at risk by FRA.

In addition to FRA's benchmarks for equipment installation, for our analysis we evaluated more broadly railroads' progress in completing other implementation activities that follow equipment installation and that FRA and stakeholders said are more difficult to achieve. Specifically, we analyzed commuter railroads' planned schedules for two key milestones to determine whether these railroads appear to have built sufficient time into their implementation plans to complete these and other activities by the 2018 deadline or to qualify for an RSD-based extension.[28] The two key milestones we examined, both of which need to be completed before a railroad enters RSD, were:

- installing the back office server (BOS) and associated software necessary to connect and interface with wayside, locomotive, and dispatch equipment (the BOS transmits and receives data among this equipment that enables PTC to work); and
- conducting field testing, in particular testing of installed infrastructure and initial assessments of the PTC system's overall functionality on trains that are not transporting passengers or operating during regular passenger service.

Our analysis found that at least one quarter, and potentially up to approximately two thirds, of commuter railroads may not have sufficient time to enter RSD and, thus, may not meet the 2018 PTC implementation deadline or qualify for an RSD-based extension. These railroads vary by size and type of PTC system and by whether they plan to apply for a deadline extension. Specifically, our analysis found the following:

- *Projection based on BOS status:* Between 9 and 19 commuter railroads appear to be at potential risk of not meeting the 2018 deadline or qualifying for an RSD-based extension based on our analysis. Our analysis found that the 6 commuter railroads already in RSD took an average of 10 months from installing the BOS to starting RSD.[29] However, the schedules of 9 railroads indicate that they plan to install a BOS less than 10 months before the 2018 deadline. We believe that given past experience of other railroads, this places these 9 railroads at potential risk. Moreover, FRA officials estimate that it can take 2 to 3 years for a railroad to install and prepare the BOS and associated software to support testing and RSD. Using FRA's 2-year installation estimate (which would require BOS installation before January 1, 2017) further exacerbates the potential risk of not meeting the deadline or of not qualifying for any RSD-based extension for up to 19 railroads.
- *Projection based on time allowed to conduct field testing:* Based on our review of the planned schedules, between 7 and 14 railroads may not have built sufficient time into their plans either to complete field testing ahead of the 2018 deadline or to qualify for an RSD-based extension. Commuter railroads and FRA officials told us that field testing is challenging and can take a substantial amount of time due to, for example, unanticipated issues and limited available track for testing given regular passenger operations. On average, our analysis found that the 6 commuter railroads already in RSD took 7 months to move from starting field testing to starting RSD. However, 7 commuter railroads plan to start their field testing less than 7 months before the 2018 deadline. This situation raises concerns about their ability to conduct field testing before the 2018 deadline. Moreover, FRA officials told us that moving from the start of field testing to the start of RSD can take between 1 and 3 years, averaging

[28] We assessed all commuter railroads against these milestones, regardless of whether a railroad planned to seek an extension. As noted above, railroads that do not plan to seek an extension have said that they will conduct RSD as the final step of required field testing, and railroads that do plan to seek an extension must by statute either initiate RSD on at least one territory or meet any other alternative criteria established by FRA. While these alternative criteria are not required to be based on RSD, we used RSD as a benchmark for our analysis based on FRA's three "alternative criteria" approvals to date; all of which have used RSD-based criteria (RSD testing on a segment of track versus RSD testing on an entire territory). According to an FRA official, it approved these three requests for alternative criteria because they were based on specific and quantifiable measures that happened to be RSD but could have been other specific, quantifiable measures.

[29] The 6 railroads in RSD, on which we based one of our comparisons, vary in system size and PTC implementation system, but many of these railroads are relatively small based on the number of track segments each operates. Specifically, 3 railroads have a single track segment; 1 railroad has 3 track segments, and 2 railroads have 10 or more track segments. In addition, one of these railroads is a tenant railroad and did not have to install wayside PTC equipment.

about 2 years, and that most railroads under-estimate the amount of time needed for testing. When we applied the lower end of FRA's estimate, we found that it further increases the potential risk for 14 railroads that plan to start field testing less than a year prior to the 2018 deadline. As a result, they could be at risk of not meeting the 2018 deadline or qualifying for an RSD-based extension.

We used RSD as a benchmark for our analysis of key milestones based on the importance of this benchmark in implementing PTC and on the three RSD-based alternative criteria that FRA has approved to date. While the three approved alternative criteria all include RSD, FRA has broad authority to approve "any other" alternative criteria even if not based on RSD, as noted above. One FRA official told us the agency approved these three alternative criteria requests because they were all based on specific, quantifiable measures, rather than because they included RSD in particular. FRA officials stated that they have not issued guidance on uniform alternative criteria because they will strive for railroads to meet the criteria for a deadline extension that are listed in statute and want the discretion to make determinations on a case-by-case basis. In addition, FRA officials said they want to ensure that each railroad's criteria are consistent with the statutory requirements for final implementation by December 31, 2020. Because it is unknown what alternative criteria FRA may establish in the coming months, which may not include RSD, it is difficult to determine at this time whether the railroads we found to be potentially at risk of not qualifying for an RSD-based extension might be more or less likely to qualify for an extension based on other, non-RSD criteria.

Many Factors May Affect Commuter Railroads' Ability to Meet the Deadline or Qualify for an Extension

Much uncertainty exists regarding railroads' ultimate implementation progress and their ability to meet the 2018 deadline or qualify for an extension. This uncertainty is due, in part, to the fact that PTC is a new way of operating and involves technologies that are more complex to implement than many other railroad capital projects. Furthermore, a number of factors can affect commuter railroads' planned and future progress, including unexpected setbacks installing PTC components and resources and capacity issues. Below we highlight some of the factors that that could affect implementation progress.

Limited Industry Expertise and Resources

Three out of five PTC contractors and suppliers and about half of the commuter railroads we spoke with acknowledged that industrywide, there are a limited number of individuals with PTC technical expertise available to successfully implement the technology. This can affect the ability of railroads and contractors to meet planned schedules. For example, one large commuter railroad said it took a year and a half to hire an internal expert to continue work on its PTC project. In addition, five commuter railroads told us that they faced other issues with their prime contractors missing their milestones; such issues, going forward, could impact railroads' progress during the coming year. Also, though most railroads we spoke to are relying on contractors, some commuter railroads may lack the in-house resources and expertise to plan and oversee a project as large and complex as PTC. Representatives from three commuter railroads we interviewed noted that PTC is not a traditional capital or construction project for a railroad; therefore, it requires additional expertise. FRA officials also stated that small commuter railroads may not have technical capacity or expertise with large contracts for such complex projects, especially given limited industry resources.

In addition to limited expertise and resources, some commuter railroads told us they faced unexpected delays in obtaining PTC equipment, such as radios, from the supplier. Some PTC equipment is only available from a single provider, which can lead to delays executing contracts and obtaining equipment. Three commuter railroads we spoke with said they encountered issues executing contracts for PTC radios, in particular negotiating unique liability requirements sought by the only supplier of this equipment, which resulted in delays or higher overall costs to the railroads. One railroad noted that executing sole-source contracts for such circumstances is particularly problematic for state and public agencies.

Interoperability and Host and Tenant Coordination

As noted above, PTC is being implemented by different types of railroads using different systems, and achieving interoperability among PTC systems can complicate implementation. For example, Northeast Corridor railroads that are implementing versions of the Advanced Civil Speed Enforcement System need interoper-

ability with freight railroads using I-ETMS. Even railroads that are installing the same PTC system have to take significant steps to ensure that systems will communicate and interoperate properly. In one case, a railroad told us that it is equipping its locomotives with equipment for multiple PTC systems to ensure that it can operate on various host railroads' tracks.

Some commuter railroads that only operate as tenants on other railroads' tracks may be able to complete some PTC implementation work more quickly, as these railroads may benefit from work the host railroads already completed as they coordinate to implement PTC. For example, representatives from one commuter railroad we spoke with said they have to acquire and install PTC equipment on their locomotives but rely on the host railroads to install the remainder of the necessary PTC infrastructure. These tenant-only commuter railroads, however, have to coordinate field testing and RSD with the host railroads.

Schedule Changes

Unexpected issues with components or technology can also require additional time to complete certain activities, causing schedules to slip. Such issues could affect railroads currently on schedule as well as railroads pursuing aggressive schedules in an effort to overcome late starts or early setbacks. For example, representatives from 10 railroads we spoke with said that installing the BOS and associated software, and ensuring it functions properly, can pose a challenge. One contractor told us that once the BOS is delivered to a railroad, a lot of testing work remains, and unexpected issues inevitably arise during testing, even if the BOS works according to all specifications. Representatives from one railroad said that despite strong organizational commitment to implementation and setting internal targets for progress, their PTC project schedule slipped many times over the course of implementation due to a variety of issues, including on-going software updates that caused delays while also straining the budget and burdening staff. Representatives from that commuter railroad also noted that equipping vehicles with PTC components took three times longer than originally expected (3 years instead of 1 year). However, some railroads are looking for ways to accelerate implementation. For example, representatives from one railroad said they made the difficult decision to cut some weekend passenger service to accelerate wayside equipment installation. Therefore, as representatives from one railroad articulated, given the schedule slippage experienced by railroads further along in implementation, railroads with aggressive schedules would have a limited ability to accommodate any additional delays.

FRA's Resources and Capacity

As the 2018 deadline approaches and railroads progress with implementation activities, the amount of documentation railroads will submit to FRA for review and approval is likely to increase significantly. For example, FRA reported in summer 2017 that it had taken between 10 and 100 days to review each of the test requests it received from railroads. As the 2018 deadline approaches, FRA will have to review a considerable amount of additional test plans and procedures as well as applications to begin RSD. In addition, FRA will have to concurrently review any safety plans that are submitted by railroads reaching the certification phase. At the American Public Transportation Association's (APTA) Commuter Railroad Summit in June 2017, FRA officials said that they expect each safety plan review—which involves all the regional specialists and some contract personnel—to take between 6 and 12 months to review. These plans are about 5,000 pages in length. FRA officials told us that reviewing all of the safety plans in a timely manner will be a challenge given staff resources. FRA has 12 technical staff dedicated to the review of railroads' PTC documentation and monitoring of PTC testing. Representatives from 10 out of 19 commuter railroads we interviewed said they are concerned about FRA's ability to review submitted documentation in a timely manner.

Lessons Learned

As railroads continue to progress with their projects and the industry becomes more experienced with PTC, railroads could benefit from lessons learned. For example, representatives from one railroad that is implementing I–ETMS, the system all large Class I freight railroads are implementing, told us that they anticipate being able to capitalize on lessons learned from freight railroads that have operated in RSD. By leveraging the freight railroads' experiences, one commuter railroad hopes to address issues before testing, rather than during, and therefore move more quickly through the testing process. If commuter railroads are able to apply lessons learned from other railroads' testing processes, then they may be able to accelerate their implementation efforts. Railroads may also accelerate implementation sched-

ules as they become more adept at the overall testing process, which involves submitting test documents to FRA and scheduling multiple tests. This could potentially shorten the average time it takes a railroad to complete one or more of the key milestones analyzed. The two commuter railroads that have been conditionally certified told us they have met with other commuter railroads informally and have shared their project experiences as a way to facilitate information sharing.

FRA Monitors Railroads' Progress but Has Not Systematically Communicated with Them or Prioritized Efforts

FRA Monitors Railroads' Implementation Progress, Reviews Documents, and Shares PTC Information

Since 2015, FRA has assumed additional roles and responsibilities—primarily through the PTC Task Force and regional PTC specialists—to monitor railroads' implementation progress, review required documentation, and share information about implementation steps and activities.

- *Monitoring and Document Review:* In response to a recommendation in our September 2015 report, FRA began to identify and collect additional information from the railroads to enable it to effectively track and monitor railroads' PTC progress.[30] For example, in 2016, the PTC Task Force began collecting quarterly progress data and monitoring railroads' annual reports to track progress in meeting the PTC implementation milestones set out in railroads' implementation plans, such as locomotive equipment installed at the end of the year.[31] As previously noted, the Task Force used this implementation progress data in May 2017 to identify 14 commuter railroads at risk of not meeting the 2018 deadline or requirements for an extension. FRA also monitors railroads' PTC implementation through meetings with railroad and industry associations, visits to individual railroads, and reviewing and commenting on PTC documentation submissions, such as requests to begin field testing and RSD. FRA officials told us that they monitor railroads' progress to determine how much commuter railroads understand about the implementation process and to trigger discussions between FRA and the railroads. Regional PTC specialists are responsible for reviewing and approving requests submitted by railroads preparing to test system functionality as well as individual testing procedures describing the specific equipment and movements involved in each test.[32] In addition, FRA officials told us that assessing civil penalties and sending commuter railroads letters of concern are the primary enforcement mechanisms they have available to oversee PTC.[33]
- *Information Sharing:* FRA officials said that they have primarily used informal assistance and participation in group meetings to convey information related to the implementation process and specific milestones necessary to meet the 2018 deadline or qualify for an extension. FRA officials acknowledged that they do not have the capacity to provide frequent one-on-one assistance to all railroads given their growing PTC workload and limited agency resources. As such, FRA officials explained that in order to reach a wide audience given the approaching deadline, their current focus is on presentations at industry group meetings (*e.g.,* APTA's Commuter Rail Summit) and specific PTC systems user-group meetings. FRA's regional PTC specialists told us they also provide direction on technical aspects of PTC implementation and testing, primarily by discussing issues at individual and railroad-industry meetings and providing informal feedback on commuter railroads' PTC documentation, such as testing requests.

FRA Has Not Systematically Communicated Information to Help Railroads Prepare for the 2018 Deadline or to Qualify for Extensions

While the majority of the railroad representatives we met with said FRA officials were consistently available to discuss issues that arise during day-to-day PTC im-

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[30] GAO–15–739.

[31] The PTC Task Force is comprised of FRA data analysts and subject matter experts responsible for PTC administrative and programmatic support, including collecting and tracking railroads' PTC data, managing documentation, and corresponding with railroads.

[32] Railroads submit certain information to FRA before beginning field testing for a PTC system, such as the date and location for the proposed testing, the planned test procedures, and other information for FRA's review and approval.

[33] To date, FRA has initiated enforcement actions against 10 commuter railroads for either failure to complete one or more hardware-installation milestones that a railroad scheduled to complete during calendar year 2016, or for the failure to submit a timely annual PTC progress report to FRA by the statutory deadline. Thus far, 8 commuter railroads have paid or have agreed to pay civil penalties up to $12,000.

plementation activities, the information conveyed by these officials has sometimes been inconsistent. In particular, FRA's heavy reliance on informal assistance and participation in group meetings to convey information to commuter railroads has led, at least on some occasions, to different or inconsistent information being communicated in different meetings. For example, representatives from one PTC equipment supplier said that FRA has not consistently commented on different railroads' test plans, and as a result, they have not been able to carry lessons learned on to other railroads' plans. In addition, while FRA's officials said their position has been consistent with the regulations stating that the host railroad must submit a safety plan to FRA, representatives from one railroad we met with said they had heard conflicting information from FRA. For example, these railroad representatives told us that FRA officials originally said commuter railroads that are only tenants on other railroads needed to submit their own safety plans but later stated at an industry association meeting that tenant railroads could be included in the host railroads' plans.

In addition, commuter railroads have expressed a need for additional clarification about the criteria for applying for an extension. FRA officials also told us that they have received a lot of questions from commuter railroads about the criteria for an extension related to RSD or other alternative criteria. As noted above, to date, FRA has approved alternative extension criteria for three railroads, and in each case, the criteria involved RSD testing on a shorter track segment.[34] However, representatives from one contractor working with several commuter railroads said it is unclear what "alternative criteria" FRA will approve to receive an extension. In addition, representatives from one commuter railroad stated that any opportunity to clearly outline FRA's interpretation of the PTC requirements, specifically the alternative extension criteria that could, for example, allow for a shorter test segment, would enable railroads to better position themselves to apply for an extension.

Representatives from some commuter railroads we met with were likewise unclear about the agency's approach to reviewing and granting extension requests. Representatives from three commuter railroads said clarification of FRA's planned approach would be helpful as the deadline approaches. According to FRA officials, the statute does not set a deadline by which railroads have to apply for an extension, and FRA has not set a deadline or indicated the latest date by which a railroad should apply. Nonetheless, for railroads that do not comply with PTC deadlines, FRA officials said they could impose civil penalties for each day a railroad fails to implement a PTC system by the applicable statutory deadline, but the agency has yet to determine how it will handle railroads that do not meet the deadline or receive an extension. With less than a year remaining before the 2018 deadline, FRA officials stated that they anticipate their workload is likely to increase as railroads submit additional documentation to review and continue to progress with testing.[35] More systematic communication that delineates FRA's planned approach for the upcoming deadline and extension process may be critical for the agency to efficiently use its limited resources and convey consistent information to all the railroads.

Standards for internal control in the Federal Government state that management should externally communicate the quality information necessary to achieve the entity's objectives. These standards also note that management should select the appropriate form and method of communication, so that information is communicated widely and on a timely basis.[36] As we have previously found, the particular form of the agency's communication—for example, by oral presentation, written guidance, or formal regulation—will depend on multiple factors including the purpose and content of the specific communication and applicable legal requirements.[37] Moreover, internal control standards indicate agencies should have standard processes in place to determine which form of communication is appropriate in each case.[38] FRA officials told us that the agency could issue written guidance explaining how it has decided to apply its deadline extension authority and what type of information rail-

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[34] FRA officials said that to date, they have directed railroads with questions about qualifying for extensions to review the statutory criteria as well as the alternative criteria the agency has approved to date. An FRA official told us these approvals were based on the railroads' proposing specific, quantifiable alternative criteria, regardless of whether those involved RSD.

[35] In addition, FRA officials said they had begun exploring options to validate the information railroads will submit to demonstrate they have met the statutory requirements for installing PTC equipment to qualify for an extension as the 2018 deadline approaches, but the officials have yet to finalize an approach to verify railroads' information.

[36] GAO, *Standards for Internal Control in the Federal Government,* GAO–14–704G (Washington, D.C.: Sept. 2014).

[37] GAO, *Regulatory Guidance Processes: Selected Departments Could Strengthen Internal Control and Dissemination Practices,* GAO–15–368 (Washington, D.C.: Apr. 16, 2015).

[38] GAO–14–704G; GAO–15–368.

roads will then need to submit to get an extension. However, FRA officials stated this written guidance would require time-consuming approval by the Office of Management and Budget under the Paperwork Reduction Act, and would make timely issuance of such guidance difficult. As noted, however, FRA may have the option to use less formal, less time-consuming methods of communicating key information about the extension process, such as webinars or conference calls, to communicate information more systematically. FRA officials acknowledged they are working to identify mechanisms such as these, but they have yet to do so. Absent systematic communication articulating the agency's planned approach for the extension process, railroads may not have the information they need to effectively prepare for the deadline or seek an extension.

FRA Has Made Limited Use of Implementation Progress to Prioritize Efforts and Mitigate Risks

While FRA has taken steps to more closely monitor railroads' implementation progress, the agency has not prioritized its efforts, including its allocation of resources, based on an assessment of risk. In its 2015 Railroad Accountability Plan, FRA stated that its PTC data collection and monitoring efforts would allow the agency to inform, among other things, its resource allocation and risk mitigation.[39] While FRA has used its data to identify at-risk railroads, it has not used this information to prioritize how to allocate its resources or address risks. For example, as discussed earlier after reviewing railroads' data on their progress in installing PTC equipment, FRA notified 14 commuter railroads of their at-risk status in May 2017. However, while FRA officials said that they hold regular meetings with many—but not all—of the at-risk railroads, 9 of these 14 commuter railroads said that the formal letter they received did not ultimately trigger any change in the type of interaction they have with FRA. More recently, in December 2017, the Secretary of Transportation notified all railroads required to implement PTC by letter of the expectation that all possible measures be taken to ensure implementation requirements are met by the 2018 deadline. However, these letters made no distinction between railroads—that is, the same letter was sent to railroads with conditionally certified PTC systems and to railroads that reported completing no training or installing no locomotive equipment to date—nor did the letters describe how FRA's approach to working with the railroads would respond to their particular circumstances and risks.

As noted above, FRA officials have stated that the agency does not have the resources to meet more frequently with or provide additional assistance to railroads. While the PTC Task Force helps monitor railroads' progress, FRA still employs fewer than 12 individuals with the requisite PTC expertise and experience to review technical documents and help railroads implement PTC systems.[40] In an environment with limited agency resources, targeting agency efforts to areas of the greatest risk or highest priority areas is one way to leverage existing resources. According to standards for internal control in the Federal Government, management should identify, analyze, and respond to risks. In addition, FRA's *Strategic Human Capital Plan* states that developments including the rapid introduction of new technologies, such as PTC, demand that FRA continuously evaluate its programs and resources to adapt to changing demands.

However, FRA has not fully leveraged the implementation progress data that railroads' submit to the agency to identify and develop a risk-based approach to prioritize agency actions. At present, it is unclear whether the agency's priorities are, for example, to help the largest commuter railroads meet the deadline or extension requirements, push those railroads that are very close to full implementation, or assist railroads that are in the earliest stages of their PTC project. For example, one regional PTC specialist we met with said that if he did not need to be reviewing documentation or observing railroads' field testing, he could spend more time with at-risk railroads. By not effectively targeting actions to help mitigate risks posed by railroads most at risk of not meeting the PTC deadline or qualifying for an extension, FRA misses the opportunity to leverage its limited resources by providing direct assistance in the areas of greatest need.

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[39] FRA developed this plan as an internal document in response to recommendations in GAO–15–739.

[40] According to FRA officials, the technical and programmatic staff and contractors supporting PTC implementation have recently expanded, and a procurement is underway for additional contractors to support PTC safety plan reviews.

Conclusions

Much progress has been made in implementing PTC by commuter railroads. Nevertheless, about half of commuter railroads plan to apply for an extension, and many of the railroads' planned schedules raise questions about their ability to complete key implementation milestones and qualify for RSD-based extensions prior to the 2018 deadline. As the 2018 deadline rapidly approaches, the need for clear information that is systematically communicated to all railroads implementing PTC becomes even more critical. FRA cannot expect to provide information and guidance to railroads individually, and therefore, adopting a risk-based communication strategy could help it more efficiently share information in the coming year. Moreover, the information FRA collects on railroads' progress has not been used to inform the agency's resource allocation decisions. Using this information to better allocate resources could help position FRA to better meet its responsibility to monitor and oversee PTC implementation in the future.

Recommendations for Executive Action

We are making the following two recommendations to FRA:

- The Administrator of FRA should identify and adopt a method for systematically communicating information to railroads regarding the deadline extension criteria and process. (Recommendation 1)
- The Administrator of FRA should develop an approach to use the information gathered to prioritize the allocation of resources to address the greatest risk. (Recommendation 2)

Agency Comments

We provided a draft of this statement to DOT for review and comment. In its comments, reproduced in appendix II, the agency concurred with our recommendations. DOT also provided technical comments, which we incorporated as appropriate.

Chairman Thune, Ranking Member Nelson, and Members of the Committee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

APPENDIX I: OBJECTIVES, SCOPE, AND METHODOLOGY

This statement examines commuter railroads' implementation of positive train control (PTC). Specifically, this report addresses:

- commuter railroads' progress in implementing PTC;
- how many, if any, commuter railroads may be at risk of not meeting the mandated PTC deadline or certain extension criteria, and what factors may be affecting implementation progress; and
- the extent to which FRA's management and oversight approach has helped ensure that commuter railroads either meet the deadline or qualify for an extension.

To address these objectives, we reviewed the Rail Safety Improvement Act of 2008, the Positive Train Control Enforcement and Implementation Act of 2015, and applicable Federal Railroad Administration (FRA) regulations, reports, and guidance. Our review focused on the 29 railroads FRA officials identified as commuter railroads required to implement PTC.[1] We also reviewed previous GAO work on PTC[2] and applied *Standards for Internal Control in the Federal Government* to FRA's role overseeing PTC implementation, including the principles that management should externally communicate the necessary quality information to achieve the entity's objectives and that management should identify, analyze, and respond to risks.[3] In addition, we interviewed representatives from 19 commuter railroads to further understand their implementation progress, factors that may be affecting progress, and the interviewees' perspectives on FRA's management and oversight of PTC implementation. We selected the 19 railroads to include the 14 railroads that

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[1] Representatives of one of these railroads consider themselves to be an intercity passenger railroad, but we included them in our review because FRA tracks and monitors their progress among the commuter railroads required to implement PTC.

[2] GAO, *Positive Train Control: Additional Oversight Needed As Most Railroads Do Not Expect to Meet 2015 Implementation Deadline,* GAO–15–739 (Washington, D.C.: Sept. 4, 2015), and GAO, *Positive Train Control: Additional Authorities Could Benefit Implementation,* GAO–13–720 (Washington, D.C.: Aug. 16, 2013).

[3] GAO, *Standards for Internal Control in the Federal Government,* GAO–14–704G (Washington, D.C.: Sept. 2014).

according to FRA were identified in May 2017 as at risk of both not meeting the 2018 implementation deadline and not completing statutory requirements necessary to receive a deadline extension, as well as 5 other railroads that were further ahead with implementation and that varied in geographic location and size of rail system, among other factors.

