

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

SIEMENS INDUSTRY, INC.,)	
)	
Plaintiff,)	
)	
v.)	C.A. No. _____
)	
WESTINGHOUSE AIR BRAKE)	JURY TRIAL DEMANDED
TECHNOLOGIES CORPORATION)	
(d/b/a WABTEC CORPORATION) and)	
WABTEC RAILWAY ELECTRONICS, INC.,)	
)	
Defendants.)	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Siemens Industry, Inc. files this complaint for patent infringement against Defendants Westinghouse Air Brake Technologies Corporation and Wabtec Railway Electronics, Inc., and in support thereof alleges and avers as follows:

NATURE OF THE ACTION

1. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, specifically including 35 U.S.C. § 271.

THE PARTIES

2. Siemens Industry, Inc. (“Siemens”) is a corporation organized under the laws of the State of Delaware, with a principal place of business at 3333 Old Milton Parkway in Alpharetta, Georgia.

3. Westinghouse Air Brake Technologies Corporation (“Wabtec”) is a corporation organized under the laws of the State of Delaware, with a principal place of business at 1001 Air Brake Avenue in Wilmerding, Pennsylvania. Wabtec does business under the name “Wabtec Corporation.”

4. Wabtec Railway Electronics, Inc. (“WRE”) is a corporation organized under the laws of the State of Delaware, with a principal place of business at 21200 Dorsey Mill Road in Germantown, Maryland.

JURISDICTION AND VENUE

5. This Court has subject matter jurisdiction over this patent infringement action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

6. Defendants are each deemed to reside in this judicial district by virtue of being incorporated in the State of Delaware. In addition, on information and belief, Defendants regularly transact business in Delaware, including but not necessarily limited to offering to sell and/or selling products that infringe one or more of Siemens’ asserted patents to customers located in Delaware and/or for use in Delaware. Accordingly, this Court may properly exercise personal jurisdiction over Defendants.

7. Venue may lie in this judicial district pursuant to 28 U.S.C. §§ 1391(b), 1391(c) and/or 1400(b) at least because Defendants are each deemed to reside in this judicial district by virtue of being incorporated in the State of Delaware. In addition, on information and belief, Defendants have committed acts of infringement in the State of Delaware, including but not necessarily limited to offering to sell and/or selling products that infringe one or more of Siemens’ asserted patents to customers located in Delaware and/or for use in Delaware.

8. Joinder of Siemens’ claims against Wabtec and WRE is permissible under 35 U.S.C. § 299 because (a) Siemens is seeking to hold Defendants jointly and severally liable for infringement of the asserted patents, and the claims against each Defendant arise out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, importing, offering for sale, or selling of the same accused products, and (b) questions of fact

common to both Defendants will arise in this action. More particularly, on information and belief, WRE manufactures and Wabtec sells the products accused of infringing Siemens' patents.

THE PATENTS-IN-SUIT

9. U.S. Patent No. 6,996,461 ("the '461 Patent"), titled "Method and System for Ensuring that a Train Does Not Pass an Improperly Configured Device," was issued by the United States Patent and Trademark Office ("USPTO") on February 7, 2006. Siemens is the owner by assignment of the entire right, title and interest in and to the '461 Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '461 Patent is attached hereto as Exhibit A.

10. U.S. Patent No. 7,092,801 ("the '801 Patent"), titled "Train Control System and Method of Controlling a Train or Trains," was issued by the USPTO on August 15, 2006. Siemens is the owner by assignment of the entire right, title and interest in and to the '801 Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '801 Patent is attached hereto as Exhibit B.

11. U.S. Patent No. 7,236,860 ("the '860 Patent"), titled "Method and System for Ensuring that a Train Does Not Pass an Improperly Configured Device," was issued by the USPTO on June 26, 2007. Siemens is the owner by assignment of the entire right, title and interest in and to the '860 Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '860 Patent is attached hereto as Exhibit C.

12. U.S. Patent No. 7,467,032 ("the '032 Patent"), titled "Method and System for Automatically Locating End of Train Devices," was issued by the USPTO on December 16, 2008. Siemens is the owner by assignment of the entire right, title and interest in and to the '032

Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '032 Patent is attached hereto as Exhibit D.

