NEXT STEPS FOR POSITIVE TRAIN CONTROL IMPLEMENTATION

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COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
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WEDNESDAY, JULY 31, 2019

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

The Committee met, pursuant to notice, at 2:06 p.m., in room SH–216, Hart Senate Office Building, Hon. Roger Wicker, Chair- man of the Committee, presiding.

Present: Senators Wicker [presiding], Thune [presiding], Fischer, Gardner [presiding], Scott, Cantwell, Blumenthal, Peters, Baldwin, Duckworth, Tester, Sinema, and Rosen.

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

The CHAIRMAN. Good afternoon. Today the Committee gathers for a hearing to examine the “Next Steps in Positive Train Control Implementation”.

I am glad to convene this hearing on this important issue with my friend and colleague, Ranking Member Senator Cantwell. I welcome our panel of witnesses. Thank them for appearing. Mr. Ronald Batory, Administrator of the Federal Railroad Administration; Susan Fleming, Director of Physical Infrastructure, U.S. Government Accountability Office; Robert Bourg, Vice President of Strategic Development, Wabtec Corporation; Chris Matthews, Assistant Vice President, Network Control Systems, BNSF Railway; and Jim Derwinski, Chief Executive Officer and Executive Director of Metra. Today’s hearing will evaluate progress on implementation of Positive Train Control, PTC, and examine potential challenges in meeting the final implementation deadline of December 31, 2020.

As recent committee hearings have highlighted, PTC is an important technology, which has the ability to prevent accidents, including overspeed derailments, such as the tragic derailment in Dupont, Washington in 2017, as well as preventing train to train collisions. PTC Enforcement and Implementation Act passed by Congress and signed into law by President Obama in October 2015, required railroads to implement PTC by December 31, 2018. However, it allowed a railroad to apply for an extension of up to 24 months, if and only if that railroad met important milestones.

I am pleased to say that under Secretary Chao and Administrator Batory’s leadership, this framework has been faithfully implemented as of December 31, 2018. All railroads required to implement PTC by the deadline either submitted documentation to show that they met the requirements for system activation or qualified
for an extension for up to two additional years to complete the full implementation. As we will hear today, many railroads received such an extension. Since that December 2018 deadline, railroads have continued to make progress on PTC implementation.

This hearing provides an opportunity for updates on the current status of PTC implementation across the network and the gains that have been made since the end of last year. Witnesses should discuss how freight and passenger railroads are implementing PTC and describe the remaining work needed to achieve full implementation. Full PTC implementation requires, among other things, that railroads be interoperable. In other words, they must be able to operate seamlessly across tracks owned by different railroads. Achieving interoperability requires coordination across the rail industry, including between the Federal Railroad Administration, host railroads, tenant railroads, vendors and suppliers, and other stakeholders. This undertaking is particularly complex in regions of this country where multiple railroads interact.

I hope witnesses will provide an update on interoperability testing and any successes or challenges identified through such testing. I also invite our expert witnesses to discuss any suggestions they have for further facilitating interoperability throughout the network. With the final deadline for implementation less than a year and a half away, today’s hearing will help this committee focus on any other issues that require additional attention. For instance, at past PTC hearings, we heard about challenges related to vendors and software, as well as railroads in the early stages of field-testing.

So, I invite our witnesses to update the Committee on the availability of vendors to support PTC installation and provide testing services. Witnesses might also identify any other challenges to full implementation as the final deadline approaches. I look forward to a robust discussion of the progress of PTC implementation. I thank all of our witnesses for appearing today.

And before, as we recognize Senator Duckworth for a special introduction, I will recognize our Ranking Member, Senator Cantwell.

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

Senator CANTWELL. Thank you, Mr. Chairman, and thanks for holding this important hearing on the next steps for Positive Train Control implementation.

I want to thank the panel of witnesses and we look forward to hearing your perspective on how railroads will meet that deadline of 2020 to fully implement PTC. The importance of this life-saving technology was made abundantly clear in my State of Washington, December 2017, when the Amtrak Cascade 501 derailed around a bend near DuPont, Washington, and fell onto the highway before claiming 3 lives and injuring 65 people.

The National Transportation Safety Board investigation found that PTC would have prevented this tragedy, but sadly this is just one of many PTC-preventable tragedies. In fact, since the National Transportation Safety Board first recommended Positive Train
Control implementation, PTC could have prevented over 150 different crashes, and many fatalities and injuries.

So I am pleased that Chairman Wicker shares my commitment to making sure that 2020 is a full PTC implementation deadline, and that this committee takes its oversight role seriously when it comes to Positive Train Control. It is unacceptable that in the year of 2019 we still have not fully implemented this important safety, and even when PTC has been fully implemented, according to the Federal Railroad Administration, there will still be miles of tracks that do not have PTC. They will be exempted, including over 1,400 miles of track used by Amtrak.

Both the NTSB and Amtrak expressed concerns about this during a committee hearing last month, and we followed up on that hearing to seek more information from the FRA about the safety measures that should be in place where PTC is not operational. This includes speed limit action plans, adequate crew training, and PTC equivalent technologies. I want to thank Administrator Batory for the FRA response to my letter, and for your commitment to ensuring safety everywhere that Amtrak operates. This will help prevent another DuPont, Washington accident from happening again.

Even with PTC in place, we have to continue to prioritize safety. No technology is a cure-all, or a complete replacement for well-trained engineers and conductors who have strong safety cultures at a railroad, and for the track maintenance and the structurally sound railroad cars that are needed.

That said, implementing PTC is truly a major step forward for safety, and I know it has been a long time coming to get where we are today. Railroads, and especially commuter railroad systems, have faced many challenges, so I look forward to the opportunity to hear from the witnesses about the steps to have PTC fully implemented everywhere, and to make sure it is required on our national rail system. And, I look forward to asking specific questions about that implementation and the 1,400 miles of track that won’t be covered.

Thank you, Mr. Chairman.

The CHAIRMAN. And now I turn to our friend, Senator Duckworth, for a special introduction.

STATEMENT OF HON. TAMMY DUCKWORTH, U.S. SENATOR FROM ILLINOIS

Senator DUCKWORTH. Thank you Mr. Chairman. It is my pleasure to introduce Metra CEO and Executive Director, Mr. Jim Derwinski, who has successfully led the organization since 2017. Every weekday, Metra operates nearly 700 trains that transport nearly 290,000 passengers. Metra provides service to and from downtown Chicago with 242 stations on 11 lines covering more than 1,200 miles of tracks.

Jim’s extensive experience and technical expertise enable him to lead one of the largest and most complex, commuter rail systems in the Nation while squeezing every drop of value out of the limited Federal and State resources that Metra receives. A few months ago, Jim invited me to tour Metra’s 47th Street coach and diesel shop, and watch its highly skilled mechanics and electricians install, test, and fine-tune PTC components aboard Metra’s rolling
stock. Jim explained to me how they were able to stretch every dollar just a little bit further by doing much of the work in-house.

It was there that I gained a real and deep appreciation for the complexity of PTC. Metra has spent nearly $250 million on positive train control efforts, while receiving less than $50 million in Federal grants to support its efforts. Metra expects its PTC implementation to ultimately cost between $350 million and $400 million, with an additional $15 million to $20 million per year in increased operating costs.

While these costs are a challenge, I am confident that Metra customers are getting the most bang for their buck with Jim at the helm. Welcome, Jim. Thanks for being here today. We stand to learn a lot from you.

And I thank you, Mr. Chairman. I yield back.

The CHAIRMAN. Thank you Senator, and we now will proceed to hearing summaries of 5 minutes or less from each of our witnesses. We will begin with Administrator Batory. Sir, you are welcomed.

STATEMENT OF HON. RONALD L. BATORY, ADMINISTRATOR, FEDERAL RAILROAD ADMINISTRATION

Mr. BATORY. Good afternoon, all. Chairman Wicker, Ranking Member Cantwell, members of the Committee, thank you for the opportunity to testify today about one of the FRA’s highest priorities, the railroad’s full implementation of FRA-certified and interoperable PTC systems as soon as possible and by December 31, 2020. FRA commends the industry for its notable progress to date.

As of March 31, PTC was in operation on 83 percent of the 58,000 miles subject to the statutory mandate. Nevertheless, railroads must still complete extensive work in the next 17 months, including activating PTC on the remaining required main lines, and achieving interoperability with tenant railroads. Notably, four host railroads reported they fully implemented PTC on their required main lines in 2018. The other 37 railroads requested an alternative schedule which the statutory mandate required FRA to approve if the railroad qualified by law. As of March 5, FRA approved all applicable alternative schedules well before the statutory 90-day deadline.

FRA continues to actively monitor railroads’ progress, including the Quarter 2 reports due today. Preliminary reports indicate PTC was an operation on 87 percent of the required mainlines nationwide as of June 2019, including 91 percent of the Class I railroads required main lines. Host commuter railroads were either conducting revenue service demonstration, or operating PTC, on 37 percent of their required miles as of June, a 12 percent increase since Quarter 1. Amtrak, a host railroad on and off the Northeast Corridor, reports PTC is in operation on 99.8 percent of its required mainlines.

In addition, six other railroads must implement PTC on their main lines that host passenger rail service. One Class II host railroad has been operating its full implemented PTC system since 2018. The other five are conducting field-testing. Currently, FRA is directing its focus to the PTC mandated main lines that have a high concentration of host and tenant railroads, including commuter railroads with significant remaining work.
On July 12, I initiated not less than monthly meetings with executive leadership of Amtrak and the commuter railroads that operate on the Northeast Corridor, or their own PTC required main lines in the Northeast. As this committee is aware, interoperability remains the primary challenge to railroads’ full implementation of PTC by December 31, 2020. Approximately 101 tenant railroads operate on PTC mandated main lines. Because railroads operate on multiple hosts’ railroads, there are 227 host-tenant relationships where interoperability must be achieved.

As of March 31, 17 percent of the tenant railroads achieved interoperability and 38 percent were conducting testing. Since May, I have met with the leadership of 61 of the 71 freight non-Class I tenant railroads to discuss next steps for interoperability. FRA will also host four additional collaborations over the next 17 months focusing on best practices to achieve the ultimate statutory deadline. Railroads continue to cite that PTC vendors and suppliers are resource constrained, in part due to increased demand as the deadline approaches and also to certain railroads’ late engagement. After being confirmed as Administrator, I met with the 10 major vendors and suppliers to stress the critical role they play.

This year, I have sent letters that underscore issues that require some suppliers’ immediate resolution, including the recall of the ACSES II equipment due to manufacturing defects and capacity limitations hindering railroads from activating the I-ETMS interoperability. FRA continues to engage with vendors and suppliers, as they are integral to the railroad’s ability to meet the deadline. In addition to technical assistance, DOT has awarded $2.6 billion in grant funding and loan financing to support PTC implementation, representing 18 percent of the $15 billion industry cost for implementation, and specifically, 42 percent of the $4.1 billion that APTA estimates implementation is costing the commuter railroads.

The industry also estimates that operation maintenance costs will be substantial, with AAR citing hundreds of millions of additional dollars, and after quoting $80 million to $130 million per year in maintenance and operation costs. FRA appreciates Congress prioritization of safety and the continued funding it provides for PTC. FRA will continue to work with all stakeholders to help ensure that railroads fully implement PTC systems quickly and safely as possible. If any railroad fails to meet the deadline, FRA plans to enforce statutory mandate by assessing the maximum civil penalties authorized by Congress.

Thank you, and I am here to answer your questions.

[The prepared statement of Mr. Batory follows:]

PREPARED STATEMENT OF HON. RONALD L. BATORY, ADMINISTRATOR, FEDERAL RAILROAD ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION

Chairman Wicker, Ranking Member Cantwell, Members of the Committee,

Thank you for the opportunity to testify today about one of the Federal Railroad Administration’s (FRA) highest priorities—the railroad industry’s full implementation of FRA-certified and interoperable positive train control (PTC) systems on all required main lines as soon as possible, and not later than December 31, 2020.

First, FRA commends the railroad industry for its significant progress toward fully implementing PTC systems where required nationwide. As of June 30, 2019, PTC systems were in operation on approximately 50,300 (87 percent) of the nearly 58,000 route miles subject to the statutory mandate, based on certain preliminary
reports about railroads’ progress as of Quarter 2 of 2019.¹ This represents a 4 percent increase in implementation since Quarter 1 of 2019. In addition, railroads are currently testing PTC systems in advanced field testing, known as revenue service demonstration (RSD), on at least 718 route miles as of June 30, 2019.² Nonetheless, railroads must still complete significant work to fully implement their PTC systems by December 31, 2020, especially with respect to activating PTC systems on the remaining required main lines and achieving the necessary interoperability with their tenant railroads.

I. Overview of the Statutory Mandate

A. Background

As the Rail Safety Improvement Act of 2008 first mandated, each Class I railroad and each entity providing regularly scheduled intercity or commuter rail passenger transportation must implement an FRA-certified PTC system on: (1) its main lines over which poison- or toxic-by-inhalation hazardous materials are transported, if the line carries five million or more gross tons of any annual traffic; (2) its main lines over which intercity or commuter rail passenger transportation is regularly provided;³ and (3) any other tracks the Secretary of Transportation prescribes by regulation or order.⁴

By law, PTC systems must be designed to prevent certain accidents or incidents, including train-to-train collisions, over-speed derailments, incursions into established work zones, and movements of trains through switches left in the wrong position.⁵ Railroads are primarily implementing the following PTC systems in the United States: (1) the Interoperable Electronic Train Management System (I–ETMS), which Class I railroads and many commuter railroads are implementing; (2) the Advanced Civil Speed Enforcement System II (ACSES II), which most railroads operating on the Northeast Corridor (NEC) are implementing; (3) Enhanced Automatic Train Control (E–ATC), which six intercity passenger or commuter railroads are implementing; and (4) the Incremental Train Control System, which Amtrak is implementing in parts of Michigan.

B. The Statutory 2018 and 2020 Deadlines and the Requirements for Compliance

On October 29, 2015, the Positive Train Control Enforcement and Implementation Act of 2015 (PTCEI Act) extended the original statutory deadline for full implementation of PTC systems from December 31, 2015, to at least December 31, 2018.⁶ In addition, the PTCEI Act permits railroads to utilize an “alternative schedule and sequence” with a full implementation deadline beyond December 31, 2018, but not later than December 31, 2020.

Notably, four host railroads subject to the statutory mandate—North County Transit District, the Port Authority Trans-Hudson, Portland & Western Railroad, and Class III railroads’ locomotives that operate in PTC territory.


² RSD is the stage of implementation when FRA conditionally permits a railroad to operate PTC-equipped trains in revenue service with passengers or freight onboard under certain testing conditions, prior to obtaining certification of their PTC systems from FRA.

³ In January 2010, FRA issued its first final PTC rule, defining the term “main line” for purposes of “intercity . . . or commuter rail passenger transportation routes or segments over which limited or no freight railroad operations occur,” which the statutory PTC mandate specifically required FRA to define by regulation. See Title 49 United States Code (U.S.C.) § 20157(v)(4)(B), as implemented by Title 49 Code of Federal Regulations (CFR) §§ 236.1003, 236.1019. Since January 2010, Amtrak and other railroads have requested “main line track exceptions” covering only 3.8 percent of the main lines otherwise subject to the statutory mandate. Despite any earlier requests for exceptions, railroads may still implement PTC systems on these track segments, and Amtrak recently committed to implementing a PTC system on its Post Road Branch in New York, potentially in addition to other lines for which Amtrak or its host railroads previously sought an exception by law.


⁵ See, e.g., 49 U.S.C. § 20157(g)(1), (ii); 49 CFR § 236.1005 (setting forth the technical specifications).

(including its commuter tenant railroad, Tri-County Metropolitan Transportation District of Oregon), and the Southern California Regional Rail Authority (Metrolink)—reported that they fully implemented an FRA-certified and interoperable PTC system on all their required main lines by December 31, 2018.

The other 37 railroads that were directly subject to the statutory mandate in 2018 formally requested an alternative schedule and sequence (in some cases jointly with their host railroads), establishing a final deadline that they certified was as soon as practicable and not later than December 31, 2020. As background, the PTCEI Act required FRA to approve a railroad’s alternative schedule and sequence within 90 days of receipt of the railroad’s request, if the railroad demonstrated it met the six statutory criteria necessary to qualify for an alternative schedule and sequence.7

As of March 5, 2019, FRA approved all applicable requests for an alternative schedule and sequence, as each railroad sufficiently demonstrated it, at a minimum, met the six statutory criteria necessary to qualify for an alternative schedule and sequence under the statutory mandate. FRA issued each decision in advance of the PTCEI Act’s 90-day decision deadline and, on average, within 66 days of receipt of a railroad’s request. The 33 requests encompassed supporting documentation submitted on behalf of 37 railroads, including certain tenant-only commuter railroads. Specifically, these 37 railroads sufficiently demonstrated that, as of December 2018, they each:

1. Installed all hardware that must be installed for PTC system implementation, consistent with the governing railroad’s PTC Implementation Plan (PTCIP);
2. Acquired all spectrum necessary for implementation of a PTC system, if applicable, consistent with the governing railroad’s PTCIP;
3. Completed the employee training required under FRA’s PTC regulations for all applicable personnel in any territory, or segment thereof, where the PTC system was presently being field tested or operated in RSD or revenue service;
4. (A) For Class I railroads and Amtrak, implemented a PTC system or initiated RSD on most territories (e.g., subdivisions or districts) or route miles the railroad owns or controls that are required to have operations governed by a PTC system; or
   (B) For other railroads subject to the statutory mandate, the railroad initiated RSD on at least one PTC-required territory, or met any substitute criteria established by FRA;
5. Included in the revised PTCIP an alternative schedule and sequence for fully implementing a PTC system as soon as practicable, but not later than December 31, 2020; and
6. Certified to FRA in writing that the railroad will be in full compliance with the requirements of the statutory mandate on or before the deadline in the proposed alternative schedule and sequence.

With all necessary PTC system hardware installed, spectrum acquired, and testing having been initiated as of December 31, 2018, the key remaining steps for full implementation of PTC systems generally include conducting RSD of uncertified PTC systems on the general rail network or expanding RSD to additional required main lines, submitting a PTC Safety Plan and obtaining PTC System Certification from FRA (host railroads only), achieving interoperability between host railroads and tenant railroads, and activating the PTC system so it governs all operations on the required main lines.

II. The Railroad Industry’s Progress Toward Full Implementation of PTC Systems

Railroads’ mandatory Quarterly PTC Progress Reports for Quarter 2 of 2019 must be submitted to FRA by July 31, 2019. Information FRA preliminarily received indicates that approximately 87 percent of the required main lines (i.e., 50,300 of the nearly 58,000 required route miles) were governed by a PTC system as of June 30, 2019.

Specifically, Class I railroads recently informed FRA that PTC systems were in operation on approximately 91 percent of their required main lines as of June 2019—that is, on 48,945 of the 53,756 required route miles that are owned or controlled by Class I railroads—representing a 4 percent increase since Quarter 1 of 2019.

As of June 2019, host commuter railroads were reportedly operating PTC systems in revenue service on 443 route miles and in RSD testing on approximately 718

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route miles, which, in total, is 37 percent of the host commuter railroads’ 3,111 required route miles and a 12 percent increase since Quarter 1 of 2019. Amtrak, as a host railroad on and near the NEC and other parts of the country (including Chicago and Michigan), reports that approximately 899 of Amtrak’s 900 required route miles are governed by a PTC system as of June 2019. In addition, Amtrak has stated that its operations are currently governed by a PTC system on approximately 16,032 of the 19,119 route miles (84 percent) where Amtrak operates as a tenant railroad on other railroads’ PTC-equipped main lines.

Also, pursuant to the statutory mandate, six Class II or III, short line, or terminal railroads must implement PTC systems on their own main lines that provide or host regularly scheduled intercity or commuter rail passenger transportation. One of these six railroads has been operating its FRA-certified and interoperable PTC system in revenue service since 2018, and the other five railroads are currently conducting FRA-approved field testing of their PTC systems on the general rail network and largely planning to commence RSD during Quarter 3 of 2019.