We met with relevant FRA officials involved in PTC monitoring, enforcement, and technical assistance including the PTC Staff Director, regional PTC specialists working in each of the FRA regions where commuter railroads selected for interviews operate, and members of the headquarters-based PTC Task Force. In addition, we met with FRA Office of Railroad Safety specialists and engineers, among others. We also interviewed representatives from all 7 of the Class I freight railroads (which are also required to implement PTC), 5 major PTC equipment suppliers and contractors identified by FRA, and representatives from 2 railroad industry associations—the Association of American Railroads and the American Public Transportation Association—to obtain their perspectives on commuter railroads' implementation of PTC, factors affecting implementation progress, and FRA's PTC management and oversight.[4]

To identify commuter railroads' progress in implementing PTC, we reviewed railroads' third quarter progress reports submitted to FRA for the period ending September 30, 2017.[5] We reviewed the most recently available quarterly data outlining the 29 commuter railroads' installation and implementation progress in selected areas as of September 30, 2017, including: locomotive equipment installed, wayside equipment installed, employee training, locomotives fully equipped and PTC-operable, spectrum obtained, the status of field testing, and revenue service initiated. As necessary, we also reviewed the narrative fields in the quarterly reports for additional context related to a given railroad's implementation activities and the extent of progress made in specific implementation areas. We assessed the data in these reports by reviewing it for anomalies, outliers, or missing information, and reviewing supporting narratives to ensure they aligned with the reported data, among other things. Based on these steps, we determined that these data were sufficiently reliable for our purpose of describing railroads' progress implementing PTC. We also reviewed other sources of information, such as PTC Implementation Plans, railroads' 2016 annual progress reports, and interviews with railroad representatives.

To assess progress on locomotive equipment installation and wayside equipment installation, we compared the quantities installed to the total quantities required for PTC implementation. Similarly, to assess progress on employee training, we compared the number of employees trained to the number of employees required to be trained for PTC implementation. To assess progress in fully equipping locomotives to be PTC-operable, we compared the quantity of locomotives that are fully equipped and PTC-operable to the quantity required for PTC implementation. To assess progress on obtaining spectrum, we reviewed the quarterly update on spectrum. We concluded that a railroad had obtained spectrum if, for one or more area or location, it reported that spectrum was either (1) acquired but not available for use or (2) acquired and available for use. We also reviewed the narrative, as appropriate. For some railroads, we concluded that spectrum was not applicable because they use a PTC system that does not require spectrum, or because their host railroad is responsible for obtaining spectrum. To assess progress on field testing, we reviewed the third quarter status on installation and track-segment progress. We concluded that a railroad initiated field testing if one or more of its segments were reported as (1) testing or (2) operational/complete. To determine which railroads initiated revenue service demonstration (RSD), we reviewed the cumulative territories where RSD had been initiated. If the railroad reported that one or more territories had initiated RSD, we concluded that RSD had been initiated.[6]

Finally, to determine which railroads anticipate completing implementation before the December 31, 2018 deadline and which plan to seek any RSD-based extension, we obtained information from all 29 commuter railroads to identify which railroads plan to implement PTC by the 2018 deadline and which plan to submit an alter-

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[4] Freight railroads are classified by operating revenues. Class I railroads are those carriers having annual carrier operating revenues of $467 million or more. We interviewed all 7 Class I railroads operating in the U.S.: BNSF Railway, CSX Corporation, Kansas City Southern, Norfolk Southern, Union Pacific, Canadian National, and Canadian Pacific. We met with the following PTC contractors and suppliers: Ansaldo-STS, Alstom, Parsons, Siemens, and Wabtec.

[5] The quarterly reports describe commuter railroads' installation and implementation progress from July 1 to September 30, 2017, and were due to FRA on October 31, 2017. In two cases, the quarterly reports include data from both the tenant and host railroad.

[6] For two railroads which used outdated quarterly report forms, we concluded that RSD was initiated if one or more route miles were in testing or revenue service demonstration.

native schedule (that is, a request for an extension) to implement PTC after the December 31, 2018 deadline.

To identify commuter railroads at risk of meeting neither the PTC deadline nor any RSD-based extension criteria, we first reviewed data on railroads' progress installing PTC locomotive and wayside equipment. We did this because FRA used such installation progress to identify 14 commuter railroads as being at risk and notified them via formal letter in May 2017.[7] To confirm FRA's identification of commuter railroads that would be at risk based on an updated benchmark for the third quarter of 2017—railroads with less than 65 percent of total hardware installed—we analyzed railroads' reported locomotive and wayside equipment installation status as of September 30, 2017 to determine the percentage of total hardware installed for each commuter railroad.

To build on this analysis, we collected information from all 29 commuter railroads on their actual and planned schedules for key implementation milestones. For the 19 commuter railroads we met with, we collected this information as part of our interviews, and for the remaining 10 commuter railroads, we collected this information by e-mail using a standard data collection instrument. The key implementation milestones covered procuring a prime contractor for PTC implementation; applying for and entering field testing and RSD, which is the final phase of field testing; installing the back office server (BOS) and associated software; and completing PTC implementation. This schedule information was collected between September 2017 and January 2018.

We compared the amount of time commuter railroads' planned for completing two key milestones to the amount of time that FRA officials estimate is required for each milestone and to the experiences of railroads that already initiated RSD. The two milestones are as follows:

- Install the BOS and associated software necessary to connect and interface with wayside, locomotive, and dispatch equipment.
- Conduct field testing of installed infrastructure, which is an initial assessment of the PTC system's overall functionality on trains that are not transporting passengers or operating during regular passenger service.

We selected these two milestones because (1) each milestone follows equipment installation (which FRA had previously analyzed to assess commuter railroads PTC implementation progress); (2) a railroad must complete both to enter RSD; and (3) several interviewees, including PTC contractors and suppliers and FRA officials, said these activities are important project milestones that are complex and time consuming. We calculated the amount of time a commuter railroad planned for each milestone (with initiating RSD as the endpoint for each milestone), and compared that amount of time to two benchmarks:[8] first, the anticipated length of time FRA officials said that the milestones have taken or may take, and second, the average amount of time (in months) that each milestone took the six commuter railroads that had started RSD as of September 2017. Since we used two benchmarks, we present a range of railroads that may not have sufficient time to complete these milestones and thus may be at risk of not meeting the 2018 deadline or qualifying for an RSD-based extension.[9]

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[7] FRA identified 14 commuter railroads that, as of December 31, 2016, had installed less than 50 percent of all PTC system hardware required for the railroads' PTC system, as specified in its revised PTC Implementation Plan.

[8] We assessed all commuter railroads against these milestones, regardless of whether a railroad planned to seek an extension. Railroads that do not plan to seek an extension have said that they will conduct RSD as the final step of required field testing, making it a meaningful milestone, and railroads that do plan to seek an extension must by statute either initiate RSD on at least one territory or meet any other alternative criteria established by FRA. While these alternative criteria are not required to be based on RSD, we used RSD as a benchmark for our analysis based FRA's three "alternative criteria" approvals to date; all of which have used RSD-based criteria (RSD testing on a segment of track versus RSD testing on an entire territory). According to an FRA official, it approved these three extensions because they were based on alternative, specific, and quantifiable measures which happened to be RSD but could have been other specific, quantifiable measures.

[9] Two commuter railroads were seeking waivers or exemptions for PTC, and neither railroad was able to share planned schedule information for the milestones. Therefore, we included these two railroads in our count of railroads that may be at risk for both milestones, as FRA had not yet decided whether to approve either railroad's request. In addition, two other commuter railroads that operate only as tenants on other railroads' tracks were using the host railroads BOS. Since these railroads lacked a date for installing a BOS, we could not calculate the amount of time each planned for this milestone. One of these railroads is operating PTC in RSD, so we

Continued

APPENDIX II: AGENCY COMMENTS

U.S. Department of Transportation
Office of the Secretary of Transportation

Assistant Secretary for Administration

1200 New Jersey Avenue SE
Washington, DC 20590

Susan A. Fleming
Director, Physical Infrastructure Issues
U.S. Government Accountability Office (GAO)
441 G Street NW
Washington, DC 20548

FEB 20 2018

Dear Ms. Fleming:

The Federal Railroad Administration (FRA) is committed to actively overseeing the progress of each railroad implementing a positive train control (PTC) system until all railroads have fully implemented an FRA-certified and interoperable PTC system on all required route miles. In addition, we will continue to perform the oversight duties required by Congress and use our oversight role and available technical resources, to the greatest extent possible, to help railroads prepare for the 2018 deadline or qualify for an extension. During calendar year 2018, FRA will also strategically increase its oversight actions and technical assistance to accelerate at-risk railroads' implementation of PTC systems. Examples of these actions include the following:

- Beginning in December 2017 and continuing in calendar year 2018, FRA leadership has met with the executive leadership and technical teams of each of the 41 railroads subject to the statutory mandate to help ensure railroads understand the statutory requirements and deadlines, to discuss the challenges the railroads continue to experience, and the railroads' precise plans for compliance with the statutory mandate.

- FRA will use the information it continues to learn in these 41 meetings and railroads' Quarterly PTC Progress Reports for Quarter 1 of 2018 to support its risk-based strategy for oversight in the remainder of 2018 and beyond. We will continue to provide technical assistance throughout railroads' PTC system installation, testing, and operation.

Upon review of the GAO's draft report, we concur with both recommendations and have already taken steps, as noted above, to identify and adopt a method for systematically communicating information to railroads and use a risk-based approach to prioritize our resources and workload. We will provide a detailed response to each recommendation within 60 days of the final report's issuance.

We appreciate the opportunity to respond to GAO's draft report. Please contact Madeline M. Chulumovich, Director, Audit Relations and Program Improvement, at (202) 366-6512 with any questions or if you would like to obtain additional details.

Sincerely,

Keith Nelson
Assistant Secretary for Administration

did not categorize it as at risk. The other railroad had begun functional testing, so we categorized this railroad as at risk based for the more stringent comparison.

The CHAIRMAN. Thank you, Ms. Fleming.
Mr. DeWeese.

STATEMENT OF HON. BARRY J. DEWEESE, ASSISTANT INSPECTOR GENERAL, SURFACE TRANSPORTATION AUDITS, U.S. DEPARTMENT OF TRANSPORTATION

Mr. DEWEESE. Chairman Thune, Ranking Member Nelson, and members of the Committee, thank you for inviting me to this important hearing on positive train control, or PTC.

Several fatal rail crashes over the past decade have heightened the need to implement PTC, one of the most complex and costly safety mandates that the rail industry has undertaken. The current deadline Congress has set for full implementation is at the end of this year.

At this Committee's request, we are currently reviewing Federal funding support for PTC and DOT's oversight of that support. We plan to issue our full report this spring. And today I will share observations on three aspects of our ongoing review: one, the amount of Federal financial assistance for PTC projects; two, DOT's oversight of Federal funds invested in such projects; and, three, key funding challenges and concerns as the rail industry implements PTC.

DOT has provided $2.9 billion to date for PTC implementation through a combination of grants and loans. As of September 30, 2017, $2.3 billion has been obligated. Rail systems can receive support from multiple sources, and at the time of our review, 29 rail systems have received Federal assistance.

Our work also shows that PTC projects vary greatly, depending on railroad type and recipients' needs. For example, some recipients use their Federal funding to acquire wireless communications equipment, while others buy onboard equipment for locomotives. DOT's oversight of PTC funding varies as well, depending on the type of funding or financial support.

Each DOT organization follows its existing oversight mechanisms for grants or loans. In the case of formula grants, the grantee has substantial discretion and flexibility on the use of funds. Regardless of oversight method, DOT cannot readily identify funding support or spending for PTC projects. Some PTC funding may be part of a larger grant, in those cases, recipients may not be required to capture or report PTC-specific spending to DOT. This makes it hard to determine which projects include PTC elements.

DOT's grant management systems also generally track spending by broader budget codes, making it difficult to see what portion of Federal awards went to PTC versus non-PTC projects. Therefore, DOT currently relies, as did we, on the recipients to provide more accurate information on PTC funds when requested. Their financial systems typically captured more detailed data on spending and budget line items.

Finally, we noted several funding challenges and concerns as railroads deploy PTC. While the extended deadline for implementation is fast approaching, not all of the funds obligated have been spent. Only four recipients have actually spent all of their provided funds, seven reported no expenditures at the time of our review, and the rest reported spending in the 50 to 75 percent range.

It is important to note, however, that PTC funding support was provided at different points in time over the last decade, making it challenging to compare spending across various rail systems or to determine if the pace of spending has slowed implementation.

In looking to the future, some recipients express concern about what it will cost to operate and maintain PTC systems once they are in place and how it will impact other safety priorities or their operational budgets. In 2016, the American Public Transportation Association estimated that operation and maintenance costs would run about $100 million a year for commuter railroads, but that long-term costs are still uncertain.

A key watch item for DOT, Congress, and industry will be to instill a sense of urgency to deliver PTC while limiting any possible negative effects on the overall safety of the system. We are committed to working with the Department and this Committee to monitor the funding implications that could impact the deployment of PTC.

This concludes my prepared statement. I would be happy to address any questions from you or members of the Committee.

[The prepared statement of Mr. DeWeese follows:]

PREPARED STATEMENT OF BARRY J. DEWEESE, ASSISTANT INSPECTOR GENERAL FOR SURFACE TRANSPORTATION AUDITS, U.S. DEPARTMENT OF TRANSPORTATION

OBSERVATIONS ON FEDERAL FUNDING SUPPORT FOR POSITIVE TRAIN CONTROL IMPLEMENTATION

Chairman Thune, Ranking Member Nelson, and Members of the Committee:

Thank you for inviting me to this important hearing on positive train control (PTC) implementation. We are all here today in the interest of advancing safety to protect the traveling public. Over the last decade, several fatal rail incidents led the U.S. rail industry and congressional leaders to commit to implementing PTC on railways nationwide. In 2008, Congress enacted this requirement and set a deadline of December 31, 2015, through the Rail Safety Improvement Act (RSIA),[1] after a devastating crash between a commuter train and freight train. Since that time, implementing PTC has been a priority for industry and the Department of Transportation (DOT). Recent accidents, such as the December 2017 derailment in Washington State that resulted in 3 deaths and more than 60 injuries, have renewed attention on this important issue and highlighted the difficulties in carrying out this critical mandate by congressional deadlines.

Citing funding and technical challenges, the industry did not meet the 2015 deadline, and Congress extended it by 3 years with the possibility of an additional 2-year extension if a railroad meets the statutory criteria set forth in the Positive Train Control Enforcement and Implementation Act of 2015.[2] Since the enactment of the RSIA, DOT has been tasked with overseeing funding support for PTC implementation, including grants and loans.

My testimony today is based on our ongoing work, conducted at the request of this Committee, regarding Federal funding for PTC and the Department's oversight of those funds and other financial support. Specifically, my statement will provide our observations and information to date on (1) the amount of Federal financial assistance for PTC implementation and the types of projects, (2) the Department's oversight of the Federal funds invested in PTC projects, and (3) key funding challenges and concerns as rail systems implement PTC. We plan to complete our audit work and issue to this committee our final report with the agencies' responses in April 2018.

Summary

To reduce the number of rail crashes caused by human error, the U.S. rail industry and Congress are working to implement PTC systems, and DOT has provided

[1] Pub. L. No. 110–432 (2008).
[2] 49 U.S. Code § 20157.

$2.9 billion to date to implement PTC. However, $2.3 billion had been obligated as of September 30, 2017, which was the focus of our work since this was the actual amount available to recipients for expenditure. PTC is an advanced communication-based technology designed to prevent certain accidents caused by human error, including train-to-train collisions and derailments caused by exceeding safe speeds. However, PTC projects vary greatly based on the type of railroad, the need for interoperability, and available communication systems. The Department's financial oversight also varies, based on funding sources and other factors, with each organization following its own established oversight mechanisms. Our ongoing review has noted that the Department's financial and grant management systems do not always provide the detail necessary to identify PTC-specific costs. Instead DOT relies on the rail systems to provide accurate information. We are also finding that only a few funding recipients have used all of their PTC funds despite the approaching mandate. Some funding recipients are concerned about potential shortfalls in funding to operate and maintain PTC, which could result in funds being shifted from other safety priorities. These will be key watch items for the Department and Congress—as rail systems move forward with PTC implementation—to maintain a sense of urgency and ensure that there are no negative effects on the safety of the system despite the improvements that PTC can deliver.

Background

Since the 2008 fatal rail crash that led to the enactment of the RSIA, several other fatal rail incidents have strengthened the Department's commitment to implementing PTC nationwide (see table 1).

Table 1. Examples of PTC-Preventable Crashes

Date	Location	Incident
September 2008	Chatsworth, CA	A distracted engineer ran a Metrolink train through a red signal, causing a collision that killed 25 and injured 135.
May 2011	Mineral Springs, NC	Human error contributed to the rear-end collision of two freight trains, killing two crew members and injuring two more
June 2012	Near Goodwell, OK	Human inattentiveness contributed to the collision of two freight trains, killing three crew members.
December 2013	Bronx, NY	An engineer fell asleep and caused a Metro-North passenger train derailment that killed 4 and injured 61.
May 2015	Philadelphia, PA	A distracted engineer accelerated into a sharp curve, causing an Amtrak derailment that killed 8 and injured 185.
December 2017	Near DuPont, WA	A derailment caused 3 deaths and over 60 injuries. The National Transportation Safety Board's investigation is expected to last 12 to 24 months.

Source: OIG

The RSIA required Class I railroad main lines handling poisonous-inhalation-hazard materials and any railroad main lines with regularly scheduled intercity and commuter rail passenger service to fully implement PTC.[3] A fully functioning PTC system must be able to precisely determine the location and speed of trains, warn train operators about potential problems, and take action if the operator does not respond to a warning. A PTC system is made up of more than 20 major components in various stages of development, which must then be integrated and installed across the rail network.

The Federal Railroad Administration (FRA) identified rail systems[4] as subject to congressional requirements for PTC implementation. Subsequently, eight of these rail systems were granted a waiver from the PTC statutory mandate, related to overarching FRA regulations for safety rule waivers.[5] Of the 41 rail systems still required to implement PTC, per the statutory mandate, 25 are receiving Federal financial support. Four others have chosen to implement PTC and also receive Federal assistance—either because the rail system's future operations will be subject to the statutory mandate or because the rail system is a tenant railroad that operates on a track segment already required to have PTC. By the end of Fiscal Year 2017,

[3] The RSIA defines main lines as those carrying 5 million or more gross tons of freight annually and authorizes the Federal Railroad Administration (FRA) to define the term "mainline" by regulation for passenger routes or segments over which limited or no freight railroad operations occur.

[4] For the purpose of our review, we refer to all direct recipients of PTC funding as "funding recipients" and "rail systems," whether railroads, commuter rail, etc.

[5] As implemented by 49 CFR 236.1019.

29 rail systems had received financial support from such sources as FRA, the Federal Transit Administration (FTA), and the Build America Bureau (BAB).[6]

DOT Provided $2.9 Billion for PTC Projects, With Nearly $2.3 Billion Obligated by End of Fiscal Year 2017

As of the end of Fiscal Year 2017,[7] approximately 60 percent of the U.S. rail systems required to implement PTC are receiving financial support. Specifically, 29 rail systems have received Federal assistance. According to estimates provided to us by the funding recipients, DOT has provided $2.9 billion to date to implement PTC. However, $2.3 billion had been obligated as of September 30, 2017, which was the focus of our work since this was the actual amount available to recipients for expenditure. Of this amount, the Department has obligated $1.3 billion through various Federal grants, and the BAB issued approximately $1 billion through a loan (see exhibit A). Funding recipients rely on various departmental funding programs to support PTC work, such as formula grants, discretionary grants, and loans.[8]

Federal funding grants ranged widely, depending on size of the rail system, the quantity and scope of projects, or the amount of funding requested. For example,

- Providence and Worcester Railroad received just under $1 million for a single project to purchase and equip locomotives with on-board kits.
- Southeastern Pennsylvania Transportation Authority received approximately $181 million for a total of seven projects that included installing signals, interlocking, and right-of-way improvements throughout multiple rail lines.

On average, those using Federal funding grants received $36.1 million. In addition, two rail systems secured financial loans from the Department—approximately $967 million went to the New York Metropolitan Transportation Authority and, subsequent to the data collection portion of our review, Massachusetts Bay Transportation Authority borrowed $382 million.[9]

A rail system can receive Federal support from multiple sources, whether as a direct recipient or through another grantee. Some railroads, such as Amtrak, receive funds both directly and indirectly. At the end of Fiscal Year 2017, the 29 rail systems mentioned above had received Federal assistance from 37 different funding recipients. Nineteen received funding from FRA, 25 from FTA, 7 from both FRA and FTA, and 1 was funded through a loan from BAB.[10]

Rail systems were at different points of implementation when they applied for Federal funding and may have used State or local money to pay for some PTC-related projects. Projects vary greatly based on the type of railroad, the need for interoperability,[11] and available communication systems. For example, some funding recipients may seek to acquire wireless communications equipment, while others have obtained financial assistance to purchase onboard equipment for locomotives. The California High-Speed Train System is using awarded funds to produce a detailed design development plan for implementing PTC in the Caltrain corridor, which connects San Francisco and San Jose; the plan includes identifying the necessary interoperable interfaces. The Nashville Regional Transportation Authority received funding to cover its PTC-related costs on the Music City Moves commuter rail line that operates on the Nashville & Eastern Railroad. The two organizations have estab-

[6] The enactment of the FAST Act led to the July 2016 creation of BAB to oversee various grant and credit programs administered by the Department. BAB is responsible monitoring and reviewing the Railroad Rehabilitation and Improvement Financing (RRIF), Transportation Infrastructure Finance and Innovation Act (TIFIA), and Private Activity Bonds (PAB) programs as well as the recently enacted Infrastructure for Rebuilding America (INFRA) grant program.

[7] As requested, we reviewed DOT's funding and financing for implementation of PTC since 2008. For timely reporting purposes, the scope of this review includes funding that had been obligated by September 30, 2017 (end of Fiscal Year 2017).

[8] Formula grant programs are noncompetitive awards based on a predetermined formula. Unlike a formula grant, a discretionary grant awards funds on the basis of a competitive process. The Department reviews applications, in part through a formal review process, in light of the legislative and regulatory requirements and published selection criteria established for a program. Additionally, the Department is authorized to provide credit assistance, direct loans and loan guarantees to finance development of railroad infrastructure.

[9] On December 8, 2017, BAB issued two loans to the Massachusetts Bay Transportation Authority. One was a RRIF loan for $220 million, and the other was a TIFIA loan for $162 million, for a total of $382 million.

[10] This was the loan to the New York Metropolitan Transportation Authority discussed above.

[11] Commuter railroads often run on tracks owned by Class I freight railroads, as well as freights on commuter-owned track. All tenant railroads equipped with PTC must be interoperable with the PTC system installed by the host railroad.

lished an agreement concerning their shared responsibilities through September 2036.[12]

DOT's Oversight of Financial Support for PTC Varies

DOT's oversight of Federal support for PTC implementation is generally dictated by the type of funding program, which is typical for all projects supported by the Department (see table 2 below for a list of grants, loans, and programs that support PTC implementation). Each DOT organization follows its own established oversight mechanisms for grant or loan procurement activities. These include a combination of recurring reviews of financial reports; regular phone calls, meetings, and e-mails with funding recipients; and onsite monitoring visits. In addition, BAB monitors financial plans and reviews credit worthiness throughout the span of a project to minimize the Federal Government's risk.

While DOT relies on various oversight methods, those methods cannot readily identify the funding support or the PTC projects on which the funds were spent. With the exception of projects funded by the PTC-specific grant programs authorized by the Fixing America's Surface Transportation Act,[13] DOT-awarded funds may support more than one project or other activities in addition to PTC. Consequently, when PTC is a component of a larger grant or loan, funding recipients may not be required to capture or report PTC-specific expenditures to the Department. This would be the case, for example, with Federal formula funding, which is apportioned to States based on population and not subject to DOT's discretion.

In addition, the Department's financial and grant management systems do not always provide the granularity necessary to precisely identify PTC costs. For example, grant management systems generally track expenditures by broader budget codes like "signals," which may include signaling for PTC and non-PTC projects. As a result, it is difficult for FRA and FTA to extract PTC-specific spending from Federal awards for other types of activities, and the two agencies must rely on the rail systems to provide more accurate and detailed information. We obtained estimates from FRA and FTA on how much funding has been used for PTC but found that either the grantees had provided the information or the agencies' estimates were incorrect.

Officials at the rail systems confirmed that they have more detailed information about expenditures and provided the information used in our review. More specifically, we found that the grantees' financial systems generally capture more data than DOT's grant management systems regarding expenditures and budget line items, which may include funding from local, State, and Federal entities. Each funding recipient uses its own financial tracking mechanisms to document all of its grants and issue reports to DOT agencies. These mechanisms range from internal controls for price and cost analyses to accounting software for tracking budgets, expenditures, and work progress.

Table 2. Grants, Loans, and Programs That Have Funded PTC Implementation

Funding or Financial Assistance Program	Oversight Agency	Legal Citation
American Recovery and Reinvestment Act of 2009	FRA	Pub. L. 111–5
Amtrak National Network Grant	FRA	49 U.S.C. § 24319
Fixed Guideway Modernization	FTA	49 U.S.C. 5309
FTA Revenue Bond	FTA	§ 3011 of Pub. L. 105–178
High-Speed Intercity Passenger Rail Grant	FRA	Div. B, Pub. L. 110–432
New Starts	FTA	49 U.S.C. 5309
PTC Implementation Grant	FTA	§ 3028 of FAST Act, Pub. L, 114–94
Railroad Rehabilitation & Improvement Financing (RRIF) Loan	BAB	45 U.S.C. 822
Railroad Safety Technology Grant	FRA	49 U.S.C. 20158
Research and Development Grant	FRA	Pub. L. 115–31 and previous appropriations acts

[12] We plan to issue our final report in April 2018; it will include a description of all 54 PTC projects nationwide using Federal funding support.