13. U.S. Patent No. 7,742,850 ("the '850 Patent"), titled "Method and System for Automatically Locating End of Train Devices," was issued by the USPTO on June 22, 2010. Siemens is the owner by assignment of the entire right, title and interest in and to the '850 Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '850 Patent is attached hereto as Exhibit E.

14. U.S. Patent No. 8,714,494 ("the '494 Patent"), titled "Railway Train Critical Systems Having Control System Redundancy and Asymmetric Communications Capability," was issued by the USPTO on May 6, 2014. Siemens is the owner by assignment of the entire right, title and interest in and to the '494 Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '494 Patent is attached hereto as Exhibit F.

15. U.S. Patent No. 9,233,698 ("the '698 Patent"), titled "Railway Safety Critical Systems with Task Redundancy and Asymmetric Communications Capability," was issued by the USPTO on January 2, 2016. Siemens is the owner by assignment of the entire right, title and interest in and to the '698 Patent, including the sole and undivided right to sue for infringement. A true and correct copy of the '698 Patent is attached hereto as Exhibit G.

BACKGROUND OF THE DISPUTE

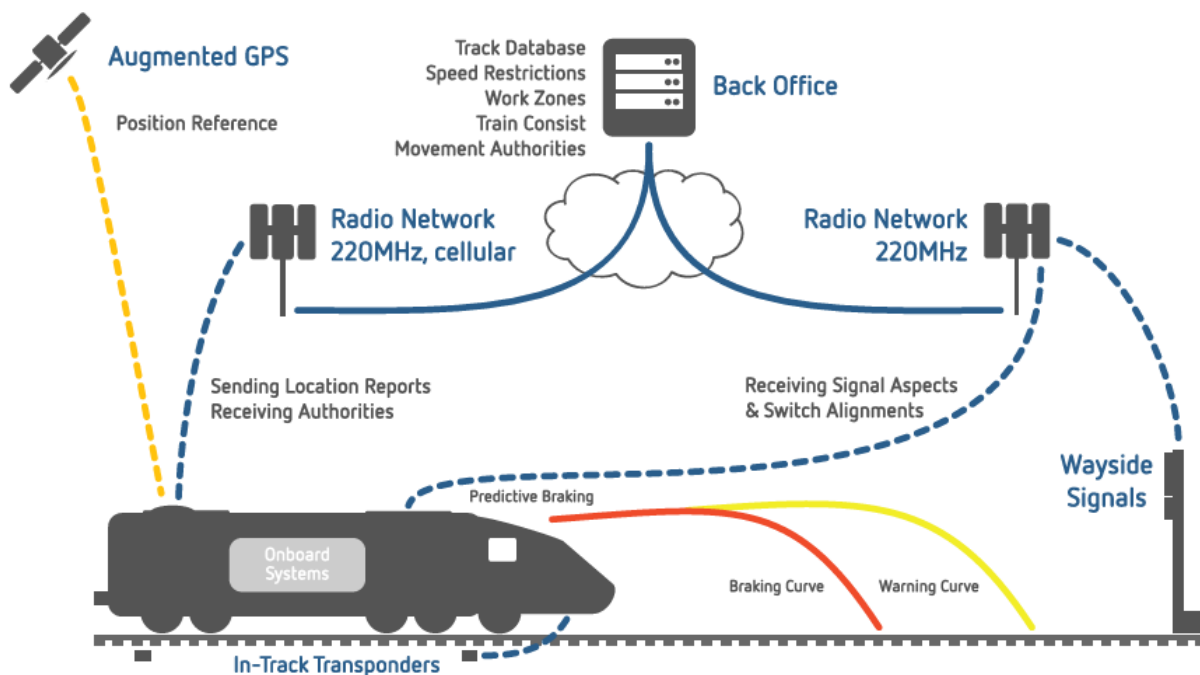
The Federal Mandate for Implementation of Positive Train Control

16. Positive Train Control, or "PTC," is a set of advanced technologies designed to make freight and passenger rail transportation safer by automatically stopping a train before certain types of accidents occur. In contrast to previously existing "reactive" train control

systems, PTC is a predictive technology that detects upcoming conditions and takes control of the train when needed.