In terms of railroads’ progress toward achieving PTC system interoperability, host railroads reported that 17 percent of the tenant railroads that operate on their PTC-required main lines had achieved interoperability as of March 31, 2019. In addition, host railroads also specifically reported that 35 percent of their applicable tenant railroads were currently installing necessary PTC system hardware (e.g., on the tenant railroads’ controlling locomotives), and 38 percent had advanced to the interoperability testing stage, as of March 31st.

III. FRA’s Initiatives to Assist with Major Remaining Challenges

With approximately 17 months remaining until the statutory deadline, FRA will continue to perform comprehensive oversight, provide extensive technical assistance to all applicable host railroads and tenant railroads, and hold each railroad accountable for the timely implementation of an interoperable PTC system on all main lines subject to the statutory mandate.

FRA is currently directing its focus and resources to the PTC-mandated main lines that have a high concentration of host railroads and tenant railroads, including commuter railroads with significant remaining work, such as the PTC-mandated main lines in the Northeast, Chicago area, Florida, and Texas. For example, on July 12, 2019, I initiated a series of not-less-than monthly meetings with the executive leadership of Amtrak and each commuter railroad that operates on or near Amtrak’s NEC and/or the commuter railroad’s own PTC-mandated main lines in the Northeast. FRA is committed to continuing to help facilitate railroads’ collaboration, expeditious resolution of remaining issues, and full implementation of interoperable PTC systems on all required main lines throughout the country.

A. Achieving Interoperability Among Required Railroads

Under the statutory mandate, “interoperability” is the requirement that the controlling locomotives and cab cars of any host railroad and tenant railroad operating on the same main line will communicate with and respond to the PTC system, including uninterrupted movements over property boundaries. Interoperability, given its scope and complexity, remains one of the primary challenges to railroads’ full implementation of PTC systems by December 31, 2020. Approximately 101 distinct tenant railroads operate on PTC-mandated main lines, according to host railroads’ current PTCIPs. Because many railroads operate on multiple host railroads subject to the statutory mandate, there are approximately 227 host-tenant railroad relationships in which PTC system interoperability must be achieved by December 31, 2020. As noted above, 17 percent of the applicable tenant railroads have already achieved PTC system interoperability (as 38 tenant railroads were reported as PTC-operational by March 31, 2019), and an additional 38 percent (87 tenant railroads) were reportedly conducting interoperability testing as of Quarter 1 of 2019. FRA is optimistic that railroads’ Quarterly PTC Progress Reports for Quarter 2 of 2019, due today, July 31st, will show continued advancement toward interoperability.

As support, during FRA’s June and July 2018 PTC Symposia, FRA provided technical assistance to all host railroads about the statutory and regulatory interoperability requirements, including any exceptions, and best practices for interoperability testing between host railroads and tenant railroads. In July 2018, FRA also issued a revised and simplified guidance document that addresses interoperability

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8Except a railroad’s controlling locomotives or cab cars that are subject to either a temporary or permanent exception under 49 U.S.C. § 20157(k) or 49 CFR § 236.1006, consistent with the applicable host railroad’s PTC Implementation Plan. See 49 U.S.C. § 20157(a)(2)(A)(i)(I), (a)(2)(D), (i)(3); 49 CFR §§ 236.1003, 236.1006, 236.1011(a)(3).
testing and the responsibilities of a host railroad and its tenant railroads with respect to a host railroad’s PTC Safety Plan and FRA’s certification of PTC systems.9

In terms of ongoing assistance during 2019, FRA recently engaged with each Class I railroad and several NEC railroads to help validate the list of PTC-required tenant railroads. To help ensure that tenant railroads also understand the statutory and regulatory requirements, FRA commenced a significant interoperability initiative in April 2019 by sending a letter to each freight, non-Class I tenant railroad10 that operates on at least one main line that is subject to the statutory PTC mandate, according to their host railroads’ current PTCIPs. FRA’s letters to these tenant railroads provided an overview of the interoperability requirements, emphasized the importance of timely PTC system implementation, and invited them to meet with FRA in Washington, DC, this summer.

From late May to early August of 2019, I, as the FRA Administrator, and FRA’s PTC subject matter experts have been meeting individually with each tenant railroad’s executive leadership and PTC program manager to offer technical assistance and discuss any challenges the tenant railroad might currently be experiencing with respect to PTC system implementation. In addition, FRA will host the remaining four of six PTC Collaboration Sessions over the next 17 months to further support all railroads subject to the statutory mandate and to convene the industry’s technical experts to share best practices and jointly resolve common technical problems.

B. PTC System Vendors and Suppliers

Another predominant challenge that railroads commonly convey is that the limited number of PTC system vendors and suppliers are significantly resource-constrained, as they are serving all 42 railroads11 subject to the statutory mandate and all their tenant railroads. For example, several railroads specifically cited vendors’ or suppliers’ schedule delays and technical issues as a reason initiation of RSD was infeasible by December 31, 2018, and utilizing substitute criteria (often an earlier or earlier or early phase of field testing) was therefore necessary to qualify for an alternative schedule by law.12

In March 2018, FRA sent a letter to each of the 10 major PTC system vendors and suppliers to underscore the critical role they play in ensuring that railroads fully implement FRA-certified and interoperable PTC systems in a timely manner. In addition, during the spring of 2018, FRA’s PTC subject matter experts and I met individually with each of these PTC system vendors and suppliers. These meetings covered challenges they are experiencing; risks they foresee with respect to railroads’ timely implementation of PTC systems; and their plans to expedite delivery of PTC system products, components, and other services to ensure railroads’ compliance with both the 2018 requirements under the PTCEI Act and the final statutory December 31, 2020, deadline for full PTC system implementation.

Based on information FRA learned during its meetings with the 10 major PTC system vendors and suppliers during 2018, FRA found that approximately 10 percent of the contracts between railroads and the major PTC system vendors and suppliers were initiated before the 2008 enactment of the statutory mandate; approximately 48 percent of contracts were initiated from 2008 to 2014; and approximately 42 percent were initiated from 2015 to 2018. Accordingly, over time and under constrained deadlines, PTC system vendors and suppliers have experienced increased demand for the services they offer, which are essential to the railroad industry’s full implementation of PTC systems.

In October 2018, FRA also held a second series of one-on-one meetings with the vendors and suppliers that mainly support the host railroads that had made less progress toward implementing their PTC systems as of that point. The vendors and suppliers stressed that they prioritize railroads’ compliance with the statutory man-

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10 A 42nd railroad, TEXRail, is now subject to the statutory mandate given its commencement of commuter rail operations during 2019. TEXRail’s FRA-approved PTCIP, dated February 13, 2019, provides that it shall implement a PTC system by December 31, 2020, on its applicable main lines.

11 FRA generally meets with the 13 railroads that utilized substitute criteria monthly, if not weekly, to discuss testing progress and actively address any challenges or technical issues they have encountered. Such regular meetings help facilitate these railroads’ advancement toward RSD. Also, 6 of the 13 railroads that utilized substitute criteria have since initiated FRA-approved RSD on at least one main line subject to the statutory mandate as of June 2019.
date, including interim requirements, and they direct additional resources to railroads that are at risk of noncompliance.

FRA continues to actively engage and meet with the major PTC system vendors and suppliers. For example, in March 2019, I sent letters to two PTC system suppliers to underscore issues that require their immediate attention. These letters stressed the importance of: (1) a supplier’s prompt resolution of certain capacity limitations hindering several I–ETMS railroads from conducting robust interoperability testing and achieving interoperability; and (2) another supplier’s full and complete resolution of issues surrounding a major recall of certain ACSES II equipment, due to certain manufacturing defects and ongoing quality concerns.

IV. Industry Cost Estimates and the Department’s Grants and Financial Assistance

In addition to providing technical assistance and oversight, the Department of Transportation (the Department)—including FRA, the Federal Transit Administration, and the Build America Bureau—supports railroads’ implementation of PTC systems by providing financial assistance. The railroad industry has estimated that initial costs associated with fully implementing PTC systems will exceed $14.7 billion in total, including approximately $4.1 billion in implementation costs for commuter railroads, according to the American Public Transportation Association (APTA). The industry also estimates that ongoing operations and maintenance costs post-full implementation will likely be substantial, with APTA citing an estimated “$80 to $150 million a year in maintenance and operation costs,” and the Association of American Railroads reporting in 2017 that “hundreds of millions of additional dollars [will be] needed each year . . . to maintain the system.”

Since 2008, through FRA, the Department has awarded over $2.5 billion in grant funding and loan financing to support railroads’ implementation of PTC systems, which amounts to nearly 18 percent of the industry’s estimates for initial PTC system implementation costs. Also, more specifically, through FRA, the Department has awarded commuter railroads PTC grant funding and loan financing for approximately 42 percent of APTA’s estimated $4.1 billion in initial implementation costs. The Department appreciates Congress’s prioritization of rail safety and the continued funding it provides to support railroads’ implementation of PTC systems.

V. Enforcement of the Statutory Mandate

As I previously committed to this Committee in 2018, FRA will continue to hold railroads accountable for timely implementation of PTC systems and will enforce the statutory mandate, including interim requirements and the December 31, 2020, deadline.

The three acts of Federal legislation governing railroads’ implementation of PTC systems specifically authorize FRA, by delegation, to assess civil penalties for any violations of the statutory mandate. Consistent with FRA’s commitment to helping ensure railroads comply with the statutory mandate, FRA continues to monitor railroads’ compliance with the implementation schedules in their PTCIPs, and FRA has assessed nearly $400,000 in civil penalties since 2017 to railroads that failed to meet interim implementation requirements in a timely manner.

As FRA Administrator, I have stated that if any required railroad fails to fully implement an FRA-certified and interoperable PTC system on its required main lines by the applicable statutory deadline (in most cases, December 31, 2020), I will recommend that FRA assess the ordinary statutory maximum civil penalty against the railroad, which is currently $28,474 per day. FRA also continues to reserve the right to initiate any other type of enforcement action within its authority, if necessary to compel a railroad’s compliance, in addition to the assessment of civil penalties.

FRA also acknowledges, however, that the statutory mandate generally prohibits FRA from imposing or enforcing the operational restrictions (e.g., speed restrictions) under FRA’s current regulations against any railroad until approximately January 1, 2022.

FRA will continue to work diligently and collaboratively with all stakeholders, including railroads, railroad associations, and PTC system vendors and suppliers, to
help ensure all railroads subject to the mandate fully implement FRA-certified and interoperable PTC systems as expeditiously and safely as possible.

I appreciate the Committee’s interest in promoting safe, reliable, and efficient rail transportation in the United States and, particularly, your assistance in helping ensure that railroads fully implement this rail-safety technology in a timely manner. Thank you, Mr. Chairman, for the opportunity to testify. I am happy to answer any questions.

The CHAIRMAN. Thank you very much. Director Fleming.

STATEMENT OF SUSAN FLEMING,
DIRECTOR OF PHYSICAL INFRASTRUCTURE,
U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Ms. FLEMING. Good afternoon, Chairman Wicker, Ranking Member Cantwell, and members of the Committee. Thank you for the opportunity to provide an update on passenger railroads’ implementation, and FRA’s oversight of PTC, which is one of the most promising technological advances in rail safety in decades.

Over the years, we have reported on railroads’ progress implementing PTC, which has been a complex and lengthy process involving nearly all major rail lines and almost every aspect of railroads’ operations. While railroads were required to implement PTC by last December, FRA was allowed to grant extensions up to December 2020 if railroads met specific requirements. While four railroads have fully implemented PTC, the others continue to work to achieve full implementation. Railroads progressed in terms of installing equipment and testing, but much work, particularly with respect to interoperability, remains to fully implement PTC.

Today, I will focus on two main issues: railroads’ implementation progress and remaining challenges, and FRA’s approach to meeting the 2020 deadline.

Turning to the implementation update, since December many railroads reported making progress on testing and implementation of their own PTC systems. Six railroads reported implementing PTC on all their own territories, and almost all these railroads reported being in this stage at the end of 2018. However, 11 railroads reported that they remain in field-testing, which is an early stage of implementation.

Regarding interoperability, as of March, 11 of the 31 host railroads that must have interoperable PTC systems reported that they achieved interoperability with at least one of their other tenant railroads. Collectively, of the 227 unique host-tenant relationships that require interoperability, railroads have achieved this for only 17 percent of these relationships. Turning now to implementation challenges, in response to our questionnaire, most railroads reported that vendor and software issues were still a significant problem.

These issues are more acute now, because as the 2020 deadline nears, less time remains to address these issues and associated delays, and the limited supply of vendors and high demand for services continues to pose problems. More than half of the railroads also reported that interoperability was a major challenge, and can be complicated by software issues and coordinating host and tenant schedules. For example, one railroad said that certain software functionality still has to be developed, tested, and implemented to address reliability issues that have caused system disruptions.
Interoperability challenges also differ across systems and geographic areas, and can be particularly difficult in dense, urban areas like the Northeast or Chicago, where railroads are at different stages of implementation. In the Northeast, eight commuter railroads, Amtrak, and most freight railroads are implementing a form of the ACSES system on at least a portion of their equipment and track. In some cases, two different PTC systems will be operated concurrently, which adds to the complexity of interoperability.

Moving on to my second point, FRA’s plans to meet the 2020 deadline. FRA continues to provide assistance and support to railroads on interoperability and the testing process, but workload challenges for the agency persist. FRA will continue to face a substantial workload through 2020, overseeing railroads’ PTC implementation and reviewing documents, including lengthy safety plans. As such, it will remain important for FRA to prioritize resources based on risk, as we recommended last year. While FRA has made improvements, the extended 2020 deadline for full PTC implementation is less than 18 months away, and FRA and railroads have substantial work to complete and challenges to address before that deadline.

Going forward, FRA also needs to transition to overseeing PTC as a routine part of railroad operations after the 2020 deadline. Similarly, railroads will need to transition from implementation, largely done by contractors, to operating and maintaining their PTC systems.

Therefore, December 2020 represents not only the deadline for a full PTC implementation, but also a point after which railroads and FRA will face a new operational and oversight environment. Mr. Chairman, this concludes my statement, and I would be pleased to answer questions that you or members of the Committee may have.

[The prepared statement of Ms. Fleming follows:]
ited to equipment installation, testing, interoperability, and system certification by the Federal Railroad Administration (FRA). According to a 2018 National Transportation Safety Board testimony, since the PTC mandate was enacted, 22 rail accidents it investigated could have been prevented by PTC, including the December 2017 derailment of an Amtrak passenger train near DuPont, Washington, that killed 3 passengers and injured 57 passengers and crewmembers.\footnote{National Transportation Safety Board, The State of Positive Train Control Implementation in the United States (Washington, D.C.: Sept. 13, 2018).}

While railroads were required to implement PTC by December 31, 2018, FRA was required under the statutory mandate to grant railroads an extension up to December 31, 2020, if they met specific requirements and requested an alternative schedule and sequence (i.e., an extension).\footnote{49 U.S.C. § 20157.} Four railroads reported that they had fully implemented PTC for all rail operations on their own track by yearend 2018. FRA approved 36 railroads’ requests for an extension.\footnote{As of December 31, 2018, 41 railroads were required to implement PTC. In September 2018, FRA approved a temporary main line track exception for one railroad; while this exempted the railroad from the December 31, 2018, deadline, the railroad is still required to implement PTC by December 31, 2020. One new commuter railroad that began service after January 1, 2019, is now also required to implement PTC, bringing the total number required to implement PTC by December 31, 2020, to 42. FRA has reported that it approved 37 railroads’ requests for extensions; FRA’s count includes one tenant railroad that submitted documentation to demonstrate it met the statutory requirements though it was not required to do so.} Consequently, while railroads have installed all needed PTC equipment on locomotives and along tracks and met some other statutory requirements, much work—particularly with respect to interoperability—remains to fully implement PTC. Achieving interoperability is critical as U.S. railroads often operate some or all of their trains as “tenants” on the track of another railroad, known as the “host.” The individual PTC systems of host and tenant railroads must be interoperable in order for their respective trains to move safely and seamlessly across others’ track.

My statement today addresses (1) the progress railroads have made to complete PTC implementation, and any related implementation challenges, and (2) FRA’s plans to oversee railroads’ PTC implementation to meet the December 2020 deadline.

To describe railroads’ progress, we analyzed the most recent available quarterly PTC implementation reports railroads submitted to FRA, that reflected their progress as of March 31, 2019. We analyzed the reports to determine the extent to which each railroad has initiated different stages of testing and different steps to achieve interoperability with other railroads. To identify the implementation status of tenant-only railroads, we categorized them based on the furthest stage of implementation their host(s) railroads have reached. Based on our review of these data for anomalies, outliers, or missing information and our previous assessment of such quarterly reports for our March 2018 and September 2018 testimonies, we determined that these data were sufficiently reliable for our purposes of describing railroads’ progress in PTC implementation. In addition, we interviewed representatives from Amtrak, two freight railroads, and five commuter railroads, selected to ensure variation in PTC implementation status and number of tenant railroads. To describe railroads’ progress and FRA’s plans to oversee PTC implementation, we sent the 42 railroads a questionnaire to obtain information on their implementation progress, including interoperability, as of May 31, 2019; challenges to implementing PTC; and any guidance or assistance needed from FRA. We received responses from all 42 railroads. We also interviewed industry associations for commuter (American Public Transportation Association) and freight (Association of American Railroads) railroads. We reviewed applicable laws and FRA regulations, presentations, reports, and guidance, and we interviewed FRA officials in headquarters and three of FRA’s nine PTC field specialists who serve as the technical leads for the PTC systems most commonly used by railroads. We also reviewed prior GAO products related to PTC.

We conducted this performance audit from May 2019 to July 2019 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

The vast majority of the 42 railroads subject to the statutory mandate to implement PTC—including 30 commuter railroads, Amtrak, seven Class I and four Class
II and III freight railroads—are implementing one of three types of PTC systems. These systems include the Interoperable Electronic Train Management System (I–ETMS), the Advanced Civil Speed Enforcement System II (ACSES), and Enhanced Automated Train Control (E–ATC). While these PTC systems are functionally similar, the technologies they use differ. For example, to determine a train’s location, ACSES and E–ATC rely on equipment embedded on the track while I–ETMS uses Global Positioning System information. ACSES and E–ATC both supplement existing train control systems to provide all required PTC functionality, while I–ETMS was designed as a new system to provide this functionality.

As noted above, testing is one of the many steps to achieving full implementation. Through multiple stages of testing, which are summarized below, railroads must demonstrate that the PTC system meets functional requirements.

- **Laboratory testing:** locomotive and wayside equipment testing in a lab environment to verify that individual components function as designed.
- **Field testing:** includes several different tests of individual components and the overall system, such as testing each locomotive type to verify that it meets functional requirements and field integration testing—a key implementation milestone to verify that each PTC component is integrated and functioning safely as designed.
- **Revenue service demonstration (RSD):** an advanced form of field testing in which the railroad operates PTC-equipped trains in regular service under specific conditions. RSD is intended to validate the performance of the PTC system as a whole and to test the system under normal, real-world operations.

Using results from field and RSD testing, combined with other information, host railroads must then submit a safety plan to FRA for system certification and approval. We previously reported that these safety plans have been up to 5,000 pages in length. Once FRA approves a safety plan, the railroad receives system certification, which is required for full implementation, and is then authorized to operate the PTC system in revenue service. According to FRA officials, the FRA may impose conditions to the PTC safety plan approval as necessary to ensure safety, resulting in a conditional certification.

Interoperability is achieved when the locomotives of any host railroad and tenant railroad operating over the same track segment can successfully communicate with and respond to the other railroad’s PTC system, allowing uninterrupted movements over property boundaries. For example, when a locomotive enters another railroad’s territory as a tenant, it immediately needs information about the upcoming track—such as any temporary speed restrictions in place due to track work (see fig. 1).