[13] Pub. Law No. 114–94 (2015).

Table 2. Grants, Loans, and Programs That Have Funded PTC Implementation—Continued

Funding or Financial Assistance Program	Oversight Agency	Legal Citation
State of Good Repair Formula Grant	FTA	49 U.S.C. 5337
Transportation Infrastructure Finance and Innovation Act (TIFIA) Loan	BAB	§ 2001 of FAST Act, Pub. L, 114–94
Transportation Investment Generating Economic Recovery (TIGER) Grant	FTA	Pub. L. 115–31 and previous appropriations acts
Urbanized Area Formula—Economic Recovery	FTA	49 U.S.C. 5307
Urbanized Area Formula Grant	FTA	49 U.S.C. 5307

Source: OIG

Funding Recipients Are Concerned About Funding Shortfalls and Delays

While approximately $2.3 billion has been provided for PTC projects, only 4 of 37 funding recipients have completely expended their Federal funds—and the extended deadline for PTC implementation is approaching at the end of this year. More than half of the recipients reported spending over 50 percent of their funds, and about 40 percent reported spending over 75 percent.

It is important to note that funding and financial assistance was made available at various points over the last decade, which makes it challenging to compare spending at rail systems. For example, FRA's Railroad Safety Technology Grants provided funds specifically for PTC implementation—$50 million in Fiscal Year 2010, $11 million in Fiscal Year 2015, and $25 million in Fiscal Year 2016. However, our analysis noted that nearly $15 million of the $25 million awarded in August 2016 had not been obligated to the grantees.[14] Similarly, out of the $197 million authorized for PTC implementation under the FAST Act, approximately $190 million had not been obligated to the grantees, even though award selections were announced last May. Since grantees have yet to receive these dollars, we excluded unobligated grant awards from our analysis of Federal funds provided to rail systems for PTC implementation. Exhibit B provides the status of individual awards for the Fiscal Year 2016 Rail Safety Technology and Fiscal Year 2017 FAST Act grant programs.

In addition, some funding recipients are concerned about future shortfalls and delays in grant funding to support PTC, which could result in funds being shifted from other projects. Most funding recipients stated general concerns about budgeting for PTC implementation, which has led some to divert funds from other safety priorities. Of the funding recipients we surveyed, 12 of 34 respondents said PTC implementation was having a negative effect on other funding priorities or general rail service. One recipient pointed out that the $15.8 million in PTC-specific grants it received was minimal compared to the $310 million in Federal and State funds it had to divert to implement PTC, which delayed investment in state-of-good-repair projects elsewhere in the system. According to the recipient, these challenges reduced capital funds to a 15-year low.

Other funding recipients expressed concerns about the uncertainty of ongoing operating and maintenance costs after PTC implementation and how that will affect their operational budgets. In 2016 the American Public Transportation Association estimated the operation and maintenance of PTC would cost commuter railroads about $100 million a year and stated that many rail systems were still uncertain about the magnitude of future long-term costs. Officials at FRA and FTA said they are aware of this concern, but they too are not sure whether additional funding will be allocated to support ongoing operational and maintenance costs after full PTC implementation.

Conclusion

PTC is one of the most complex and costly safety mandates ever undertaken by the railroad industry. Recent accidents, although rare, remind us that they can and do occur and have a profound impact on lives and communities. While the U.S. rail industry and Congress are committed to implementing PTC nationwide, progress has been slower than anticipated, and ensuring that the rail industry has a sense of urgency will be a key watch item for the Department. Given the potential impact on safety projects throughout the Nation's rail systems, the Department must also be mindful of industry concerns that the costs of operating and maintaining the PTC system, once implemented, could crowd out other safety-critical projects. We are

[14] The scope of this review includes funding obligated by September 30, 2017 (the end of Fiscal Year 2017).

committed to working with DOT and this Committee to monitor the funding implications that could impact railroads' deployment of PTC and expect to issue our final report in April 2018.

This concludes my prepared statement. I will be happy to answer any questions you or other Committee Members may have.

Exhibit A. ESTIMATES OF FEDERAL FUNDING AND FINANCING OBLIGATED FOR PTC IMPLEMENTATION BY END OF FY 2017

	Funding Recipients	Estimated Total Cost of PTC Implementation	FTA Funds	FRA Funds	Total Federal Funds	% Federal Funds Expended
1	Connecticut DOT	$180,000,000	$144,055,237	$3,836,100	$147,891,337	17.5%
2	Maryland DOT	$30,458,627	$9,476,056	$642,445	$10,118,501	77.0%
3	New York DOT	$54,214,286	$—	$3,000,000	$3,000,000	0.0%
4	New York Metropolitan Transportation Authority	$1,063,000,000	$90,236,669	$6,597,000	$96,832,669	88.5%
5	Pennsylvania DOT	$—	$7,034,353	$1,350,000	$8,384,353	50.4%
6	Southern California Regional Rail Authority	$240,365,079	$19,168,366	$9,005,446	$28,173,813	92.5%
7	Amtrak	$232,800,000	$—	$187,820,938	$187,820,938	94.5%
8	California DOT	$12,810,000	$—	$38,400,000	$38,400,000	86.1%
9	California High-Speed Rail Authority	$20,000,000	$—	$16,000,000	$16,000,000	99.0%
10	Fort Worth & Western Railroad	$3,648,496	$—	$2,538,768	$2,538,767	20.0%
11	Illinois DOT	$88,000,000	$—	$72,387,079	$72,387,079	93.2%
12	Michigan DOT	$168,965,682	$—	$152,772,015	$152,772,015	100.0%
13	Missouri DOT	$60,000,000	$—	$3,000,000	$3,000,000	0.0%
14	Providence & Worcester Railroad Co.	$1,300,000	$—	$965,832	*$965,832*	0.0%
15	Kansas City Southern (KCS) Railway Company, MO*	$300,000,000	$—	$1,867,449	$1,867,449	73.3%
16	Twin Cities & Western Railroad Company	$5,065,000	$—	$1,100,550	$1,100,550	0.0%
17	Washington State DOT	$7,909,170	$—	$6,382,182	$6,382,182	100.0%
18	Alaska Railroad Corporation	$171,100,000	$77,211,524	$735,000	$77,946,524	89.5%
19	Dallas Area Rapid Transit (DART)	$44,500,000	$12,500,000	$—	$12,500,000	0.0%
20	Denton County Transportation Authority	$20,000,000	$13,588,430	$—	$13,588,430	68.7%
21	Florida DOT (SFRTA)	$73,500,000	$6,725,482	$—	$6,725,482	7.5%
22	Fort Worth Transportation Authority	$—	$17,000,000	$—	$17,000,000	0.0%
23	Massachusetts Bay Transportation Authority	$492,028,418	$2,560,000	$—	$ 2,560,000	74.0%
24	Metra—Northeast Illinois Regional Commuter Railroad Corporation	$385,879,609	$155,948,676	$—	$155,948,676	60.7%
25	Minnesota DOT (Met Council)	$4,400,000	$4,219,303	$—	$4,219,303	72.9%
26	Nashville Regional Transportation Authority (RTA)	$25,000,000	$2,425,445	$—	$2,425,445	0.7%
27	Northern Indiana Commuter Transportation District (NICTD)	$117,767,416	$11,073,177	$—	$11,073,177	75.5%
28	North County Transit District	$87,292,969	$7,668,038	$—	$7,668,038	87.5%
29	Orange County Transportation Authority	$—	$4,147,427	$—	$4,147,427	57.9%
30	Peninsula Corridor Joint Powers Board	$231,000,000	$27,433,269	$1,250,000	$28,683,269	96.5%
31	Prince William County/ Potomac and Rappahannock Transportation Commission	$14,192,000	$8,442,714	$—	$8,442,714	68.7%
32	Regional Transportation District (RTD)	$22,682,612	$5,512,543	$—	$5,512,543	100.0%
33	Riverside County Transportation Commission	$5,100,000	$2,095,447	$—	$2,095,447	100.0%
34	San Joaquin Regional Rail Commission (SJRRC)	$9,000,000	$6,400,868	$—	$6,400,868	52%
35	Southeastern Pennsylvania Transportation Authority (SEPTA)	$310,000,000	$187,271,060	$—	$187,271,060	95.6%
36	Tri-County Metropolitan Transportation District of Oregon (TriMet)	$14,000,000	$2,704,000	$—	$2,704,000	0.0%
37	Utah Transit Authority (UTA)	$31,158,524	$3,520,000	$—	$3,520,000	0.0%
Grant Funding Totals		$4,527,137,888	$822,618,085	$509,653,804	$1,332,271,888	76.45%
Grant Funding Totals, Without KCS		$4,227,137,888	$822,618,085	$507,786,355	$1,330,404,439	76.46%
USDOT Loans Issued for PTC-Related Projects						
	New York Metropolitan Transportation Authority			$967,100,000 (RRIF)	$967,100,000	15.1%
	Massachusetts Bay Transportation Authority		*$162,000,000 (TIFIA)*	*$220,000,000 (RRIF)*	*$382,000,000*	*0%***

	Funding Recipients	Estimated Total Cost of PTC Implementation	FTA Funds	FRA Funds	Total Federal Funds	% Federal Funds Expended
Total with MTA Loan		$4,527,137,888	$822,618,085	$1,476,753,803	$2,299,371,888	50.67%
Total, Including Both Loans		*$4,527,137,888*	*$984,618,084*	*$1,696,753,803*	*$2,681,371,888*	*43.45%*
Total, Including Both Loans but Without KCS		*$4,227,137,888*	*$984,618,084*	*$1,694,886,355*	*$2,679,504,439*	*43%*

*Kansas City Southern is a Class I railroad that indicated it had received funding to enhance wireless communications capabilities in preparation for PTC implementation, including a conversion from their analog system to a digital communications system.

**The TIFIA and RRIF loans to the Massachusetts Bay Transportation Authority were issued after the end of Fiscal Year 2017 and are therefore outside the scope of our review. We provide these details to acknowledge that additional financing was issued.

*Source: OIG analysis of information provided by PTC funding recipients. Note: $– as an implementation cost indicates an entity that received funds on behalf of a railroad operating within that State; *e.g.,* Pennsylvania DOT does not own or operate its own railroad, but it received a grant from FTA that was used for SEPTA's system. Entities whose implementation costs were less than the total funds received partially funded other rail projects; *e.g.*, California DOT provided funds to North County Transit District for Metrolink. Additionally, OIG noted several grants that were in process but not awarded by the end of Fiscal Year 2017. For example, Capital Metro is in the process of being awarded $12,762,969 for PTC implementation, and New Jersey Transit expects to receive an award of $10 million.

Exhibit B. EXAMPLES OF PTC GRANTS PENDING OBLIGATION

During our analysis of FTA and FRA grant funding, we noted that a number of recent PTC-specific grants had been announced but were not documented in DOT's grant management systems. These grants had not yet been officially obligated and were technically still in the award process. We analyzed the status for grants in the two most recent announcements for PTC-specific funding, Fiscal Year 2016 FRA Railroad Technology Grants and Fiscal Year 2017 PTC Implementation Grants (see tables B1 and B2). FTA and FRA explained that once allocations for grants are made, the grantee must complete application requirements, including those for environmental and program review at the agency. Only when that work is completed can the grant be officially obligated. The DOT agencies stressed that most grants are eligible for pre-award authority, allowing pre-award expenditures on approved programs to be reimbursed after the funds are obligated. However, it is important to note that we did not include unobligated grants in our analysis since grantees have yet to fully receive the funding.

Table B1. Status of FY 2016 Railroad Technology Grant Recipients

	Grantee	State	Grant Allocation	Status
1	American Short Line and Regional R.R. Association	DC	$2,500,000	Not Obligated
2	Amtrak	DC	$2,640,000	Not Obligated
3	Caltrain	CA	$2,880,000	Not Obligated
4	Capital Metropolitan Transportation Auth.	TX	$3,000,000	Not Obligated
5	Fort Worth and Western Railroad	TX	$2,560,000	Obligated
6	Missouri DOT	MO	$3,000,000	Obligated
7	North Carolina DOT	NC	$771,070	Not Obligated
8	Providence and Worcester Railroad Co.	MA	$965,832	Obligated
9	Metrolink	CA	$2,400,000	Obligated
10	Sonoma-Marin Area Rail Transit/SMART	CA	$3,000,000	Not Obligated
11	Twin Cities and Western Railroad Co.	MN	$1,100,000	Obligated
			$24,816,902 Allocated	$14,791,070 Not Obligated

Source: OIG

Table B2. Status of FY 2017 FAST Act PTC Funding Recipients

	Grantee	State	Grant Allocation	Status
1	Capital Metropolitan Transportation Authority	TX	$9,760,000	Not Obligated
2	Florida DOT	FL	$1,840,000	Not Obligated
3	Illinois DOT	IL	$18,870,000	Not Obligated
4	Mass. Bay Transportation Authority	MA	$7,820,000	Not Obligated
5	Maryland Transportation Authority	MD	$9,440,000	Not Obligated
6	Missouri DOT	MO	$12,020,000	Not Obligated
7	New Jersey Transit	NJ	$10,000,000	Not Obligated
8	New York State DOT	NY	$33,750,000	Not Obligated
9	Oregon DOT	OR	$1,200,000	Not Obligated
10	Peninsula Corridor Joint Powers Board	CA	$21,680,000	Not Obligated
11	Regional Transportation Authority/Metra	IL	$20,200,000	Not Obligated
12	Rio Metro Transportation Authority	NM	$3,600,000	Not Obligated
13	South Florida Regional Transportation Authority	FL	$31,630,000	Not Obligated
14	Southeastern Pennsylvania Transportation Authority	PA	$5,800,000	Not Obligated
15	Southern California Regional Rail Authority	CA	$3,200,000	Not Obligated
16	Tri-County Metropolitan District of Oregon	OR	$2,700,000	Obligated
17	Utah Transit Authority	UT	$3,520,000	Obligated
Total			$197,030,000 Allocated	$190,810,000 Not Obligated

*Source: OIG

The CHAIRMAN. Thank you, Mr. DeWeese.
Mr. Mayer.

STATEMENT OF DAVID L. MAYER, CHIEF SAFETY OFFICER, NEW YORK METROPOLITAN TRANSPORTATION AUTHORITY

Mr. MAYER. Chairman Thune, Ranking Member Nelson, and other members of the Committee, thank you for the opportunity to be here today. My name is David Mayer, and I am the Chief Safety Officer of the New York Metropolitan Transportation Authority, North America's largest transportation authority.

Prior to joining the MTA, I spent 23 years with the National Transportation Safety Board, and from 2009 to 2014, I was Managing Director, the senior career official, there. I brought my two decades of experience in transportation safety as part of ushering in a renewed safety focus across the MTA.

The MTA's two railroads, the Long Island Rail Road and Metro-North Railroad, PTC implementation schedule calls for us to meet all statutory requirements by the end of 2018. And while there are significant risks and challenges to our schedule, the MTA is working diligently to implement PTC in a safe, incremental, and controlled rollout. Our railroads are confident that they will continue to operate safely while PTC is implemented.

Our commuter railroads are the Nation's busiest. With over 1,400 passenger trains per day, our railroads provide nearly 588,000 weekday trips. During peak periods, we dispatch trains every 90 seconds at both Penn Station and Grand Central Terminal. We have made significant progress in developing, testing, purchasing, and installing PTC. We have embraced the challenges of this effort and are working hard to mitigate schedule risks.

PTC is not an off-the-shelf technology. There is no plug-and-play PTC system. We are designing, testing, and installing all at once, and we have to do this in a way that ensures we do not create any new safety hazards.

Let me start by providing a snapshot of our status. Both railroads operate with a high degree of safety because current signal systems provide important safety protections, many of which have been added in incrementally as we progress toward full PTC.

One of the requirements of PTC is to prevent overspeed derailments. Long Island already has overspeed protection on its entire system, and Metro-North has had this protection at critical curves and bridges. I'm pleased to tell you that as of yesterday, all of Metro-North's territory has been equipped with speed protection hardware, and properly equipped trains are currently protected, and in the coming weeks, Metro-North will extend this protection to all trains. In addition to enforcing these permanent speed restrictions, once PTC is operational, it will also enforce temporary speed restrictions.

Another PTC requirement is preventing trains from entering work zones. Metro-North has implemented a system in 2013 that meets this PTC requirement and has been heralded as a model for the industry. Long Island will achieve this functionality once PTC comes online.

Finally, PTC is intended to guard against train-to-train collisions and the movement of a train over a misaligned switch. At both rail-

roads, existing systems provide these protections for all trains operating over 15 miles per hour. PTC will extend these protections for all speeds.

I will now discuss our implementation status, identify risks to our schedule, and then outline our strategies to mitigate those risks.

For the MTA's two railroads, we have secured 100 percent of the radio spectrum we need. We have installed 80 percent of the wayside hardware, and we have installed about 63 percent of the railcar equipment needed for compliance. We have also trained 68 percent of the required personnel. The remainder of the installation and training will be completed in time to support revenue service demonstration.

Both railroads have begun testing and compiling documentation in preparation for June applications to the FRA to enter RSD, which is a period that will illuminate any problems before beginning to systematically cut in PTC on the rest of our network.

The MTA has set a highly aggressive, but achievable schedule. We control only so much of the schedule. Railroads around the country are simultaneously taxing a limited set of specialized resources. Although not a Federal requirement, our Board has maintained an independent third-party engineer to identify risks and ways to reduce them. For example, we've pressed our systems integrator to hire additional staff and to expend additional resources to complete the required work.

In closing, PTC implementation at the MTA remains a vast undertaking. Our schedule still faces significant risks and technical challenges. We are working diligently every day to overcome these risks and challenges. We thank the states of New York and Connecticut and the Federal Government for helping us marshal the necessary resources to move this enormous effort across the finish line, including a $968 million loan sponsored by the FRA.

The MTA is fully committed to operating safe and reliable railroads. Although our challenges are significant and unique, the MTA continues to aggressively work toward full PTC compliance before December 31, 2018.

Thank you for giving us this opportunity to share with you the MTA's efforts to bring the promise of PTC into reality.

[The prepared statement of Mr. Mayer follows:]

PREPARED STATEMENT OF DAVID L. MAYER, CHIEF SAFETY OFFICER, NEW YORK METROPOLITAN TRANSPORTATION AUTHORITY

Chairman Thune, Ranking Member Nelson, and to other Members of the Commerce Committee, thank you all for the opportunity to be here today. My name is David Mayer and I am the Chief Safety Officer for the New York Metropolitan Transportation Authority (MTA), the Nation's largest transportation network.

As Chief Safety Officer, I am tasked with crafting, implementing, and overseeing a variety of safety initiatives at MTA's agencies, working closely with agency Presidents and staff from across our agencies. Prior to joining the MTA, I spent 23 years with the National Transportation Safety Board and was Managing Director, the senior career official, from 2009 to 2014. I was recruited to the MTA to use my two decades of experience in the transportation safety field as part of an effort to usher in a renewed focus on safety across the MTA family agencies.

I am here today to share with you the status of implementation of Positive Train Control (PTC) on the MTA's two commuter railroads: the Long Island Rail Road (LIRR) and Metro-North Railroad (MNR). This hearing is timely as just last week, MTA PTC implementation staff updated the MTA Board on the remaining schedule

and our progress to meet the 2018 deadline. As stated to our Board, the MTA's schedule calls for us to meet all statutory requirements by the end of 2018.

And while there are risks and challenges to our schedule, the MTA is working diligently to implement PTC in a safe, incremental, and controlled roll-out. Our approach to PTC implementation, coupled with other safety and cultural enhancements, has already yielded safety benefits. The LIRR and MNR are confident that they will continue to operate safely as PTC is implemented on schedule.

MTA's two railroads are the Nation's busiest commuter railroads. With over 1,400 revenue trains per day, the railroads provide nearly 588,000 trips on an average weekday morning, with a total of more than 177 million trips annually. These two railroads operate some 2,400 rail cars along 1,381 track miles. The combined service territory spans nearly 5,000 square miles fanning out from New York City, and it serves a regional population of 15 million. Between the LIRR and MNR, we support 2,200 train movements of both passenger and work trains each day; this translates to as many as 303 trains per hour during peak service. To put this in context, the LIRR and MNR provide more commuter annual rail trips than the commuter rail agencies in Chicago, Philadelphia, Boston, Salt Lake City, and Los Angeles combined.

Nowhere in this country has a fully designed PTC system been implemented on passenger rail networks as large, complex, and with as dense operations as the LIRR and MNR. During rush hour periods, hundreds of trains move in close succession through a series of complex switches and interlockings in Queens and the Bronx and into and out of our terminals in Manhattan and Brooklyn. During peak periods, we dispatch trains every 90 seconds at both Penn Station and Grand Central Terminal.

MTA Service Area & PTC Landscape

The MTA has taken an aggressive design-build approach to the development and implementation of PTC. The MTA has committed approximately $1 billion to support the development, testing, purchasing, and installation of PTC, and, significant progress has been made at our railroads toward meeting the statutory PTC requirements.

PTC is not an 'off the shelf' technology; there is no plug-and-play PTC system. The PTC statute requires specific PTC functions; each railroad must design the technology from the ground up, prove that it works as intended and test technology in a phased roll-out on a network that is essentially running trains 24/7. And we have to ensure that we do not introduce any new safety hazards that weren't present before. To fulfill our statutory obligations, we are designing, testing, and installing concurrently. There are significant challenges in this design-build approach, but we have embraced these challenges and have risk mitigation strategies to remain on schedule.

Let me start by providing the Committee with a snapshot of the railroad's current signal systems, which already provide critical protections against the types of accidents that PTC is intended to prevent. I will then discuss our implementation status, identify high-level risks to implementation and then outline our remaining schedule and risk mitigation strategies.

MTA's Current Signal System Safety Benefits

Both Metro-North and LIRR already operate with a high degree of safety because of functionality provided by their existing signal systems. The railroad's PTC design is an overlay onto each railroads existing signal systems and I would like to explain briefly the protections already provided by our existing systems, and how PTC will supplement those protections.

One of the primary goals of PTC is to prevent overspeed derailments like the DuPont, Washington derailment last December. Since December 2013, both MNR and LIRR have lowered the maximum allowable speed difference to no more than 20 mph at a number of critical locations. LIRR's existing network is already protected against derailments caused by overspeeding across its signaled network. I am pleased to tell you that as of yesterday, all of MNR's territory in New York and Connecticut has been equipped with Civil Speed Enforcement, and ACSES-equipped trains are currently protected from derailments due to exceeding permanent speed limits nine months ahead of the PTC deadline. Once PTC is fully installed, it will additionally enforce temporary speed restrictions, which is a layer of additional protection to the railroads' already robust systems.

Another goal of PTC is the prevention of incursions into work zones. MNR implemented a system known as its Enhanced Employee Protection System, or EEPS, in 2013. This system, which won the APTA Gold Award for Safety, has been heralded as an industry model and already satisfies this portion of the PTC mandate at

MNR. LIRR currently has track blocking and will implement an electronic Roadway Worker Protection System with PTC.

Finally, PTC is intended to guard against train to train collisions and the movement of a train over a misaligned switch. At both railroads, both of these risks are already mitigated by our existing signal systems, which limit speeds at red stop signals and switches at interlockings to 15 miles per hour. The additional functionality to be provided by PTC will be to bring trains to a complete stop at these locations.

Status of MTA's PTC Implementation

I would now like to describe our current implementation efforts of the required PTC components. MTA's PTC design is overlaid onto our existing signal systems, as I described above; the idea is to provide a supplemental safety system, layered on top of the existing protections. And railroad's PTC system must be fully interoperable with every other railroad operating on the same network.

For the MTA's two railroads, we have installed 80 percent of the wayside transponders and 87 percent of wayside interface units, 66 percent of the radio cases, and antennas necessary to transmit PTC instructions to our trains. Both railroads have secured 100 percent of the necessary radio spectrum. For on-board equipment, the railroads have equipped 423 locomotives, or 56 percent. PTC will be installed in control centers for both our railroads, and the Systems Integrator (contractor) is continuing to develop and refine the software needed. The MTA has also trained 68 percent of their train and engine crews, rail traffic controllers, train maintenance personnel and signal maintainers. Those trainings are scheduled to advance at an aggressive pace and be completed by the end of 3rd Quarter 2018.

As the MTA advances its installation of these components, our railroads are preparing to test pilot segments. The importance of pilot testing cannot be overstated. Both railroads have begun pilot testing in preparation for their application to the Federal Railroad Administration (FRA) for Revenue Service Demonstration (RSD). Getting the pilot lines into RSD is the most critical milestone that the railroads now face. Both railroads intend to submit their RSD applications to FRA this June. Both railroads have completed all hardware installations on their respective pilot segments, and in the months leading up to the filing of the applications, the railroads will be working closely with the System Integrator to complete the development of the core PTC software and to conduct site performance testing. This will enable the railroads to compile the necessary documentation to support the RSD Application and obtain FRA approval to proceed.

Our schedule estimates FRA approval to allow RSD by the fall of this year. At the present time, we do not know how long the RSD period will last, but we are already engaged with FRA on our progress and the assumptions in our approved PTC Implementation Plan. Once the FRA determines that RSD has been successful, the railroads will be able to implement PTC on the rest of their territory.

