STATEMENT OF

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BEFORE THE
SENATE COMMITTEE ON
COMMERCE, SCIENCE, AND TRANSPORTATION

HEARING ON
NEXT STEPS FOR POSITIVE TRAIN CONTROL IMPLEMENTATION

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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 manufacturing 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

FIGURE 1

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:
  - o Increasing track file size. Wabtec's recent software update enables more than 50 percent additional flexibility for larger subdivisions and total file storage.
  - o 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.

- <u>Deliver for the passenger railroads where Wabtec is the PTC system integrator or provides significant system integration services</u>
  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:
    - o Progress customer initiatives to complete PTC Revenue Service Demonstrations;
    - o Achieve FRA approval of PTC Safety Plans; and
    - o 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

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.

FIGURE 2: Train Management Computer (TMC)

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)

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