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6 Freight railroads are classified by operating revenues. As of 2017, Class I railroads have annual operating revenues of $447.6 million or more. Class II railroads have annual operating revenues of less than $447.6 million but more than $35.8 million, and Class III railroads have annual operating revenues of $35.8 million or less.

7 PTC systems are required to prevent train-to-train collisions, over-speed derailments, incursions into work zone limits, and the movement of a train through a switch left in the wrong position. Pub. L. No. 110–432.

8 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 railroads may need to equip. Wayside equipment includes items such as communication towers or poles, switch position monitors, wayside interface units, and base station radios.

9 GAO–18–367T.

For certain PTC systems, railroads also have to ensure that their PTC back office servers, which contain information on track features and speed restrictions, are linked and can communicate to achieve interoperability; railroads call this process “federation.” However, depending on the PTC system, federation can occur at different points. For I–ETMS, for example, railroads must complete federation before conducting lab or field testing. Because ACSES relies on transponders to communicate certain information to locomotives, railroads can complete federation either before or after lab or field testing.

To achieve interoperability, railroads have to complete a series of steps including (1) additional installation work (such as installing equipment on a tenant railroad’s locomotives) and scheduling (such as coordinating with the relevant railroad to reach any needed agreements and identify dates for testing), (2) laboratory testing, (3) field testing, and (4) RSD or revenue service operations. Many railroads will complete much of the implementation for their own PTC systems, such as starting RSD on some or most of their track, before they begin to take steps to achieve interoperability with other railroads. However, a railroad can take steps to achieve interoperability with other railroads while simultaneously completing field testing or other stages of testing on its own PTC system.

FRA is responsible for overseeing railroads’ implementation of PTC, and the agency monitors progress and provides direct assistance to railroads implementing PTC. For example, each railroad had to develop an FRA-approved PTC implementation plan that includes project schedules and milestones for certain activities, and a railroad is required to report quarterly and annually to FRA on its PTC implementation status relative to its implementation plan. FRA also provides technical assistance to railroads, addresses questions, and reviews and approves railroads’ documentation, including test and safety plans. FRA has a national PTC project manager, designated PTC specialists in the eight FRA regions, and approximately a dozen engineers, test monitors, and other staff responsible for overseeing technical aspects of implementation. FRA also has oversight tools, which includes authority to impose civil penalties when a railroad fails to meet certain statutory PTC requirements. Since 2017, FRA reports that it has assessed nearly $400,000 in civil penalties against railroads that failed to comply with their implementation plan milestones or reporting requirements.

**Railroads Continue to Make Progress Implementing PTC, but Significant Work Remains to Achieve Interoperability**

**Railroads’ Implementation of Their Own Systems Has Advanced, but Some Commuter and Smaller Freight Railroads Remain in the Early Stages of Testing**

Since the end of 2018, some railroads have reported making progress on testing and implementation of their own PTC systems. Figure 2 shows the 42 railroads’ reported progress by PTC implementation stage.

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11 For certain PTC systems, railroads also have to ensure that their PTC back office servers, which contain information on track features and speed restrictions, are linked and can communicate to achieve interoperability; railroads call this process “federation.” However, depending on the PTC system, federation can occur at different points. For I–ETMS, for example, railroads must complete federation before conducting lab or field testing. Because ACSES relies on transponders to communicate certain information to locomotives, railroads can complete federation either before or after lab or field testing.

12 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(b). In addition, 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 RSD has been initiated or PTC is in operation. See 49 U.S.C. § 20157(e)(1); 49 C.F.R. § 236.1009(a)(3).

These railroads continue interoperability efforts with their tenants, and so have not fully implemented PTC. We considered railroads to be in this stage if they reported 100 percent of their route miles or track segments in PTC operation as of March 31, 2019.

All 7 Class I railroads required to implement PTC have received conditional system certification from FRA or provisional authority to operate a PTC system under revenue service. 49 U.S.C. §20157(h)(2). Therefore, these railroads’ PTC operations are considered to be revenue service, rather than RSD testing. For our purposes, we consider these railroads to be in the late stages of PTC testing akin to RSD testing, so we report their activities as RSD rather than revenue service.

Notes:

Full implementation means a railroad has implemented an FRA-certified PTC system on all its own territories and has achieved interoperability with any railroads that operate on its tracks.

Revenue service demonstration on one territory or 50 percent of territories was one of the statutory requirements a railroad had to meet to receive an extension.

The two railroads not yet in field testing are one new commuter railroad and one railroad that received a temporary main line track exception. This allowed the railroad to remain in installation beyond the 2018 deadline. FRA can grant main line exceptions under certain conditions, such as through limited operations. 49 C.F.R. §236.1019(c).
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1 of their tenant railroads. 16 Collectively, of the 227 unique host-tenant relationships that require interoperability, FRA reported that railroads had achieved interoperability for 38 (17 percent) of these relationships. 17 The number of tenants each railroad must work to achieve interoperability with ranges from 1 to 31 railroads, based on railroad reports to FRA. For example, Class I railroads, as host railroads, average about 18 tenants, while commuter railroads average about 3 tenants. A railroad does not generally start work to achieve interoperability with all the railroads it interoperates with at once, according to FRA; instead a railroad will prioritize its interoperability work. For example, representatives from one Class I railroad we interviewed said it prioritized achieving interoperability in the following sequence: first with commuter-railroad tenants given the need to ensure passenger safety; second with other Class I railroads given the high total miles of track they share; and finally with smaller Class III railroads. In addition, a railroad may be in multiple interoperability steps (e.g., installing, testing) with different tenants at the same time.

FRA counts a relationship as having achieved interoperability if the tenant is operating PTC on all of the host’s track miles. This binary measure for interoperability—that is, achieved or not—does not describe the extent to which railroads have started work on interoperability or, according to representatives from two railroads we interviewed, reflect when interoperability has been achieved along most but not all of its host’s track. 18 Railroads reported to FRA that they had begun work on interoperability for more than 90 percent of the remaining host-tenant relationships that need to achieve interoperability. In particular, based on their quarterly reports, railroads were installing for 82 host-tenant relationships and testing for 89 host-tenant relationships as of March 31, 2019. Overall, the status of interoperability work did not vary much among Class I, commuter, and Class II and III railroads.

FRA officials and others we spoke with could not provide an estimate of how long it takes on average for two railroads to complete the individual steps to achieve interoperability. Representatives from industry associations we interviewed said that it can vary. An FRA specialist we interviewed agreed, explaining that interoperability field testing, for example, varies based on track availability. One railroad might complete testing in 4 days while another railroad might need weeks because it can only test at specific times. In its quarterly reports, FRA asks host railroads to provide the scheduled date for completing interoperability testing with each tenant railroad. As of March 31, 2019, seven railroads reported that they did not anticipate completing interoperability testing with at least one tenant until the last quarter of 2020. 19

Railroads Continue to Report Challenges with Vendors and Software, and Face New Interoperability Challenges

In responding to our May 2019 questionnaire, most railroads reported that vendor and software issues remain major or moderate challenges for PTC implementation. 20 As part of our ongoing work related to PTC, we have reported that railroads have faced challenges associated with the limited number of vendors that design
PTC systems, provide the software and hardware, and conduct testing. However, as representatives of half of the railroads we interviewed emphasized, vendor and software issues are more acute now because as the 2020 deadline nears, less time remains to address these issues and associated delays. Software and vendor issues can be interrelated as a small pool of vendors develop and update the software that supports railroads' PTC systems. Representatives from several railroads and FRA specialists we interviewed said that software issues routinely arise in lab testing, field testing, and RSD that require vendor revisions before a railroad's PTC implementation can continue. For example, representatives from one railroad said that existing software defects affecting its PTC system must be addressed and a new version of the software is needed before they can start RSD. They added that they had no control over this process, as they must rely on the vendor to provide reliable software. Representatives from this railroad also noted that resolving software issues is often not entirely within a railroad's control due to the need for vendor support, in contrast to some earlier challenges leading up to the 2018 deadline, where, for example, the railroad itself had more control as it was installing equipment and could more clearly track progress.

Moreover, the limited supply of vendors and high demand for services as railroads work simultaneously to implement PTC by the 2020 deadline continue to pose problems. For example, representatives from one railroad said their vendor has consistently had issues meeting milestones and delivering on its commitments. Representatives from a small railroad said they had limited internal resources to implement PTC, making the railroad's progress heavily reliant on its vendor. Representatives from two other railroads and FRA officials also highlighted implementation delays caused by recalls for some locomotive equipment, which has caused additional work for railroads as well as the vendor. Specifically, the equipment had to be removed, sent in for repair, and then re-installed.

More than half of the railroads implementing PTC also responded to our questionnaire that interoperability was a major or moderate challenge. Railroads said that interoperability can be complicated by software issues and coordinating host and tenant railroad schedules, when asked to describe the biggest challenges to achieving interoperability. Fifteen railroads specifically mentioned software issues, and representatives from several railroads noted that interoperability will require reliable software. For example, one railroad reported that certain software functionality remains to be developed, tested, and implemented to facilitate interoperability and to address software reliability issues that have caused system disruptions. Also, 14 railroads noted that scheduling time with other railroads to begin interoperability testing can be cumbersome and time consuming. For example, several railroads that we interviewed and that responded to our questionnaire said that scheduling can be complicated by whether other railroads have made enough progress on their own PTC implementation to begin work on interoperability.

According to FRA officials, interoperability challenges also differ across PTC systems and geographic areas. Below, we use the Northeast Corridor and the Chicago metropolitan area—where most railroads are implementing ACSES and I–ETMS, respectively—to illustrate the challenges faced in working to achieve interoperability. However, railroads in other areas or implementing other PTC systems may face some of these same challenges or face additional different challenges.

Northeast Corridor and Surrounding Area

Over a dozen railroads operating on the Northeast Corridor and in the surrounding area are required to implement PTC. The Northeast Corridor runs from Washington, D.C., to Boston, Massachusetts, and Amtrak predominantly owns track on the corridor. Eight commuter railroads, Amtrak, and most freight railroads are implementing a form of the ACSES system or at least a portion of their equipment and track. In some cases, railroads in the Northeast will be operating two different

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22 As noted above, we asked railroads that had not achieved full implementation to report how much of a challenge—major, moderate, minor, not at all—a list of previously identified challenges currently posed. Twenty-one of 37 railroads said this was a major or moderate challenge. Half or more of the 37 railroads reported major or moderate challenges in only three areas: vendor issues, software issues, and interoperability.

23 The questionnaire asked railroads that had not achieved full implementation to describe their biggest challenges specific to achieving interoperability. We analyzed the narrative responses received from 31 railroads to report the major themes identified about challenges specific to achieving interoperability.
PTC systems concurrently on the same track, which will add to the complexity of interoperability, according to FRA. Examples of interoperability challenges faced in the Northeast include:

- **Software issues.** PTC software presents particular challenges in the Northeast because software is being supplied by multiple vendors and has been developed to accommodate railroads' existing systems that have different configurations. Therefore, according to FRA officials, ACSES does not have a common set of requirements or specifications. Also, even if two railroads use the same vendor for their locomotive equipment or software, each railroad may use a different version of software. In addition, representatives from two railroads that operate in the Northeast told us they built different software functionality into their PTC systems to accommodate their own operations, so additional work is needed to resolve such differences to achieve interoperability. In light of these software issues, representatives from one industry association and one railroad we interviewed said that Northeast Corridor railroads are discussing creating a software management process to aid interoperability.

- **Boundary issues.** A train needs to seamlessly operate PTC when it crosses the boundary between two railroads' territories, as previously described. According to a rail industry association, as of June 2019, there are about 20 boundaries on the Northeast Corridor where more work is needed to ensure seamless operation. FRA officials and one industry association said boundary issues are complex and time-consuming to resolve but not insurmountable. For example, FRA officials said a railroad could install its own equipment such as transponders and wayside devices across the boundary to create an overlap between their system and that of the other railroad.

- **Securing PTC wireless communication.** FRA requires that PTC wireless railroad communications be encrypted. However, a solution that aims to encrypt all PTC wireless communication and data transmittal among railroads operating ACSES in the Northeast is currently in lab development. In August 2016, Amtrak received a grant from FRA to create this solution for ACSES. Amtrak originally planned to implement this solution in December 2018, but Amtrak has experienced delays and currently estimates that it will implement the solution by January 2020. However, Amtrak has reported several risks that it will need to overcome to meet this implementation deadline. Further delays could affect railroads' ability to fully implement PTC in the Northeast by the December 2020 deadline. FRA noted it will continue to monitor and support the railroads as they implement security measures in the Northeast.

### Chicago Area

Ten I-ETMS railroads that operate in the greater Chicago metropolitan area received extensions to implement PTC. Throughout PTC implementation, FRA, industry associations, and railroads have identified Chicago as a place where interoperability would be challenging due to the dense freight, passenger, and commuter operations in the area. Examples of such challenges include:

- **Software issues.** According to FRA and railroads we interviewed, software issues have slowed interoperability work by railroads implementing I-ETMS. The underlying problem is the memory available on the locomotive equipment, which is needed to store its railroad’s track data, according to FRA and railroads we interviewed. To be interoperable, the locomotive equipment also needs to store and exchange multiple railroads’ track data, causing the memory to fill up very quickly. According to railroad representatives, memory limitations for I-ETMS locomotive equipment prohibited railroads with large track data files—mainly the Class I freight railroads—from being able to interoperate. The vendor for this equipment has been working on a software solution for this problem, and according to a few railroads we interviewed, the vendor delivered an interim software solution in March 2019 that allowed the four largest Class I railroads to achieve interoperability. However, this software was delivered 7 months later than initially planned, and an additional software solution is still needed to allow the locomotive equipment’s memory to store the data of all railroads operating I-ETMS, according to representatives from two railroads and an industry association we interviewed.

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24 In these cases, railroads plan to either install their locomotives with equipment for both systems or install wayside equipment along the tracks for both systems. Freight railroads, for example, plan to dual-equip the wayside equipment where they operate as a tenant on the Northeast Corridor so their locomotives can use I-ETMS.

25 49 C.F.R. §236.1033.
Other technical issues. Railroads in the Chicago area conducted modeling to help ensure that sufficient communications capacity (e.g., spectrum and radio capacity) would be available to support PTC interoperability in the region.26 According to one industry association, while actual PTC operations in the area are minimal right now relative to full expected operations, railroads must continue to monitor the communications capacity as more railroads progress with their own PTC implementation and start to interoperate. For example, railroads may have to re-engineer their radio networks, such as re-routing certain communications through different radio towers and other network connections, if issues are subsequently identified.

Scheduling interoperability work with other railroads. Within the Chicago area, the total number of railroads and the number of railroads that have to be interoperable on a single line complicates interoperability. Chicago is the busiest rail hub in North America and handles one-fourth of the Nation’s freight. Nearly 500 freight trains and over 700 passenger trains travel through the area on tracks owned by several different railroads every day. For example, one commuter railroad, for one of its lines, operates over track owned by four host railroads that alternates with its own track. Achieving interoperability for this line will involve sequencing and scheduling with multiple railroads to activate PTC along the entire line, including across the numerous boundaries between different railroads’ territories, according to representatives from that railroad. According to one FRA specialist, work to achieve interoperability in the Chicago area will ramp up in late 2019 or early 2020. As a result, many railroads will have to coordinate schedules to sequence interoperability work across the dozens of host-tenant relationships in the area.

FRA Is Assisting Railroads with Testing and Interoperability while PTC Workload Challenges Persist

FRA officials told us that the agency continues to provide assistance to railroads on interoperability and to support railroads through the testing process. In summer 2019, FRA began an effort to meet with all freight, non-Class I tenant railroads that have to be interoperable with host railroads required to implement PTC.27 FRA officials said they will use meetings with these 72 individual tenant railroads to discuss PTC requirements and review the railroads’ plans for implementing PTC with their host railroads. FRA officials said they have also continued to meet regularly with railroads still in field testing or starting RSD on their own PTC systems. For example, FRA officials said the agency meets weekly or monthly with each railroad that has not yet initiated RSD to provide targeted technical assistance to resolve any issues. FRA and representatives from one railroad also told us that FRA has met with vendors to discuss specific equipment or software issues and to stress the importance of resolving these issues. FRA also participates in meetings held by the railroad industry’s PTC working groups, including those focused on the Northeast Corridor and Chicago area, as needed.

In addition, FRA officials told us that they are working with industry to improve the safety plan review process. Specifically, according to a June FRA presentation, FRA is working with two railroads and an industry association to create templates for streamlined, more consistent safety plans for two types of PTC systems—ETMS and E–ATC. The goal of the template is to reduce the burden on both railroads and FRA by using a shorter format and, where possible, relying on standardized system documents. FRA officials anticipate that the templates will be ready for other railroads to use in fall 2019.28 In addition, FRA has contracted for help in re-

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26 Radio frequency spectrum is the medium for wireless communications and supports a vast array of commercial and governmental services, such as mobile voice and data, broadcast television and radio, and satellite services, among other wireless services. We previously reported that railroads have faced challenges obtaining spectrum to operate PTC. In particular, railroads have raised concerns about the potential for railroads operating in close proximity to cause interference to each other’s radios, mostly in congested metropolitan areas where multiple trains are operating with PTC. GAO–15–739.

27 These tenants are largely Class II and III railroads that operate on tracks of the railroads currently required to implement PTC by law. According to FRA, some Class II or III tenant railroads that have four or fewer unequipped movements per day on PTC-required main lines could have until December 31, 2023, to implement PTC, but their host railroads are requiring them to implement PTC by December 31, 2020.

28 As noted above, there are no common specifications for the ACSES system, so a template or baseline for a safety plan for ACSES would not help speed up FRA’s review, according to FRA. Instead, FRA officials said the FRA field specialist for ACSES will work individually with railroads to provide feedback on draft safety plans.
viewing safety plans. However, representatives from four railroads and two industry associations we interviewed noted that they remained concerned about the amount of time it has taken FRA to review safety plans. FRA reported in February 2019 that it took on average 331 days to review a safety plan.

While it is too early to determine the effect of FRA’s efforts to improve the safety plan review process, much work remains for FRA in the next 18 months. According to FRA, 23 railroads will be submitting safety plans in the next 12 months. While FRA has conditionally certified 13 PTC systems as of March 31, 2019, these railroads, too, are required to continue to work with FRA to provide additional documents to respond to FRA’s conditions. Some of these railroads also plan to resubmit safety plans for FRA to review, hoping to receive an unconditional certification before the December 2020 deadline.

In March 2018, we reported that railroads had expressed a need for additional clarification about applying for an extension and that FRA could provide more consistent information to railroads. We recommended that FRA identify and adopt a method for systematically communicating extension-related information to railroads. In 2018, FRA held three symposiums for railroads to consistently communicate information to help railroads prepare to qualify for an extension and to understand what was required to have a fully implemented PTC system. FRA held two similar sessions in February and June 2019. Representatives from most of the railroads we interviewed (six of eight) said they had been happy with the communication with FRA, via these sessions as well as regular meetings with FRA’s PTC field specialists and other staff. For example, representatives of two railroads said it was helpful to have the FRA Administrator attend the sessions with railroads and talk directly to railroad representatives. In addition, clarity of information from FRA was the lowest rated challenge in response to our questionnaire, with 29 railroads reporting this as a minor challenge or not at all a challenge.

While FRA has made improvements, the extended 2020 deadline for full PTC implementation is less than 18 months away, and FRA and railroads have substantial work to complete and challenges to address before that deadline. Moreover, unlike the 2018 deadline, no additional extensions are available beyond December 2020.