Implementation Risk Mitigation

The MTA has set a highly aggressive schedule to meet all the statutory requirements for PTC but do not control all of the activities of this schedule. Railroads around the country are taxing the resources of a limited set of suppliers. When these suppliers' schedules slip, our schedules slip. As the deadline approaches, railroads across the country will be dependent on the FRA for timely review and approval of our plans and documents.

The MTA is making every attempt to meet our schedule. Though not a Federal requirement, we have retained a third-party independent engineer work independently of our PTC implementation teams to identify areas of schedule risk and actions to reduce or eliminate these risks. We have pressed our Systems Integrator to hire additional staff and expend additional resources to complete the integrated testing necessary to prove the PTC system is safe and works as intended, and to resolve any unknown technical issues that may occur during testing. FRA staff have been and continue to be good partners in guiding the MTA in the development of the RSD and all other PTC matters.

MTA PTC Development & Funding

Since the passage of the original PTC mandate, the MTA has worked to meet regulatory milestones, collaborated with Amtrak and other railroads on interoperability issues, worked to secure the required spectrum, and competitively procured a System Integrator. The nearly $500 million contract awarded to the SI encompasses the engineering, design, and provision of all material components, wayside, onboard, and communication equipment.

In 2015, U.S. DOT awarded a $968 million Railroad Rehabilitation and Improvement Financing (RRIF) loan to the MTA. The loan, which at the time was the largest ever awarded, is being used towards the installation of PTC, as well as for fund-

ing signal upgrades to some sections of non-signaled (dark) territory that were previously exempted from PTC protections due to low traffic density. As the MTA is committed to ensuring maximum safety, we are upgrading our dark territories to bring PTC safety benefits to our entire network. Thus far, the MTA has submitted approximately $350 million in reimbursable expenditures for funding via the RRIF Loan and we will continue to submit invoices twice a year as we accept delivery of PTC components and as vendors continue to submit invoicing. As you know, RRIF is a reimbursement based loan program; and per MTA's loan agreement, repayment of the loan begins in 2018 and continues over the next 35 years.

Additional MTA Safety Initiatives

Though I have stated this before, it bears repeating: the MTA is committed to operating its railroads safely and reliably. PTC, while a promising life-saving technology, is only one important part of the safety of our transportation network.

Despite a lack of Federal requirements, the MTA has developed and implemented the first-in-the nation comprehensive sleep disorder screening and treatment program. We plan to have screened every train operator, bus operator, and locomotive engineer—about 17,000 employees total—by the end of May 2018.

Our railroads have also implemented the Confidential Close Call Reporting System (C3RS). As you know, C3RS is an FRA sponsored, voluntary, confidential program allowing railroad employees to report close calls. And this program is already providing safety tangible safety improvements at both railroads.

Grade crossing safety has also been a major facet of the MTA's safety efforts. The MTA has increased its grade crossing awareness through public information campaigns and a partnership with Operation Lifesaver, as well increased police enforcement for grade crossing violations, and is currently performing a long-term study of the conditions at our crossings. A key aspect of this work is an unprecedented partnership with the local authorities responsible for the roadways that cross our tracks. Through this partnership, we are realizing important incremental safety improvements, one grade crossing at a time.

Our safety program includes technological advancements that improve safety, including on-board cameras and alerters on our trains, and expanding track geometry programs to identify track problems before derailments occur.

Conclusion

PTC implementation at the MTA remains a vast undertaking—one that will not only make our system safer now but also long into the future. To be sure, our work schedule still faces significant schedule risks and technical challenges. We are working diligently every single day to overcome these risks and challenges. By the time we are done, a billion dollars will have been expended on this effort. We thank the States of New York and Connecticut and the Federal Government for helping us marshal the necessary resources to move this enormous effort across the finish line, including a $968 million RRIF loan sponsored by the FRA. The MTA continues to aggressively work toward full PTC compliance by December 31, 2018, even though our challenges are significant and unique. Thank you for giving us this opportunity to share with you and the public the efforts of the MTA to bring the promise of PTC safety into reality.

The CHAIRMAN. Thank you, Mr. Mayer.

Mr. Anderson.

STATEMENT OF RICHARD ANDERSON, PRESIDENT AND CHIEF EXECUTIVE OFFICER, AMTRAK

Mr. ANDERSON. Thank you, Mr. Chairman, and thank you, members of the Committee. My name is Richard Anderson. I began serving as President and CEO of Amtrak on January 1, 2018, following my tenure for 10 years as CEO and Executive Chairman of Delta Air Lines; COO and CEO of Northwest Airlines; President of Commercial Businesses at United Health Group; and a state court prosecutor in Houston, Texas.

As the only Amtrak CEO without a background in rail, I bring a different perspective. In 1971, many doubted that we'd see passenger rail play such a large role in transportation in America. Our services, our railroad, our infrastructures support hundreds of mil-

lions of rail transportation trips a year. It's also clear, as you look at our 47-year history, that at times we've underinvested in rail travel and certainly some safety aspects of the business.

Amtrak is essentially operated as a freight railroad carrying passengers rather than a world-class passenger transportation company. And while freight railroads have done a great job in their business model of improving safety, passenger rail must operate in America at a much higher standard of care, and that means we need to implement in America and establish a standard of a Safety Management System based upon the FAA SMS program that's in place today in aviation.

Recent incidents, including the terrible derailment of 501 near DuPont, Washington, and the collision of Train 91 in Cayce, South Carolina, conclusively demonstrate the need for an SMS system, as recommended by the NTSB, and we have commenced implementation of SMS at Amtrak.

Getting to PTC, it's the most important aspect of the Safety Management System, and it must be the safety standard for all passenger rail in America. Without PTC, the system in America for passenger trains is vulnerable to single points of human failure. And today we train engineers to memorize routes, trees, boulders, intersections, and signals, and the loss of situational awareness or forgetting a single rule, forgetting to throw a switch, we have no basic systems to act as a risk mitigation for basic human error.

Amtrak is a leader in PTC. It's installed already on virtually all of the Northeast Corridor. We're set to complete installation on the tracks and equipment we own or control by the December 31 deadline. For those areas of our network that rely on tracks of other railroads, we are closely cooperating with them as they progress on their own PTC installations.

Amtrak has to operate on 20 different railroads among three different PTC systems. We're working with the railroads that operate on Amtrak infrastructure to equip their rolling stock with PTC on our railroad.

It has been a difficult undertaking for the industry, and we are likely, and, in fact, I think we will, as a country, confront scenarios where PTC is not operational by the deadline you've established. First, some routes outside the Northeast Corridor will face a situation where the host railroads can apply for an alternative implementation schedule out to 2020 under the law. At Amtrak, through our SMS program, we have to determine whether we continue to operate in non-PTC territory and apply the principles of our Safety Management System to mitigate those risks.

Second, there are host railroads, like Canadian National, that appear unlikely to achieve sufficient progress to year's end to apply for the implementation schedule. Some of this isn't clear yet. For those route segments, we are required by law to suspend service.

Third, a portion of our services will operate on routes that receive mainline track exclusions, and actually Amtrak will, even after the deadline, operate potentially on hundreds of miles of track that are not required to have any PTC, and among those are what are called dark railroads, where there are no signal systems. We are reevaluating, in light of 501, 91, 506, 188, and 89, whether that really is a best practice if you have a very high standard of care.

And, lastly, there may be railroads that operate over our tracks which won't be commissioned, and under the present law, Amtrak cannot permit noncompliant equipment on the railroad.

So I think we have some basic challenges, and I think that it's highly probable that there will be parts of passenger rail that are not going to be compliant by the deadline.

But, one, we should establish PTC as the standard for passenger rail in America, including dark territory and including covering the areas that are today excluded by the law.

Second, all passenger railroads in America must be early adopters of the Safety Management System promulgated in a rulemaking now by FRA and consistent with Bob Sumwalt's recommendations from NTSB.

Third, we need to apply SMS methodologies and determine how we get to an equivalent level of safety for non-PTC and dark railroads.

And, lastly, I think the Committee is going to be challenged on how much discretion to give FRA in terms of the implementation deadline, or there may be significant cancellations of sort of necessary transportation. I know you may not want to hear that, but it is the reality of when you listen to all the testimony.

Thank you.

[The prepared statement of Mr. Anderson follows:]

PREPARED STATEMENT OF RICHARD ANDERSON, PRESIDENT AND CHIEF EXECUTIVE OFFICER, AMTRAK

Good morning, and thank you Chairman Thune, Ranking Member Nelson, and all of the members of this Committee for holding this hearing on rail safety and Positive Train Control. My name is Richard Anderson, and I serve as the President and Chief Executive Officer of Amtrak. My term as CEO began January 1 and, prior to this, I served as Co-CEO with Wick Moorman since July. Previously, I served as the CEO for Delta Air Lines, CEO for Northwest Airlines, and the President of Commercial Business at United Health Group.

Amtrak is committed to running the safest rail system for our customers and our employees. We have seen what can be achieved when stakeholders work together toward a common goal, as demonstrated by the commercial aviation system which last year achieved the remarkable feat of zero passenger fatalities. Amtrak has achieved strong results in the past and can and must do the same again for the intercity passenger rail industry.

Sadly, the recent incidents have demonstrated that we are far from that goal today. Though the circumstances of each of these accidents are quite different, the tragic derailment of Train 501 near DuPont, Washington, the grade-crossing incident near Crozet, Virginia, which impacted many of your colleagues, and most recently, the collision between Amtrak Train 91 and a CSX freight passenger train near Cayce, South Carolina remind us that there are still too many gaps in the U.S. rail network's current safety systems.

I am here today to pledge to you that, despite these incidents, Amtrak is a safe railroad that is becoming safer each day. All of us at Amtrak are doing all that we can with the resources we have to make sure that incidents like these don't occur again. I will chronical some of the many steps we've taken in response to these varied incidents and, more generally, describe our work to adopt a more predictive and global approach to safety. I will also present areas where broader policy discussion and greater resources are needed to strengthen safety across the diverse network of freight and commuter railroads that host the vast majority of Amtrak's route miles.

Positive Train Control

One of the most critical tools that the rail industry needs to vastly improve safety is the prompt implementation of Positive Train Control (PTC) technology. Amtrak is confident that the installation of PTC on the required routes nationwide will

make the entire U.S. rail network safer for passengers, railroad employees, and the cities and towns which the national rail network traverses.

Amtrak has long been a leader in the installation of PTC, having already deployed systems almost universally where we control the tracks including on most of the Northeast Corridor (NEC), the busiest railroad in North America. As we've already pledged in a letter to Transportation Secretary Chao, we are set to complete the installation of PTC on the few remaining elements of the infrastructure we control and on all of our equipment by the December 31, 2018 Federal deadline.

For the tracks we use but do not own or control, we are cooperating with our freight and commuter host railroads as they advance their obligations to complete PTC installations, which are required either because of the presence of our trains or the haulage of certain hazardous material. Additionally, the various freight and commuter railroads that operate over Amtrak's infrastructure must equip their rolling stock with PTC for use on our railroad and we are working cooperatively with them to advance these tasks.

PTC in Context

Railway operations in the United States are complicated, with multiple companies and agencies required to cooperate closely to ensure the safe, reliable, timely operation of various types of trains across differing networks. To integrate PTC into this complex environment has been a significant undertaking for the industry and its suppliers. While Amtrak has been eager to bring this technology online, it has been a difficult process and has required the dedication of significant resources, both in terms of funding and of our personnel.

To place PTC in its proper context, permit me to explain how PTC is designed and how Amtrak operates. PTC relies on three interdependent elements, all of which must be in place for the system to function. The first includes equipment that must be installed on the locomotives by owners and operators. Second, trackside equipment must be installed by host railroads along the protected routes that monitor signals, switches, and track circuits. Third, there are computer sys-tems, called back office servers (BOS), which link the locomotives and the trackside equipment while integrating more information about the network. Additionally, each host railroad and rail operator must have a BOS and it needs to be correctly integrated before the system can be operational. All of this must be done in the proper sequence, and for the carriers required to use the system, it must be achieved in accordance with the timetables set by law.

Locomotive Installation

The first part of a PTC system is the equipment installed on locomotives and cab cars, which monitors a train's position and speed and activates braking as necessary to ensure compliance with speed restriction and territorial limits. The complexity of our operations requires Amtrak to use three different PTC systems across our network. Since 2000, Amtrak's Northeast Corridor operations permitted to exceed 125 mph have depended on our first form of PTC called Advanced Civil Speed Enforcement System, or ACSES. By the end of 2015, to meet the original deadline of the 2008 Rail Safety Improvement Act, Amtrak had enabled ACSES for all our loco-motives, cab cars and trainsets operating on the NEC. For equipment that operates on a 98-mile stretch of track Amtrak owns in Michigan and to permit higher speed operation on the newly purchased and upgraded line owned by the State, we have installed a second form of PTC equipment, called ITCS.

Finally, to operate across the other host railroads that make up 72 percent of the miles our trains travel, we are also installing a third form of PTC in our locomotives to integrate with the I–ETMS system in use by freight railroads. Having already PTC commissioned 338 units, we are on target to have 447 Amtrak-owned units fully commissioned and ready to operate before the December 31, 2018, deadline. Apart from our locomotives and rolling stock, several of our state partners also own their own equipment which we operate and maintain. Amtrak is working with these owners and various suppliers to help achieve compliance prior to year's end.

Trackside Equipment

The second part of a PTC system is the trackside equipment, which monitors railroad track signals, switches, and track circuits. By law, each railroad owner is responsible for installation of PTC equipment on the tracks within their rights-of-way. Additionally, the hosts are responsible for reporting their PTC trackside readiness schedule to the Federal Railroad Administration (FRA). Amtrak is working with the host railroads to develop an implementation schedule for PTC integration and testing. While 13 out of 20 host railroads that will be using I–ETMS have not provided a notice of intent to start PTC testing, the four Class I railroads that own the major-

ity of the track over which Amtrak operates (BNSF, CSX, NS, and UP) have all provided letters of intent.

Regarding the trackside installations for which Amtrak is responsible, Amtrak completed the ACSES PTC implementation on all but a few miles near terminals and stations on the NEC in December 2015 and on the Harrisburg Line during the first quarter of calendar year 2016. On our Michigan Line, trackside PTC implementation on our segment was fully completed in 2011 and the State-owned portion of our route to Detroit will be completed by June 2018. Installation of the ACSES PTC system on Amtrak's Springfield Line will be completed by late Fall 2018 and we will soon begin hardware installation on the portions of the Hudson Line in New York which we control, with implementation expected by December 31, 2018.

Back Office Servers (BOS)

The third part of a PTC system is the back office server, which stores all information related to the rail network and trains, and transmits authorization for individual train movements. Each host railroad and each rail operator will have a BOS that enables the necessary information exchanges. For a BOS to be operational, the tenant who operates over a host railroad must establish a dedicated two-way communication link between their BOS and the host BOS, a process known in the field as federation. Amtrak's ACSES system does not require a BOS, so Amtrak only needs a BOS for its ITCS system in Michigan and its I–ETMS operations over freight hosts. Amtrak's BOS will pass crew and train information to the host railroad system, as well as to the locomotives themselves. Operability of Amtrak's BOS is currently scheduled for April 2018, though we are looking to accelerate its delivery through our vendors. Once it is operable, federation with the BOS of each individual host railroad must commence before PTC operations can occur.

Next Steps for PTC Implementation

While PTC relies on completing these three components, the next vital steps in deploying PTC include testing and training. Once Amtrak and a host have linked their BOS units, testing of the system will proceed, beginning this spring, to verify functionality along with system interoperability testing to ensure that all of the disparate components work together correctly. As for training, Amtrak is implementing a training plan for 1,300 locomotive engineers and 2,200 conductors that includes classroom training and, once the PTC system is active, field training. We are taking steps as part of this training to prepare our employees for what will likely be the phased deployment on routes as different hosts and territories are brought online.

The industry as a whole is already moving forward, so it is important to note that some of our partners will have PTC implemented and operational in time for the December 2018 deadline. In this case, we will continue to operate passenger rail service with the certainty that operational PTC is on that route.

However, a phased implementation brings us to a number of challenging policy questions facing Amtrak, FRA, Congress and the various railroads we interact with across our network. It is now clear that we are likely to encounter four different scenarios where PTC is not yet operational by the end of the year.

First, there will be carriers that have made sufficient progress to apply to FRA for an alternative PTC implementation schedule under the law. In these instances, Amtrak's equipment will be ready for PTC operation, but additional work, testing or approvals are still required by the host railroad before the system is considered functional. We believe a significant number of routes outside of the NEC will face this situation. The question we must ask ourselves is whether we continue to operate over such routes until PTC is turned on and if so, what additional safety protections are appropriate to reduce risks?

Second, there will be carriers over which we operate who appear unlikely to achieve sufficient progress to apply for an alternative PTC implementation schedule by year's end. For any such route segments, Amtrak will suspend operations until such time as the carrier becomes com-pliant with the law.

Third, there are areas over which we operate for which there is an FRA "Mainline Track Exclusion" in place exempting that segment from the PTC requirements based on the low levels of freight and passenger train traffic or the presence of low-speed operations, such as in yards and terminals. We are currently reviewing our policy on operating passenger trains on Exclusions to determine whether we have adequate safety mitigation practices in place for each territory and in certain areas, where signal systems are not in place, we will reconsider whether we operate at all.

Lastly, there may be railroads that operate over Amtrak tracks in the NEC which may not have sufficient PTC-commissioned rolling stock by the December 31, 2018 deadline to operate normal services. Under the present rules, Amtrak cannot permit non-compliant equipment to be used over our railroad after the deadline and we will

be working closely with our partners and the FRA to determine the best way to address this situation.

To be clear, Amtrak has not made any decisions to cease train operations across our network or on any specific routes at this time. Instead, we are going to thoroughly analyze each route on a case-by-case basis and consider the appropriate strategies for enhancing safety on such routes after the December 2018 deadline. In particular, as we assess these routes, we know that some of them are shared with our commuter partners who face their own challenges to reach the deadline. We will assist our commuter partners, where we can, to reach the deadline or to find viable alternatives to bridge the gap. It would not be prudent to force more commuters onto our highways in already congested urban regions; rail remains the best and safer solution.

While we work to meet this deadline, I think it's also important to acknowledge the role that Federal funds have and will play in the implementation of these systems for passenger and commuter rail. Amtrak has certainly been the recipient of some of these funds and acknowledge their critical role in allowing us to meet our deadlines. We are also aware of the additional funding likely needed by our commuter partners to help fully implement PTC as quickly as possible. In addition, there will be an ongoing maintenance cost associated with PTC systems, which for some may be a financial hardship in future years and could require further Federal investment. We appreciate and acknowledge the important role Federal funding has in improving rail safety.

As we prepare to operate in a PTC environment, I do think it is worth noting that PTC was designed to address specific vulnerabilities in train operations—train-to-train collisions, over-speed derailments, incursions into work zones, and misaligned switches. Thus, PTC is not a complete technology answer as there are events that PTC does not address –such as when a car or truck crosses over tracks at a crossing, certain track defects, or other incidents like rockslides.

I raise this not to take anything away from PTC and the important capabilities it offers the rail industry, but simply to be clear about how we cannot rely on PTC alone. Safety depends on the hard work and vigilance of thousands of our trained and dedicated employees and on the appropriate levels of investments being made in the network's infrastructure. For instance, while the number of total U.S. train accidents has declined by 14 percent over the past four years and accidents involving passenger trains accounted for only 2.5 percent of all accidents, according to the FRA rail safety database, grade crossing and trespasser incidents remain high. In 2017, there were 1,880 grade crossing accidents involving 243 fatalities and a separate 552 trespasser fatalities. PTC will help protect against many of the human factors-caused accidents that occur across the U.S. rail system, but having made progress against this vulnerability, we must also turn our attention and, the attention of the highway and motorist communities, to the startling loss of life that occurs on a daily basis when motorists and pedestrians occupy the right of way ahead of a train.

Safety and Amtrak

Amtrak, as the Nation's intercity passenger rail carrier, has long recognized our unique requirement to have strong protocols in place to make riding the rails safe. In many areas, we go above and beyond FRA requirements and industry practice. For example, Amtrak requires a full annual physical evaluation for every engineer, including sleep apnea screening, whereas FRA simply requires an exam once every three years. Amtrak requires that newly promoted engineers are evaluated monthly for their first year of service, whereas FRA has no special requirements for evaluation of newly promoted engineers. Amtrak engineers and conductors are required to attend annual training for recertification, whereas FRA only requires full recertification every three years. In addition, Amtrak's drug and alcohol testing protocols exceed Federal requirements. Our testing regimen is so strenuous that employees understand that a random drug test in the course of the year is not just possible, it is likely.

We're also taking other steps, such as installing inward-facing cameras. These cameras monitor locomotive and engineer performance and are installed in Amtrak trains along routes in the Northeast, Midwest, and West and we are actively working to install them on Amtrak trains nationwide. Reviewing the data from these cameras, coupled with the data from our efficiency testing programs, provides us an excellent view of operational issues to be addressed in future training programs.

While many of these efforts draw on safety practices used by some of our partners in the freight rail industry, since we are carrying people, we believe we must also draw on the expertise of other safety-critical industries. Our goal is to build upon

our good practices and take them to the next level to deliver the world-class safety that our customers deserve and expect.

To put us on the path to reach that goal, just last month Amtrak hired a new Executive Vice President and Chief Safety Officer, Ken Hylander. Ken is a widely respected member of the transportation safety community with more than thirty years of service—in addition to being a former colleague of mine at Delta Airlines. Ken reports directly to me to ensure his position has full authority and maximum impact. Amtrak has consolidated several previously separate resources, including System Safety, Compliance and Training, Environmental Compliance, Sustainability, and Public Health underneath him.

Safety Management System (SMS)

Ken's primary objective will be to implement a Safety Management Systems (SMS) to improve our safety culture. SMS will revitalize Amtrak's safety programs by primarily strengthening hazard identification and complimentary mitigation programs. An SMS is a proactive risk management system, which will move us toward a more predictive safety management method at an organizational level. Having a safety culture that continually identifies, and mitigates, future risk is the proven way to improve overall safety performance. It has been a cornerstone of im-proving safety in many industries, including aviation, health care, and energy—and it is also the right system for Amtrak.

A positive safety culture means an organization that easily facilitates and is receptive to safety discussions; that is committed to and practices risk reduction; that recognizes and accepts a healthy balance between centralized policy and procedure control and the value of local knowledge. A safety culture requires the reporting of safety issues at all levels. It is intolerant of recklessness and willful disregard for safety practices and learns from its mistakes. Safety culture emerges over time. Daily decisions and actual practice will define our culture. A good safety culture and a successful SMS are interdependent.

We will know as a company that we have arrived at a good SMS when we (1) have better safety data available for decision making, (2) can analyze safety risks before we do something, not after; and 3) have closed-loop processes that find hazards, mitigates them, and verifies efficacy. Additionally, our safety processes will be fully integrated into our organizational decision-making and supported by strong oversight to ensure compliance with the practices we want to implement. At a personal level each Amtrak employee will know his or her role in the safety process.

We know that implementation of an SMS is a significant undertaking—it requires our organizational commitment. SMS demands that all safety related procedures must be carefully documented, universally understood, and unfailingly applied. SMS is designed to advance that outcome by formalizing our knowledge into processes, checklists, and governing documentation to improve consistency. Amtrak believes the implementation of SMS will truly take our safety performance to the highest level of service. These efforts are in line with the NTSB's recommendation that Amtrak and our unions implement a SMS Program and generally consistent with the Risk Reduction Program approach mandated by this Committee in the 2008 Rail Safety Improvement Act and required by FRA through the development of a System Safety Program.

Conclusion

When the Amtrak board asked me to lead their railroad, they did so with the expectation that I would bring an outsider's perspective to the business. This mandate, combined with the events of the past few months, compels me to examine our business practices and think carefully about ways in which an elevated safety focus would alter how we operate. Some of these changes have been made, and several more of them are now underway. Let me present some ex-amples.

We are changing our policies on operating on host railroad territories with temporarily inoperable signal systems. While we are evaluating two different approaches, they both boil down to reducing speed significantly in these circumstances in advance of known hazards. While we see such a change as fully warranted, they may result in operational impacts to our host railroads and our trains, and we will need to work with our hosts to determine the best ways to minimize those impacts.

Building on the changes to our operations when signals are unavailable, Amtrak will change how we operate through sections of track with no signals at all, so-called 'dark territory,' which is also exempted from the PTC mandate. Approximately 1 percent of our current or planned routes transit through dark territory, totaling 222 miles in Indiana, Maine, New York, Quebec, and Vermont. We believe it is time to reevaluate the risks that accompany such operations and adopt a new approach, particularly as the implementation of PTC will provide even greater safety margins

beyond traditional railroad signaling on the vast majority of our routes. Based on hazard analyses and mitigation options, the application of new technologies like switch position indicators; altered operating practices; signal system and PTC investments or rerouting or route abandonments may all be appropriate for such dark territory. Working together with our host railroads and local stakeholders, we need to quickly evaluate the risks and take the necessary steps to ensure we don't leave sections of our network unnecessarily vulnerable.

Amtrak is organizing a centralized standards, training, and quality assurance organization for engineers and conductors moving away from a former regional approach to training and safety oversight. Our aim is a more robust, consistent, and unified approach to these issues, which will serve as a vital resource across our network. Similarly, immediately following the December derailment of Train 501, we adopted a new policy that requires approval from the heads of our operations and safety departments before our personnel operate over new or modified routes. While Amtrak had general procedures for new routes prior to that incident, they were managed regionally and we believe a central review by our safety and operating experts and a single array of consistent standards will strengthen outcomes.