17. The PTC technical architecture comprises four core segments—Back Office, Locomotive, Wayside, and Maintenance of Way (MOW)—with a combination of wireless and wired communications linking components in the different core segments. The Back Office segment in a typical PTC implementation comprises a computer-aided dispatch system, a back office server, and a database storing information about tracks, train consists (*i.e.*, the locomotives and cars that make up a train), work zones, and speed restrictions. The Back Office issues “movement authorities” to Locomotives based on aspect information received from PTC-enabled Wayside signals and switches, location information received from trains, and work status from Maintenance of Way vehicles and personnel. PTC improves upon existing in-track transponder-based train positioning systems through the use of augmented GPS data, which provides more accurate location information.

18. The diagram below provides a general overview of PTC operation:



Positive Train Control White Paper, 8 (Joint Council on Transit Wireless Communications May 2012) (Ex. H).

19. The Rail Safety Improvement Act of 2008 (“RSIA”), signed into law on October 16, 2008, required all Class I freight railroads (*i.e.*, BNSF, Canadian National, Canadian Pacific, CSX Transportation, Kansas City Southern, Norfolk Southern, and Union Pacific) and all passenger rail operators in the United States to implement PTC-based collision avoidance systems by December 31, 2015 (recently extended to December 31, 2018). Under the law, the PTC technology must be installed on all main-line tracks where intercity passenger trains and commuter trains operate, as well as on all rail lines carrying toxic-by-inhalation hazardous materials.

20. Passage of the RSIA was prompted by a major train accident in Chatsworth, California in September of 2008 involving a head-on collision between a freight train and a commuter train that left 25 people dead and more than 130 people injured. The cause of the accident was determined to be human error. Regulatory bodies such as the Federal Railroad Administration (“FRA”) and the National Transportation Safety Board generally acknowledged that a PTC-type system would have prevented the collision, as it would have automatically stopped the trains rather than relying on an engineer to physically respond to a stop signal.

21. According to the Association of American Railroads (“AAR”), a trade association representing primarily the Class I railroads operating in North America, the federal PTC mandate is the single-largest regulatory cost ever imposed on the rail industry by the FRA. An April 2010 report commissioned by the AAR estimated that installing and maintaining PTC systems would cost Class I railroads up to \$13 billion over the next 20 years. Those costs include equipping 71% of the Class I locomotive fleet (approximately 20,000 locomotives) with PTC devices,

installing PTC on 78% of the Class I mainline rail network (an estimated 73,467 route-miles), and installing 125,000 wayside units. Additionally, the total cost of PTC for passenger rail operators was estimated to exceed \$2 billion.

22. In 2008, in response to the RSIA, a subset of the Class I railroads formed the Interoperable Train Control Committee (“ITC”) to develop interoperability standards for various aspects of PTC systems, including messaging format, braking algorithms, hardware platforms, and wireless communications. After considering existing automatic train control technologies, the ITC eventually adopted Wabtec’s “ETMS” (Electronic Train Management System) platform, as it met the requirements of the RSIA and was already being tested by some of the Class I railroads and other rail operators. Accordingly, the PTC standards ultimately promulgated by the AAR are generally descriptive of the structure and function of Defendants’ PTC products.