In March 2018, we recommended that FRA develop an approach to use the information it gathers on railroads’ PTC implementation progress to prioritize the allocation of resources to address the greatest risk. FRA agreed with this recommendation, and while FRA officials have described testing and interoperability as areas of focus in 2018 and 2019, they have not articulated or demonstrated how, within these broad areas, they are monitoring risk and prioritizing resources. For instance, FRA plans to meet with all 72 tenant railroads in over 30 meetings rather than use the data it collects from host railroads to target this outreach. In addition, while FRA will have to review dozens of new and resubmitted safety plans in the coming months, FRA officials have not identified how they will prioritize these reviews relative to other reviews (e.g., other documentation that railroads submit as they continue testing on their own systems and for interoperability). According to FRA, it has communicated to railroads in industry-wide meetings that conditional certification for a PTC system is generally sufficient to meet the statutory requirement for full implementation; FRA noted this would only not be sufficient if a railroad’s PTC system did not otherwise meet the technical requirements in regulations and one or more of the conditions related to such non-compliance. However, representatives from two railroads we interviewed also said it was unclear whether conditional certification would be enough for a railroad to comply with the 2020 deadline, and uncertainty remains about which conditions must be addressed to meet the statutory requirement for full implementation.

Related to system certification, representatives from three railroads and one industry association we interviewed also said FRA still needed to clarify how it would
handle situations where a host or tenant railroad is not fully implemented by the 2020 deadline. Although the FRA Administrator has publicly said he will enforce the implementation deadline (which is December 31, 2020, for most railroads) and recommend assessing the maximum civil penalty against a railroad that did not meet its deadline, FRA has not clarified if this would apply in situations where a host or tenant relationship affects another railroad's implementation. We continue to see value in FRA developing a risk-based approach to allocating its limited resources and will continue to monitor FRA's actions on this recommendation.

Going forward, FRA will also need to transition to overseeing PTC as a routine part of railroad operations after the 2020 deadline. Similarly, railroads will need to transition from implementation—largely done by contractors—to operating and maintaining their own PTC systems. Several railroads, in response to our questionnaire, said that they anticipate difficulties funding ongoing operations and maintenance as well as managing software and other updates. Therefore, December 31, 2020, represents not only the deadline for full PTC implementation but also a point after which railroads and FRA will face a new operational and oversight environment.

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

The CHAIRMAN. Well, thank you very much. Mr. Bourg.

STATEMENT OF ROBERT BOURG, VICE PRESIDENT, STRATEGY AND GROWTH, WABTEC CORPORATION

Mr. BOURG. Good afternoon, Chairman Wicker, Ranking Member Cantwell, and all the members of this committee. Thank you for holding this important hearing on next steps for PTC implementation. My name is Robert Bourg, and I am Vice President of Strategy and Growth for Wabtec Corporation.

It is a privilege to represent Wabtec and appear before you today along with two of our earliest PTC partners, BNSF and Metra. Going back to our origins in 1869 as the Westinghouse Air Brake Company, safety has been and remains a core mission for Wabtec. Supporting our freight and passenger customer railroad commitments to meet the December 31, 2020 deadline for PTC implementation is a foremost priority. At the outset, I thought it might be helpful to note that as currently approved by the FRA and deployed by the railroads, PTC functions as a safety overlay. That is, PTC is designed to enforce existing railroad signal indications and other operating rules. This means that PTC presently serves as a supplementary safety assurance measure supporting existing railroad safety practices and procedures.

Wabtec’s role in PTC builds on our interoperable electronic train management system, or I-ETMS, which is deployed on freight and passenger railroads operating outside the electrified Northeast Corridor. Wabtec is a hardware and software supplier for I-ETMS PTC onboard and back-office segments. Wabtec also serves as a PTC system integrator for a number of passenger railroads. To enable railroads implementing I-ETMS to meet the RSIA 2018 requirements, Wabtec manufactured and delivered more than 23,000 onboard I-ETMS systems. Wabtec also developed new customized software applications for the back-office that interface to, and in some cases replace, existing railroad back-office systems. Our focus on enabling our customers to meet the December 31, 2020 PTC deadline is twofold.

First, Wabtec is committed to meeting our railroad customer requirements for PTC interoperability. Specifically, we have released
software updates that enable increased track file size, and we are working toward another update this fall that will double the onboard capacity to handle train bulletins. These and other planned software upgrades, along with even closer stakeholder collaboration, are intended to enable our Class I customers to continue their plans for completing interoperability and enabling more efficient PTC operations.

Second, we are committed to delivering for our passenger railroad customers, where Wabtec has a majority as a major system integration role. Building on our experience across the railroad system including our early work with Metrolink in Southern California, the first passenger railroad to complete interoperability testing and receive FRA PTC certification, we are supporting customer agencies to, one, complete PTC revenue service demonstrations, two, achieve FRA approval of PTC safety plans, and three, validate host and tenant PTC interoperability.

In summary, Wabtec is dedicated to fulfilling its commitments to enable full I-ETMS interoperability across the rail system. We are teaming closely with our customers to continually improve PTC performance, and we are working directly with our passenger railroad customers where Wabtec has a lead system integration role. Looking to the future, PTC is an ongoing commitment for all stakeholders, and the work and investment will continue past 2020. New digital technologies will enable even greater safety and operational benefits.

Wabtec looks forward to partnering with our customers and other rail industry stakeholders to advance this vision for the future. Thank you for this invitation to testify, and I would be pleased to answer any questions that you have.

[The prepared statement of Mr. Bourg follows:]

**PREPARED STATEMENT OF ROBERT BOURG, VICE PRESIDENT, STRATEGY AND GROWTH, WABTEC CORPORATION**

Good afternoon Chairman Wicker, Ranking Member Cantwell and all the members of this Committee. Thank you for holding this important hearing on the implementation of Positive Train Control (PTC).

My name is Robert Bourg, and I am Vice President of Strategy & Growth for Wabtec Corporation. Prior to my current role, I led Wabtec’s Electronics Group, which developed and supplies the Wabtec PTC Interoperable Electronic Train Management System (I-ETMS®) now operating on our customer freight and passenger railroads across the United States. I have been with Wabtec Corporation and its predecessor companies for 26 years. Before that, I worked in the instrumentation and controls industry and served as a U.S. Naval officer in the nuclear propulsion program headquarters. It is a privilege to represent Wabtec and appear before you today along with two of our earliest PTC partners, BNSF Railway and Metra.

**Wabtec Corporation**

As background, five months ago on February 25 of this year, Wabtec completed the acquisition of the GE Transportation business unit from General Electric Company. This merger establishes Wabtec as a new Fortune 500, global transportation and logistics leader by combining Wabtec’s broad range of freight, transit and electronics products with GE Transportation’s equipment, services and digital solutions in the locomotive, mining, marine, stationary power and drilling industries. The new Wabtec has more than 27,000 employees globally with revenues exceeding $8 billion.

Wabtec traces its origins back to 1869 with the founding of the Westinghouse Air Brake Company by American innovator George Westinghouse to produce his revolutionary air brakes designed to enhance train safety. Safety has always been and remains at the core of our operations, including our early involvement in PTC, to the present and into the future. Wabtec today is still headquartered in the manufac-
turing plant Westinghouse built in Wilmerding, Pennsylvania in 1889. This fall we will move just west to our new global headquarters in Pittsburgh.

PTC Implementation

Supporting our customer freight and passenger railroad commitments to meet the December 31, 2020 deadline for PTC implementation is a foremost priority for Wabtec. We are teaming closely with our customers and supporting them with a singular goal of achieving mandated PTC implementation by the end of 2020.

Before summarizing our program for the Committee, I thought it might be helpful to review from a rail technology supplier perspective what PTC is, and is not, intended to do. As you know, as mandated by the Rail Safety Improvement Act of 2008 (RSIA), PTC is designed to help prevent four rail incident scenarios:

• Train-to-train collisions
• Overspeed derailments
• Train incursions into established work-zone limits
• Movements of trains through switches in the wrong position

As currently approved by the FRA and deployed by the railroads, PTC functions as a safety overlay. That is, PTC is designed to enforce existing railroad signal indications and other operating rules. PTC intervenes by stopping a train only when the specific signal indications or operating rules, such as not proceeding into the next block that may be occupied by another train, are not observed by train crews in a timely fashion.

PTC serves as a supplementary safety assurance measure supporting the full range of existing railroad signal, maintenance, inspection, operating and other practices. PTC cannot prevent incidents such as highway-rail grade crossing or trespassing incursions, or address other risk scenarios, but PTC’s overlay function does provide a valuable safety enhancement. In the future, Wabtec envisions the potential for vital PTC implementation that would enable PTC to serve as a direct means of railroad signal and train control.

PTC Operations

Wabtec PTC I–ETMS® as presently implemented to meet the RSIA has four main segments (FIGURE 1):

• Locomotive On-board—computer, display screens, GPS units and radio/antennas
• Wayside—interfaces to existing equipment to provide data about signals, switches and other detection needs, such as broken track
• Communications—a mixture of RF base stations, Wi-Fi connections and cellular networks
• Office Systems—software applications that manage information from the railroad signal network, dispatch system and other data systems to integrate items such as movement authorities and restrictions and train makeup
During the Initialization process before a train leaves a terminal or siding, all relevant information, such as the train's consist (connected cars), track data and speed restrictions, is downloaded from the “back-office” system to the locomotive's onboard computer. Once the train is en route, its exact location is determined by matching GPS positioning with the on-board track database. Meanwhile, the on-board computer is continuously calculating the distances for issuing any warnings or activating the braking system if needed. At the same time, I–ETMS® communicates with wayside equipment to check current signal status, the presence of incorrectly aligned switches and the status of other monitoring equipment.

Train crews operating Wabtec PTC I–ETMS®-equipped locomotives receive constant real-time visual and audible communication letting them know when a train must be slowed or stopped. If a train crew does not respond to the PTC warning system, onboard computers will activate the brakes and stop the train.

Wabtec’s Interoperable Electronic Train Management System

Wabtec’s I–ETMS® builds on three decades of innovation and investment in positive train control. I–ETMS® traces its roots back to pioneering work done in the late 1980s by Rockwell and Burlington Northern Railroad on a pilot called ARES (Advanced Railroad Electronics System). Wabtec acquired the railroad electronics division of Rockwell in 1998 and has since worked to refine the architecture and functionality of its PTC system.

In 2007, the FRA approved Wabtec’s PTC system for initial deployment on BNSF, making Wabtec’s technology the first federally approved PTC system in the United States. I–ETMS® has since been deployed on all Class I carriers, on Class II and Class III short-lines implementing PTC, and many of the passenger railroads on the general system, including Amtrak and commuter railroads, operating outside the electrified Northeast Corridor.

Of the four core I–ETMS® segments, Wabtec provides the On-board and Back-Office components and software. The appendix to this statement offers more background on the Wabtec I–ETMS® on-board Train Management Computer (TMC) and Cab Display Unit (CDU). Wabtec also provides the critical Back-Office servers and systems which enable PTC to interface with a railroad’s signal and train control functions.

The Wabtec I–ETMS® TMC and CDU are American-made, having been engineered and manufactured at Wabtec’s facilities in Cedar Rapids, Iowa and Germantown, Maryland (just north of Washington, DC on I 270). Our I–ETMS® software
development team is based in Cedar Rapids, and we invite interested Members and staff of this Committee to please join us to see either site.

**Wabtec Supports Customer Railroads Implementing PTC**

Although the basic principles of operation for I–ETMS® were established before enactment of the RSIA in 2008, deploying I–ETMS® on much of the non-electrified railroad network outside the Northeast Corridor has involved substantial railroad financial investment and commitment, and supplier dedication and focus.

Wabtec is principally a PTC hardware and software provider to Class I, short line and passenger railroads. For certain passenger railroads, Wabtec also serves as the system integrator or principal support to a third-party system integrator contractor. For these customers, Wabtec also provided the training and on-site equipment installation and software support necessary to meet the initial 2018 deadline and/or qualification for alternative schedule.

In support of our work with BNSF, Metra and other freight and passenger railroads implementing I–ETMS® to meet the RSIA mandate, Wabtec manufactured and delivered more than 23,000 on-board I–ETMS® systems. New customized software applications and interfaces needed to be developed as well. For example, most railroads have computer-aided dispatch systems and other back-office configurations optimized for their unique operations and needs.

Interfacing I–ETMS® to these systems required close cooperation between Wabtec and the railroads to establish specifications, develop the software and certify it for production operation.

A sustained and comprehensive partnership enabled freight and passenger railroads implementing I–ETMS® to meet either the FRA’s requirements for conditional certification or the statutory criteria for alternative schedule. By December 31, 2018 these railroads received FRA approval for their PTC Implementation Plan, installed all PTC equipment and trained all required personnel, performed required Functional Testing, and received FRA approval of their implementation schedule.

Currently, 25 host railroads operate I–ETMS®, with 93 total railroads using I–ETMS®. More than 45,000 route-miles are in I–ETMS® operations today out of 47,000 total route-miles planned.

Supporting our customer commitments to meet the December 31, 2020 deadline for PTC implementation is a foremost priority for Wabtec. We have mobilized significant additional resources to meet customer schedules, leveraged our experience with PTC implementation to date to apply lessons-learned and reemphasized our focus on quality program delivery. Our workplan priorities are to:

- **Meet our railroad customer requirements for PTC interoperability**
  Wabtec has responded to our Class I freight railroad customer needs by:
  - Increasing track file size. Wabtec’s recent software update enables more than 50 percent additional flexibility for larger subdivisions and total file storage.
  - Increasing on-board train data storage in support of interoperability. Wabtec has a planned software release in 2019 to double the on-board bulletin capacity.

  These and other planned software upgrades are intended to enable our Class I, short line and passenger railroad customers to continue their plans for completing interoperability—that is, ensuring that PTC works when a locomotive from one railroad is in the lead of a train entering another railroad’s territory. We are collaborating closely with our customers to facilitate an ongoing technical and management dialogue to ensure that these upgrades are successfully implemented and any critical software issues for 2020 compliance are addressed, while also meeting customer objectives for more efficient, and improved PTC operations.

- **Deliver for the passenger railroads where Wabtec is the PTC system integrator or provides significant system integration services**
  To enable our passenger rail customers to meet the 2020 PTC deadline, Wabtec has drawn upon the substantial lessons learned from our earliest ventures in PTC, including pioneering work with our partner, Metra, even before the RSIA mandate. More recently, we successfully supported the achievements by Metrolink in Southern California as the first commuter railroad to fully complete interoperability across its network and receive conditional FRA PTC certification.

  Building on our experience with these and other passenger railroads around the country in meeting the 2018 PTC requirements, Wabtec’s 2020 focus for our system integration passenger railroad customers is to:
Progress customer initiatives to complete PTC Revenue Service Demonstrations;

Achieve FRA approval of PTC Safety Plans; and

Validate Host and Tenant PTC interoperability.

Conclusion

Wabtec fully appreciates the magnitude of the PTC implementation challenge ahead to enable I–ETMS® railroads to meet the 2020 statutory deadline. Wabtec is dedicated to fulfilling its own commitments to enhance software reliability and performance.

We are teaming closely with our customers to continually improve PTC system availability on train start-up and reduce unnecessary or undesired PTC enforcement actions. We are working directly with our passenger railroad customers where Wabtec has a prime system integration role to support their timetables and performance objectives for PTC implementation by December 31, 2020.

PTC is an ongoing commitment, and the work will continue past 2020. System enhancements and other updates will require close, regular engagement with our customer railroads and with the FRA. Looking ahead to the future, Wabtec is investing in new safety and technology enhancements, drawing fully upon the deep digital background of our colleagues from GE Transportation in our newly combined organization, to enable even greater efficiency and operational improvements.

We appreciate this and every opportunity for continued dialogue with all stakeholders including this Committee to continually enhance railroad safety and operational performance. Thank you for this invitation to testify and I would be pleased to answer any questions you may have.

APPENDIX

Visual Supplement to July 31, 2019 Testimony of Robert Bourg, Vice President of Strategy & Growth, Wabtec Corporation

Wabtec PTC I–ETMS® Locomotive On-Board Equipment

The Wabtec I–ETMS® TMC and CDU are American-made, having been developed and manufactured at Wabtec’s facilities in Cedar Rapid, Iowa and Germantown, Maryland.

Train Management Computer (TMC)

- Accepts and validates data from peripheral devices on board the locomotive, including the braking and navigation systems and event recorder.
- Accepts and interprets controlling data from the Central Office and Dispatch systems and Wayside equipment.
- Monitors a train’s position and speed with dual GPS receivers and activates braking as necessary to enforce speed restrictions and unauthorized train movement.
- Designed for triple-redundancy of Central Processing Unit (CPU) hardware. The I–ETMS® software on three distinct CPUs confirm synchronization by voting, and the system will allow the train to operate only if at least two agree.
Cab Display Unit (CDU)
- Provides the graphical user interface to the Wabtec I–ETMS® Train Management Computer (TMC) for the crew.
- Through function keys, the train operator can view and configure system data and acknowledge visual and audible alerts and prompts from the TMC.

![Figure 3: Cab Display Unit (CDU)](image)

Wabtec “Back-Office” Systems and Software
- Computer Aided Dispatch (CAD) systems provide a graphical user interface of the rail network to dispatch operators and allow them to control movement of trains including meet-pass planning. The Back-Office Server is the interface between PTC, CAD and other railroad data systems providing for example movement authorities, work zone information and temporary speed restrictions.

![Figure 4: Computer Aided Dispatch (CAD) and Back-Office Server](image)

The Chairman. Thank you, sir. Mr. Matthews.

STATEMENT OF CHRIS MATTHEWS, ASSISTANT VICE PRESIDENT, NETWORK CONTROL SYSTEMS, BNSF RAILWAY

Mr. Matthews. Good afternoon, Chairman Wicker, Ranking Member Cantwell, and members of the Committee. Thank you for inviting me today to provide an update on BNSF’s implementation of Positive Train Control.

PTC is an important component of BNSF’s overall Risk Reduction Program that has resulted in meaningful progress toward our vision of zero accidents and injuries. Safety is the most important thing we do at the railroad. BNSF’s ongoing risk reduction efforts combine a robust capital investment program, training that reinforces safe operating practices, and maintenance of a strong em-
ployee safety culture. It also increasingly involves development and deployment of new technology. BNSF has invested nearly $65 billion in private capital back into the railroad since 2000 and plans to invest more than $3.5 billion in 2019. The railroad’s physical plant is in the best condition in its history.

PTC is an important safety development and also one of the most significant, costly, and complex technologies that the rail industry has ever deployed. BNSF’s capital investment in PTC will exceed $2 billion. As the rail industry deploys PTC and other important technological advancements, we are working closely with the FRA in support of moving toward a regulatory paradigm that will allow for leveraging our PTC investment and support future innovation. Today, BNSF is operating PTC on all 88 federally mandated subdivisions, covering more than 11,500 route miles and 80 percent of our freight volume.

We have also equipped and are operating PTC on nine non-mandated subdivisions, providing an additional 2,000 miles of PTC protection. We are running more than 1,000 trains daily in PTC revenue service and have run more than two-and-a-half million trips with PTC since December 2012. BNSF has trained more than 21,000 employees to operate and maintain PTC trains and equipment, which involves not just technology, but changes to the work processes of our operations teams and many other departments.

The volume of PTC trains running on our network demonstrates that our people know how to operate and support the system. Moving forward, BNSF has three major focus areas to continue refining and driving continuous improvement with PTC, ensuring reliability, fully integrating PTC into our train operations, and achieving full interoperability. We are closely engaged with our vendors, and in particular Wabtec, the supplier of our onboard hardware and software, to refine key components of the system and ensure they have the necessary capacity, longevity, and reliability to support our operations.

BNSF is also actively working on interoperability with our suppliers in each of the railroads, with which we need to be interoperable to identify their needs and provide technical and operational assistance along with services such as back-office hosting and crew training as needed. BNSF has now achieved interoperability with 10 of the 23 tenant railroads that will operate PTC on our network. That includes all passenger railroads, where they run on BNSF, as well as several short line railroads.

Last month, we began running PTC trains with the Union Pacific, our largest interchange partner and the first Class I freight railroad with which we have achieved interoperability. BNSF will be able to fully test interoperability upon completion of ongoing efforts with the remaining Class I railroads. This is a time and labor-intensive process involving weeks, and in some cases months, of preparation and testing with each railroad. PTC interoperability relies heavily on the reliable flow of accurate information. The amount of data that will ultimately be transmitted between railroads and the various components that comprise the PTC system is significant.