A related initiative is the revamping of our trainmaster and road foreman staffing to provide more support and training for our engineers and conductors. These positions directly manage our front-line employees who operate our trains and we are re-thinking our qualification training standards and identifying the additional resources—both manpower and technology—to enable our crews to benefit from industry leading approaches to procedural and operational training regimens. We will look carefully at how the commercial aviation industry has applied simulation, and more recently, virtual reality as well as augmented reality, to make our training more realistic and more effective to serve our crews and customers better.

Strengthening safety is a continuous process. Amtrak's responsibility is to lead safety across our industry and serve as good stewards of the vital resources that we receive from Congress and the Administration to help us implement these advancements. Likewise, railroads alone can't solve all of the issues, as grade crossing and trespasser accidents require a broader effort of local, state and Federal stakeholders to educate motorist and pedestrians, better equip vulnerable crossings, limit public access to rights of way and strengthen enforcement.

I have great confidence in Amtrak's dedicated workforce and the commitment I see across our company to becomes the safest passenger railroad in North America, but there is work to be done to improve the entire rail system. While the challenges described today are difficult, they can be overcome. At Amtrak, we owe our customers nothing less.

Thank you for the opportunity to appear before you today, and I welcome your questions.

The CHAIRMAN. Thank you, Mr. Anderson.

Ms. Fleming, you testified that 7 to 19 commuter railroads may not even hit the milestones necessary to qualify for an extension beyond December 31, let alone fully implement PTC. I want to drill down a ways to see what we can do to improve the situation. What can these railroads be doing in the next 10 months to best advance PTC implementation?

Ms. FLEMING. You know, I think, where possible, it's really important to get management and the Board on board to make some important decisions in order to keep moving forward. We've heard from some of the railroads that are further along that they've had to make service adjustments in order to finish installation of equipment or to begin testing. We also heard from some of the railroads that it's really important that the railroad be actively involved in all phases of the project rather than solely relying on your contractors.

And then I think the last thing would be is there are some railroads that are further along, and there are opportunities to take full advantage of user groups and industry forums to capitalize on some of the best practices and lessons learned from these railroads.

The CHAIRMAN. And do you think it's realistic that all that get done in 10 months?

Ms. FLEMING. You mean to meet the deadline?

The CHAIRMAN. Mm-hmm.

Ms. FLEMING. Our analysis shows that no, that depending on how you cut the data, as many as half of the railroads may not meet the deadline or have enough time to meet the criteria to qualify for an RSD extension.

So I think part of the problem is that some of the railroads have some heavy lifting to do. They haven't begun the second phase, which is really where you have to deal with some of the complexity and time-consuming things, installing the back office server, field testing. The railroads that have done those things, on average, it could take them 7 to 10 months, but from FRA's perspective, you're talking about 1 to 3 years. So if these railroads haven't started tackling some of that, the time is running out for them.

The CHAIRMAN. You also recommended that FRA improve its communication with railroads and better prioritize its resources and workload regarding PTC. And based on your recommendations, I intend to send a letter to the new Administrator of FRA inquiring about the agency's plan to address the recommendation that you have raised in your report.

Ms. FLEMING. I appreciate that.

The CHAIRMAN. Mr. Mayer, according to your projections, Metro-North and Long Island Rail Road are scheduled to have PTC operating on all lines by December 31 of this year. And while I appreciate the aggressive schedule, I want to make sure the traveling public has a clear-eyed understanding of the likelihood of this outcome. At this point, can you guarantee that Metro-North and Long Island Rail Road will not file for an extension from the December 31, 2018, deadline?

Mr. MAYER. Well, our schedule is a doable schedule, but as I said in my remarks, it is a schedule that has risk. And as we move forward through each stage, we don't know exactly what we're going to encounter. We believe we can have all lines in operation by the deadline, but if we don't, the schedule does allow for or the law does allow for an alternative schedule compliance, and we're certain that we can be able to meet that if we have to.

The CHAIRMAN. Ms. Fleming, in follow-up to that question, GAO studied how long certain steps take to implement PTC, including the testing and demonstration phases. How does MTA's schedule compare with the information that you learned in your reviews and analysis?

Ms. FLEMING. Quite frankly, it looks a little bit tight, and I think it's because, again, having to tackle some of the more complex, time-consuming activities, you know, I know that they have a pretty ambitious schedule, but, you know, things can happen, particularly as you start the testing phase. And, again, FRA's own estimate on average puts railroads at about 2 years to complete that phase.

So I think it's ambitious, and it doesn't maybe account for some of the glitches that you can find, the bugs that you can find, through testing. And even installing the back office server, we found that the railroads that are far along, it took them at least

10 months on average, but, quite frankly, from FRA's perspective, you're again looking at a couple years.

Mr. MAYER. Mr. Chairman, if I could add, we certainly don't disagree that this is an extraordinarily aggressive and tight schedule, and it has our challenges. That said, at least for our railroads, as we enter revenue service demonstration, it won't be the first time that we've been testing. I mentioned that we're able to provide speed enforcement on both of our railroads, and particularly Metro-North Railroad, we have been testing for 2 years, and that's why we're able to incrementally provide speed enforcement. I won't tell you that we won't encounter problems when we add the back office server and we move to full-up revenue service demonstration, but it gives us some degree of confidence that other railroads may not have about that phase.

The CHAIRMAN. Mr. Anderson, you stated that there may be railroads that operate over Amtrak tracks in the Northeast Corridor that will not have PTC on their locomotives, and you stated that Amtrak cannot permit such locomotives to be used on its tracks after the PTC deadline. Based on your understanding of the progress of your tenant railroads, how likely is it that Amtrak will prohibit these commuter railroad locomotives from operating on its tracks?

Mr. ANDERSON. I think that the factual situation will arise whether or not technically allowed to operate on the tracks. And I think what we have to work on with some of those are mitigation plans. We have some extra ACS–64 locomotives where we could provide the propulsion and the T&E crews, but this gets back to my point, that I think the reality is—and to your question about what FRA is doing—Ron Batory is actually doing a really good job pulling all the railroads in. We have another two-day session with him on March 4 and 5, and really going through every single milestone for each one of the railroads that operate on Amtrak or where Amtrak operates off its own infrastructure.

And I think we're going to get confronted, as a policy question, with that issue. I mean, do you have a commuter railroad that carries a couple hundred thousand people a day, you know? Can you practically? And is it the right policy to not have that railroad operate and put everybody on roads? So the question is, What other mitigation steps can you take? What things can we do, as a host, with our partners on the Corridor to mitigate those issues and be certain that we still provide safe operations?

The CHAIRMAN. Which commuter railroads do you think are most at risk?

Mr. ANDERSON. I think Metro-North, NJT, are probably the two that we understand, but we will know more as Ron Batory works with us. And we're working very close with Metro-North. We're working very close with NJT. We want to see them succeed. That's our responsibility as a steward of that, of the Northeast Corridor.

The CHAIRMAN. My time is expired.

Senator Nelson, I understand you want to defer to Senator Cantwell.

Senator NELSON. Yes. Senator Cantwell is the one that requested this hearing, so I want to defer my time for her and just say at the outset that here we are, 3 years later, confronting the same

thing that we confronted 3 years ago, that several railroads are not going to be ready, and it's going to lead to more crashes. When is enough, enough?

The CHAIRMAN. Senator.

STATEMENT OF HON. MARIA CANTWELL,
U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Thank you, Senator Nelson. Thank you for your indulgence.

Thank you, Mr. Chairman, for both you and the Ranking Member organizing this hearing. And clearly the discussion of positive train control and implementation has become a all too live debate in the State of Washington with the horrific crash that killed three people and injured 80 in the State of Washington. So what the discussion you're having right now is about how do we move forward in that same vein? I know, as it relates to Washington State, the rail Amtrak uses in Washington that is owned by BNSF will be compliant by the end of this year. Is that right, Mr. Anderson?

Mr. ANDERSON. Yes, Senator, it will.

Senator CANTWELL. So it will only be those, you know, separately run tracks and the question on their compliance. Is that correct?

Mr. ANDERSON. That's a correct statement.

Senator CANTWELL. So on the line that was—where the accident occurred, it's a question about whether they'll be compliant.

Mr. ANDERSON. They will be PTC-compliant before the deadline.

Senator CANTWELL. OK. So if I could ask, because as this discussion continues with the Committee about those sites that are going to be compliant and noncompliant and where we're going to run, if I could just show a picture—oh, it's already there. This is the warning sign, right? It's like a highway, I guess, in the sense of your exit is coming up, but in this case, slow down to 30 miles an hour, right? They see that sign at 2 miles, at 1 mile, at one half mile, and as the curve starts, right? But I think in this case—well, we don't know all the NTSB investigation will say, but instead of going 30, they didn't have the situational awareness to—they didn't observe this, and hit that curve on its maiden route at speeds we think over 50 miles per hour above the limit. So this is going to continue to be a real live discussion in other places.

Now, just to clarify, in this situation, under positive train control, if they blew by this signal at more than 30 miles an hour, the train would be automatically slowed down or stopped, is that correct?

Mr. ANDERSON. Correct.

Senator CANTWELL. So that implementation, you wouldn't need the situational awareness in that instance, but it is still something that you would want to have implemented with your engineers, is that correct?

Mr. ANDERSON. Correct. And actually we need to go further than the PTC regulation and establish a standard of 100 percent. If you're a passenger and you get on a train in America, you need to be PTC-compliant or PTC-equivalent. I just don't think there's any other way to deal with the risk of single human error. I walked that track the night after the accident, and you see the curve and you see the signs, and it really makes such a compelling case for PTC because we could have avoided it.

Senator CANTWELL. Well, I think that's what the Ranking Member was just saying, that, yes, we should have mandated something in 2015 that now we're going to discuss what's going to happen when it's not in place by the end of the year for certain tracks and services, right?

Mr. ANDERSON. Correct.

Senator CANTWELL. And so I'm understanding your House testimony that you doubted that Amtrak would operate on any rail line that wasn't PTC functioning by the end of the year.

Mr. ANDERSON. Yes. That hasn't been very popular.

Senator CANTWELL. And so does the Committee have a list of that, of where those areas are?

Mr. ANDERSON. We can give you a list of those.

Senator CANTWELL. OK.

Mr. ANDERSON. But, yes, we do have—and they touch my estimate is probably somewhere between 300 to 700 miles of track we operate on.

Senator CANTWELL. And so just for the riding public on rail services, not knowing where PTC exists and doesn't exist, what is Amtrak going to do to increase the situational awareness training that is important for those lines that don't have PTC? Or is Amtrak just going to take a hard-and-fast line, no more commuter rail transportation after December 31 without PTC?

Mr. ANDERSON. Look, that's the sort of Sisyphean problem, which is on the one hand we support Amtrak assets and trains and T&E crews and maintenance, we support probably a half a billion trips a year, so it's an essential part of what we do. On the other hand, it's not very comforting being the President of Amtrak and running trains on dark railroads.

So I think the first thing is we have to—and after 501, we immediately improved our oversight and hands-on engagement of our road foremen in our crew briefing rooms. We've revamped our operating procedures for commissioning new routes. It takes my approval now to go through the gating process under our SMS for a new route.

We have reduced headcount in the headquarters, and we're going to redeploy those resources to the field for more road foremen and assistant road foremen, and in our transportation organization.

We put in new rules for operating on signal-suspended railroads. And we're implementing well in advance of the FRA deadlines a rail safety SMS program.

But we still remain exposed. And even after PTC—now, PTC will be on the Defiance Bypass and all of the Cascades, but even after that, and I can share with you, it's a great question, the places where we, even after the deadline, if you assumed every railroad complied with the rule, we are still going to have significant sections of passenger rail operations without PTC, and I think that is a level of risk that we shouldn't be prepared to take as a railroad, and my Board at Amtrak has taken that position.

Senator CANTWELL. Well, thank you, Mr. Chairman. I know my time has expired, but this certainly was a very costly incident to the Pacific Northwest, and we—our sympathies are with the families who have lost loved ones. The issue is that we need to make sure that the traveling public is safe——

Mr. ANDERSON. Absolutely.

Senator CANTWELL.—and that these, both situational awareness and technologies, are at the best available—or the assessment that you're just making is implemented.

Thank you.

Mr. ANDERSON. And we are deeply sorry to the communities in Washington. And we have admitted all liability, and we are generously settling those claims and covering all the costs for the State of Washington.

The CHAIRMAN. Thank you, Senator Cantwell.

Senator Hassan.

STATEMENT OF HON. MAGGIE HASSAN,
U.S. SENATOR FROM NEW HAMPSHIRE

Senator HASSAN. Thank you, Mr. Chair. And thank you to our panelists this morning. I appreciate your being here very much and the work you do very much.

I'll start with a question to Mr. Anderson and Mr. Mayer. As you may know, the NTSB recently reported the undiagnosed obstructive sleep apnea was a causal factor in two separate commuter train derailments, in September 2016 and January 2017. These two derailments collectively involved the injury of over 200 people and the death of one. The NTSB noted that the Federal Rail Administration does not require medical screenings for its safety-critical workers to guard against disorders such as sleep apnea.

The lack of Federal standards and testing requirements around this issue I think is reckless and has clearly led to deaths and injuries in the rail sector. So we obviously need to do something about it. I recently wrote a letter to FRA calling on them to remedy this situation.

So, Mr. Anderson and Mr. Mayer, what steps are you taking to protect rail workers and the commuters who depend on them from harms caused by undiagnosed sleep apnea?

Mr. ANDERSON. Well, first, you're right. And so at Amtrak—the FRA rule is a physical for an engineer every 3 years. Our rule is every 1 year, and we require screening for sleep apnea; when diagnosed, you're taken out of service. We want our engineers to get the proper treatment. There are proper treatments.

Senator HASSAN. Yes.

Mr. ANDERSON. So we are big believers, from an SMS standpoint again, our safety management system tells us we have to mitigate the risk from sleep apnea, and so our program is set up to do that.

Senator HASSAN. Great. Thank you.

Mr. MAYER. We set up a program that we believe leads the industry in this. We decided to screen all of our locomotive engineers on both of our railroads as well train operators on the New York City subway system, I realize not the subject of this hearing——

Senator HASSAN. Yes.

Mr. MAYER.—but that's thousands of individuals. We've been on a very aggressive schedule to do this, just screen thousands of individuals and make sure that they have the treatment that they require. And we'll be having passed through and screened every one of those job titles by the end of May.

Senator HASSAN. That's good to hear. Thank you.

To Ms. Fleming, is this a problem that merits further attention by the GAO?

Ms. FLEMING. You know, it's not an area that we've looked into, but we'd be happy to work with you and the Committee on this issue. It sounds like a very important issue.

Senator HASSAN. I think it is, especially because, as both of these witnesses answered, there is also treatment for sleep apnea.

Ms. FLEMING. Right.

Senator HASSAN. So it's not an either/or thing, we just need to make sure we're identifying it and treating it.

Mr. Anderson, I wanted to follow up a little bit with you on the issue of what happens to lines that may not be PTC-compliant by the deadline. And in my case, I'm concerned about lines in Vermont, which obviously serve constituents of mine in New Hampshire and, as I understand it, are exempted from the requirement.

So to follow up on some of the other questions you've gotten, you testified before the House Transportation Committee and stated that you doubted whether service would continue for areas that did not have PTC in place by 2018. We've heard concerns about how this could impact the Vermonter's service, which travels through New Hampshire, and constituents are obviously concerned.

So, again, is there a way that we can address safety concerns, but also not take these lines, which were exempted under the statute, out of service? They're so critical for people in our states and businesses, too.

Mr. ANDERSON. Yes, Senator. And after you expressed that to us, and after my testimony in the House, we have undertaken under our SMS risk assessment program what steps we could take in the short run——

Senator HASSAN. Right.

Mr. ANDERSON.—to mitigate operations on dark railroads and non-PTC railroads. I do think that—and we have an R&D project underway at Amtrak to determine whether we can use technologies from Europe that don't require as much trackside investment, but would give us speed restrictions and signal location. And there may be mitigation efforts like slow speeds coming up on switches, requiring the conductor in dark territory to ride in the front of the cab.

Senator HASSAN. OK.

Mr. ANDERSON. So we are putting it through candidly as what we did in aviation, and we're putting it through that same sort of alternative means of compliance because we realize the importance of our service. And the Vermonter is a really good route for us.

Senator HASSAN. Yes.

Mr. ANDERSON. So it's not one that economically or otherwise you would ever be motivated to do anything to——

Senator HASSAN. Right.

Mr. ANDERSON.—but as a practical matter, after you go to Washington and walk down, you know, and sit at one of these accident sites, it sharpens your focus.

Senator HASSAN. Of course it does, and we are very glad for that sharp focus. Thank you all very much.

Thank you, Mr. Chair.

The CHAIRMAN. Thank you, Senator Hassan.
Senator Klobuchar.

STATEMENT OF HON. AMY KLOBUCHAR,
U.S. SENATOR FROM MINNESOTA

Senator KLOBUCHAR. Thank you very much, Mr. Chairman.
Thank you, welcome, Mr. Anderson.
I think I'll start with you, Ms. Fleming. While the FRA collects information from commuter railroads on their progress in implementing PTC, the GAO has found that the FRA is not using this information to prioritize resources to those railroads most likely to miss the deadline. I would think that a risk-based approach would help with PTC implementation. What specific information does the FRA need to collect that would help target support where we need it the most?

Ms. FLEMING. You know, I think that they really need to consider, as a recommendation, to have—to use the information that it collects and to apply more of a risk-based approach. You know, they're going to be getting significant documentation coming their way in the next months and leading up to 2020, everything from test waivers, RSD applications, and safety plans. To give you a sense of what that means, for now, it has been taking FRA 10 to 100 days to review a test waiver, but the safety plans are 5,000-plus pages, and they told us that they won't be able to review more than two or three a year. So if you do the math, that's pretty much a heavy lift.

And also it means the FRA needs to think about, you know, what do they do? Do they then target the railroads that carry the most passengers, work with them? Do they work with the railroads that are close to being there and push them over the hump? Or do they target their resources to work with the railroads that are really struggling and may need more handholding and some assistance so that they can kind of tackle some of these challenges?

Senator KLOBUCHAR. Mm-hmm. And what do you think they should do?

Ms. FLEMING. We are going to leave that up to them because I think—you know, there are 12 PTC experts right now, and I know FRA is looking to hire a few more. You know, we've heard that the individualized, you know, attention, that one-on-one, has been great, but there are only 12 folks, and there are a lot of railroads that could use some guidance. And the other recommendation really speaks to the fact that, again, it's more of an informal reactive approach, and we think that the downside of that is that there could be inconsistent information be relayed, maybe even inaccurate information.

So they need to, at this juncture, have more of a systematic communication with all the railroads in terms of, what are they looking for in terms of the criteria, the application process and the criteria for the extension. How are they planning to review and approve these? I think railroads just need a lot of good information right now.

Senator KLOBUCHAR. OK. Mr. Anderson, a different topic that I don't think has been focused on very much, and that's rail crossing safety. And I know that you mentioned that in 2017 there were

1,880 grade crossing accidents. And while PTC we know is very crucial safety technology, it's not always equipped to handle those kinds of incidents at all, and we've had a few of these in our state.

So what is Amtrak doing to address rail crossing safety?

Mr. ANDERSON. In our legend grant, we support the Federal Highway program, which allocates about $250 million a year for investment in rail crossing safety. This is the single biggest safety issue for rail in America. Over 250 to 300 deaths a year, and completely preventable with the right infrastructure investment in rail crossing, and I think the work that the FRA historically has done has been quite successful in terms of driving down accidents at rail crossings. So it's something that is a solved problem, we just have to put the investment in the infrastructure.

Senator KLOBUCHAR. So you would like to see investment help with that.

Mr. ANDERSON. We did. We put it in our legend grant request and endorsement of the Federal Highway programs for more investment in grade crossings. What we should do is just a Pareto analysis of the highest risk to the lowest risk, and then just target investment after investment after investment to just drive the number down.

Senator KLOBUCHAR. OK. And by the way, thanks for your leadership. I know there's a lot going on, and I appreciate you stepping up.

Mr. ANDERSON. Thank you, Senator.

Senator KLOBUCHAR. Thank you.

Mr. ANDERSON. Good to see you.

Senator KLOBUCHAR. Good to see you. You still live in my state, so there you go.

Mr. ANDERSON. I still do part-time.

Senator KLOBUCHAR. He still does, yes. He loves our state even when it's one degree.

[Laughter.]

Senator KLOBUCHAR. Mr. Mayer, coming from a border state, and as Co-Chair of the Canadian-U.S. Inter-Parliamentary Group, I'm concerned about the level interoperability of rail safety technology with Canadian rail operators, who have had a few issues. Do you want to just briefly comment on this so I can—Mr. Mayer? Thank you.

Mr. MAYER. We don't operate up into Canada, but interoperability is extremely important to us. We should track—we should corridor with Amtrak. Long Island Rail Road operates over Amtrak tracks into and inside of Penn Station, and our New Haven line on Metro-North territory functions as the Northeast Corridor that Amtrak operates over. And so we are committed to interoperability. We will be interoperability when we bring PTC online, and we will find a way to continue to operate together safely and legally.

Senator KLOBUCHAR. All right. Thank you.

The CHAIRMAN. Thank you, Senator Klobuchar.

Senator Udall, then Senator Blunt.

STATEMENT OF HON. TOM UDALL,
U.S. SENATOR FROM NEW MEXICO

Senator UDALL. Thank you very much, Chairman Thune and Ranking Member Nelson, for convening this hearing. We all know there have been a number of accidents that could have been prevented if appropriate safety measures had been in place, and I think several of you have highlighted that in your testimony. But even the best technology cannot prevent human error, both on trains and abandoned vehicles on tracks.

I'm concerned about the ability of small commuter railroads being able to sustain the cost for full implementation of positive train control. However, every railroad, commuter or freight, must operate with high safety standards to ensure the protection of the public and the protection of railroad employees.

Ms. Fleming, are low-risk railroads, like the Rio Metro Rail Runner in New Mexico, able to operate safely under a risk mitigation plan and without positive train control until they are able to have a system operational?

Ms. FLEMING. So what the risk mitigation strategy would lay out, it's a plan for operating trains that would fall below the threshold that requires positive train control. So it wouldn't necessarily provide the same benefits as a fully operational PTC system. And it allows the railroad to have a grace period. So it basically allows them to operate under that plan, but ultimately they still would be required to implement PTC at some point.

Senator UDALL. Thank you for that answer.

Mr. Anderson, in your testimony, you outlined the ways, including training centralization, that Amtrak is improving its safety culture. This is essential to ensure the safety of workers and passengers alike. Can you clarify the timeframes when these various actions will be operational?

Mr. ANDERSON. Thank you for the question. And I would start out by offering that we have very—a really good workforce of conductors and engineers that work really hard to operate a safe railroad. We are—right now I hired an Executive Vice President and Chief Safety Officer from the aviation industry, reports directly to me, and it is a daily process now at Amtrak. We have already implemented our new signal suspension policies. We will shortly have completion of our engineer qualification on new routes to address the issues that we had in 501 out in Washington. So it's an ongoing process.

I will say that the SMS program, which is in an NPRM right now with FRA, has a deadline of November, and we plan on filing our SMS plan well in advance of November. This is imperative. It's the single biggest priority we have at Amtrak right now.

Senator UDALL. Thank you.

And, Mr. Mayer and Mr. Anderson, cybersecurity protection measures are extremely important for all businesses, but especially for transit systems, where a cyber intrusion could cause death or extreme property destruction. What are the steps that you are taking to prevent cyber attacks? And if you cannot provide a complete answer now, you're welcome to respond in the record.

Mr. MAYER. I can certainly tell you a little bit about cybersecurity. First of all, I would point out that PTC is a layer

onto the engineer, so it can slow or stop trains, but it is not a remote control capability for trains. So there's a limited protection there just in the basic functionality. That said, the FRA has strict cybersecurity rules for PTC implementation, and I know our railroads are working very hard with Amtrak as we implement a secure PTC solution. Amtrak was the recipient of a grant from the FRA for cybersecurity development for PTC. The consortium of railroads that are all designing around the Amtrak system are working very hard to ensure that our systems are secure, and we are using industry best practices and NIST-approved encryption to roll this technology out.

Senator UDALL. Great. Mr. Anderson, I assume you agree with most of that, right?

Mr. ANDERSON. I agree, and I'd like the chance to come brief you because we have a lot of work underway on this.

Senator UDALL. That would be great.

Just a quick final question. Each railroad system has determined which PTC technology it will use. And there was no Federal coordination in selecting software use. Can each of you address how your systems will ensure that the technology installed will be interoperable across technology platforms and rail systems?

Mr. MAYER. The—Amtrak has been using its system for a number of years, and so the railroads that interoperate with Amtrak have chosen to develop systems that are based on the Amtrak solution. Now, that's been a challenge. We've been able to use about a third of the Amtrak solution right off the shelf. Another third has needed a major rewrite. And a final third is a complete ground-up software development project. But that said, because we are all based on a common platform, and, quite frankly, because our engineers and our technical staffs speak with each other on a daily basis, we are confident that we will arrive at an interoperable PTC solution across our different railroads.

Senator UDALL. Great. Thank you very much.

My time is exhausted. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Udall.

Senator Blunt.