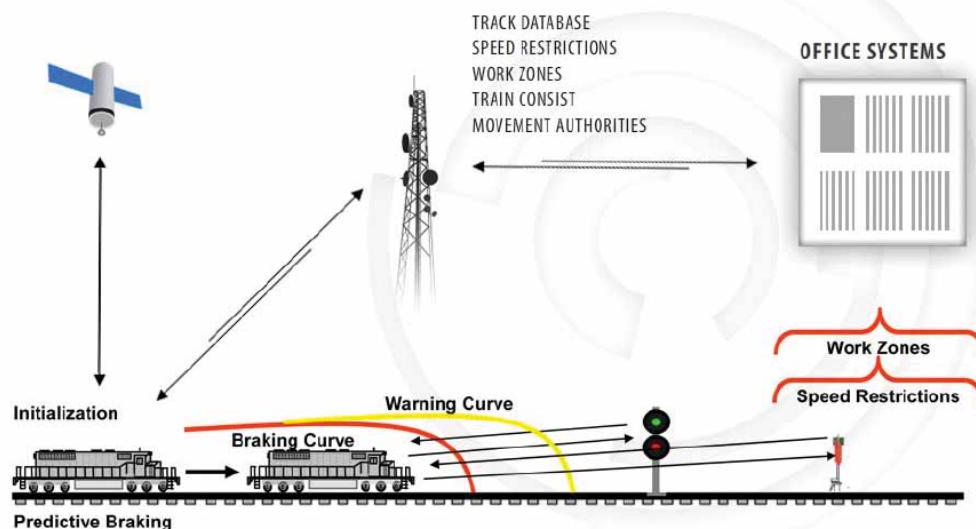
Defendants’ Infringing Products

23. On information and belief, Defendants have been selling PTC products to customers in the United States since at least March of 2011. Generally designated “I-ETMS,” for “Interoperable Electronic Train Management System,” Defendants’ PTC products are grouped into four segments that generally correspond to core segments of the PTC architecture: Office (Train Data, Authorities, Restrictions); Wayside (Signal Status, Switch Status, Radio Frequency Communication); Communications (RF Base Stations, 802.11, Cellular); and Locomotive (Onboard Computer & Display, GPS, RF Communication). The diagram below, taken from a Wabtec product catalog, illustrates the general architecture of the I-ETMS System:

Positive Train Control

Interoperable Electronic Train Management System – I-ETMS®

I-ETMS® System Architecture



Wabtec Locomotive Catalog Excerpt, 35 (downloaded from www.wabtec.com on February 2, 2016) (Ex. I) (hereinafter, “Wabtec Catalog”).

24. Defendants’ I-ETMS System is designed to “[p]revent[] track authority violations, speed limit violations, unauthorized entry into work zones, and train movement through a switch left in the wrong position, all of which reduce the potential for train accidents.” Wabtec Product Finder, 3 (downloaded from www.wabtec.com on November 5, 2015) (Ex. J). “As the train moves down the track, the I-ETMS® on-board computer, with the aid of an on-board geographic database and global positioning system, continuously calculates warning and braking curves based on all relevant train and track information, including speed, location, movement authority, speed restrictions, work zones, and consist restrictions.” *Id.* The system also “communicates with wayside devices checking for broken rails, proper switch alignment and signal aspects.” *Id.* “All information is combined and analyzed in real time to provide a ‘safety net’ for improved train operation.” *Id.*

25. The I-ETMS System comprises a variety of different components. For the Locomotive segment, Defendants' PTC product offering includes a Train Management Computer ("TMC"), an I-ETMS Display, a CommLink II Communications Manager, an Asy Cut-Out Switch, and a Navigation Sensor Module. Wabtec Catalog at 36-37. The TMC is the "brain" of the I-ETMS System on any given locomotive, incorporating multiple controllers (*e.g.*, CPUs) to implement the functionality required to comply with governmental regulations for PTC systems. *Id.* at 36. For instance, the TMC is responsible for enforcing movement authorities, speed limits, and hand throw switch alignment, meaning the system will cause a visual and/or audio warning to be given to the train operator if a potentially dangerous situation is encountered, and then will take control of the train, causing the brakes to be applied as appropriate, in the event the operator does not rectify the situation. *See id.*

26. For the Office segment of the I-ETMS System, Defendants offer a Train Management Dispatch System ("TMDS") and a Back Office Server ("BOS"). *Id.* at 38. The BOS is the storehouse for databases containing speed restriction, track geometry and wayside signaling configuration data that is communicated to the TMC for use in, for example, calculating safe braking distances. *See id.*

27. On information and belief, the various components of the I-ETMS System, specifically including the TMC and BOS, are manufactured in the United States by WRE and sold in the United States by Wabtec.

28. On information and belief, Wabtec has sold I-ETMS Systems to at least the following customers in the United States since 2011: Alaska Railroad Corporation, Denver Transit Partners, Herzog Technologies (for North County Transit District in Oceanside, California), Northeast Illinois Regional Commuter Railroad, Parsons (for MetroLink in Southern

California), Regional Rail Partners, San Diego Rail Line, and Sound Transit (in Seattle, Washington).

29. In addition to the I-ETMS System, Defendants manufacture and sell telemetry systems, including but not necessarily limited to TrainLink ATX and TrainLink II 4G-ATX, that monitor essential “last car” conditions, provide rear-of-train emergency braking capability, and provide a high-visibility marker for nighttime use. *See* Wabtec Catalog at 6; TrainLink ATX Brochure (Ex. K). On information and belief, the TMC of the I-ETMS System interfaces with these telemetry systems for enforcement of emergency braking. *See* Wabtec Catalog at 37 (describing Asy Cut-Out Switch). These telemetry systems are comprised of a Head of Train unit (“HOT”) located in the locomotive, and an End of Train unit (“EOT”) located on the last car. On information and belief, the EOT automatically transmits last car data to the HOT on a periodic basis, including last car brake pipe pressure, motion status, marker light status, and emergency valve status. *Id.* at 6.