We are working closely with Wabtec to ensure that upcoming software releases will accommodate the amount of data required
for full nationwide interoperability, and testing to prove that out will be ongoing. BNSF and the rail industry have made tremendous progress on PTC implementation, but there is still significant work to do in coming months. A highly reliable system is important not only for the safety benefits it delivers, but also essential to efficiently meeting the freight transportation needs of our customers.

BNSF will continue to work with all stakeholders to meet the goal of implementing an interoperable PTC system as Congress envisioned. Thank you for the opportunity to be here today, and I would be happy to answer any questions you might have.

[The prepared statement of Mr. Matthews follows:]

**Prepared Statement of Chris Matthews, Assistant Vice President, Network Control Systems, BNSF Railway Company**

Good Morning Chairman Wicker, Ranking Member Cantwell and members of the Committee. Thank you for inviting me today to provide an update on BNSF's implementation of Positive Train Control (PTC) technology. As Assistant Vice President of Network Control Systems, I have responsibility for the railroad's ongoing implementation of PTC along with other safety and operations technology initiatives. PTC is an important component of BNSF's overall risk reduction program that has resulted in meaningful progress toward our vision of zero accidents and injuries.

BNSF is a wholly-owned subsidiary of Berkshire Hathaway, Inc. and one of North America's leading freight transportation companies. BNSF operates a rail network of 32,500 route miles, serving 28 states in the western two-thirds of the United States and three Canadian provinces. BNSF handled 10.7 million units of freight in 2018, an all-time volume record for our railroad. BNSF operates about 1,500 trains per day, including 245 passenger trains that run over our network.

**BNSF Commitment to Safety**

Safety is the most important thing we do at the railroad. BNSF's ongoing risk reduction efforts combine a robust capital investment program, training that reinforces safe operating practices and maintenance of a strong safety culture among our employees. It also increasingly involves technology development and deployment to drive the next level of safety and efficiency improvements on the railroad.

Our ongoing and significant capital investments play a key role in our ability to safely deliver the best transportation services for our customers. To maintain, optimize and position our network for opportunities, BNSF has invested nearly $65 billion in private capital back into the railroad since 2000 and plans to invest more than $5.5 billion in 2019. The railroad's physical plant is in the best condition in its history.

BNSF is committed to a culture that continuously examines the effectiveness of its safety processes and performance, and we've made steady improvements over time in reducing employee injuries and the number of mainline derailments. We've also made steady improvements in grade crossing safety. Since 2009, BNSF's employee injury frequency ratio has been reduced by 55 percent while the rail equipment incident rate has been reduced by 26 percent. BNSF's highway grade crossing incident rate has decreased by 21 percent over this same time period.

BNSF has made significant safety progress in partnership with our employees and by continually investing in new technologies that help make the railroad safer and more efficient. Technology is playing a key role in how we "design-in" safety on our railroad to drive additional improvements throughout the system. PTC is an example of this, with deployment of the technology helping to address human factor risks associated with train operations. While PTC has received the most public attention in recent years when it comes to railroad safety, there are also many other important safety technologies being developed and deployed on the railroad.

For example, BNSF has 4,000 trackside detectors across the network that monitor and analyze trains as they roll by, helping to proactively identify and address issues that may otherwise cause equipment to fail. These detectors, which utilize infrared, vision, force, acoustic and laser technologies, among others, provide us with more than 35 million readings a day about the health of our locomotives and the railcars moving along our network.

Yet another example is deployment of an evolving fleet of advanced rail inspection vehicles, placing a premium on automated inspections that allow for near-continuous observation of the state of the railroad infrastructure. This reduces the risk
of derailment while also allowing for better management and planning of preventative track maintenance.

Because of these and other technological advancements and our commitment to continuous improvement, we are working closely with the Federal Railroad Administration (FRA) in support of moving towards a regulatory paradigm that incentivizes and empowers innovation. The regulatory treatment of PTC, for example, should ultimately be managed in a manner that will not impede—and actually encourage—the next generation of rail operational technologies that will be built upon the foundation of PTC and drive safety, expand network capacity and increase performance. This means in part that regulatory oversight should focus not on monitoring and inspecting every aspect of the equipment and technology but rather on the overall functionality and effectiveness of the system to deliver expected safety outcomes.

PTC Implementation

PTC is an important safety development and also one of the most significant, costly and complex technologies that the rail industry has ever deployed. BNSF’s capital investment in PTC will exceed $2 billion. It is an unprecedented “system of systems” that integrates advanced analytics, wireless communications networks, GPS, trackside and locomotive hardware and software and a back office computer system.

PTC is technology that provides a safety overlay over the existing infrastructure and operating rules that ensure safe operations today. PTC determines the location, direction and speed of a train; ensures the train does not exceed the authorities granted to it by the dispatching system; warns the train crew of a potential problem; and takes corrective action by stopping the train if there is not a response from that crew.

BNSF made the decision to develop and deploy PTC technology on certain portions of its network before Congress mandated it in the Rail Safety Improvement Act of 2008 (RSIA). BNSF developed a form of PTC—the Electronic Train Management System (ETMS)—and in 2003 submitted the system to the FRA for approval. BNSF partnered with the FRA to initially pilot ETMS technology on our Beardstown subdivision in central Illinois and over time expanded testing to more complex operating environments on our network. ETMS is the platform upon which the industry’s current PTC technology is based.

Today, BNSF has PTC infrastructure installed on all 88 subdivisions required to be equipped under the Federal mandate, covering more than 11,500 route miles and 80 percent of our freight volume. We have also equipped and are operating PTC on nine non-mandated subdivisions, providing an additional 2,000 miles of PTC protection. We are running more than one thousand trains daily with PTC in revenue service, and have run more than two and a half million trains with PTC since December 2012. BNSF has trained more than 21,000 employees to operate and maintain PTC trains and equipment, and the volume of PTC trains running on our network demonstrates that our people know how to manage and support the system.
Driving Continuous Improvement

Moving forward, BNSF is working to address remaining technological and operational challenges with PTC to ensure high reliability of the system. Always with safety in mind, railroads still need to operate trains and serve customers as they work through these issues. There may also be occasions where the rail network is under stress—this year’s unprecedented flooding is a good recent example—where flexibility is needed to recover operations and maintain the flow of commerce. With the underlying infrastructure and operating rules in place that ensure safe operations today, we continue to work cooperatively with the FRA to ensure railroads have the flexibility to avoid severe disruptions to their operations.

BNSF closely tracks and analyzes key performance metrics to understand the root cause of any issues with the PTC system and has three major focus areas to drive continuous improvement with PTC: ensuring reliability, fully integrating PTC into our train operations and related work processes, and achieving full interoperability.

To operate PTC, we have essentially built a “digital railroad,” which needs to be maintained right alongside the physical railroad. However, PTC implementation does not just involve technology; it requires changes to the work processes of our various operations team, including Transportation, Mechanical and Engineering, along with a host of other departments. Examples include additional equipment moves to build trains with PTC-equipped locomotives in the lead; maintaining technologically sophisticated locomotives that are becoming rolling data centers; and maintaining thousands of additional devices along the track. BNSF has been focused on integrating PTC into our operations for several years, and while we must continue to test and refine this highly complex system to support safe and, importantly, efficient and fluid train movement, running trains on our PTC network is becoming just a part of how we do business.

Interoperability

The lynchpin of a fully functioning and interconnected PTC system across the country is interoperability. Interoperability for BNSF requires that all railroads operating across our PTC-equipped lines be capable of operating with our PTC system, and vice versa where BNSF trains operate over another rail carrier’s PTC network. Railroads also exchange locomotives routinely, and the locomotives owned by other railroads need to be able to operate PTC in our trains. BNSF is actively working with each of the approximately 30 railroads—including other Class Is, short lines and passenger operations—with which we need to be interoperable to identify their needs and whether and how BNSF can help. This assistance ranges from technical, operational and regulatory advice to a variety of services such as back office hosting and crew training.

Aware that BNSF’s PTC reliability would in part depend upon the reliability of every other railroad with which we interoperate, we engaged early on with each of the passenger and freight tenant carriers that will operate PTC on BNSF track. We sought to establish certain protocols between BNSF and its tenants to ensure implementation of PTC technical solutions which meet the regulatory and operational requirements of interoperability; communicate expectations for participation in a PTC testing program to verify functionality and interoperability; and facilitate the exchange of technical information needed to effectively and efficiently implement PTC.

BNSF has now achieved interoperability with—and PTC is currently active on—ten of the 23 tenant railroads that will operate PTC on our network. That includes all passenger railroads, including Amtrak, Metra, Metrolink, Northstar and Sound Transit where they run on BNSF. We are also interoperable with short line railroads Montana Rail Link, the Otter Tail Valley Railroad, Louisiana & Delta Railroad, and the Portland and Western Railroad. We have worked closely with these short lines to enable their PTC-equipped locomotives to function with BNSF’s PTC back office while operating on our track. Last month we began what we call production interoperability (operating PTC trains in revenue service) with the Union Pacific, our largest interchange partner and the first Class I freight railroad with which we’ve achieved interoperability. While BNSF and UP are fierce competitors in the freight transportation marketplace, we cooperate on safety and our technical
teams worked well together to achieve this important milestone. PTC is in fact a prime example of how the entire industry comes together to advance safety.

BNSF will be able to fully test interoperability upon completion of bilateral testing with each of the remaining Class I railroads. This is an intensive process that involves federation of each railroads’ back office servers, commissioning of locomotives, and lab and field testing followed finally by revenue service production interoperability. We conduct weeks, and in some cases months, of testing and preparation with each railroad.

Once we are interoperable, we need to maintain the flow of accurate information between railroads to ensure smooth interchange of trains and prompt resolution of any technical problems. For example, with the Union Pacific alone we have over 200 locations where our tracks connect on PTC territory. For each of those we must make digital connections to match the physical connection, ensure communication systems can hand off trains without interruption of data flow, and be able to provide real-time information to another railroad’s trains and crews.

The amount of data that will ultimately be transmitted between railroads and the various components that comprise the PTC system is significant. While the industry’s modeling shows we will have sufficient spectrum in the industry’s most heavily trafficked areas (e.g., Chicago), that will be confirmed when all railroads are fully implemented there. Similarly, we are working closely with our supplier to ensure that upcoming software releases will accommodate the amount of data required for full nationwide interoperability, and testing to prove that out will be ongoing.

Conclusion

The implementation of PTC—layered on top of an already safe rail network and in combination with current and emerging innovative risk mitigation efforts—is already advancing railroad safety for BNSF and its employees and will create a foundation upon which additional safety and efficiency technologies can one day be deployed. We have accomplished much but still have significant work to do in the coming months to ensure a highly reliable PTC system. This is important not only for the safety benefits it delivers but also essential to efficiently meeting the freight transportation needs of our customers. BNSF will continue to work collaboratively with all involved stakeholders to meet the goal of implementing an interoperable PTC system as Congress envisioned.

The CHAIRMAN. Thank you, sir. Mr. Derwinski.

STATEMENT OF JAMES DERWINSKI, CHIEF EXECUTIVE OFFICER AND EXECUTIVE DIRECTOR, METRA

Mr. DERWINSKI. Good afternoon Chairman Wicker, Ranking Member Cantwell, members of this esteemed committee, and especially Senator Tammy Duckworth from Illinois. My name is Jim Derwinski. I am the CEO and Executive Director of Metra in Chicago, as Senator Duckworth pointed out. I am also in APTA’s Board of Directors. I am a member of APTA’s Commuter Rail CEO subcommittee, and I am Chairman of the newly formed Commuter Rail Coalition, which was formed to bring a distinct voice of commuter rail to advocate its unique needs to legislators and regulators. I am pleased to have this opportunity to speak with you about positive train control implementation and next steps for both Metra and this esteemed body.

First, I would like to provide a little bit of background on commuter rail industry and our system. There are 31 active commuter rail systems in the United States that deliver over 500 million passenger trips annually, and they provide the safest form of service transportation for commuters. In Metropolitan regions that we serve, we support economic development, tax base growth, reduce congestion, reduce emissions, and compared to traveling on the highway, we give back valuable time to our customers, time which they can be as productive as they want or they can catch up on rest, both activities not possible behind the wheel of an automobile.
Commuter rail also offers customers the ability to access more affordable housing, as they still will be able to come downtown to work and be there safe and on time. Commuter railroads are in existence for two basic reasons. Freight railroads in the 1980s and beyond were unable to sustain operations without great losses. Cities and states identified the public necessity for commuter and began funding these subsidies. These commuter railroads are now known as legacy systems. Second are the newer systems, or new starts, which cities and states have identified the need for commuter in a region and have re-invested heavily in commuter for the benefits provided to those cities.

BROADLY, commuter railroads face major funding challenges. Our industry has been working diligently to install PTC, but the Federal safety mandate has put great strain on our limited dollars for state of good repair and capital project. Further, legacy commuter systems, like Metra, face unique capital challenges as we work to maintain and upgrade our aging infrastructure.

Since its creation in 1984, Metra has grown to be the largest commuter railroad in the country based on track miles and the fourth largest based on ridership. Metra has 11 separate lines with 242 stations. Our trains operate over our own infrastructure as well as infrastructure owned by our freight partners. We are both a host and a tenant railroad in Chicago. Metra's primary goal is to operate nearly 700 trains that run daily throughout our system with our partners, intermingled with approximately 700 additional freight and passenger trains.

PTC implementation will further enhance the safety of our networks. Simultaneously, we will work to sustain our legacy system that includes some capital components dating back well into the 1800s. Approximately half of all trips made from suburban Chicago to downtown are on our network. Despite complexity in our network and our infrastructure challenges, we are pleased to report that, since our inception, we have been able to maintain a 93 percent on-time performance or better. It is with these realities in mind that I provide an update to the Committee on PTC implementation status, challenges we face, and potential next steps for both Congress and industry.

In 2018, we met all the statutory requirements for the extension. Interoperability right now is one of our biggest challenges, not only for Metra, but also for the entire rail network in Chicago. PTC must work for any train on any track, even though different railroads have different PTC systems, different operating rules. In Chicago alone, there are 14 railroads working together. While implementing PTC, we have run into some unforeseen challenges, including setbacks with hardware and software, and it forced us to modify our implementation schedule. And limited supplier network, including technical support, has further exacerbated these issues for Metra. Our suppliers, Wabtec, and we share these resources with majority of the railroads in the United States. Since the conversion of our dispatching system last year, we are on our 31st software upgrade in 1 year.

Despite setbacks, Metra will meet the deadline of the alternative schedule implementation. We must have increased timely support from our supplier network. This will help us build back into our
schedule the lost contingencies that we originally built into the schedule, lost because of these past setbacks. There also must be enough resources readily available, not just for Metra, but the entire industry.

Positive Train Control will increase safety of our system for nearly 290,000 passengers that we give trips to every day and get them to work on time. However, PTC implementation, and its expected cost to maintain, have put additional stresses on our limited capital and state of good repair budget. PTC installation is expected to cost Metra over $400 million, originally estimated at $75 million. That is equivalent to two and a half years of our Federal formula funding. Original estimates were based on what was known at the time, and as you can see, we did not know enough. An estimate of $15 to $20 million is what our operating costs will be each year, and each commuter railroad will have to bear its perpetual operating costs. While we are grateful to Congress for recognizing the burden of PTC, we ask Congress to increase the Federal formula funding to help support that.

Additionally, we encourage Congress to create a commuter rail grant program that would provide some relief to railroads struggling to address most PTC operations and maintenance costs. Congress will have several opportunities coming up. I want to thank you for inviting us to testify.

I look forward to answering any questions you may have. I also invite any members of this committee to come out, see, touch, and feel PTC in Chicago, the most complicated network in the U.S.

Thank you.

[The prepared statement of Mr. Derwinski follows:]
Over the years, Metra has grown to be the largest commuter railroad in the country based on track miles, and the fourth largest based on ridership. The Metra system has 11 separate lines with 242 stations and nearly 1,200 miles of track throughout the northeastern Illinois region. Metra owns and operates four of those lines, has trackage-rights or lease agreements to operate Metra trains over freight railroads on three lines, and has purchase of service agreements with two freight railroads, which operate commuter service on four other Metra lines.

Metra’s primary business is to serve people traveling to downtown Chicago to work. Approximately half of all work trips made from suburban Chicago to downtown are on Metra. Our riders, whose trips average 22 miles in length, come from all parts of our region’s 3,700 square miles. Additionally, riders and employers are also now supporting reverse commute services and we are excited by the potential to expand our service into the suburbs during peak commute times.

Metra is particularly proud that it has maintained an on-time performance of 93 percent or better in each year since 1984, the year after Metra was created. This has been achieved despite operating one of the oldest fleets in the country.

Metra’s primary goal is the safe operation of nearly 700 trains that run daily throughout our system, carrying nearly 290,000 passengers. Our customers rely on us to get them to and from work, home, school, and medical offices every single day. PTC implementation will further enhance the safety of our network and furthers our commitment to safety. Our secondary goal is to sustain our legacy system that includes some capital components dating back to the late 1800s. It is with these goals in mind that I provide an update to this committee on our PTC implementation status, challenges we have faced, and potential next steps for both Congress and the industry.

On October 29, 2018, we submitted a Request for Alternate Schedule and Sequence to Federal Railroad Administration (FRA) demonstrating that all 2018 PTC regulatory requirements were achieved, and we were granted an alternate schedule on January 2, 2019. In our 2019 Quarterly PTC Report to the FRA, we reported that we had fully installed and equipped all radio towers and acquired all spectrum needed to operate PTC, trained 85 percent of our employees on PTC, and have begun Revenue Service Demonstration on 20 percent of our network, while the remainder of our network is undergoing field testing. Our dedicated team is working hard to continue to equip our rolling stock with the required safety equipment and is completing required installation and safety work on our track segments. However, we have had to overcome several challenges as we have worked to implement PTC.

Chicago is one of the Nation’s largest rail hubs, as all seven Class I railroads, Amtrak, other commuter railroads, switching railroads, short line railroads and transit all converge in the city. Interoperability of PTC systems is a major challenge for not only Metra, but Chicago’s entire rail network. PTC must work for any train on any track even though different railroads may have different PTC systems. While Metra owns some of its network, we rely on freight railroad hosts to meet the needs and demands of our customers. Further, we host ten railroads on our own infrastructure and are working diligently with both our tenants and hosts to ensure our systems are interoperable.

While implementing PTC, unforeseen challenges, including glitches and software errors, have forced us to modify our implementation schedule while a limited supplier network has further exacerbated these issues. False clears are an example of one of the glitches the industry has encountered. A false clear is a miscommunication between a locomotive and a wayside signal. The wayside signal may tell a train to stop, but the onboard system will say that the track is clear and to proceed. As PTC is a brand-new safety system that is being tested and implemented in real time, unforeseen glitches requiring the issuance of software patch solutions have presented themselves. Once a patch is issued, our internal team must then test the patch and ensure the issue the patch is addressing has been resolved. As a result, we have reported to the FRA that PTC software on the entire Metra fleet will be executed “just in time” for PTC system testing or revenue service demonstration in order to mitigate the delay effects of software updates and patches. Further, without a competitive supply network, we lack the opportunity to change vendors based on their performance. The available vendors currently lack market incentive to develop
software patches to meet the needs and demands of railroads working under an intense statutory implementation deadline.

Despite the challenges of PTC interoperability and software, I am pleased to report that Metra will meet the December 31, 2020, PTC implementation deadline. Positive Train Control will increase safety on our system and for the nearly 290,000 daily passengers that rely on us to get them to and from work, safely. However, PTC implementation, and its expected costs to maintain, have increased the stress placed on our limited capital and state of good repair budgets. We believe Congress has an important role to play in developing shared “next steps” for PTC.

Since 1985, Metra has invested more than $6 billion to rebuild, maintain and expand the Chicagoland’s passenger rail network. Operating funding is provided through system-generated revenues—primarily fares—and subsidized in large part through a regional sales tax. Capital funding is provided through a variety of Federal programs and state and local funding sources and a small amount of fare revenue. Metra’s total budget for 2018 is $994 million. That includes $797 million for operations and $197 million for capital.