STATEMENT OF HON. ROY BLUNT,
U.S. SENATOR FROM MISSOURI

Senator BLUNT. Thank you, Mr. Chairman.

Let's follow up on Senator Udall's question a little bit.

Mr. Anderson, you mentioned, I think, that you use 20 different railroads' track and three different systems—let's follow up on what that you were asked and what Mr. Mayer sort of commented on that. How do you make that work? Is there a reasonable way to make those three different systems work? And do you have the same equipment running on tracks where there is more than one system? And just tell us a little bit about that challenge.

Mr. ANDERSON. OK. So in the Northeast Corridor, it's an Amtrak-developed system because of the speeds that operate on the Acela, and it's called ACSES, and ACSES is the standard in the Corridor. The freight railroads that operate in the Corridor have to operate with ACSES, which is the Amtrak system that's been around for a while, but they have also have something called

ETMS, which is the standard that the Class 1 freight railroads have established around the country, so they're dual-equipped.

Because we run on catenary in the Corridor, the ACS–64 locomotives are electric, they stay in the Corridor. So that equipment is dedicated there. In Michigan, we have a different system, ICTS, because we run at higher speeds with passenger rail, and that is just for the folks that operate or the railroads that operate on the line zoned by Amtrak in the state of Michigan—three routes in Michigan. We tend to have dedicated locomotives rather than dual equipping——

Senator BLUNT. And as long as you do that, do you think that creates a long-term ability for you to deal with the different systems on the different railroads——

Mr. ANDERSON. It does.

Senator BLUNT. Different equipment is the answer?

Mr. ANDERSON. Well, ultimately, you would like simplification in a single piece of equipment because if a locomotive breaks down and you have another locomotive there, you want to be able to substitute it, but if it doesn't have the right equipment on it, you're not going to be able to. So ultimately we will probably go through a process of dual equipping, but for now, the way you can get to the deadline is have—which we sort of dedicate different types of equipment to different regions anyway. It will work practically for us to have the third EMTS, which is the—I don't know if I got the acronym right—is the system that the Class 1 freight railroads use around the United States.

Senator BLUNT. And how does the back office server relate to all of this?

Mr. ANDERSON. The back office server is basically a computer system that for Amtrak is operated by Rockwell Collins. Rockwell Collins bought something called ARINC, which is the company that connects airplanes in the sky, and——

Senator BLUNT. You know something about that, too.

Mr. ANDERSON. Well, yes.

[Laughter.]

Mr. ANDERSON. Yes, I do. And so Amtrak, because we had to federate, that is, have interoperability with so many railroads, and on two different systems outside the Corridor. ACSES doesn't have to federate, so ACSES in the Corridor runs standalone. The other two, we rely on Rockwell Collins to operate the basic server farm to federate all of the other railroads that we operate on and to operate that server farm for us so that the trains and the dispatchers all communicate.

If I were going to suggest one thing for the Committee that could accelerate all this, get the presidents of Alstom, Siemens, Wabtec, and Rockwell Collins, and put the four of them right here because much of this technology that we're talking about depends upon software development and hardware development by those OEMs, and that's—those are the—those are probably the biggest critical dependencies right now.

Senator BLUNT. Thank you. Maybe the Chairman took down notes as to future hearings we could have on this.

Mr. DeWeese, you mentioned that there was a substantial lack of drawdown by some of the railroads on the money that they have

access to. Are you evaluated in any way from that? What would be a reasonable amount of money still to be left where they could be done by the end of the year? And what clearly is a recipient of funds that has not drawn down funds that would relate to them complying with the goal? Is there any way there you're following up with the railroads that aren't drawing down the funds they need?

Mr. DEWEESE. I certainly think that the level of expenditure is an indicator of something. You know, the scope of our work, as I mentioned, was really trying to piece together the puzzle of who got the money, you know, where did it go, and sort of what is the level of expenditures and what did they spend it on?

You know, our—we didn't do a deep dive into spending habits. We didn't dive into the spending rates. It's a function of many different things. It could be when they got the money. So even though there is zero percent expenditure, it could be that they only recently received their funds. We didn't do any analysis to really show in the time that we had that even someone who had spent 80 percent of their funds is going to meet the deadline versus someone who has not spent that level of funding.

It depends on the size of the railroad. It depends on the types of projects, the size and scope of the projects that we're talking about. Some railroads may have one project, and they were able to spend their money quicker than another railroad that may have multiple projects. So it's a function of many different things.

And I think just the level of effort that it took, you know, my team to really piece together the funding angle, we really weren't able to do a deeper dive into some of the issues that you're talking about, but I do think it's an important one.

Senator BLUNT. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Blunt.

Senator Peters.

STATEMENT OF HON. GARY PETERS,
U.S. SENATOR FROM MICHIGAN

Senator PETERS. Thank you, Mr. Chairman.

And thank you to our witnesses for being here today to discuss what is truly a very critical issue, and it's very personal to me as well. On May 12, 2015, a very—some close friends of mine, Gilda and John Jacobs, lost their daughter Rachel on an Amtrak 188 derailment in Philadelphia, and she sent a letter to the Committee for Committee members. And, Mr. Chairman, I would like to enter this letter into the record with unanimous consent.

The CHAIRMAN. Without objection.

[The information referred to follows:]

February 28, 2018

Dear Committee Members:

As we do often, this weekend, my husband John and I visited the grave of our daughter Rachel. And each time I go, I cry for her, her now 5 year old son Jacob, her husband Todd, and my daughter, Jessica. We all lost a part of ourselves, and our family, and the world mourns her loss as well.

Rachel's life and the lives of 7 others were needlessly cut short when the AMTRAK train they were riding on derailed May 12, 2015. And it could have been pre-

vented had PTC been installed and activated on the tracks and train. It has been almost three years and yet more trains have derailed, others passengers have died, and scores of others have been injured. And yet PTC has not been installed or activated on all passenger trains in our country. My anger is seething.

I want to quote the testimony of AMTRAK's CEO to the House of Representatives' Transportation and Infrastructure Committee a few weeks ago, in which he told Congressional members: "[A]s a matter of U.S. policy, PTC should be required for all passenger rail trips in America." I agree wholeheartedly. Unfortunately and inexplicably, that has not occurred.

I recognize that the Federal deadline is in place for the implementation of PTC by the end of this year, with a potential extension with FRA approval to the end of 2020. The railroad lobby has been successful in extending the date for compliance once already and will likely seek further extensions from you in the coming months. This is totally unacceptable, wrong, and those requests should be denied. Thousands of lives are in danger every single day and every hour that passenger rail trains are permitted to continue to carry passengers on rail lines that are unsafe. The passengers on board those trains could be your child, your spouse, your mother, your colleague, your office mate, and, as we saw again last month in Crozet, Virginia, you as members of Congress.

I, for one, will never step foot on an AMTRAK train, nor should you. They are clearly unsafe until this life-saving technology is implemented. Without PTC, the question is now if another train derailment will occur, but when. In fact, I believe that Congress should mandate that passengers be informed whether or not PTC is installed and activated on a train before a passenger boards a train until all trains are in compliance.

Before my current job as CEO of a public policy nonprofit, I spent 30 years in local, county, and state government as an elected official. I have held leadership positions in my caucuses, passed legislation, knocked on thousands of doors, and met with thousands of people over the years. I have been held accountable for my actions and the actions of my colleagues. And that is the way it should be.

Yet the inaction of Congress, the lack of oversight and accountability, and the failure to insist that passenger trains accelerate the installation and implementation of safety equipment have caused more death and human destruction. The responsibility of this oversight rests on the shoulders of each and every senator and representative who took an oath to serve the public.

Please step up to do what is right. Don't let my daughter's death be in vain. Please protect the public from deadly foot dragging. Do not let the railroad lobby convince you that it is too costly or too difficult to do the right thing now.

There are human lives behind the decisions and indecisions you make.

Sincerely,

GILDA Z. JACOBS

Senator PETERS. Thank you, Mr. Chairman.

And I think it's important. It's a letter that will be entered into the record, but I would like to read the first two paragraphs, if I may, for the Committee members.

"Dear Committee Members," and this is written by Gilda Jacobs, "as we do often, this weekend my husband, John, and I visited the grave of our daughter, Rachel. And each time I go I cry for her, her now 5-year-old son, Jacob, her husband, Todd, and my daughter Jessica. We all lost part of ourselves and our family, and the world mourns her loss as well."

"Rachel's life and the lives of seven others were needlessly cut short when the Amtrak train they were riding on derailed May 12, 2015, and it could have been prevented had PTC been installed and activated on the tracks and train. It has been almost 3 years, and yet more trains have derailed, other passengers have died, and scores of others have been injured, and yet PTC has not been installed or activated on all passenger trains in our country. My anger is seething."

I think we can all relate to that and share that anger as well.

Mr. Anderson, I know you're new in the position at Amtrak, and I know you care deeply about each and every passenger that rides on your train as well, and you've expressed that here today as well as in a previous hearing. But I think your viewpoint on this is particularly insightful now, coming from the airline industry, and I know as a leader in the airline industry, you focused on safety, and the airline industry now has an enviable record when it comes to safety.

You have always given very candid assessments of the situation. I'm going to ask you to give a very candid assessment today. As you come into this industry and you look at how PTC has not been moving forward, the industry continually comes forward, says, "We need more time," "We need more time," what do you think is going on, and why has the railroad industry not been able to do this when we have seen successes in aviation?

Mr. ANDERSON. I think, speaking for passenger railroad and being new to Amtrak, is what I said in my remarks, which is we tend to think of ourselves as a freight railroad that carries passengers rather than a world-class passenger railroad modeled after the great passenger railroads around the world. And when you take that approach and you take the approach that we had in aviation with the SMS systems that have been at the core of driving the improvements in aviation—and how the SMS systems in aviation got started was in the mid nineties, there were a series of accidents from about 1993 to 1997, and as a result of that, we made huge investments in technology and in SMS systems.

And I think what we have to do in the industry is stop thinking of ourselves as an extension of the freight railroad industry. They do a really good job, and their safety record is improving, but we carry passengers, and that's a much higher standard of care. And I don't think the industry has focused on having that same commitment to safety management systems and compliance.

Senator PETERS. So they haven't had the commitment. Do you believe they've had the time to do that?

Mr. ANDERSON. I believe we have had the time. I mean, we went through these sorts of exercises in aviation with controlled flight into terrain, wind shear warning systems, collision avoidance systems in midair, which were the three big drivers of issues in aviation. All three of them got solved with technology that we installed in the cockpits of all airplanes.

Senator PETERS. So the industry has had the time, they've have an extension, they may be asking for more time, as we heard from Ms. Fleming, half of the railroads aren't going to be compliant, but yet there seems not to be a focus. And it doesn't seem to be a resource issue.

Mr. DeWeese, you mentioned that many of them have not—in fact, only a few funding recipients have used their PTC funds. So they're not spending the money. They have the time. Then is this a question of commitment? And if there's a lack of commitment, that is a serious, serious problem, when we have people dying on our railroads. So the industry is going to need to answer to that.

Thank you.

The CHAIRMAN. Thank you, Senator Peters.

Senator Blumenthal.

STATEMENT OF HON. RICHARD BLUMENTHAL,
U.S. SENATOR FROM CONNECTICUT

Senator BLUMENTHAL. Thanks, Mr. Chairman.

And I want to thank the Chairman for his very strong words and strongly expressed admonition at the beginning of this hearing about the urgency of this system and his stated intention to contact appropriate Federal authorities about the GAO report. In fact, I was very disappointed in a response from the Secretary of Transportation to a letter that I led with 14 of my colleagues demanding answers regarding DOT's enforcement plan about positive train control. All she really said was that the Department was, quote, considering all options.

The industry needs to know that there will be penalties, that enforcement will be rigorous, that, in effect, there will be no tolerance for delay, and that the six criteria that have to be met are not some expanded timeline, they are conditions that will be interpreted narrowly and specifically. If they have no such warning, then the prediction made by one member of the Long Island Rail Committee just last week, Mitchell Pally, said he would be, quote, significantly surprised if DOT and FRA levy fines in the event of a failure to meet the deadline. If that's the mindset of the industry, it will be a self-fulfilling prophesy, and we cannot allow an additional delay after all these years.

I was really alarmed, Ms. Fleming, by the GAO report, which said that there was a risk, to use your word——

Ms. FLEMING. Mm-hmm.

Senator BLUMENTHAL.—of two-thirds of the commuter railroads failing to meet those deadlines. I am not sure what you meant by "risk," but for me, it means that on the present trajectory, they will not meet those deadlines because of the information and data that you provided in the report.

With respect to MTA, last week MTA's project lead for PTC implementation, Debbie Chin, announced, quote, Our plan is to get it done by the end of the year. But Metro-North also announced that you're just 61 percent complete overall, leaving many of your customers—and I am a very active one, in fact, I'm going to be riding the train home tonight hopefully—whether, in fact, you're going to meet the deadline.

I would like a commitment from you that you will meet the 2018 deadline, and that Metro-North will have positive train control implemented, in operation, by then.

Mr. MAYER. Senator, first of all, our schedule calls for us to meet the deadline. We believe our schedule is achievable, as Ms. Fleming testified, and as we agree, there are significant schedule risks, but right now, it's our intent and our plan to meet the deadline.

I testified earlier that on the railroad that you and I both ride on a frequent basis, we have over—thanks to 2 years of testing, we have cut in civil speed enforcement capabilities on all of the Metro-North lines, and later in the month, we'll be enforcing speed limits, and that's incremental——

Senator BLUMENTHAL. You would agree with me that this technology has been proven over the years?

Mr. MAYER. No, sir. It's not off-the-shelf technology. It hasn't been proven. We're proving it every day of the week that we test it and build it.

Senator BLUMENTHAL. And what would prevent you from achieving that end of your deadline?

Mr. MAYER. Our most important challenges are the delivery of software. There's been a lot of talk here about office software to make the portions of the PTC system that are dependent on software communicate and operate. So our biggest challenge is software. And we also heard some discussion from Ms. Fleming about the time it may take the FRA to approve the applications.

Senator BLUMENTHAL. This system has been implemented elsewhere, correct?

Mr. MAYER. Our operations are very different than elsewhere. We are the densest railroads in the country.

Senator BLUMENTHAL. But the same kinds of systems should be applicable regardless of how dense the systems are, wouldn't you agree?

Mr. MAYER. No. The railroads, although we look very similar, we are extremely different in signal systems, communication capabilities, and operational control.

Senator BLUMENTHAL. And are you on a path to completing whatever software issues have arisen?

Mr. MAYER. We believe so, sir. That's a major deliverable from our systems integrator, and we have encouraged them to hire staff. Our own engineers are assisting with them. They are reaching out to programmers around the world and are doing everything that we know how to motivate them to deliver.

Senator BLUMENTHAL. Is that the major obstacle to your completing the system on time?

Mr. MAYER. Yes. If we were testifying a year ago, we might talk about hardware and delivery of that, but the main obstacle that we're facing is software and ultimately FRA approval.

Senator BLUMENTHAL. Well, I would like a detailed report and a meeting with Metro-North on those obstacles, what you are doing to meet and overcome those obstacles, what resources, if any, additionally are necessary, and why you would not meet the end-of-year deadline? I don't want to hear in 6 months that you're not meeting it.

Mr. MAYER. We look forward to meeting with you, Senator.

Senator BLUMENTHAL. And I might just say, finally, this system, positive train control, is not a new system. It is a proven technology. It has been around for years and years. There may be software challenges in Metro-North's sphere, but those challenges also have been around for years and years. It's not like we're discovering a new planet here or a new kind of equipment. I think, in my view, and, frankly, in the view of many of your customers, there will be no excuse for Metro-North failing to meet that 2018 deadline.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Blumenthal.

Senator Fischer.

STATEMENT OF HON. DEB FISCHER,
U.S. SENATOR FROM NEBRASKA

Senator FISCHER. Thank you, Mr. Chairman.

Ms. Fleming, in your testimony, you noted that the field testing phase can be a long and difficult process. In your discussions with Class 1 and other railroads, can you talk about some of the events or unseen circumstances that could delay and extend field testing or revenue service demonstration? Can you elaborate on some of that?

Ms. FLEMING. So the six railroads that are at RSD, for them, the average was 7 months, but FRA's estimate is field testing could take an average of 2 years. And I think until you go through that, you don't know what bugs there will be and how to work through that.

Some railroads have made the tough decision to suspend operations and to conduct that testing around the clock. So I think, you know, you don't know kind of what you're going to be coming up against until you start going through that. So I think each railroad, it has been kind of a tricky phase of implementation.

Senator FISCHER. Can you give us some examples, though, on what events could delay that implementation? What are some of those unseen circumstances that delay it?

Ms. FLEMING. You know, can I provide that for the record? Because I think I'm going to have to go through our work papers a little bit more and get some good examples for you.

Senator FISCHER. OK. That would be great. Thank you.

Also, the FRA appears to be taking an approach to PTC implementation that says railroads that have completed all PTC component installation and actually operate PTC for trains across their networks cannot be considered fully PTC-compliant and, therefore, must request a PTC extension because of the slower progress of other railroads to use their network. In other words, a railroad that finishes everything within their control would need to file for an extension even if they were using PTC for their trains and have the capability of communicating with other railroads.

Do you believe that the FRA may consider a railroad fully implemented, not when the railroad itself has met the requirements within its control, but when all operations on a track are PTC-compliant regardless of who is responsible?

Ms. FLEMING. To be honest, it's unclear, and I think that's another area where FRA really needs to articulate, what does it plan to do come January 2019? We've asked them, and we didn't get a satisfactory answer. And I think it's important information that the railroads need to understand. What does that mean come January, if you've kind of dotted your i's and crossed your t's, but some of the other folks that you share tracks with haven't? And I think they owe it to the railroads at this point, since we're approaching the deadline, to answer some of those questions that railroads have.

Senator FISCHER. Do you think there would be benefits if the FRA, instead of the railroads, to be quoted, early adopters, if they're allowed and reasonably comply with the law beginning in 2018?

Ms. FLEMING. You know, again, I think that's something the FRA should consider and to think about. Does that make sense? Does that meet their criteria?

They also, quite frankly, have at their fingertips where they can use alternative criteria that is not RSD-based, and I think that's another area that railroads are like, "Well, what does that look like? What does that mean?" And so FRA, I think, needs to, you know, work with the railroads and try to help them understand, what are examples of that? what would meet their threshold?

So they have some options at their fingertips, but they haven't done a good job of articulating what that means.

Senator FISCHER. Do you have any suggestions on how we can encourage FRA to do that?

Ms. FLEMING. I think the Chairman announced today that he's planning to send a letter, and I think that may be a good opportunity to seek out some of the clarifications that we all have.

Senator FISCHER. Thank you.

Mr. DeWeese, in your report, you noted that two commuter railroads utilize the Railroad Rehabilitation and Improvement Financing loans to implement the PTC technology. However, those programs—the program has billions in loan authority provided by Congress that could have been used for PTC. So why is the RRIF funding not being used more extensively for positive train control?

Mr. DEWEESE. Thank you for the question. It wasn't a question certainly that we asked as part of the scope of this effort, but we have done work in this before in the last few years, and I think it's a number of factors that are at play here. I think it could be the lengthy application review process. As you know, that can go anywhere from 90 days to many, many months. It can also be the costs that are involved. I mean, there are loan application fees and credit risk premiums that have to be paid, and that could be—that could discourage some of your smaller commuter railroads for applying for these loans.

The Class 1s may rely on their capital budgets to be able to finance, you know, some of the investment projects, so you may not see them, you know, applying for these loans. But we certainly reported years ago that, you know, a way to streamline the process. The Build America Bureau, you know, sort of was intended to consolidate all these credit programs and to streamline the process and put procedures in place. I think that's to be determined, quite frankly. And, you know, we have work that we're going to be planning. I know GAO, too, is going to be looking at the Bureau. So maybe together we'll be able to figure that out and look at how they plan to do oversight of these programs.

Senator FISCHER. OK. Thank you very much.

Thank you, Mr. Chair.

The CHAIRMAN. Thank you, Senator Fischer.

Senator Wicker.

STATEMENT OF HON. ROGER F. WICKER,
U.S. SENATOR FROM MISSISSIPPI

Senator WICKER. Thank you. And I guess members of the panel realize that many members of this Committee have two other hear-

ings scheduled at the same time, and so we've been coming in and out. But thank you for your patience and being here.

Let me just observe generally. We've had some pretty explicit statements on the part of the Committee Chairman and also the Ranking Member, and I understand the testimony today has not been particularly encouraging about our ability, our collective ability, to have this requirement fulfilled by the end of the year.

I do think the Chairman and Ranking Member's statements indicate that, on behalf of the Congress, they're trying to say that patience is running out. And, I mean, clearly we're going to try not to shut down train traffic around the country at a date certain, but we need whoever to understand that we need to get the attention of those responsible and get a timetable that will work and avoid, if I might say, a train wreck coming either figuratively or literally. So I thank Chairman Thune and Ranking Member Nelson for going ahead and being explicit there.

I might as well ask about an area of particular importance to me, which is Amtrak from Mobile to New Orleans.

You know, the Southern Rail Commission, Mr. Anderson, had hoped for a longer route, and it seems, though, that the real interest there and the real possibility for making it work sooner is to take this real heavily populated area, I mean, Mobile is a major city. The gulf coast of Mississippi is heavily populated. And New Orleans, of course, is one of the major cities of the South in terms of population and potential traffic. So the Commission has trimmed its proposal to that.

And so I'm just hoping that you can give me some encouragement about making that actually work. I think if the schedule can accommodate passengers and accommodate the public, and if the trains are reliable and they run on time, this could be a winner because the population is there.

So how is PTC going between New Orleans and Mobile? When will it be complete? What impact will it have on Amtrak? And also I understand you talked about this, but are we OK with the interoperability of the freight and passenger technology on PTC?

Mr. ANDERSON. The interoperability piece with the four large Class 1 freights is going well. We've actually federated or are in the process of what's called federating, which is hooking our system up to their system so it speaks to our locomotives. That process is going well, particularly well with BNSF and Union Pacific; they've been real leaders. And it——

Senator WICKER. Not particularly well with whom?

Mr. ANDERSON. Well, it's going—it's going better with them because they're moving along, but Norfolk Southern has done a good job with us, and we still have some work to do with CSX. So——

Senator WICKER. We certainly want to encourage CSX to be part of that——

Mr. ANDERSON. We do. Now, let me get to your question. Look, I actually think that well-timed, well-run service between New Orleans and Mobile is a winner, especially if it's both ways, three times, four times a day. Those are big population centers. I'm from the gulf coast. I live on the gulf coast. So I'm familiar with that part of the world. It would work.

The problem is until our preference rights and incremental cost rights under the 1971 statute that created Amtrak are properly enforced—you know, right now the question for reintroduction of that service from CSX was $2 billion.

So the challenge we have in all of these markets where we have routes like that that make good sense, we've never been able to get the preference right that Amtrak has on the freights enforced, and we've never been able to really get them to think straight about true incremental costs because that's what Congress said in 1971.

Senator WICKER. You say the law is there, it's just not enforced?

Mr. ANDERSON. It has never been enforced.

Senator WICKER. And whose responsibility is it to enforce that law?

Mr. ANDERSON. Hopefully yours.

Senator WICKER. Well, we are the legislative branch. Who is—what is the enforcement office?

Mr. ANDERSON. STB.

Senator WICKER. OK.

Mr. ANDERSON. And we'd like a private right of action under the statute.

Senator WICKER. So the statute would have to be amended. The law is there, but it's not as you would like it to be.

Mr. ANDERSON. The law is there, but since 1971, there has never been any effective enforcement over the preference action. That's why the long distance service that Amtrak runs at massive delays.

Senator WICKER. And so the Surface Transportation Board, if they were of a mind to, could enforce it as an agency, but you would like some sort of cause of action provided for in the statute.

Mr. ANDERSON. Correct.

Senator WICKER. Thank you, sir.

The CHAIRMAN. Thank you, Senator Wicker.

Senator Cortez Masto.

STATEMENT OF HON. CATHERINE CORTEZ MASTO, U.S. SENATOR FROM NEVADA

Senator CORTEZ MASTO. Thank you, Mr. Chair.

And like Senator Wicker, I appreciate your patience with us coming in and out. That's why your testimonies are so important. Your written testimonies as well are very helpful. And thank you for being here today.

I know that my colleagues who manage the congressional transportation appropriations, namely, Senators Collins and Reed, have recently written to Secretary Chao about the need to get moving and spending down millions in Fiscal Year 2017 funding to help facilitate progress on the PTC at the FRA. As a matter of course, the FRA reported to our staffs that there are only eight railroads with conditionally certified PTC safety plans, four more under review, and more than 25 who haven't even submitted.

So, Mr. Anderson or Mr. Mayer, what is the average size and complexity of either these PTC safety or implementation plans generally? Can you talk about that?

Mr. MAYER. So our railroads have submitted PTC implementation plans. Our next step will be in the months ahead as we submit revenue service demonstration applications. And, as Ms. Fleming

testified, they are extremely complicated, long documents. But we are running tests now, collecting data, and making plans to be able to file those applications. We've also had recent interactions with the FRA that's helped us to understand exactly what's going to be required of us.

Senator CORTEZ MASTO. And so talk a little bit about that because, how long does it take? Does it take the experts at the FRA a while to review and certify them?

Mr. MAYER. For our revenue service demonstration application, we have allowed 8 weeks in our schedule, and the FRA has told us they will make every effort to do that, but we will need them to hold up that end in order to be able to stay on schedule.