30. Defendants’ TrainLink ATX and TrainLink II 4G-ATX telemetry systems also include a GPS positioning system and a cellular modem to enable cellular tracking of EOTs. TrainLink ATX Brochure at 2. On information and belief, Defendants maintain an access-controlled website through which customers are able to track the location of their GPS-equipped EOTs. *See* Asset Management Website Users Guide (Ex. L).

Defendants’ Knowledge of Siemens’ PTC-Related Patent Portfolio

31. On information and belief, Wabtec and WRE have been aware of Siemens’ PTC-related patent portfolio since at least November 20, 2014, when Siemens provided Wabtec with express written notice of the ‘461 and ‘860 Patents. That same notice also identified U.S. Patent No. 7,096,096, which is the parent of the ‘032 Patent and grandparent of the ‘850 Patent.

Siemens described the patents as being relevant to Wabtec's business in the areas of positive train control and end of train detection, following up on an earlier discussion in which Siemens indicated that it would be willing to discuss licensing its PTC patents to Wabtec. Wabtec never agreed to take a license to Siemens' patents.

32. On information and belief, WRE and Wabtec were aware of several of the Patents-in-Suit and/or patents related thereto for almost ten years prior to the filing of this complaint. For instance, on July 28, 2006, Siemens' predecessor-in-interest with respect to certain of the Patents-in-Suit, Quantum Engineering, Inc. ("Quantum") provided WRE with express written notice of the '461 Patent, as well as notice of the parent, grandparent, and great-grandparent of the '801 Patent and the parent of the '860 Patent. Later, on March 9, 2007, Quantum provided WRE with notice of the parent of the '032 Patent and the grandparent of the '850 Patent. Quantum described the patents as being relevant to train control systems such as the ETMS system that WRE was reportedly testing at the time, and further indicated that the patents identified in its notices were part of a substantial portfolio of train control patents.

INFRINGEMENT CLAIMS

Count I – Infringement of U.S. Patent No. 6,996,461

33. Siemens incorporates by reference the allegations in Paragraphs 1 through 32 above.

34. The '461 Patent is generally directed to a train control system that, in accordance with particular embodiments, includes a positioning system and consults a database to determine when the train is approaching a configurable device such as a switch or grade crossing. The system may interrogate the device to determine its status as the train approaches the device, and may force an engineer to acknowledge any detected malfunction. The train may be forced to

come to a complete stop before proceeding past the device or may be slowed down to a speed that will allow the engineer to visually determine whether it is safe to proceed past the device. See '461 Patent, Abstract.

35. On information and belief, Defendants directly infringe, induce others to infringe, and/or contributorily infringe one or more claims of the '461 Patent, either literally or under the doctrine of equivalents. Non-limiting examples of such infringement are provided below, based on the limited information currently available to Siemens.

36. Claim 1 of the '461 Patent recites as follows:

1. A system for controlling a train, the system comprising:

a control unit; and

a transceiver, the transceiver being located on the train and being in communication with the control unit;

wherein the control unit is configured to perform the steps of

transmitting an interrogation message to a configurable device near the train;

listening for a response from the configurable device, the response including a configuration of the configurable device and an identifier of the device;

allowing the train to continue if a response with a correct configuration is received within a period of time; and

stopping the train otherwise;

wherein the control unit is further configured to perform the step of confirming that the identifier received in the response corresponds to the device to which the interrogation message was directed.

37. On information and belief, the I-ETMS System manufactured and sold by Defendants satisfies each and every limitation of claim 1. The "control unit" limitation is satisfied by the TMC, which contains multiple CPUs and is configured to perform, or to control

the performance of, the various steps involved in communicating with a wayside device. In addition, the I-ETMS includes, or interfaces with, a “transceiver” for communicating with wayside devices, with such communications being controlled by the TMC in combination with the Commlink II. *See* Wabtec Catalog at 35-36; Wabtec Product Finder at 2-5.

38. In view of the foregoing, Defendants’ manufacture, sale, and offer to sell I-ETMS Systems directly infringes the ‘461 Patent in violation of 35 U.S.C. § 271(a).