Capital funding to maintain and improve our aging system remains a constant challenge. Metra’s capital program is mostly funded by Federal formula funding (Sec. 5307 and 5337) totaling $173.6 million for Fiscal Year (FY) 2019. However, our needs far exceed the level of funding available. In fact, the Regional Transportation Authority (RTA), our region’s transit funding and oversight agency, estimates that Metra needs to invest $1.2 billion annually over the next decade to achieve and maintain a state of good repair.

While we must reinvest in our network to continue to safely and efficiently move our customers, complete PTC installation is expected to cost Metra between $350 million to $400 million, equal to the amount of Federal formula funding Metra receives every 2½ years. Further, based on our own estimates and discussions with our freight railroad partners, PTC operation and maintenance costs are expected to be between 5–10 percent of the total installation cost per year. An additional $15–$20 million will be required annually to operate this complex safety system with no current Federal financial assistance available.

I wanted to take this opportunity to thank Congress and the FRA for allowing commuter railroads, including Metra, to utilize the Consolidated Rail Infrastructure and Safety Improvement (CRISI) grant program for PTC projects. However, this source of funding is not sustainable, and we strongly believe more needs to be done by Congress to financially help commuter agencies with the ongoing costs of PTC, especially those agencies that will meet their statutory PTC deadlines.

There is no doubt that the Federal PTC mandate has added to the pressure on our capital and state of good repair needs and the expected PTC operations and maintenance costs will continue to add pressure for years to come. While the State of Illinois recently passed a much-needed state capital bill, which will help address some of our needs, we believe the Federal government has a role to play in recognizing and supporting the unique challenges faced by commuter railroads resulting from the dual mandate of PTC implementation and safely maintaining aging capital-intensive infrastructure. Creating a new grant program specifically for commuter railroads would provide some relief to these public agencies struggling the most to address PTC operations and maintenance costs and associated capital costs.

The Federal formula funding that Metra receives annually is the bedrock of our capital program. However, because our needs are great and state funding has been inconsistent, it has been nearly impossible to effectively budget and plan a capital renewal program. One area that Metra is struggling to meet demands is in its bridge infrastructure. Many of the bridges Metra operates over are aging and tend to be expensive pieces of infrastructure to maintain. Congress may help us remedy this situation by increasing Section 5307 Urban Area Formula Grants and Section 5337 State of Good Repair transit formula funding. Further, we believe Congress should also consider creating a dedicated funding stream for commuter railroads to ensure the numerous commuter rail systems across the country are no longer forced to rely on sporadic discretionary grants and can effectively plan for both safety and capital expenditures.

Metra, like other railroads, is a highly regulated, capital-intensive entity. It requires a substantial annual investment to maintain its own rights-of-way and track structure. Metra’s capital assets are diverse and extensive: locomotives, passenger cars, track signal and communications equipment, yard and maintenance facilities, station buildings, platforms, parking lots and headquarters. Each day, the delivery of safe, reliable, efficient train service depends on these assets. Constant maintenance, rehabilitation and replacement, and significant funding, are required to keep Metra’s facilities and equipment in working order.
Congress will soon have several upcoming opportunities to address the unique needs of commuter railroads as its debates reauthorizing the Fixing America’s Surface Transportation (FAST) Act. Metra looks forward to working with Congress as its debates authorizing new surface transportation programs. Our current funding situation is unsustainable and threatens the future viability of the important service Metra, and commuter railroads across the country, provide.

Metra thanks Congress for its continued support of public transportation and systems like ours and appreciates the opportunity to update this committee on our PTC implementation status, challenges, and future needs. Federal support has provided the majority of funding for our capital and safety needs over the last decade, and Metra will continue to depend on it while working with all our funding partners to secure additional assistance.

Thank you for inviting me to testify and I look forward to answering any questions you may have.

The CHAIRMAN. Can’t wait. But Mr. Derwinski, you are going to make it on time?

Mr. DERWINSKI. Currently, right now we are scheduled to make everything on time, sir. We do not need any more hiccups in the road. All we need is to have the software be delivered without any bugs, and we need those resources at hand on a daily basis.

The CHAIRMAN. Mr. Batory, Mr. Derwinski said they are different PTC systems. How did that—how did we get to that place?

Mr. BATORY. Thank you, Senator Wicker, for that question. The Class I railroad community, the leadership that was in place when this became law, and before it became law, demanded among themselves standardization. And that is why you have a system that is called I-ETMS that is represented across the United States.

The CHAIRMAN. Say that again.

Mr. BATORY. It is called I-ETMS, and it is a system that is across the United States among all the Class I railroads, and many of the short lines and regionals. They have to have it, and do the switch and terminal companies. It was with the commuter railroads that there was solicitation of the FRA to agree to alternate systems other than I-ETMS. I cannot speak from fact because I was not part of that decisionmaking process, but in knowing that hindsight is 20/20, I think it was a leadership error in the commuter agency arena, and I am available to make more comment later today in so far as the severity of it in certain parts of the country.

The CHAIRMAN. But it was an error?

Mr. BATORY. In my personal opinion, I think we could they could have done better and brought about standardization.

The CHAIRMAN. OK. Well, Mr. Derwinski says there are a number of things Congress will have an opportunity to do to address the unique needs of computer railroads, consider creating a dedicated funding stream. A number of items listed on page four of his testimony. Mr. Batory, and other members of the panel, would you like to respond to these suggestions?

Mr. BATORY. Well, as far as responding to money amounts, it would be not appropriate for me to, if you will, site money amounts per se——

The CHAIRMAN. Well, tell us about what you would like for us to do?

Mr. BATORY. One thing that I will say about Metra, and it was mentioned in Senator Duckworth’s remarks, and I have said this time and time again throughout my career, it is not about how much money you spend, it is how wisely you spend it. And Metra
is a classic example of that on how wisely they spend their money. When I see the total spectrum of money being spent among the different railroads, you kind of shake your head and say, what is going on here? And a lot of it has to do with the attentiveness of the leadership in the corner office.

And, you know, Metra is kind of a poster child in so far as being a commuter railroad that spends its money wisely. That is not to say that others don’t, but I think they do an extremely good job.

The CHAIRMAN. Anyone else want to respond to ways that Congress can help in the near term or long term? Mr. Bourg?

Mr. BOURG. Mr. Chairman, I fully support Mr. Derwinski’s position. I think there should be additional funding. My perspective is that some of the funding challenges have led us to this compression of the schedule at this point. But notwithstanding, there will be an investment for ongoing maintenance of this system. Once we achieve the 2020 deadline, there will be an ongoing need for operational funding to support the maintenance, and therefore I am fully behind Mr. Derwinski’s position of additional Federal funding in that area.

The CHAIRMAN. Director Fleming, are there going to be some disappointments after this next 18 months expires?

Ms. FLEMING. You know, I think we are at a crossroads. I am cautiously optimistic. We have heard from the panel there has been a lot of progress. I think folks are taking this very seriously, but that being said, we only have 4 railroads that have crossed the finish line, and we have 11 railroads that are still in the early stages. There are some pretty complex hurdles to get through, whether it is the limited number of vendors or, whether it is the software issues. The ACSES and I-ETMS systems also have different issues, such as the locomotive memory capacity issues with I-ETMS.

I think you also have the big hurdle of interoperability and having to work through that, particularly in certain parts of the country. So, we are at a crossroads. A lot of work has happened, but there continues to be software issues, reliability issues, and vendor issues, and FRA also has a lot on its plate. Some of the PTC safety plans are thousands of pages. FRA is trying to create a template to try to have some standardization for the safety plans it has to review, but a template is not going to work with every PTC system. So, how is that going to all play out? This is why we are at a critical juncture. Six months from now, I think we will be able to take a closer pulse to where railroads are.

The CHAIRMAN. Sounds like we may have some disappointments at the end of 2020.

Ms. FLEMING. I hope not.

Mr. BATORY. We are doing everything to keep that from happening.

The CHAIRMAN. Senator Cantwell.

Senator CANTWELL. Thank you, Mr. Chairman. Mr. Batory, you know I sent a letter after the NTSB findings and lessons learned from the Amtrak 501 derailment in the State of Washington, and the FRA response to my letter states that, “FRA’s investigation of the Amtrak 501 accident found that training for assigned crewmembers does not comply with Federal regulation and was a con-
tributing factor in the cause of the accident, and FRA’s enforce-
ment action is ongoing.”

So I don’t want to talk about the ongoing investigation, but can you explain how a deficient crewmember training standard was able to comply with FRA’s existing regulations, and what are you doing to improve those regulations?

Mr. BATORY. As far as what transpired that morning and when I learned of it, just from my career experience, I shook my head in dismay. To think that you would have an inaugural train with an engineer, regardless of what level of training he had at proficiency, and not have a road form of engines on that train, it is just unprecedented. We do not do that in the railroad industry. So there was a failure in management that allowed that to happen. On top of that, there was a conductor that was trying to get qualified on the territory.

So now, if you have somebody that is not familiar with the territory, an engineer that supposedly qualified on the territory, communicating back and forth in the cab at the early hours of the morning. And when I saw the video, in-cab video, and also the audio, I just shook my head in dismay and said, that should never have happened. It was like the perfect storm. It is not representative of this railroad industry, but unfortunately, there was that incident.

Senator CANTWELL. Well, so what—I mean your job, obviously, is the oversight of that culture. So how did this happen and what do we need to do to address it?

Mr. BATORY. Amtrak was not enforcing its engineer certification program and line characteristics, in that particular instance, properly. And we do spot checks and audits on engineer certification programs to make sure the carriers are complying, but as I said, what transpired there that morning was something that should never have happened.

Senator CANTWELL. So what should we do to update our rules if you are saying, and we did spot inspections—what should we do to make sure that Amtrak creates that culture?

Mr. BATORY. The rules were there, but, you know, you can write rules, and rules, and rules, but it takes people to enforce them. And the people that were responsible for enforcing them either were not cognizant of what they were supposed to enforce, or if they were cognizant, they were lacking in fulfilling their duties.

Senator CANTWELL. Do you mean people within Amtrak?

Mr. BATORY. Yes.

Senator CANTWELL. And so what should FRA do about that? If you think—because obviously we are going to keep going through this, and now we just had this discussion about what may or may not get done by 2020, what do we need to do to make sure that the culture addresses this issue?

Mr. BATORY. Well with that there is a lesson learned, and Richard Anderson and his organization was new. They realized that they had an issue, and they have done a lot as far as improving the organization structure and operating department, and the culture that is there, in so far as adding additional road form of engines, getting the rise in with the engineers as they are supposed
to, doing more training, both in the field as well as in simulators. Richard has done an extremely good job in addressing that.

Senator CANTWELL. So you are confident that adequate safety is in place at Amtrak?

Mr. BATORY. I feel very comfortable with everything that they have done as a result of that lesson learned.

Senator CANTWELL. And so you think there is adequate safety there now?

Mr. BATORY. Safety never sleeps and never ends. You have got to keep on top of it constantly. And it does not matter who is at the helm, OK, you have got to stay on top of it. People do not come to work to have an accident. That engineer didn’t want that to happen. If you listen to what he said on that audio, OK, it is scary, he should have never left.

Senator CANTWELL. So, I am very interested—look, I get cultures are hard to legislate. You have to create these safety standards and you do have to make sure they are implemented. So from FRA’s perspective I just want to know whether you think that everything FRA has done today, you have done everything you can to make sure that that is implemented?

Mr. BATORY. Yes, I think the railroads, first, are the responsible parties. And the men and women who lead and maintain, and operate those railroads, it is FRA’s responsibility to do a double-check and make sure everything is being fulfilled.

As I often share with people, and I think this is a good news story, even though it is one too many. As far as head-on collisions, which were the most pronounced type of collision that the railroad industry had, I may have shared earlier there was a total of 68 head-on collisions in 1978. In the industry today, and one is one too many, but last year we only had one and that was in KC, North Carolina between CSX and Amtrak.

Senator CANTWELL. So we are definitely going to be keeping the record open if there is anything else that FRA wants to suggest during this time period. We will certainly continue to look at implementation of recommendations from the NTSB on this accident.

Mr. BATORY. And if I can, I would certainly afford myself to your staff to give more information. I have more I can share.

Senator CANTWELL. Thank you. Thank you, Mr. Batory. Senator Gardner.

STATEMENT OF HON. CORY GARDNER,
U.S. SENATOR FROM COLORADO

Senator GARDNER. Thank you. I believe it is Senator Duckworth next. Senator Duckworth. Senator Duckworth go ahead.

Senator DUCKWORTH. I will take it.

[Laughter.]

Senator DUCKWORTH. If it is a jump ball, I am going for it. Thank you. Well, first, I want to applaud the diligent efforts of passenger commuter and freight rail operators who have prioritized PTC installation testing and interoperability. Administrator Batory, as we have discussed on several occasions, railroads that are still working to implement PTC have so far sufficiently demonstrated continued progress toward the December 2020 deadline.
You will continue to keep us apprised of any changes in that progress, is that correct?

Mr. BATORY. Yes.

Senator DUCKWORTH. Thank you. Mr. Derwinski, as your testimony suggests, Metra made the tough choice to make early investments in PTC, and I saw that when I came out to visit the yard, but even after PTC is fully implemented, Metra still faces an estimated $15 to $20 million in additional annual operating costs. Can you scratch a bit below the surface on some of the ideas you highlighted in your testimony to provide operators some relief from the tremendous PTC investments that you have incurred?

Mr. DERWINISKI. Yes, I think, you know, with support from the Congress from the CRISI program, just an expansion of the CRISI program into the grants that are available there. But discretionary grants are kind of hard, so we have been actually asking Congress to consider a commuter rail funding source in the future as they look at the FAST Act Reauthorization. And any time we can get increased Federal formula funding, 49 U.S.C. 5307 to 5337, this certainly will help.

Planning has always been one of our biggest things when we have ebbs and flows within funding. Anything we can do to get sustainable, continuous funding, we can actually probably take PTC and look at the next wave of safety initiatives that the rail industry can undertake.

Senator DUCKWORTH. Would you want that funding to be more of a multi-year type of funding then? Is that what you are asking for? Instead of a single year, 5 years, and that sort of timeframe?

Mr. BATORY. The longer the funding period, the better for the industry. That helps us with planning.

Senator DUCKWORTH. Thank you. I am troubled to hear about software glitches and performance issues in the supply chain. Mr. Derwinski, could you paint a picture for us about how unforeseen software challenges can impact the PTC timeline for real operators? Every time there is a glitch, what exactly happens to you, to Metra?

Mr. DERWINISKI. Well, what ends up happening is we beta test everything in labs, and in the labs, certain things are able to be, you know, smoked out I would say. Once we get it out on the railroad and we actually start interoperating with the other trains even on that track, not even on other railroads, we start finding sometimes operational glitches, things that just were not, you know, found earlier.

So we have to work with the vendors. We are held handcuffed to the people that actually can write the software. They then work on writing software updates, and those software updates that have to be brought back to us, tested, and then redeployed out in the field. And in a network like Chicago, where we are having 1,400 trains that eventually will work within that tight little area, we are continually always finding new challenges that just did not exist in other areas of deployment in the country.

Senator DUCKWORTH. So then how do those glitches get shared with other rail networks out there, other systems, are you in contact with others or does that go to the software people? How does that happen?
Mr. DERWINSKI. Yes, the ITC committee actually has the ability to have only the latest revision of software available to everybody. So as they come out with the latest revision, it is not just fixing problems maybe on our network, it might be fixing problems in Los Angeles, Seattle, or New York as well, depending on where the operators are at. So it is all controlled by that ITC committee. So there is really only one of the eventual version of software that is out there.

Senator DUCKWORTH. But if you are finding a glitch, or you find a glitch that is problematic, and the software does not actually fix it, it keeps on going, do you then, the way you function, do you ever reach out to Los Angeles or somewhere else and say, hey, are you guys seeing this or we are seeing this problem? What are you doing, that sort of thing, so that you are not out there trying to troubleshoot on your own with just the software company?

Mr. DERWINSKI. Yes, absolutely. We have a great network of people that have been set up through APTA and also through AAR. We are constantly in communication with our peers. We also in Chicago, because of the complexity of Chicago and the Chicago Deployment Group, which meets every 2 weeks, and we have constant conversations. And Wabtec themselves actually holds meetings with us so we can always be chattering about what is the latest and greatest thing that is happening and what lessons have been learned elsewhere.

Senator DUCKWORTH. Great. And so, Mr. Bourg, I would like to hear from Wabtec. I have heard from a number of operators, both freight and commuter, who have concerns about the software updates. Can you describe the challenges that Wabtec is facing with software updates and how this might affect that PTC testing and interoperability?

Mr. BOURG. Yes, Senator. So the magnitude of the issue in Chicago is significantly greater than elsewhere. We have had challenges in Chicago. I believe that we have turned a corner. Several of the subdivisions within Metra are now in revenue service demonstration and are performing well.

We have had our share of challenges but based on the progress that we have made in the interoperability testing done elsewhere in the country, I have confidence that we have overcome the most significant problems. Certainly a lesson learned is there cannot be enough testing, and it also requires a lot of collaboration with the ITC committees that Mr. Derwinski mentioned, as well as our other railroad customers to make sure that we stay in front of the problems before they cause an operational impact.

Senator DUCKWORTH. Thank you. I am over time. I yield back.

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

Senator THUNE. OK. Thank you, Senator Duckworth. Let me just say that during my time as Chairman of this Committee, I held numerous oversight hearings on the implementation of Positive Train Control, and I appreciate the Chairman and the Ranking Member's continued oversight of this very important issue. Under Administrator Batory's leadership, railroads have made significant progress toward full implementation of PTC, and continued oversight from
FRA will be critical to ensuring that railroads can overcome various challenges, particularly those associated with achieving interoperability as we approach the December 2020 deadline.

Mr. Batory, aside from the 42 railroads subject to the mandate, I am interested to hear more about the progress of the dozens of short line railroads implementing PTC as tenants due to contracts with host railroads. Short lines provide a critical service in South Dakota, connecting facilities like grain elevators and ethanol plants to Class I main lines.

And so I am wondering if you could provide an update on the status of PTC implementation among short line railroads, and could you speak to some of the major challenges they face in reaching full interoperability with host railroads?

Mr. BATORY. Thank you, Senator, for those kind remarks. As far as the short line regional community, when we finally were able to get a list put together from the Short Line Association and the AAR, we consolidated and basically got rid of the redundancy. We came up initially with 76 railroads of which 41 were independent, the balance were associated with conglomerates. We have met with 61 of those railroads so far, face-to-face or on conference calls, and today I have not yet learned of any short line or regional railroad that has basically thrown its hands up and said, we cannot get this done by the deadline of next year.

The two things, though, as far as challenges that they are faced with is primarily financial. One is the cost of equipping their locomotives when you realize that the cost is probably $100,000 plus per locomotive and some of the locomotives they are operating they purchased for the same amount of money at one time. So that is a hard pill to swallow. The second one that is emerging though is the amount of insurance that they are having to take on now as resolved the underwriters reviewing their operation and their requirement to have PTC.

So, a railroad that maybe handles 10, 15 cars a day, and it has to make an investment of $100,000. They have the locomotive pull the 10 to 15 cars a day, and then finds out that its insurance is going on up, its insurance premiums are going up as well. It is hard and something that needs to be addressed, OK. And if FRA is actually not in a position to address it, it is going to have to be through the Short Line Association and its membership.

And I think the rail industry network as a whole needs to recognize this because we are an integrated industry and we interchange traffic every day among all of the railroads regardless of size.

Senator THUNE. Right. So just as a follow up to that, Mr. Matthews, BNSF has been a leader in implementation of PTC, could you speak briefly about what you are doing to ensure that short line tenants operating on your track will achieve full interoperability?

Mr. MATTHEWS. Thank you, Senator. We take a very targeted approach to helping each of our short line tenants that we work with. So of the several hundred short lines that operate on our system, we have worked with them to understand every move on PTC territory and whether or not we can protect that within alternate
means other than PTC, such as restricted speed, close to yard limits, or changing interchange points.