Senator CORTEZ MASTO. And is there a time-frame that you can point to that normally this takes to get through it?

Mr. MAYER. We've never been through it before, so I can't answer that.

Ms. FLEMING. I can answer that.

Senator CORTEZ MASTO. OK, please.

Ms. FLEMING. For test waivers, it's taking FRA anywhere from 10 days to 100 days, but for the safety plans, which can be 5,000 pages or more, they said they can only review two or three a year.

Senator CORTEZ MASTO. OK. OK. Thank you.

So let me follow up. Ms. Fleming, your testimony also underscored the fact that the FRA lacks a clear extension review and appeal process. So then I would ask Mr. DeWeese and Ms. Fleming, can you outline the progress that you've seen in staffing up the necessary personnel and experts internally at the FRA and whether it has been sufficient to help facilitate a faster progress on certification of PTC on the national network where it's required?

Ms. FLEMING. So my understanding, there are 12 PTC experts right now. That's not a lot, particularly given that we see in the next 10 months plus going into next year their workload and capacity really coming into play. They're going to be starting to get the test waivers, the RSD applications, the safety plans. So we have suggested that they really consider prioritizing, having a risk-based approach, figuring out, "Where do we put the resources? What's the best bang for the buck? Do we go after the railroads that have the largest passengers? Do we go after the railroads that are really struggling and have a long ways to go? Do we go after the railroads that maybe just need a push to go over the wall?"

And so we leave it up to them, but we really think, you know, with just having 12 people in-house, with all of these documents and approval processes coming their way, they're going to really need to think about their approach.

Senator CORTEZ MASTO. And has the administration's hiring freeze had an impact on why there are only 12 people in-house?

Ms. FLEMING. You know, I think it has been this way for a while. This is—it's hard to get these folks. There are a limited number of PTC experts out there.

Senator CORTEZ MASTO. OK.

Ms. FLEMING. And so I just don't think that there's a long queue of people that you can draw from.

Senator CORTEZ MASTO. OK. And can I ask—I know I've heard the narrative that there is some—plenty of Federal funding has

been made available to the railroads, and we've heard that today, and we're not making fast enough progress on PTC.

Mr. Mayer, would you agree with that sentiment?

Mr. MAYER. Yes. We are grateful for the RRIF loans sponsored by the FRA in the State of Connecticut and the State of New York. We have a significant amount of money available to us to complete our work. We have submitted invoices in the amount of about a third of those funds and will draw down and then begin to pay back that loan.

Our problem, honestly, is not really money, and more money wouldn't help us move faster. Our bottleneck is, as was just alluded to, the lack of qualified talent, the lack of PTC expertise. Every railroad in the country is looking for that same small pool of talent, and we're working with our systems integrator to creatively tap the talent that exists to help us develop the software that's necessary.

Senator CORTEZ MASTO. Thank you. I appreciate that.

I notice my time is up. I'll submit the rest of my questions for the record.

Thank you again for being here.

The CHAIRMAN. Thank you, Senator Cortez Masto.

We have others here. I would like to just, if I might, ask a question and maybe direct this, principally at least, to Mr. Mayer and Mr. Anderson.

But we've talked a lot about the role of the FRA in this, and I'm wondering what additional guidance or information, if any, from FRA would be helpful for you as you continue to meet the implementation requirements?

Mr. MAYER. You know, as I just mentioned, we have recently received some clarification and some informal assistance from the FRA to help us understand the road ahead for us. It has been very helpful.

Our main concern at this point is FRA resourcing to receive, process, and approve our revenue service demonstration application. The time-frame is going to be very tight, but if there's anything that this Committee can do to help them tap into additional resources, either new hires or perhaps even talent within the Department of Transportation and other modal administrations, that may be helpful.

Mr. ANDERSON. I agree with that. You could have everything installed and be operating in revenue service, but we've got to truncate that time that FRA is going to take in order to certify because if it's 6 to 8 weeks at the end, that's—you know, we're 10 months out. That's number one.

Number two, Ron Batory is leading an effort industrywide to have everyone in on a regular basis in his office where we go through, hours at a time, line by line, installations all over the country in that effort. He needs to—he's done a good job of it, and he's got to spearhead it for the whole industry.

The CHAIRMAN. Unfortunately, he should have been there about 6 months ago in the job, but I've heard this reiterated, in response to questions that have been posed by members of the Committee, but this is a very complex and challenging undertaking, we all agree with that. But it sounds like, if I heard correctly, the most challenging aspect remaining for full implementation is software.

At least that's okay. And it sounds like you've talked a little bit about how you plan to overcome that challenge. Good.

Anything else to add before we wrap up?

Mr. MAYER. You know, one thing that I would add—and thank you, Senator—is, you know, we've heard a lot about commitment. We understand that this Committee and the Congress in general is committed to PTC implementation. We heard a little talk about the MTA board of directors.

I would want to end by pointing out that our Board of Directors is extremely clear that PTC is a very, very high priority and absolutely essential for us to bring online and further provide for the safety of our customers. And that commitment extends to our chairman, our managing director, our two railroad presidents, and the entire implementation team. We are working as hard as we can possibly work to bring the promise of PTC into reality.

The CHAIRMAN. And we hope we will continue that. I mean, I think you heard today us convey the sense of urgency that we attach to getting implementation done in accordance with the requirement and the deadline. So let us know as this moves forward, and I'm going to be consulting, obviously, with the FRA, but what additional help you might need, if there's anything that this Committee or the Congress can do.

I'm going to ask unanimous consent to insert a statement for the record, from the Association of American Railroads on the implementation of PTC.

[The information referred to follows:]

PREPARED STATEMENT OF EDWARD R. HAMBERGER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF AMERICAN RAILROADS

On behalf of the Association of American Railroads (AAR), thank you for the opportunity to discuss positive train control (PTC). AAR members account for the vast majority of North American freight railroad mileage, employees, and revenue.

In this testimony, I will review what positive train control is and what it is meant to do; the progress railroads have made in the development and implementation of this technology; and what to expect going forward. While other railroad entities use each Class I railroad's tracks—Amtrak, commuter railroads, and shortlines—my focus will be on Class I freight railroads and their PTC operations.

The bottom line is that by December 31, 2018, all Class Is will have completed PTC installation, just as Congress required. Further, by the end of this year PTC will be in operation on the vast majority—approximately 80 percent—of Class I PTC route-miles network wide, with some Class I railroads planning to be fully implemented on their networks. Between 2018 and 2020, remaining Class I railroads will be completing PTC implementation, consistent with statute. All railroads will continue their work on resolving technical operational challenges that will inevitably rise, which Congress anticipated and specifically provided protection for in its 2015 law. They also will be addressing perhaps the biggest challenge of PTC implementation: interoperability with each other and with their tenant passenger and shortline railroads.

What is Positive Train Control?

"Positive train control" (PTC) describes technologies designed to automatically stop a train before certain accidents caused by human error occur. Under the Rail Safety Improvement

Act of 2008 (RSIA), passenger railroads and Class I freight railroads are required to install PTC on main lines used to transport passengers or toxic-by-inhalation (TIH) materials.[1]

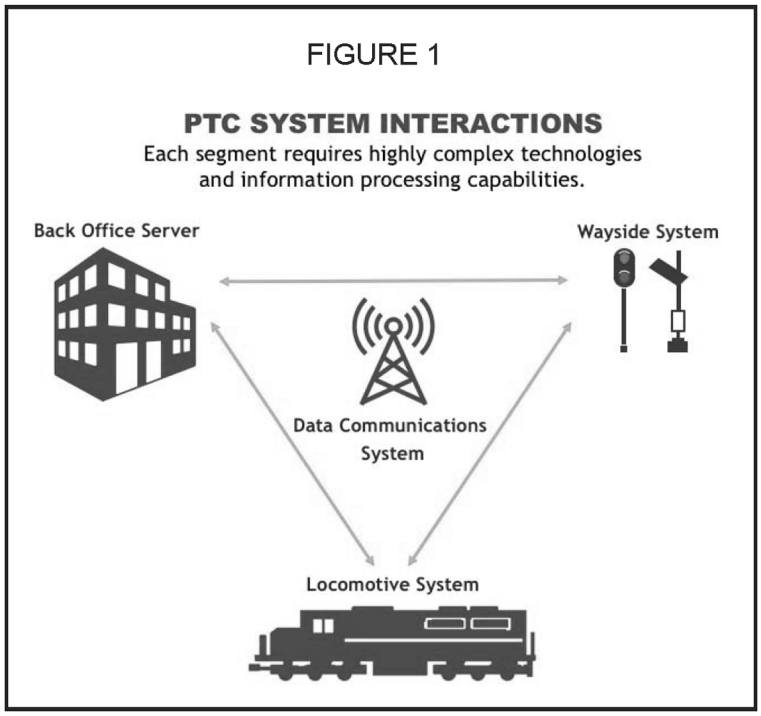
[1] TIH materials are gases or liquids, such as chlorine and anhydrous ammonia, which are especially hazardous if released into the atmosphere.

Specifically, PTC as mandated by the RSIA must be designed to prevent four major types of train accidents: train-to-train collisions; derailments caused by excessive speed; unauthorized incursions by trains onto sections of track where maintenance activities are taking place; and the movement of a train through a track switch left in the wrong position.[2] The PTC system now being installed to meet this statutory mandate is an overlay system, designed to be failsafe and meant to supplement, rather than replace, existing methods of operation.

Positive Train Control is an Unprecedented Technological Challenge

To work as it should, a PTC system must be able to determine the precise location, direction, and speed of trains; warn train operators of potential problems; and take immediate action if the operator fails to act after a warning is provided by the PTC system. For example, if a train operator fails to begin stopping a train before a stop signal or slowing down for a speed-restricted area, the PTC system will override the operator and apply the brakes automatically before the train passes the stop signal or enters the speed-restricted area.

A PTC system consists of three main elements that are integrated by a fourth critical element, the wireless data communications system. An *onboard or locomotive system* monitors a train's position and speed and activates braking as necessary to enforce speed restrictions and unauthorized train movements; a *wayside system* monitors railroad track signals, switches, and track circuits to communicate data on this local infrastructure needed to permit the onboard system to authorize movement of a locomotive; and a *back office server* stores all information related to the rail network and trains operating across it (*e.g.,* speed restrictions, movement authorities, train compositions, etc.) and transmits this information to individual locomotive onboard enforcement systems. Finally, all of these are integrated by a *wireless data communications system* that must move massive amounts of information back and forth between the back office servers, the wayside equipment, and the locomotive's on-board computers.



[2] A switch is the infrastructure that controls the path of trains where two sets of tracks diverge or converge.

Such a system requires highly complex technologies able to analyze and incorporate the huge number of variables that affect train operations. A simple example: the length of time it takes to stop a freight train depends on train speed, terrain, the weight and length of the train, the number and distribution of locomotives and loaded and empty freight cars on the train, and other factors. During the operation of a single train over a single operating segment of track known as a sub-division, the length of time and the distance needed to stop that train may change 100 or more times due to changes in the factors mentioned above. A PTC system must be able to take all of these factors into account automatically, reliably, accurately and in real time in order to safely stop the train wherever it may be along its route.

PTC development and implementation constitute an unprecedented technological challenge. Some of the development and installation tasks associated with the Class I railroads' efforts include:

- A complete physical survey and highly precise geo-mapping of the more than 54,000 route-miles on which PTC technology will be installed, including more than 450,000 field assets along the right-of-way (*e.g.,* mileposts, curves, rail and highway grade crossings, switches, signals, track vertical profiles and horizontal geometry).
- Installing more than 28,500 custom-designed "wayside interface units" (WIU) that provide the mechanism for transmitting information from signal and switch locations along the right-of-way to locomotives and railroad facilities.
- Installing PTC technology on more than 17,200 Class I locomotives.[3]
- Installing PTC technology on nearly 2,100 switches in non-signaled territory and completing signal replacement projects, including upgrades to PTC-compatible signal technology, at some 14,500 locations.
- Developing, producing, and deploying a new radio system specifically designed for the massive data transmission requirements of PTC at tens of thousands of base stations and trackside locations, and on more than 17,200 locomotives.
- Developing back office systems and upgrading and integrating dispatching software to incorporate the data and precision required for PTC systems.

In all these areas, Class I railroads have already made tremendous progress. Figure 2 has details on the status of Class I PTC installations at the end of 2017.

FIGURE 2

CLASS I FREIGHT RAILROAD PTC INSTALLATION AS OF DEC. 31, 2017

Locomotives			Wayside Interface Units		
Equipped and PTC Operable	Required for PTC Operation	% Complete	Installed	Required	% Complete
13,470	17,261	78%	26,698	28,604	93%

Employees			Radio Towers		
Trained	Require Training	% Complete	Installed	Required	% Complete
88,556	101,821	87%	14,667	15,067	97%

Source: AAR compilation of figures provided by individual Class I railroads

Additionally, as shown in Figure 3, at the end of 2017, the Class I railroads already had in operation more than 30,000 route-miles, or 56 percent, of the 54,000 route-miles that will eventually be equipped with PTC. To be clear, each Class I railroad will install 100 percent of PTC wayside, back office, and locomotive hardware and complete all required training by the end of 2018 and expect to have nearly 80 percent of required PTC route-miles operational by the end of 2018.

[3] As just one example of the magnitude of the PTC implementation effort, it takes about one person working for about one month to install all of the necessary PTC equipment on a single locomotive. It will take approximately 1,400 staff-years to install PTC on all of the Class I locomotives that require it.

FIGURE 3

CLASS I FREIGHT RAILROAD PTC IN OPERATION AS OF DEC. 31, 2017

Miles		
In PTC Operation	Required for PTC Operation	% Complete
30,223	54,028	56%

Source: AAR compilation of figures provided by individual Class I railroads

The AAR estimates that, as of the end of 2017, freight railroads together have spent more than $8 billion—of their own funds, not taxpayer funds—on PTC development and deployment, and expect to spend more than $10 billion by the time PTC is fully operational nationwide. This does not include the hundreds of millions of additional dollars needed each year to maintain the railroads' PTC systems once they are initially installed.

Testing and Validation is Essential for Safe Operation and Full Interoperability

From the outset, railroads' efforts were focused on development and testing of technology that could meet the requirements of the RSIA, particularly those related to interoperability, and that could be scaled to the huge requirements of a nationwide system. For example, production and installation of the new radios—necessary to meet PTC's immense communication demands—became possible only after a long period of development and testing. Essential software and hardware for many PTC components had to be developed and deployed, and then rigorously tested. Only after technology is actually installed and exposed to the rigors of day-to-day operations can the task of testing each of the individual parts, and the system as a whole, be completed under real world conditions.

This task is made particularly complex by the need to ensure that PTC systems are fully and seamlessly interoperable across all of the Nation's major railroads. It is not unusual for one railroad's locomotives to operate on another railroad's tracks. When that happens, the "tenant" locomotives must be able to communicate with, and respond to conditions on, the "host" PTC system. Put another way, a CSX locomotive must behave like a Norfolk Southern locomotive when it is traveling on NS track; a BNSF locomotive must be compatible with Union Pacific's PTC system when it is on UP track, and so on. All the while, each railroad has its own operating rules designed to address specific conditions on its property, all consistent with FRA regulations, but further adding to this complexity. Ensuring this interoperability has been a significant challenge.

Interoperability appears to also have been a significant problem in Europe where the European Union's first "interoperability directive" was published in 2001. It was not until 2016 that sufficient technical progress in either hardware or software had been made to allow the first deployment of an early stage, interoperable system. However, much work remains to be done to cure both technical and institutional problems that keep their current technology from being fully equivalent to that required under U.S. statute. To date, only 2,400 miles of track in the EU are equipped with this new generation technology. The EU does not expect that a 30,000-mile

"core" network will be deployed before 2030; a full build out over 73,000 miles of the most densely used portions of the European network is not expected to be completed before 2050.[4,5]

It is critical that the huge number of potential failure points in PTC systems be identified, isolated, and corrected. By necessity, a mature, well-functioning PTC system is enormously complex, and it is not realistic to think it will perform flawlessly day in and day out, especially upon initial implementation. That is precisely why testing, first in a simulated environment and then under real-world operating conditions, is so important. Unfortunately, the failure of a single part within a complex PTC system can mean the system does not work as it should. When that happens, the fail-safe nature of PTC means that trains are not able to operate normally on affected rail lines until the failure is corrected, a situation railroads are facing today as they proceed toward PTC implementation. U.S. railroads are working hard to limit negative impacts on their customers associated with PTC rollouts, but these impacts will be a fact of rail life particularly until the system fully matures.

Every day, as railroads finalize their PTC installation and expand PTC operations, additional accident avoidance becomes possible. However, as other train control systems implemented in other countries demonstrate, there is risk in improperly designed, installed, or operated PTC systems. This is not just a speculative concern. Since 2008, there have been a number of incidents worldwide in which accidents resulting in deaths and injuries occurred on rail lines that had PTC-like systems. Insufficient testing of PTC design or equipment has been identified as the cause in two high profile accidents involving significant fatalities.[6,7]

These concerns make it essential that a railroad's first priority must be to implement PTC correctly, and to test and validate it thoroughly.

Conclusion

Railroads have devoted enormous human and financial resources to develop a functioning and reliable PTC system, and progress to date has been substantial. Class I railroads remain committed to safely implementing PTC as quickly as feasible. By the end of 2018, each Class I railroad will have implemented PTC or initiated revenue service demonstration on, at a minimum, 51 percent of its required PTC route-miles or subdivisions; have 100 percent of the necessary wayside, back office, and locomotive hardware installations completed; have all required spectrum in place; and have all required employee training completed.

In addition, network-wide approximately 80 percent of required PTC route-miles are expected to be operational by the end of 2018. While several Class I railroads plan to be fully implemented by the end of this year, all Class I railroads will be fully implemented no later than 2020. In the meantime, Class I railroads will continue to work with each other and their tenant passenger and shortline railroad partners to successfully achieve full interoperability, which is the largest remaining challenge to a fully implemented national PTC system.

The CHAIRMAN. We will keep the hearing record open for a couple of weeks. And I know there are members who have indicated a desire to submit questions for the record. So if our witnesses could respond as quickly as possible to those so that we can close the record out, it would be greatly appreciated.

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[4] European Court of Auditors, Special Report No. 13, A Single European Rail Traffic Management System: Will the Political Choice Ever Become Reality? European Union, Luxembourg, July 2017.

[5] European Commission, Delivering an Effective and Interoperable European Rail Traffic Management System (ERTMS)—The Way Ahead, Commission Staff Working Document, Brussels, November 2017.

[6] In 2011 a pair of trains on a high-speed line in China equipped with a PTC-like system collided, resulting in 40 deaths and 192 injuries. Investigation of cause revealed that installation of a Japanese "off-the-shelf" PTC-like system had failed to recognize and accommodate local operating conditions and rules and had not been properly adapted to the dispatching and train management processes used on the Chinese line.

[7] In 2013 a high-speed train in Spain derailed while exceeding the speed limit on a sharp curve at the end of the high-speed section of the railway, killing 79 passengers and injuring 139. The high-speed portion of the route was equipped with a PTC-like system, but failed to warn the locomotive engineer of the speed-restricted curve and also failed to take action to slow the train. Investigation of cause determined that the failure of the system to intercede was due to both design flaws and a failure of the operational components of the system.

Thank you all for this. I think this is an important hearing, a timely hearing, and a very important update for us in terms of what's happening with respect to this very important safety issue.

This hearing is adjourned.

[Whereupon, at 12:05 p.m., the hearing was adjourned.]

A P P E N D I X

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JOHN THUNE TO SUSAN FLEMING

Question. The Committee is aware that some Class I railroads may require their tenant short line railroads to have PTC-equipped locomotives when operating any of the Class I's lines equipped with PTC, potentially prior to the applicable statutory or regulatory deadlines. While the most recent GAO engagement focused on commuter railroads, we understand GAO has interviewed short line railroads representative in connection with some of its past work on PTC.

a. Does the GAO have any data on this issue, including how many short line railroads are impacted?

Answer. GAO has not conducted recent work related to short line railroads' PTC implementation efforts, and we do not have any data directly related to this issue.

From our understanding, Class Is can determine whether one of their connecting short lines must install onboard PTC equipment, depending on the working arrangement between the Class I and short line. Given this, an unknown number of short line railroads may be installing PTC components as directed by Class Is.

FRA's appears to be tracking implementation progress for a few short line railroads. For example, the Q4 2017 data from quarterly and annual reports available on FRA's website includes: (*https://www.fra.dot.gov/app/ptcprogress/2017q4*)

- Alaska
- Terminal Railroad Association of St. Louis
- Kansas City Terminal
- Belt Railway
- Portland and Western (also covers TriMet)

b. What potential challenges do short line railroads face in meeting these requirements?

Answer. In GAO–15–739, we reported that according to FRA, 10 smaller—or Class II/III—railroads are required by RSIA to implement PTC because they support passenger traffic. Of these, GAO interviewed Alaska, Belt Railway of Chicago, Kansas City Terminal, Nashville and Eastern, New Orleans Public Belt, Pan Am Railways, Portland and Western, Saratoga and North Creek, Terminal Rail of Saint Louis. We also interviewed three Class II/III railroads that are not required by statute to implement PTC on their track, but are equipping locomotives with PTC because they will run on PTC-equipped track. Some Class II/III railroads are being required to equip their locomotives with PTC because they are a tenant and their host railroad has indicated they must equip.

In GAO–15–739, representatives of one Class II/III railroad indicated to us that they will use their Class I host railroad's back office system, but others indicated they may have to develop their own; this may be costly and these railroads may lack in-house resources to maintain such systems. Representatives also told us that they are exploring the use of a virtual back office that would be shared among several railroads and managed by a third party.

In GAO–15–739, three of the Class II/III railroads and 1 commuter railroad we interviewed said that they have received limited guidance and instruction from their Class I host railroads regarding the extent to which they need to equip with PTC and when they should be equipped, making it difficult for them to begin PTC implementation. However, three Class II/III railroads and thee commuter railroads stated their Class I railroad hosts were communicating with them and, in some cases, had been helpful in addressing vendor issues. FRA officials told us that FRA will not get involved in this issue because it is a commercial arrangement between two private entities.

c. To your knowledge, has the Department of Transportation assessed the potential for freight rail service disruptions if short line railroads do not meet these deadlines?

Answer. We have not conducted recent work focused on specific actions taken by DOT related to short line railroads' implementation of PTC. The scope of our review was focused on commuter railroads' implementation progress and DOT's management and oversight of their PTC implementation. DOT, via a December 2017 letter from Secretary Chao to all the Class I railroads, intercity passenger railroads, and state and local transit authorities, stressed the urgency and importance of safely implementing PTC systems in the upcoming year to meet the December 31, 2018 deadline. Given this, the agency does not appear to be focused on short line railroads' implementation at this time.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BILL NELSON TO SUSAN FLEMING

Implementation Status. Ms. Fleming, you took a deep dive look into how consumer railroads are working to implement positive train control.

Question 1. How concerned are you about the status of implementation by these railroads?

Answer. We found that most of the 29 commuter railroads implementing PTC have reported progress in some of the areas of initial implementation that the Federal Railroad Administration (FRA) monitors, such as locomotive and wayside equipment installation, but the amount of progress reported varies across individual railroads. However, beyond the initial implementation activities, much work remains for the majority of commuter railroads to complete other key PTC activities that will enable them to complete implementation such as field testing and interoperability. Based on our analysis, some of the commuter railroads that told us they did not plan to seek an extension beyond 2018 appear to be at risk of not meeting the requirements to qualify for an extension, let alone complete implementation before the end of 2018.

Commuter railroads unable to implement a PTC system by December 31, 2018, may receive a maximum 2-year extension if they meet certain statutory criteria. Based on our analysis of the PTC schedules of the 29 commuter railroads, we found that over half may not have sufficient time to complete activities needed to implement PTC by the end of 2018 or to qualify for an extension of that deadline by meeting criteria based on initiating revenue service demonstration (RSD).

GAO's analysis of commuter railroads' PTC scheduled milestones for two key activities necessary to meet the 2018 deadline or qualify for an RSD-based extension (one of the statutory options) found that as many as two-thirds of the 29 commuter railroads may not have allocated sufficient time to complete these milestones. Specifically, in comparing the commuter railroads' schedules to FRA's estimates of the time required to complete these milestones and the experiences of railroads that have already completed them, GAO's analysis found that from 7 to 19 commuter railroads may not complete the milestones before the 2018 implementation deadline or qualify for an extension.

Question 2. What challenges led to this point? Why were some railroads able to make such progress and others were not?

Answer. A number of factors can affect the progress of commuter railroads' implementation of PTC, including limited industry expertise and resources, or unexpected schedule changes. In addition, PTC implementation is a complex and lengthy process. It requires the integration of various components, many of which are new technologies that must be integrated with existing systems. About half of the commuter railroads we spoke with acknowledged that industrywide, there are a limited number of individuals with PTC technical expertise available to successfully implement the technology, which can affect the ability of railroads and contractors to meet planned schedules. In addition, some commuter railroads told us they faced unexpected delays in obtaining PTC equipment, such as radios, from the supplier. Some PTC equipment is only available from a single provider, which can lead to delays executing contracts and obtaining equipment.

Unexpected issues with components or technology can also require additional time to complete certain activities, causing schedules to slip. Such issues could affect railroads currently on schedule as well as railroads pursuing aggressive schedules in an effort to overcome late starts or early setbacks. For example, representatives from one railroad said that despite strong organizational commitment to implementation and setting internal targets for progress, their PTC project schedule slipped many times over the course of implementation due to a variety of issues, including

on-going software updates that caused delays while also straining the budget and burdening staff.