39. Claim 14 of the ‘461 Patent recites as follows:

14. A method for controlling a train comprising the steps of:

transmitting an interrogation message from the train to a configurable device near the train;

listening for a response from the configurable device, the response including a configuration of the configurable device and an identifier of the configurable device;

confirming that the identifier received in the response corresponds to the configurable device to which the interrogation message was directed;

allowing the train to continue if a response with a correct configuration is received; and

stopping the train otherwise.

40. On information and belief, use of the I-ETMS System by Defendants’ customers satisfies each and every limitation of claim 14. As discussed with reference to claim 1 above, the I-ETMS System, under control of the TMC and using the Commlink II, interrogates a wayside device and takes appropriate enforcement actions depending upon the response received. *See* Wabtec Catalog at 35-36; Wabtec Product Finder at 2-5.

41. The I-ETMS System sold by Defendants constitutes a material part of the method recited in claim 14 of the ‘461 Patent, being programmed to cause each of the method steps to be performed, and it is not a staple article or commodity of commerce suitable for substantial

noninfringing use. Moreover, at least as a result of having been put on notice of the '461 Patent by Siemens and Quantum, Defendants know that the I-ETMS System is especially made or especially adapted for use in a manner that infringes the '461 Patent. Accordingly, Defendants' sale of I-ETMS Systems contributes to infringement of the '461 Patent by their customers in violation of 35 U.S.C. § 271(c).

42. On information and belief, both by configuring the I-ETMS System to operate in a manner that Defendants know infringes the '461 Patent and by encouraging customers to use the I-ETMS System in a manner that Defendants know infringes the '461 Patent, Defendants are inducing infringement of the '461 Patent by their customers in violation of 35 U.S.C. § 271(b). For example, Defendants' marketing literature touts functionality of the I-ETMS System that falls within the scope of the above-identified claims of the '461 Patent. *See* Wabtec Product Finder at 3; Wabtec Catalog at 36-37.

43. Defendants' infringement of the '461 Patent has caused Siemens to suffer substantial monetary harm, including lost profits and price erosion relating to Siemens' sale of competing PTC products.

44. On information and belief, Defendants' infringement of the '461 Patent has been willful, done deliberately and with full knowledge that the manufacture, sale, offer for sale, and use of I-ETMS Systems infringes the '461 Patent, justifying an increase in the damages to be awarded Siemens up to three times the amount found or assessed, in accordance with 35 U.S.C. § 284.

45. Defendants' willful infringement of the '461 Patent renders this an exceptional case, justifying an award to Siemens of its reasonable attorney fees in accordance with 35 U.S.C. § 285.

Count II – Infringement of U.S. Patent No. 7,092,801

46. Siemens incorporates by reference the allegations in Paragraphs 1 through 32 above.

47. The ‘801 Patent is generally directed to, in accordance with particular embodiments, a computerized train control system in which a dispatcher sends track warrants (*e.g.*, speed restrictions) directly to a locomotive cab. In one aspect, a control module may calculate required stopping distances based on factors such as the weight of the train and the grade of the track on which the train will be operating. In another aspect, braking “penalties” can be imposed when an engineer or conductor fails to apply the brakes in a manner sufficient to comply with speed restrictions. In yet another aspect, a positioning system may be used to provide train location information. *See* ‘801 Patent, Summary of the Invention.

48. On information and belief, Defendants directly infringe, induce others to infringe, and/or contributorily infringe one or more claims of the ‘801 Patent, either literally or under the doctrine of equivalents. Non-limiting examples of such infringement are provided below, based on the limited information currently available to Siemens.

49. Claim 10 of the ‘801 Patent recites as follows:

10. An apparatus for controlling a train comprising:

a positioning system;

a receiver for recovering a wireless transmission including a speed restriction, the speed restriction including a maximum allowable speed;

a brake interface configured to control a braking system on the train;

and a processor connected to the positioning system, the receiver and the brake interface, the processor being configured to perform the steps of:

receiving a speed restriction via the receiver;

determining a position of the train using information obtained from the positioning system;

determining when a train is in danger of violating the speed restriction based at least in part on a grade of a track on which the train is traveling and at least in part upon a weight of the train; and

controlling the braking system via the brake interface such that violation of the speed restriction is prevented.