We have taken that large list and taken down to 16 short lines that are going to have to equip PTC on our system. Right now five of those are interoperable, and we work closely to help them with training and some cases back-office hosting, in some cases helping with equipping locomotives or leasing locomotives through us. So it is a case-by-case basis on the support we provide each of the short lines.

Senator THUNE. And Mr. Bourg, can you speak to what some of the challenges are that you face with achieving interoperability from an equipment perspective, particularly in areas with high traffic volumes and numerous interchanges, and perhaps respond to some of the things Mr. Batory said regarding those resource issues and how you all are going to deal with that?

Mr. BOURG. Thank you, Senator. Yes. So with regard to interoperability, we did have a recent challenge with regard to capacity in the onboard system in file size, and Wabtec received one of the letters that Administrator Batory talked about, about highlighting the importance of solving that issue. We worked with our industry partners, with BNSF and others, and we have implemented software changes that address that.

We implemented a partial change initially that provided some relief, and we do have a software release scheduled for September that will fully address it. And our railroad partners have agreed that that will address it. With respect to resources, it has been challenged in the industry. There is a lot of specialized operational knowledge and software knowledge that goes into supporting this system.

I personally believe that we are over the hump with respect to this, but the ongoing maintenance of the system will be a challenge. And retaining those people and ensuring that we keep the pipeline with qualified resources that understand the application and have the technical skills to maintain the application, are very important, and we are highly focused on that.

Senator THUNE. My time has expired. Thank you. Senator Blumenthal.

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

Senator BLUMENTHAL. Thank you, Senator. Thank you all for being here today. As you may know, PTC has been an abiding issue for me, a challenge, that I think our Nation must fulfill. We are celebrating 50 years since the day we put a man on the Moon. If we cannot implement PTC, it is due to a lack of will, not technological knowledge, and certainly not resources because the Nation has the resources. And I hope none of you disagree with those two basic propositions. The record will note no one is disagreeing.

[Laughter.]

Senator BLUMENTHAL. Mr. Batory, I would like to ask you about a recent report, April 18, 2019 in the Connecticut Post about hundreds of defective antenna assemblies for Metro-North’s Positive Train Control Safety System, which were recalled, “threatening further delays in an already delayed project.” It refers to 1,200
scanner assemblies that allow trains, as it says, to communicate with a central system, recalled over defective parts. The system evidently was made by Siemens. Are you familiar with this issue?

Mr. BATORY. Yes, sir, I am.

Senator BLUMENTHAL. Do you know whether that delay will threaten Metro-North’s compliance with the 2020 deadline?

Mr. BATORY. I certainly, at this juncture, think that there is an opportunity to recover that lost time as a result of that quality control issue, but I am not here to make a statement of fact that is, we are going to make the finish line, because of all the territories in the United States, the one that has most of my attention is the eight railroads that represent the Northeast Corridor.

Senator BLUMENTHAL. And I am going to ask you generally about that Corridor, but focusing for the moment on this issue, do you think Siemens ought to be debarred?

Mr. BATORY. That is an excellent question. I will leave that up to the respective commuter agencies. I know what the State of New York has done under Chairman Foye. He apprised me of that personally. It is certainly an alternative that others can look at, but at this juncture, my full concentration is looking at what we can do today to make the system implemented by the deadline.

Senator BLUMENTHAL. I am not going to ask you for definitive answers as you sit here now, but would you get back to me at some point, in the next week or so, with an estimate on whether or not Metro-North is going to make that December 2020 deadline, sent to me?

Mr. BATORY. Most definitely. We’ll be with the leadership on Monday of next week, and when I return from New York, I will reach out to your office.

Senator BLUMENTHAL. Thank you. Let me ask you about the Northeast Corridor. What is your level of confidence that those systems will meet the December 2020 deadline?

Mr. BATORY. In respect to the time that we have here——

Senator BLUMENTHAL. And you can get back to me on the record if that would be easier.

Mr. BATORY. I will but basically here is what we have. We have eight railroads on the Northeast Corridor that operate a network. If any one railroad doesn’t operate properly out there and has a functional system, it has a domino effect in so far as the service impact. If they do not have an operational system, the host railroad is not going to allow the tenant to be out there, because then they will be both subject to violations and fines, plus the risk.

And that is why on July 12 we brought that leadership together. We decided we would meet not less than once a month. Most of it is going to be in New York, face-to-face, and it is strictly the leadership. It is not the technical people. They meet all the time and talk, but those technical people need support and leadership, and that is why I decided to amalgamate this group and see what we can accomplish over the next 17 months. The risk is too great, too many trains, too many people.

Senator BLUMENTHAL. The risk is literally that the entire Northeast Corridor could be crippled transportation wise.

Mr. BATORY. It has the potential, especially in the New York metropolitan area and in your territory going up toward Con-
necticut, it has a domino effect. And you want, you know, seamless interoperability, and you want everybody equipped out there.

Senator Blumenthal. Given that threat, I would appreciate your coming back to me after the leadership meeting as soon as possible to give me an update, and obviously not just me but the entire committee, because I think the Northeast Corridor is not just about any single state, or even about that region, it is about the whole country and the economic effect, catastrophic and disastrous economic effect that the failure to meet that deadline could have on our Nation as a whole.

Mr. Batory. You have my word. I will be in your office.

Senator Blumenthal. Thank you. And part of the issue with disciplining the vendors, as Ms. Fleming points out, is the limited number of them and the fact that the barring or disqualifying one sounds easier than it is in terms of the effect on, you know, meeting those deadlines. Am I correct, Ms. Fleming?

Ms. Fleming. Yes, I mean everyone needs the vendors, you know, for everything from equipment, to helping with software glitches, to helping with interoperability securing, and securing wireless PTC communications. As you know, there is a limited pool of vendors, and at this point, you know, these types of slippage will affect the railroads' ability to move to that next critical stage of implementation and meet the 2020 deadline. But at the same time, the vendors have the expertise, and it is really, I think, critical that everyone do their part in order for us to finish PTC implementation and to make that 2020 deadline.

Senator Blumenthal. I do not know what the answer is, but whether it is in the Midwest or the Northeast, there needs to be a very aggressive and proactive intervention by Federal authorities to make sure the deadline is met, which is required by law, but also that the potential market power or monopolistic power of these companies doesn't put your railroads at their unfair mercy, and ultimately consumers in the entire country.

Ms. Fleming. And you know, you raise some important issues about the Northeast Corridor. I mean, the key challenge there include that software for PTC systems in the Northeast are supplied by multiple vendors, and the railroads still have to work through and secure the wireless PTC communications. You have 20 boundaries that you still have to work through. It is very complex and these are pretty significant challenges. So the Northeast Corridor is an area that we have highlighted as well in addition to the Chicago area. It is two of the trickiest parts of the country for different reasons.

Senator Blumenthal. Well, I appreciate your being here, and thank you also to Senator Thune for his leadership on this issue over many years. We have had a lot of conversations, and he has provided a lot of good leadership, and I really appreciate it.

Senator Thune. Thank you. Senator Baldwin——

Mr. Batory. Senator, if I could share one remark?

Senator Thune. Permissible. Yes.

Mr. Batory. In regards to Northeast Corridor, and I answered this yesterday, just to put it in perspective, if you look at the equipment configurations, they are required to support two different types of PTC systems on the Northeast Corridor. There are 40 dif-
ferent options among 8 different railroads involving 7 different vendors. That is the demand that is being put on the supply industry. And keep in mind, some of these commuter railroads did not initiate their engagement until round 2015, and the law was passed in 2008.

So I am not defending the supply industry, but there is a little bit of blame on both sides of the equation here. But it is behind us. We have got figure out how to get this thing fixed sooner than later because we are behind the eight ball right now insofar as 37 percent in the commuter industry as a whole. Now, when you go to Chicago, it is I-ETMS. It is basically one system, and that is not to say it is going to be easy, but I often tell the people in Chicago after serving four different corporate flags over a third of my career, that can be Chicago's worse blizzard or snowstorm if they don't get PTC right.

Senator Blumenthal. I want to avoid any unfairness, and I apologize Senator Thune for going over in time, but the Apollo project involved 400,000 people across the United States in thousands of different companies making the spacesuit, and the rocket, and the craft that carried the astronauts, and somehow they put it all together.

So America can do it. Other countries have done it. And I understand the complexity and the challenges, but you know, I have been a longtime advocate of avoiding any further delay and at this point I am very doubtful about any excuses for the delay. Easy for me to say here on the dais, but I hope that you all will do your best. Thank you.

The Chairman. Senator Thune.

Senator Thune. The Chairman is back, and I just had one quick question. He has indulged me. Allowed me to ask it, but you talked a lot about this vendor supply constraint on implementation schedules, and I would direct this to you, Ms. Fleming because in your testimony you discussed that effect specifically, but have issues with supply constraints in your view improved since the end of 2018 or have they gotten worse?

Ms. Fleming. I think things are about the same. You know, I think the difference is that everybody is really trying to work through this. It has gotten everyone's attention, including our attention, but there is a limited pool, and everybody is working toward that same deadline. So far, you have only four railroads that have crossed the finish line, and everyone is looking for their plans and their implementation schedule to be adhered to.

But at the same time, when the railroads encounter a software glitch or I-ETMS faces problems with the locomotive memory capacity, these are things that have to be worked through because the railroads have to get it right. So we are at a critical juncture. I do not know if things are better or worse. I think, unfortunately, we really need the vendors, and we need them on their A-game to cross that finish line and get it right.

Senator Thune. Thank you. Thank you, Mr. Chairman.

The Chairman. Well, thank you all. We have now embarked on a series of roll call votes on the floor of the Senate, which were unexpected. I want to thank all the witnesses for indulging us and
for being with us today on a very important topic. We remain hopeful but watchful, and we look forward to your suggestions.

The hearing record will remain open for two weeks. During this time, Senators are asked to submit any questions for the record. Upon receipt, the witnesses are requested to submit their written answers to the Committee as soon as possible but by no later than Wednesday, August 28, 2019.

Thank you very much, and with that, we conclude the hearing with the thanks of the members.

[Whereupon, at 3:17 p.m., the hearing was adjourned.]
RSD is the final stage of testing a PTC system when FRA conditionally permits a railroad to operate PTC-equipped trains in revenue service with passengers or freight onboard under certain conditions, prior to obtaining certification of its PTC system from FRA.

APPENDIX

PREPARED STATEMENT OF IAN JEFFERIES, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF AMERICAN RAILROADS

On behalf of the members of the Association of American Railroads (AAR), thank you for the opportunity to provide this update to the Committee.

As I mentioned at the Amtrak hearing last month, the railroads have made tremendous progress on positive train control (PTC) implementation and we continue to make progress. The seven Class I freight railroads all met statutory requirements by having 100 percent of their required PTC-related hardware installed, 100 percent of their required employee training completed by the end of 2018. In aggregate, Class I railroads had 91 percent of required PTC route-miles in operation as of July 1, 2019.

Railroads, in coordination with Amtrak, commuter railroads, and other tenant railroads, are continuing to methodically test and validate their PTC systems to ensure they are interoperable and work correctly. This process includes a number of AAR managed committees and working groups that identify and resolve the unique interoperability challenges throughout the network including—the PTC Interoperability Committee, the PTC Executive Committee, a committee for each of the two main PTC systems, and a working group focusing on the unique challenges posed by Chicago.

While work still continues, each Class I railroad expects to be operating trains in PTC mode on all mandated PTC routes no later than the end of 2020, as required by statute.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO HON. RONALD L. BATORY

FRA Oversight of PTC Implementation Progress. The fast approaching deadline for all 42 railroads to fully implement PTC is December 31, 2020. It’s likely that FRA will see an influx of documents from railroads that must be reviewed by the agency in order for PTC systems to be certified.

In March 2018, the GAO recommended that FRA develop a risk-based approach for allocating its resources to effectively carry out its role in oversight of PTC implementation.

Question 1. Has the agency developed a risk-based approach to ensure it is dedicating resources to where they are needed most? If so, what does this approach entail and how do you plan to implement it?

Answer. Yes, a risk-based approach is in place to prioritize FRA’s resources. FRA Administrator Batory and FRA’s PTC subject matter experts are monitoring all railroads’ progress on a continuous basis, with a key focus on providing technical support to railroads not yet in revenue service demonstration (RSD) and host railroads with a high concentration of tenant railroads that operate in complex areas, such as the Northeast Corridor (NEC) and Chicago area, where interoperability is critical for the full implementation of PTC systems.

• Railroads Not Yet in RSD: Throughout 2018, and more frequently in 2019, FRA continues to engage with railroads that have not commenced RSD. This engagement has included reviews of railroads’ status in relation to their alternative schedules and sequences, as well as face-to-face meetings with railroads and their suppliers to discuss technical roadblocks. Additional manpower has also been brought onboard, supported by FRA regional staff, to support the aggressive testing program of many of these railroads.

1 RSD is the final stage of testing a PTC system when FRA conditionally permits a railroad to operate PTC-equipped trains in revenue service with passengers or freight onboard under certain conditions, prior to obtaining certification of its PTC system from FRA.
• Complex Operations: Beginning July 12, 2019, the FRA Administrator initiated a series of monthly meetings with the executive leadership of Amtrak and each commuter railroad that operates on or near Amtrak’s NEC and/or the commuter railroad’s own PTC-mandated main lines in the Northeast. These meetings continue, with a key focus on the interoperability and configuration management of the Advanced Civil Speed Enforcement System II (ACSES II). In addition, on December 19, 2019, FRA met in Chicago with Wabtec, all seven Class I railroads, Belt Railway Company of Chicago, Chicago South Shore & South Bend Railroad, Indiana Harbor Belt Railroad, Metra, and the Northern Indiana Commuter Transportation District to discuss the remaining work that host railroads and tenant railroads must complete to fully implement the Interoperable Electronic Train Management System (I–ETMS) on the PTC-mandated main lines in the Chicago area.

Supporting and informing FRA’s risk-based approach, FRA continues to regularly engage, in a direct, sustained, and intensive manner, with all stakeholders—including railroads, PTC system suppliers and vendors, and railroad associations—to underscore the importance of railroads’ full implementation of FRA-certified and interoperable PTC systems on all required main lines by December 31, 2020. These focused interactions provide opportunities for candid discussion and the exchange of highly technical information, with a key focus on resolving outstanding technical issues that could impede the full implementation of PTC systems.

Throughout 2020, FRA will continue engagement with railroads, meeting monthly with any railroad that has not yet commenced RSD of its PTC system to directly support such railroads’ ongoing field testing and actively address any technical issues, including software-related issues, to enable them to advance to RSD as soon as possible. In addition, even if a railroad is operating its PTC system in RSD, FRA will meet regularly throughout 2020 with any railroad that has significant technical issues that, if not resolved, could jeopardize a railroad’s ability to fully implement a PTC system on its required main lines by December 31, 2020.

Question 2. In 2017, FRA officials said that they expected PTC safety plans—such as those for NEC—would take 12 months to review. Based on FRA’s experience since that time, how long do you estimate the majority of PTC safety plans that you will receive will be? How long do you estimate it will take for the agency to review those safety plans and other documents a railroad submits to certify their PTC systems?

Answer. FRA’s regulations do not dictate the length of a host railroad’s PTC Safety Plan (PTCSP). However, during FRA’s July 2018 symposia and FRA’s three collaboration sessions during 2019, FRA has consistently instructed railroads to provide in their PTCSPs only the information and analysis required under FRA’s PTC regulations, including 49 CFR §236.1015, PTCSP content requirements and PTC System Certification. For example, multiple provisions under 49 CFR §236.1015(d) require only “a complete description,” not the entire referenced material, and host railroads’ adherence to the existing regulations, when developing their PTCSPs, should help ensure PTCSPs are more concise and streamlined.

In addition, many railroads implementing the same type of PTC system are collaborating effectively to develop their PTCSPs consistently and using baselined supplier documentation, which will also enable FRA to review PTCSPs more expeditiously. FRA has been working with railroads on the development of these baselined safety case documents. FRA’s regulations provide that FRA will, to the extent practicable, approve, approve with conditions, or deny a railroad’s PTCSP within 180 days of the filing date, which FRA is striving to do for each PTCSP it receives during 2019 and 2020. See 49 CFR §236.1009(j)(2)(ii). If FRA does not approve or deny a railroad’s PTCSP within 180 days, FRA will provide the railroad with a statement of reasons why the submission has not yet been acted upon, a projected deadline by which an approval or denial will be issued, and any further consultations or inquiries to be resolved. See 49 CFR §236.1009(j)(2)(iii).

Question 3. Are you confident that FRA will be able to concurrently review all remaining railroads’ safety plans and provide necessary feedback in time to certify each of the railroads before the deadline?

Answer. Yes. FRA is prioritizing its review of host railroads’ PTCSPs and will ensure it dedicates sufficient resources to reviewing all remaining PTCSPs, providing necessary feedback to railroads, and issuing its certification decisions by December 31, 2020. FRA is currently procuring additional contractor support from one or more entities with the expertise necessary to assist FRA as it reviews these complex PTCSPs, including hazard logs, risk assessments, and other safety analyses. This support will be in place in early 2020, when the existing contracts for PTCSP review support end.
**Question 4.** When do you estimate railroads will need to submit documents to ensure they are certified by December 31, 2020?

Answer. FRA has advised railroads that all remaining PTCSPs must be submitted to FRA by mid-2020 (specifically, not later than Friday, July 3, 2020), given that FRA’s regulations provide a minimum 180-day review period. Currently, railroads’ FRA-approved PTC Implementation Plans, including the alternative schedules and sequences therein, indicate that the latest date any host railroad will submit its PTCSP is July 1, 2020.

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**RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. AMY KLOBUCHAR TO HON. RONALD L. BATORY**

**Question.** The FRA’s Consolidated Rail Infrastructure and Safety Improvements grants program has been a critical source of Federal funding to improve rail safety through the implementation of Positive Train Control (PTC). Last year, the FRA awarded $250 million for PTC projects, although it received more applications than it was able to fund. Can you speak to what additional resources the FRA needs to fully implement PTC?

Answer. FRA’s PTC program consists of technical and programmatic staff and contractors, many of whom are dedicated to PTC on a full-time basis and a subset that supports the program on a part-time basis, while also performing other duties. This team includes 27 Full-time Equivalent (FTE) positions, as described below:

- **Full-time FRA Technical Staff and Contractors (15 FTE):** 1 Acting Staff Director of the PTC/Signal & Train Control (S&TC) Division, 2 senior test monitors, 8 PTC specialists, 1 software engineer, and 3 technical contractors. These staff members provide direct technical assistance to railroads throughout testing and implementation.

- **Full-time FRA Programmatic Staff and Contractors (7 FTE):** 1 attorney, 1 program analyst, 2 project management contractors, and 3 data analyst contractors. These staff members monitor railroads’ status and manage documentation and approvals.

- **Part-time FRA Technical and Programmatic Staff (approximately 5 FTE):** 1 Staff Director of the Passenger Rail Division, 2 S&TC engineers, 1 attorney, and 1 contractor that helps review PTCSPs on a task-order basis (average 2.5 FTE). These staff members directly support FRA’s review of railroads’ PTCSPs.

FRA is using appropriated PTC funding, from our Safety and Operations account, not only to keep the current contract force in place, but also to expand both the contract force and FRA staff to enable the PTC team to timely review documentation and provide effective support to railroads as they strive to meet the statutory deadline. The expanded PTC team, totaling approximately 36+ FTE, will also include:

- **Two railroad experts to provide additional subject matter expertise in support of FRA’s review of railroads’ PTCSPs.**

- **Three new contract positions to support FRA’s oversight of interoperability in highly congested areas, including Chicago and the NEC.**

- **An additional procurement is currently underway for another set of contractors to support FRA’s review of PTCSPs, with the skill set capable of reviewing a PTCSP in its entirety, including approximately 5 to 10 FTEs.**

Several additional procurements are also planned in early 2020 to support PTC cyber security review and opportunities for PTC to improve grade crossing safety.