For those railroads that have made more progress with implementation, we heard that early commitment from agency leadership and support from the board to implement PTC helped encourage progress throughout the project and enabled management to make tough decisions to constantly progress. Officials from one of these railroads told us they made difficult decisions that would enable them to move forward with the overall project.

Question 3. Does implementation of positive train control by any of the Florida railroads raise particular concern for you?

Answer. In January 2018, Sunrail and TriRail were both identified among the 13 commuter railroads FRA identified as at risk of not meeting the 2018 deadline and not completing requirements for a deadline extension. FRA made these determinations based on whether a railroad had installed at least 65 percent of all equipment as of the end of September 2017. Florida East Coast Railway/All Aboard Florida was not identified as at risk by FRA, but the railroad has had multiple fatal grade crossing accidents in the last year.

Much uncertainty exists regarding railroads' ultimate implementation progress and their ability to meet the 2018 deadline or qualify for an extension. This uncertainty is due, in part, to the fact that PTC is a new way of operating and involves technologies that are more complex to implement than many other railroad capital projects. Furthermore, a number of factors can affect commuter railroads' planned and future progress, including unexpected setbacks installing PTC components and resources and capacity issues.

DOT Oversight. Ms. Fleming, the Department of Transportation should be providing clear and consistent guidance to railroads, particularly as they near the deadline.

Question 4. How is the Department doing at this task?

Answer. We found that FRA monitors railroads' PTC implementation progress, but has not systematically communicated information to help them prepare for the 2018 deadline or to qualify for extensions. Since 2015, FRA has assumed additional roles and responsibilities—primarily through the PTC Task Force and regional PTC specialists—to monitor railroads' implementation progress, review required documentation, and share information about implementation steps and activities. While the majority of the railroad representatives we met with said FRA officials were consistently available to discuss issues that arise during day-to-day PTC implementation activities, the information conveyed by these officials has sometimes been inconsistent. Commuter railroads also expressed a need for additional clarification about the criteria for applying for an extension, and representatives from some commuter railroads we met with were unclear about the agency's approach to reviewing and granting extension requests.

In addition, FRA has made limited use of implementation progress information to prioritize its efforts and mitigate risks. FRA has not fully leveraged the implementation progress data that railroads' submit to the agency to identify and develop a risk-based approach to prioritize agency actions. At present, it is unclear whether the agency's priorities are, for example, to help the largest commuter railroads meet the deadline or extension requirements, push those railroads that are very close to full implementation, or assist railroads that are in the earliest stages of their PTC project. By not effectively targeting actions to help mitigate risks posed by railroads most at risk of not meeting the PTC deadline or qualifying for an extension, FRA misses the opportunity to leverage its limited resources by providing direct assistance in the areas of greatest need.

Question 5. What more could be done by the Department to assist commuter railroads—especially those that are falling behind?

Answer. As the 2018 deadline rapidly approaches, the need for clear information that is systematically communicated to all railroads implementing PTC becomes even more critical. FRA cannot expect to provide information and guidance to railroads individually, and therefore, adopting a risk-based communication strategy could help it more efficiently share information in the coming year. Moreover, the information FRA collects on railroads' progress has not been used to inform the agency's resource allocation decisions. Using this information to better allocate resources could help position FRA to better meet its responsibility to monitor and oversee PTC implementation in the future. Given this, GAO recommended that FRA: 1) identify and adopt a method for systematically communicating information to railroads regarding the deadline extension criteria and process, and 2) develop an approach to use the information gathered to prioritize the allocation of resources to address the greatest risk.

Grade Crossing Safety. My state continues to top the list for grade-crossing collisions and fatalities. In recent months, we have seen a renewed problem with grade crossing safety following the start of higher speed rail service.

Question 6. What steps should we be taking to better address grade crossing safety?

Answer. During the course of our PTC review, we did not conduct the work necessary to answer this question. GAO has ongoing work in the area of grade crossing safety, and anticipates issuing a final product in Fall 2018.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JOHN THUNE TO HON. BARRY J. DEWEESE

Question. The Committee is aware that some Class I railroads may require their tenant short line railroads to have PTC-equipped locomotives when operating any of the Class I's lines equipped with PTC, potentially prior to the applicable statutory or regulatory deadlines. Did any short line railroads that received Federal funding raise this issue to DOT OIG?

Answer. OIG did not receive any tenant railroad responses indicating that host railroads had set additional deadlines for their PTC implementation; however, our line of questioning focused primarily on decisions related to the use and access of funding. During our information gathering, we did note three railroads that were not independently subject to the congressional requirement were implementing PTC because their host railroads were doing so. In addition, some tenant railroads mentioned that their host railroads' technical specifications and the need for interoperability would ultimately impact the types of equipment they purchase.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BILL NELSON TO HON. BARRY J. DEWEESE

Funding for Positive Train Control. Mr. DeWeese, you found that the Federal Government has provided more than two billion dollars in support to help implement positive train control. Yet, some believe that much more is needed to help commuter railroads.

Question 1. Is funding a challenge for commuter railroads? What kind of additional support might they need?

Answer. Our recent audit identified the amount of Federal funding provided to implement positive train control; we did not assess future needs. While the commuter railroads we contacted did not identify funding as a challenge to meeting the December 2018 congressional deadline, they did express concern about costs that will arise after full PTC implementation. Those costs, as well as the potential for funding shortfalls, remain uncertain and will be key watch items going forward. We will continue to work with the Department and Congress to monitor funding implications that could impact railroads' deployment and sustainment of PTC.

Grade Crossing Safety. My state continues to top the list for grade-crossing collisions and fatalities. In recent months, we have seen a renewed problem with grade crossing safety following the start of higher speed rail service.

Question 2. What steps should we be taking to better address grade crossing safety?

Answer. We share your concern. While our office has not studied this topic in recent years, we are currently planning an audit to assess the Department's progress in advancing grade crossing safety. We will reach out to your staff as we finalize our audit objectives.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO HON. BARRY J. DEWEESE

Speed Limit Action Plans. Mr. DeWeese, the FAST Act requires passenger railroads to come up with speed limit action plans for any place there is a speed reduction of 20 miles-per-hour or greater. Speed limit action plans are meant to help prevent incidents like the Amtrak Cascade Train 501 derailment in DuPont, WA by creating numerous warnings for the engineer that they need to reduce their speed.

Question 1. Do you know if the Department of Transportation approved Amtrak's speed action plan for the curve in DuPont, WA?

Answer. At this time, we do not have information on the Department's approval process or the status of Amtrak's speed action plan for the curve in DuPont, WA.

Highway-Rail Grade Crossing Safety. I would like to address the topic of safety issue, highway-rail grade crossings. The City of Lakewood sits on the new Point Defiance Bypass Rail line where the DuPont derailment occurred.

The city has 7 grade crossings within its city limits. They are understandably concerned about safety at these crossings given that over 30 percent of rail related fatalities occur at grade crossings.

Question 2. Mr. DeWeese, In November 2016, the FRA released their model for state highway-rail grade crossing action plans. The FAST Act requires the FRA to create a rule requiring state to submit their action plans. Can you update me on the status of this rule?

Answer. While we have reviewed grade crossing safety in the past, our office has not studied this topic in recent years. In the next few months, we will initiate an audit that will assess FRA's progress in advancing grade crossing safety, and we will be in a better position to provide an update at that time. We will reach out to your staff as we finalize our audit approach.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JOHN THUNE TO RICHARD ANDERSON

Question 1. As you noted, many commuter rail passengers ride on trains that use the Northeast Corridor or connect to Amtrak trains.

a. Could you provide a comprehensive overview of Amtrak's interactions and planning to date with each commuter railroad that may not fully implement PTC by December 31, 2018 or qualify for an extension?

Answer. Amtrak has regular communication with the commuter railroads that use our infrastructure or on which we are a tenant through a cross-departmental approach aimed at allowing us to understand and prepare for likely outcomes as implementation and installation of positive train control (PTC) progresses throughout the year. As progress is made in PTC implementation, we adjust our planning and options based on the needs of Amtrak and individual commuter railroads and maintain strong coordination across our 46 state network through focused oversight of our Assistant Vice President of Operations.

More specifically, Amtrak's Engineering Department works with commuter railroads on a weekly and often daily basis. They discuss way-side installation, boundary locations and testing of the PTC system. This is important since all responsible parties need to be involved in testing to allow our equipment and teams to communicate effectively.

The Amtrak Mechanical Department works on a monthly or more frequent basis with the various commuter agencies to ensure there is regular progress on installation of relevant on-board hardware installed in the locomotives. Amtrak Operations also communicates monthly with the commuter agencies to monitor and update progress with implementation and installation of the overall PTC system.

At this point in time, we are confident that most commuter agencies relevant to the Amtrak network will qualify for extensions.

b. From both a safety and business perspective, could you speak in more detail to what you see as the impact of potential service cuts on the overall transportation network in the region?

Answer. At this time, Amtrak continues to assess the readiness of its commuter tenants on the Northeast Corridor and is working closely with all agencies to progress forward with implementation. We are not yet prepared to make any definitive statements on the outcome of their efforts to implement PTC and any impacts on past service this year as much of the necessary work is scheduled to be achieved this fall.

c. What information, if any, has FRA provided to you on how it expects to handle a tenant or connecting railroad not meeting the statutory deadline?

Answer. Amtrak continues to have regular discussions with FRA on how hosts manage PTC implementation with tenants and connecting railroads. The FRA's PTC symposiums have helped facilitate communication between tenants and hosts as well as clarifying expectations.

d. What guidance, if any, has FRA provided to you on how it expects Amtrak to handle a tenant or connecting railroad not meeting the statutory deadline?

Answer. Amtrak continues to have regular discussions with FRA on how hosts manage PTC implementation with tenants and connecting railroads, but have not received official guidance on this matter.

Question 2. As you know, Amtrak operates over host railroad track where a host railroad may not implement PTC by December 31, 2018, or qualify for an extension.

Following-up on a commitment at the hearing, please provide a list of the services, routes, or lines which may cease at the end of the year due to a host railroad not fully implementing PTC or not meeting the statutory deadline, and please detail the likelihood and underlying issues relevant for the decision.

Answer. There has been significant progress since the hearing on locations where Amtrak had concerns about a host's implementation schedule or ability to qualify for extensions or exemptions. Since the hearing, many of these concerns have been addressed and we have received significant information from hosts to confirm compliance or exemptions have been filed in accordance to the law.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. ROGER F. WICKER TO RICHARD ANDERSON

Question 1. Mr. Anderson, in your testimony you stated that "well timed, well run service between New Orleans and Mobile is a winner". I agree. You further stated that, "the question for reintroduction of that service from CSX was $2 billion". As you know, the Gulf Coast Working Group, created by Congress in the FAST Act, identified the preliminary capital cost estimates for restoring service to Orlando, FL to be $117,672,000, with annual operating cost estimates at $5,480,000 for the long-distance route and $6,970,000 for a twice daily State-supported route between New Orleans, LA and Mobile, AL. Amtrak was part of the working group and supported its conclusion.

Congress, in S. Rept 115–138, the Appropriations Committee report accompanying S. 1655, the FY18 Senate Transportation, Housing, and Urban Development Appropriations Act, endorsed the findings of the Gulf Coast Working Group when it stated the following:

> *Gulf Coast Rail Service.—Section 11304 of the FAST Act required the Gulf Coast Working Group [GCWG], consisting of FRA, Amtrak, the Southern Rail Commission [SRC], railroad carriers, State and local governments, and others, to evaluate all options for restoring passenger rail service in the gulf coast region, select a preferred option for service, develop an inventory and cost estimate of capital projects to restore service, and identify Federal and non-Federal funding to restore service. The GCWG report, released on July 17, 2017, identified the preferred options as a daily long-distance route that extends Amtrak's existing City of New Orleans service from New Orleans, Louisiana to Orlando, Florida and a new daily State-supported route from New Orleans, Louisiana to Mobile, Alabama. The preliminary capital cost estimates for restoring service is $117,672,000, with annual operating cost estimates at $5,480,000 for the long-distance route and $4,000,000 for the State-supported route. These cost estimates are dwarfed by the $2,300,000,000 estimate previously determined by industry, which also raised concerns with on-time performance [OTP] requirements and delays at drawbridges. The Committee believes the GCWG report more accurately reflects these concerns and is a more realistic cost estimate, but directs Amtrak and DOT to continue working with the host railroad and the Coast Guard to refine cost estimates.*

a. Is your testimony in agreement with the Gulf Coast Working Group and Amtrak staff or is it supporting the CSX assessment?

Answer. My testimony was a reference to the wide gap, as also noted by the Appropriations Committee report, between CSX's proposal and the GCWG report. Like the Appropriations Committee, Amtrak believes that the GCWG report is a more accurate and realistic assessment of the host railroad-related challenges and solutions.

Question 2. Mr. Anderson, during the hearing, you further stated that Amtrak's "preference" and "incremental cost rights" are not properly enforced.

a. Please describe the impact of lack of enforcement of these rights on restored service between New Orleans, LA and Mobile, AL.

Answer. Lack of enforcement of Amtrak's rights, in particular preference over freight transportation, has led to a severe deterioration in the on time performance of Amtrak service. The largest cause of delay to Amtrak trains on host railroads is Freight Train Interference, typically caused by a freight railroad requiring an Amtrak passenger train to wait so that its freight trains can operate first. Host railroads often choose to delay Amtrak trains with hundreds of passengers on them in favor of their trains carrying coal, garbage, crude oil, empty freight cars, or any freight that the host chooses to prioritize. Very often, a host railroad will make Amtrak passengers follow the same slow freight train for more than 50 or even 100 miles.

During FY 2017, Amtrak trains were delayed by freight trains on host railroads almost 100,000 times. These delays totaled more than one million minutes (or 17,500 hours). These delays, which continue to increase at an alarming rate, threaten the viability of major portions of Amtrak's network and therefore threaten Amtrak's capability to expand service at all, including in the New Orleans-Mobile corridor.

Moreover, a New Orleans-Mobile service will not be successful if our customers, and your constituents, experience such delays on a regular basis.

b. Please describe your plan for addressing this issue.

Answer. Amtrak continues to exercise every available opportunity to collaborate with willing hosts to share data and otherwise work together to identify and address delays—whether due to Freight Train Interference or other factors. However, for such efforts to be fully successful, host railroads must be motivated to run Amtrak well. Unfortunately, this currently is not the case with some host railroads. Current law prevents Amtrak from taking action in response to host railroad violations of Amtrak's preference rights. Amtrak's FY2019 Legislative and Grant Request to Congress includes a proposal to correct this problem by allowing Amtrak a private right of action with respect to preference, so that Amtrak can protect its rights just as any other company would if its rights were being violated.

Question 3. Mr. Anderson: As you know, Senator Cochran and I, along with our colleagues from Louisiana and Alabama, are working to restore passenger rail service along the Gulf Coast. The Southern Rail Commission is currently pursuing a state-supported route between New Orleans, LA and Mobile, AL to restart service along the gulf coast. The long term goal is ultimately to add the long distance route to Orlando, FL.

a. It is my understanding that Positive Train Control (PTC) will be in place between New Orleans, LA and Mobile, AL on time. Please confirm whether this is true and, if not, please provide specific information about remaining gaps in installing PTC along this corridor.

Answer. The New Orleans to Mobile segment is not owned by Amtrak, but this is our understanding as well. The host railroad, CSX, should be able to provide an update on progress for implementation.

b. It is also my understanding that PTC may not be installed by the deadline on track that is east of Mobile, AL and which may one day be part of the long distance route to Orlando, FL. Can you confirm that a state-supported route from New Orleans, LA to Mobile, AL would not be impacted by the status of PTC on track east of Mobile, AL?

Answer. This segment is also not owned by Amtrak, but this is our understanding as well. The host railroad, CSX, should be able to provide an update on progress for implementation. You are correct that the status of PTC implementation east of Mobile will not impacts the potential State Support service we are seeking to advance with the SRC to the west.

Question 4. Recently, Politico reported that a spokesman for the freight railroad Canadian National stated the railroad was scheduled to complete installation of PTC on time. The spokesman further stated that "the City of New Orleans corridor will be the first completed, and multiple subdivisions in the corridor are in revenue service demonstration."

a. Can you confirm that this is correct?

Answer. This segment is not owned by Amtrak. The host railroad, Canadian National, should be able to provide an update on progress for implementation.

b. If not, please provide describe the status of PTC on the City of New Orleans route and the impact upon Amtrak's revenue service on that route.

Answer. This segment is not owned by Amtrak. The host railroad, Canadian National, should be able to provide an update on progress for implementation. While we are in regularly communication with Canadian National, they would be able to provide the most accurate and up-to-date information on this route.

c. Please provide information describing the status of PTC on Amtrak's Crescent route and the impact upon Amtrak's revenue service on that route.

Answer. This segment is not owned by Amtrak, but Amtrak has completed interoperability testing on this route between Washington, DC and New Orleans. The Amtrak project schedule calls for beginning operations with PTC in the fall of 2018 after final software upgrades are ready.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BILL NELSON TO RICHARD ANDERSON

Positive Train Control. Mr. Anderson, Florida relies on Amtrak service to provide access to long-distance rail service for many cities.

Question 1. What is the status of positive train control on routes you travel in Florida? When will it be implemented?

Answer. There has been significant progress since the hearing on locations where Amtrak had concerns about a host's implementation schedule or ability to qualify for extensions or exemptions. Since the hearing, many of these concerns have been addressed and we have received significant information from hosts to confirm compliance or exemptions have been filed in accordance to the law. In Florida, we are working with both the South Florida Regional Transportation Authority and SunRail as they progress forward in their work to achieved Alternate Schedules for implementation from the FRA. Assuming that such schedules are granted, Amtrak is undertaking hazard analysis and risk mitigation plans for operations over the territory until PTC becomes operational.

Grade Crossing Safety. Panel, my state continues to top the list for grade crossing collisions and fatalities. In recent months, we have seen a renewed problem with grade crossing safety following the start of higher speed rail service.

Question 2. What steps should we be taking to better address grade crossing safety?

Answer. We continue to look for opportunities to address grade crossing safety and we have long supported outreach programs. The most prominent program is "Operation Lifesaver," a nonprofit public safety education and awareness organization dedicated to reducing collisions, fatalities and injuries at highway-rail crossings and trespassing on or near railroad tracks. However, more needs to be done and we still believe the safest grade crossing is the one that does not exist. Several of the host railroads have programs in place that financially incentivize communities to remove public grade crossings and we strongly believe that more funding and focus on upgrading those grade crossings that necessary with enhanced traffic control and safety features is justified. Similarly, where new public grade crossings are introduced it is imperative that active warning devices are installed.

Washington State Crash. Mr. Anderson, the Amtrak derailment in Washington State is eerily similar to the 2015 derailment in Philadelphia. In the last transportation bill, Congress mandated that railroads evaluate curves where the speed drops in hopes of preventing a similar crash.

Question 3. Did Amtrak evaluate the curve near DuPont, Washington prior to starting service? What actions did you take to address it?

Answer. In light of the open and ongoing NTSB investigation we are unable to provide this information at this time. It is important to note that the NTSB has publicly released that had an automatic-braking system been operational, it would have applied the brakes to slow and stop the train.

Question 4. Could a derailment like the one in Washington State happen in Florida or elsewhere? What steps are you taking to prevent that from happening?

Answer. The possibility of a train derailment is present across the Nation's railroad network from a variety of possible risk areas. However, many of the recent accidents involving Amtrak trains have involved over-speed situations that Positive Train Control could have prevented. Thus, we believe PTC or the application of technology and operating practices that achieves PTC-equivalency must be standard for all Amtrak routes and that this technology will make the entire U.S. rail network safer for passengers, railroad employees, and communities. While some question the need for PTC on low-density territory, our recent experience has shown that over-speed relative to signal indications and permanent or temporary speed restrictions is a significant risk and this risk exists regardless of traffic levels on a given route. As the leader in the installation of PTC for decades, having already deployed systems across nearly all of tracks we control, we have strong corporate experience with both the benefits of having PTC installed and the risks associated with its absence.

For the tracks we use but do not own or control, we are cooperating with our freight and commuter host railroads as they advance their obligations to complete PTC installations, which are required either because of the presence of passenger trains or certain hazardous material. Additionally, the various freight and commuter railroads that operate over Amtrak's infrastructure must equip their rolling stock with PTC for use on our infrastructure and we are working cooperatively with them to advance these tasks.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO RICHARD ANDERSON

Speed Limit Action Plans. Mr. Anderson, the FAST Act requires passenger railroads to come up with speed limit action plans for any place there is a speed reduction of 20 miles-per-hour or greater. Speed limit action plans are meant to help prevent incidents like the Amtrak Cascade Train 501 derailment in DuPont, WA by creating numerous warnings for the engineer that they need to reduce their speed.

Question 1. Had Amtrak created a speed action plan for the curve in DuPont, WA, where the derailment occurred?

Answer. In light of the open and ongoing NTSB investigation we are unable to provide information related to the 501 derailment. However, Amtrak did comply with the FAST Act requirements for speed limit action plans.

Question 2. Can you explain what measures were in place to warn the engineer that he needed to reduce the speed of the train?

Answer. The information publicly released by the NTSB confirmed that a 30 mph speed-limit sign was posted on the engineer's side of the train to remind engineers about the upcoming curve. It was posted two miles before the curve.

Question 3. Can you identify what you are doing to learn from this derailment to update all your speed limit action plans?

Answer. We have and will continue to review our speed limit action plans. The need for full implementation of Positive Train Control is critical. PTC will prevent over-speed derailments. PTC must be standard for all Amtrak routes and this technology will make the entire U.S. rail network safer for passengers, railroad employees, and communities. Amtrak is a leader in the installation of PTC, having already deployed systems across nearly all of tracks we control.

For the tracks we use but do not own or control, we are cooperating with our freight and commuter host railroads as they advance their obligations to complete PTC installations, which are required either because of the presence of passenger trains or certain hazardous material. Additionally, the various freight and commuter railroads that operate over Amtrak's infrastructure must equip their rolling stock with PTC for use on our infrastructure and we are working cooperatively with them to advance these tasks.

In addition, Amtrak established system wide qualifications standards for our train and engine personnel and is in the process of expanding our use of simulation for training and route qualification.

Highway-Rail Grade Crossing Safety. I would like to address the topic of safety issue, highway-rail grade crossings. The City of Lakewood sits on the new Point Defiance Bypass Rail line where the DuPont derailment occurred.

The city has 7 grade crossings within its city limits. They are understandably concerned about safety at these crossings given that over 30 percent of rail related fatalities occur at grade crossings.

Question 4. Mr. Anderson, can you tell me how Amtrak is working to make highway-rail grade crossings safer?

Answer. We continue to look for opportunities to address grade crossing safety and we have long supported outreach programs. The most prominent program is "Operation Lifesaver," a nonprofit public safety education and awareness organization dedicated to reducing collisions, fatalities and injuries at highway-rail crossings and trespassing on or near railroad tracks. However, more needs to be done and we still believe the safest grade crossing is the one that does not exist. Several of the host railroads have programs in place that financially incentivize communities to remove public grade crossings and we strongly believe that more funding and focus on upgrading those grade crossings that necessary with enhanced traffic control and safety features is justified. Similarly, where new public grade crossings are introduced it is imperative that active warning devices are installed.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. RICHARD BLUMENTHAL TO RICHARD ANDERSON

Implementation of Positive Train Control. Mr. Anderson, under one scenario, Metro-North completely implements PTC by December 31, 2018. That's the only acceptable option in my book.

Under a second scenario, Metro-North does just enough to get a series of extensions of the deadline to implement from the FRA—known technically as the "alternative schedule."

I want to consider the impact of a third, nightmare scenario: Metro-North fails to qualify for any extension at all. In that scenario, several things would happen.

Metro-North should be properly penalized. But Metro-North would not be the only railroad affected by its failure to comply with the law. Amtrak would be, too. If Metro-North's track isn't PTC-compliant, I understand Amtrak will need to act accordingly. That means Amtrak service could completely cease on track in Connecticut from the New York border to New Haven. That could sever one of the country's key transportation arteries, leading to even more congestion on the highways and in the air up and down the Eastern Seaboard.

In your testimony you envision this problem. You state, "For any such route segments" without PTC implemented or having failed to qualify for an "alternative schedule," "Amtrak will suspend operations until such time as the carrier becomes compliant with the law."

Question 1. Does this statement apply to Metro-North?

Answer. At present, we believe that Metro-North will qualify for an extension but we recommend you seek confirmation of this status with them directly. As you know, Amtrak will conduct risk assessments for all routes which do not have operable PTC by December 31, 2018. The risk assessment outcome will result in developing operational and/or technological recommended enhancements on a route-by-route basis that we can deploy until PTC is operational. However, if Metro-North were to fail to qualify for an extension at all, Amtrak would not be able to operate over their infrastructure.

Question 2. What would happen to the riders who depend on Amtrak service between New York and Boston if Metro-North fails to implement PTC by December 31, 2018, or qualify for any extension?

Answer. Amtrak does not have a plan at this time since we have been informed by Metro-North that they expect to meet the deadline or file for an extension. However, this segment is not owned by Amtrak. The host railroad, Metro-North, should be able to provide an update on progress for implementation.

Question 3. Are you confident that in 2019 you will be able to continue service on tracks you currently use between New York and Boston?

Answer. Yes.

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