In your view, what are the safety concerns associated with the delay in railroads implementing PTC?

Answer. By law, PTC systems must be designed to prevent certain accidents or incidents, including train-to-train collisions, over-speed derailments, incursions into established work zones, and movements of trains through switches left in the wrong position. Given the importance of this rail safety technology, FRA continues to actively oversee and assist railroads and to collaborate with railroad associations and PTC system suppliers and vendors, to help ensure all railroads subject to the statutory mandate fully implement FRA-certified and interoperable PTC systems on the nearly 58,000 required route miles by December 31, 2020.
RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. GARY PETERS TO HON. RONALD L. BATORY

Question 1. Your testimonies touched on a wide range of challenges with PTC interoperability: given the myriad challenges, do you feel confident with the current testing protocol to ensure full PTC interoperability?

Answer. Host railroads and tenant railroads continue to conduct interoperability testing to ensure that any PTC-equipped locomotives operating on the same main line will communicate with and respond to the PTC system(s), including uninterrupted movements over property boundaries. As of September 30, 2019, approximately 59 of 236 applicable tenant railroads have reportedly both completed interoperability testing and achieved interoperability, according to host railroads' Quarterly PTC Progress Reports for Quarter 3 of 2019 (Form FRA F 6180.165, OMB Control No. 2130–0553).

To help ensure railroads are conducting robust interoperability testing, FRA provided technical assistance to railroads about the statutory and regulatory interoperability requirements and best practices for interoperability testing, during FRA's June and July 2018 PTC symposia. Also, in July 2018, FRA issued a revised and simplified guidance document that addresses, in relevant part, interoperability testing and the responsibilities of a host railroad and its tenant railroads with respect to a host railroad's PTCS and FRA's certification of PTC systems.2

FRA's PTC specialists continue to monitor various phases of railroads' PTC system testing, including field testing, RSD, and interoperability testing, across the country; provide on-site support during PTC system testing; and offer technical assistance on an ongoing basis, as necessary, to help railroads address and resolve any critical, remaining issues.

Question 2. FRA has been conducting public collaboration sessions—can you provide an update of any new issues you've learned about from these sessions regarding PTC implementation?

Answer. During FRA's three PTC collaboration sessions during 2019, FRA provided technical assistance during the general sessions and hosted break-out sessions for each major type of PTC system, enabling railroads with similar PTC systems to share lessons learned and best practices. For example, the break-out sessions offered railroads utilizing ACSES II to collaborate about various methods to comply with the communications security requirements under FRA's PTC regulations. FRA learned that these railroads have identified two vendors they can work with to implement 49 CFR §236.1033-compliant security measures, including cryptographic message integrity and authentication. Also, during the break-out sessions for I–ETMS and Enhanced Automatic Train Control (E–ATC), FRA learned more about each host railroad's approach to developing its PTCS, including a general interest among the railroads in using a consistent approach or methodology, when possible, and baselined supplier documentation.

Question 3. You indicated to Senator Blumenthal during the hearing that you would keep him updated on PTC's progress in the Northeast Corridor. Will you please share these updates with my office as well?

Answer. Yes, FRA Government Affairs staff will reach out to schedule a briefing to update you on the Northeast Corridor's PTC implementation progress.

Question 4. Given the ongoing challenges identified with achieving PTC interoperability, do you anticipate financing to be a challenge for short line railroads?

Answer. FRA would defer to the rail industry on the financing issues that they will face. FRA's discussion with industry has focused on the timeline for implementing PTC, not funding challenges.

Question 5. A number of my colleagues here on the Committee would like to see updated schedules for on-time performance as soon as possible—as this is a major hindrance to Amtrak and passenger rail service. FRA has indicated some larger efficiencies can be gained with PTC implementation—particularly with the technologies that can be utilized along with PTC technology. Is PTC implementation going to affect your getting schedules out as soon as possible? Has the timeline you identified earlier this year for FRA to complete its work changed or are you still anticipating completion by the second quarter of next year?

Answer. The timeline identified earlier this year for releasing a proposed rule on the Metrics and Minimum Standards for Intercity Passenger Rail remains the same.

2Federal Railroad Administration, Revised PTC Guidance Regarding Interoperability Testing, Operations and Maintenance Manuals, and Certification Responsibilities (July 24, 2018), available at https://www.fra.dot.gov/eLib/details/L19583#p1_z5_gD_lPO.
FRA and Amtrak are jointly developing the Metrics and Minimum Standards. FRA anticipates publishing a notice of proposed rulemaking in the 2nd quarter of 2020.

Question 6. FRA recently issued a Request for Information (RFI) regarding automation in the railroad sector. Are there initial findings from this RFI that you can share?

Answer. In March 2018, FRA published an RFI on the future of automation in the railroad industry. FRA received over 3,000 separate comments in response to the RFI from a wide variety of stakeholders, including members of the public, railroads, railroad industry suppliers and equipment manufacturers, individual railroad employees, labor organizations, and state and emergency response organizations. The vast majority of public commenters equated automation in the railroad industry with full automation (i.e., fully autonomous rail operations and the elimination of operating crews). Railroads and industry suppliers, on the other hand, acknowledged that automation is an incremental process already underway and noted that existing automation technologies (e.g., PTC technology, automated track inspections) are already resulting in increased efficiencies and safety benefits in the railroad industry by reducing the potential for human error, the primary cause of railroad accidents. These commenters asserted that to take full advantage of the benefits automation may offer, a flexible regulatory approach is necessary. At the same time, other commenters, including rail labor organizations, urged caution noting infrastructure concerns, the unique operating environment in which U.S. railroads operate, and the importance of maintaining skilled railroad personnel.

The comments received in response to the RFI reinforce FRA's longstanding belief that a balanced approach to technology implementation and automation is required. FRA currently has several regulatory initiatives in process designed to encourage the use of advanced technologies involving various levels of automation (e.g., continuous rail testing, certain revisions to FRA's air brake standards). FRA is also working with railroads to develop and implement test programs designed to evaluate both existing automated track inspection technologies and technologies still under development. Coupled with FRA's Risk Reduction and System Safety programs, these efforts are designed to encourage technological developments while ensuring the safety of railroad operations.

Question 7. With respect to FRA's withdrawal of its Notice of Propose Rulemaking regarding crew-size, The National Transportation Safety Board (NTSB) submitted comments on the NPRM and recommended that the FRA capture data on crew member size to evaluate the adequacy of crew-size regulations. FRA has indicated it does not have conclusive data. Have you begun gathering this data? Is FRA taking into account in its gathering of data the changes in train length (longer and longer trains) and precision train scheduling (faster movement of trains generally)—both of which are rapidly evolving in the industry?

Answer. Although FRA continues to monitor any potential safety impact of train crew staffing, as noted in its May 29, 2019 withdrawal of its 2016 Notice of Proposed Rulemaking (NPRM) pertaining to train crew staffing, FRA has found no direct safety connection between train crew staffing and railroad accidents that have occurred. See 84 FR 24735. However, at FRA's request, and consistent with NTSB's comments to the 2016 NPRM, the Railroad Safety Advisory Committee (RSAC) has formed a working group to meet and discuss possible changes and updates to FRA's data collection requirements. That RSAC task will include consideration of NTSB's recommendations.

With regard to train length and "precision train scheduling," FRA enforces a comprehensive set of railroad safety regulations and laws designed to ensure the safety of railroad operations, but the agency does not directly regulate either train length or what is referred to as "precision train scheduling." Accordingly, FRA is not gathering specific data on train length or "precision train scheduling." Specific to train length, however, FRA, through its Office of Railroad, Research, Development and Technology, is currently studying issues related to train makeup and handling, including the braking performance of longer trains. Moreover, through FRA's comprehensive safety program, the agency continually assesses railroad safety performance through data analysis, inspections, audits, and accident investigations. Accordingly, any train, regardless of length and all railroad operations, regardless of scheduling factors, must meet all applicable Federal safety standards.

Question 8. Approximately 90 percent of fatal train accidents are due to trespassing or collisions at highway-rail grade crossings—the inspector general is apparently auditing FRA's use of data in this area. Is there anything you can tell us about how you're using data to better address railroad related fatalities? How, if it all, do you expect PTC to affect fatalities with regard to collisions and trespassing?
Answer. The Department of Transportation Office of Inspector General (OIG) completed its audit of FRA's use of grade crossing data in September 2019. FRA's safety program has historically been and continues to be data-driven. Highway-rail grade crossing safety and trespassing prevention are no exceptions. Both issues, however, are highly dependent not only on FRA data and actions, but on the involvement of stakeholders outside of FRA as well (e.g., railroads, state transportation departments, local governments and communities). Accordingly, FRA has amplified its efforts to improve the quality of its data and to ensure data related to grade crossing safety and trespassing incidents is available and accessible to all stakeholders. Key strategies the agency uses to address both issues are included in its Highway-Rail Grade Crossing Safety Business Plan and National Strategy to Prevent Trespassing on Railroad Property. As described in each of these documents, FRA has created and maintains numerous data visualization tools (e.g., dashboards, maps) which enable the agency and our stakeholders to better monitor and analyze key safety metrics over time, and FRA is using analytical tools, such as GradeDec and Web Accident Prediction System, to gain insight into grade crossing safety from multiple angles (e.g., from system-level overviews to localized detail). FRA is also seeking new and unconventional data sources and voluntary methods of sharing data among stakeholders to identify leading indicators of both grade crossing and trespassing risk factors.

Although PTC technology is intended to reduce the risk of certain human-error caused accidents, by law, PTC systems are not required to be designed to prevent grade crossing collisions or accidents or incidents involving trespassers. FRA recognizes, however, that PTC technology will likely serve as a basis for further development of fully integrated technological systems designed to ensure railroad safety and gain efficiencies in railroad operations. Consistent with the mandate of Section 11404 of the FAST Act, FRA will conduct a study of the possible effectiveness of PTC and related technologies on reducing collisions at highway-rail grade crossings and will report the results of that study to Congress when completed.

Question 9. About 18 months ago, we had a train block a crossing around Detroit—in the Plymouth area—for nine hours. In the township of Huron and in Romulus Michigan, I've heard of emergency vehicles that could not get passed train tracks. I understand the IG is looking at FRA's use of grade crossing data—but we definitely see incidents where cars/trucks try to beat trains because they know they're going to experience long wait times—and sometimes this leads to tragedies. Do you have data on this phenomenon and are you using the data to help address blocked crossings?

Answer. As noted in response to question 8, the OIG completed its audit of FRA's use of grade crossing data in September 2019. Idling trains blocking highway-rail grade crossings are not a new concern, so for years the Federal government, including FRA, has provided technical expertise, data, education, and outreach to assist all stakeholders in resolving issues related to blocked crossings. Specific to the Plymouth, Michigan area, over the last several years, FRA's Region 4 office has been actively engaged in assisting stakeholders to address concerns with blocked crossings.

As railroad operations have changed in recent years, generally, FRA has received an increasing number of blocked crossing complaints, and is working towards innovative solutions to address the issue. Historically, FRA has been notified of blocked crossings via e-mail through information contained in formal complaints and correspondence, and a generic “Contact Us” website used by the public to submit any type of comment/question to FRA's Office of Railroad Safety, not just reports of blocked crossings. Accordingly, the information submitted via e-mail is varied and often does not identify the key facts (e.g., location, time, duration, impact) of the incident being reported. However, FRA is currently using GIS mapping to track reports of blocked crossings from these formal and informal sources, as well as reports of blocked crossings that several States are voluntarily submitting to FRA. In addition, on December 20, 2019, FRA launched a new online portal through the FRA website to collect additional data from the general public and public safety officials on blocked crossings. When submitting a report, information will be specifically requested on the location of the blocked crossing, the time, duration, and impacts of the blocked crossing, which will provide the agency with more standardized data on instances of blocked crossings throughout the United States. Recognizing that even with this additional information, FRA will not have complete data on blocked cross-

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4 Federal Railroad Administration, Blocked Crossing webpage available at: https://www.fra.dot.gov/blackedcrossings/
ings, we anticipate the additional data will tell FRA where, when, for how long, and what impacts resulted from blocked crossing incidents reported by the public. FRA intends to maintain, analyze, and share that data with all affected stakeholders to help inform the development of local solutions to reduce and prevent incidents of trains blocking crossings.

Earlier this year I wrote to the CEOs and senior leadership of the railroad companies regarding the impacts to quality of life and public safety associated with blocked crossings. My request was that the railroads determine appropriate actions to minimize blocked crossings and to redouble their efforts in working with states and local communities to advance the safety and efficiency of both railroad and highway operations. FRA will also continue to help facilitate meetings between stakeholders and share expertise on potential solutions to the issues, as it has historically done and as we have done most recently through an ongoing series of technical symposiums and listening sessions on grade crossing and trespassing issues. However, because the factors leading to blocked crossings are necessarily location and railroad specific, the Federal government cannot dictate solutions.

**Question 10.** Can you provide an update on FRA’s smart phone app—with respect to citizen engagement and the ability to provide more data on blocked crossings?

**Answer.** As noted in response to question 9 above, on December 20, 2019, FRA launched a new online portal to collect additional information on incidents of blocked crossings. The portal will provide a way for the public and other stakeholders to report blocked crossing incidents to FRA. FRA will then make the submitted data available online and will engage with all stakeholders to encourage the development and implementation of local solutions to blocked crossings.

**RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JACKY ROSEN TO HON. RONALD L. BATORY**

**NUCLEAR WASTE AND POSITIVE TRAIN CONTROL.** Although we require railroads that carry passengers or have high-volume freight traffic with hazardous materials to implement Positive Train Control systems, from my reading of the current regulations, this rule does not apply to transporting nuclear waste when it is not part of high-volume freight traffic. This presents a major concern for a state like Nevada, which for decades has been fighting back Federal efforts to make our state a nuclear dumping ground. While the railroad industry has done much to reduce the rate of accidents, rail incidents are unfortunately not unheard of in our state. Just last month, a train carrying bombs, ammonium, and grenades derailed outside the City of Elko. Thankfully, the 22 cars that derailed were located on the opposite end of the train, separate from the cars filled with military munitions. But this serves as an example of why it would be so dangerous to transport nuclear waste into an area where thousands live and work . . . and without positive train control, no less.

This Administration has tried to restart the licensing process for Yucca Mountain, which the majority of Nevadans strongly oppose, in part because it would require shipping radioactive waste through nearly every state in the country and through numerous major cities before getting to Nevada, and the vast majority of those shipments would be by rail, possibly with no positive train control.

**Question.** Will your agency commit to requiring PTC technologies to transport nuclear waste in all instances? If *not*, why not?

**Answer.** The statutory mandate requiring certain railroads to implement PTC systems does not necessarily extend to a main line carrying nuclear waste, unless the main line also transports the types of traffic identified below. Under the statutory mandate, each Class I railroad and each entity providing regularly scheduled intercity or commuter rail passenger transportation must implement a PTC system on:

1. its main line over which poison-or toxic-by-inhalation (PIH or TIH) hazardous materials and five million or more gross tons of traffic are transported per year;
2. its main line over which intercity or commuter rail passenger transportation is regularly provided; and
3. any other tracks the Secretary of Transportation prescribes by regulation or order.

The statutory mandate specifically defines PIH or TIH hazardous materials as those classified as such under 49 CFR §171.8, 173.115, and 173.132, which does not include nuclear waste. Class I railroads are generally implementing PTC systems on main lines that transport those types of hazardous materials (PIH or TIH).
and main lines where intercity or commuter rail passenger transportation is regularly provided, at a minimum. Several railroads have indicated they are also voluntarily implementing PTC systems on main lines that are not required to be governed by a PTC system by law.

Over the last dozen years, the FRA has overseen the railroad industry’s efforts to implement PTC within this statutory framework established in the Rail Safety Improvement Act of 2008, and further endorsed in the Surface Transportation Extension Act of 2015.

Under this mandate, 41 railroads have made tremendous progress in implementing PTC systems on nearly 58,000 route miles in anticipation of the December 31, 2020 statutory deadline established by Congress. That said, FRA is willing to offer technical assistance if Congress is considering mandating PTC system implementation on additional main lines, including those that transport other types of hazardous materials that are not classified as PIH or TIH, through an act of legislation.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. GARY PETERS TO SUSAN FLEMING

Question. Your testimonies touched on a wide range of challenges with PTC interoperability: given the myriad challenges, do you feel confident with the current testing protocol to ensure full PTC interoperability?

Answer. More than half of the railroads implementing PTC reported to us that achieving interoperability was a major or moderate challenge because of issues such as software bugs and coordination between railroads—issues that often arise during the testing phase. We did not evaluate the effectiveness of railroads’ testing protocols or the Federal Railroad Administration’s (FRA’s) oversight of this testing, but several railroads told us that interoperability testing can be a time and resource intensive process. Railroads generally must go through all steps of testing with each host or tenant railroad they interoperate with individually, including testing each point at which the systems interact (boundaries), which can number in the hundreds between just one host and tenant. The amount of time it takes two railroads to achieve interoperability varies and is case by case, according to one industry association, as the testing is used to prove that the PTC systems interoperate to function correctly. Representatives for one railroad also explained that the level of testing between railroads using one particular type of PTC system—the Advanced Civil Speed Enforcement System II (ACSES)—is much greater because their systems are customized and they use different vendors. While testing PTC systems—including their ability to interoperate with other railroads’ systems—can be challenging, it is critical for ensuring the effective and safe operation of PTC.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. GARY PETERS TO CHRIS MATTHEWS

Question. Mr. Matthews, given the ongoing challenges identified with achieving PTC interoperability, do you anticipate financing to be a challenge for short line railroads?

Answer. BNSF is currently working with 18 different short line railroads on PTC implementation, having so far achieved interoperability with five of them including Montana Rail Link; the Otter Tail Valley Railroad; Louisiana & Delta Railroad; Dakota, Missouri Valley and Western Railroad; and the Portland and Western Railroad. As I stated in my written testimony, we have worked closely with these short lines to enable their PTC-equipped locomotives to function with BNSF’s PTC back office while operating on our track. While I do not have clear visibility into the condition of the various short line railroads’ finances, to date funding has not appeared to be a significant challenge and we are aware of at least one shortline applying for Federal grant money to support implementation.
Federal Funding for PTC. Commuter railroads are public agencies that face funding challenges for installing and maintaining positive train control (PTC) systems. Last year, Congress appropriated approximately $250 million in CRISI grants specifically for PTC implementation and other Federal programs can also support PTC projects.

Question 1. After Metra’s PTC system is fully operational, what do you estimate will be the cost per year to maintain and update your agency’s PTC system? Is it important that Congress continue to help support commuter railroads maintain and upgrade PTC systems following the 2020 implementation deadline?

Answer. Our PTC system is expected to cost us more than $400 million, equal to the amount of Federal formula funding Metra receives every 2 1⁄2 years. Further, based on our own estimates and discussions with our freight railroad partners, PTC operation and maintenance costs are expected to be between 5–10 percent of the total installation cost per year, or $15–$20 million.

We strongly believe Congress should continue to support publicly-funded commuter rail agencies as they work to maintain and upgrade their PTC systems in the years to come.

PTC Training. According to FRA’s PTC implementation progress dashboard, nearly 90 percent of Metra’s employees have completed training required by PTC regulations as of June 30, 2019.

Question 2. Do employees continue to receive training as Metra adopts new technologies, including updates to the PTC system? Will employees continue to receive training beyond the 2020 deadline as the PTC system is maintained and updated? What if any feedback have you received from Metra employees regarding the training that has been given to date, and do you plan to incorporate that feedback into future training?

Answer. PTC will be part of recertification process as well as being part of the annual rules exams. New employees will receive the full training program that will be adjusted as the PTC system matures. Current employees will receive these adjustments through safety contacts. If system adjustments are determined to be to such an extent that they cannot be given through safety contacts, we will provide addition classroom training. We have not received any negative feedback. Attendees have said that the practical exercises on the actual equipment are more beneficial than use of the simulator.