50. On information and belief, the I-ETMS System manufactured and sold by Defendants satisfies each and every limitation of claim 10. The I-ETMS System, and particularly the TMC, includes an on-board geographic database and a GPS system to determine the location of the train, the GPS system being incorporated in the Navigation Sensor Module and/or the Commlink II. *See* Wabtec Catalog at 36-37. The Commlink II, which serves as the gateway for PTC-related communications, includes a receiver for recovering wireless transmissions including speed restrictions. *Id.* at 36. The TMC uses the location information and speed restriction information, along with track and train consist information, to determine whether the train is in danger of violating a speed restriction. If such danger exists, the TMC will enforce the speed restriction by causing the brakes to be applied as necessary if the operator does not take appropriate corrective action first. *See* Wabtec Catalog at 34-36.

51. In view of the foregoing, Defendants' manufacture, sale, and offer to sell I-ETMS Systems directly infringes the '801 Patent in violation of 35 U.S.C. § 271(a).

52. Claim 1 of the '801 Patent recites as follows:

1. A method for controlling a train comprising the steps of:

receiving a speed restriction at a train, the speed restriction including a maximum allowable speed;

determining a position of the train using a positioning system;

determining when a train is in danger of violating the speed restriction based at least in part on a grade of a track on which the train is traveling and at least in part upon a weight of the train; and

applying a train brake such that violation of the speed restriction is prevented.

53. On information and belief, use of the I-ETMS System by Defendants' customers satisfies each and every limitation of claim 1. As discussed with reference to claim 10 above, the TMC uses GPS location information and speed restriction information, along with track and train consist information, to determine whether the train is in danger of violating a speed restriction. If such danger exists, the TMC will enforce the speed restriction by causing the brakes to be applied as necessary if the operator does not take appropriate corrective action first. *See* Wabtec Catalog at 34-36.

54. The I-ETMS System sold by Defendants constitutes a material part of the method recited in claim 1 of the '801 Patent, being programmed to cause each of the method steps to be performed, and it is not a staple article or commodity of commerce suitable for substantial noninfringing use. Moreover, Defendants have known since at least the filing date of this complaint, if not sooner as a result of having been put on notice of the parent, grandparent and great-grandparent of the '801 Patent, that the I-ETMS System is especially made or especially adapted for use in a manner that infringes the '801 Patent. Accordingly, Defendants' sale of I-ETMS Systems contributes to infringement of the '801 Patent by their customers in violation of 35 U.S.C. § 271(c).

55. On information and belief, both by configuring the I-ETMS System to operate in a manner that Defendants know infringes the '801 Patent and by encouraging customers to use the I-ETMS System in a manner that Defendants know infringes the '801 Patent, Defendants have been inducing infringement of the '801 Patent by their customers in violation of 35 U.S.C.

§ 271(b) at least since the filing date of this complaint. For example, Defendants' marketing literature touts functionality of the I-ETMS System that falls within the scope of the above-identified claims of the '801 Patent. *See* Wabtec Product Finder at 3; Wabtec Catalog at 36-37.

56. Defendants' infringement of the '801 Patent has directly caused substantial monetary harm to Siemens, including lost profits and price erosion relating to Siemens' sale of competing PTC products.

Count III – Infringement of U.S. Patent No. 7,236,860

57. Siemens incorporates by reference the allegations in Paragraphs 1 through 32 above.

58. The '860 Patent is generally directed to, in accordance with particular embodiments, a train control system that may include a positioning system and may consult a database to determine when the train is approaching a configurable device such as a switch or grade crossing gate. The system may continuously interrogate the device to determine its status as the train approaches the device. The train may be forced to come to a complete stop before proceeding past the device or may be slowed down to a speed that will allow the engineer to visually determine whether it is safe to proceed past the device. *See* '860 Patent, Abstract.

59. On information and belief, Defendants directly infringe, induce others to infringe, and/or contributorily infringe one or more claims of the '860 Patent, either literally or under the doctrine of equivalents. Non-limiting examples of such infringement are provided below, based on the limited information currently available to Siemens.

60. Claim 1 of the '860 Patent recites as follows:

1. A system for controlling a train, the system comprising:
a control unit located on the train;

a database connected to the control unit, the database including position information for a plurality of configurable devices, the database further including an identifier for each of the configurable devices;

a positioning system connected to the control unit, the position system being operable to provide position information pertaining to the train to the control unit; and

a transceiver connected to the control unit;

wherein the control unit is configured to perform the steps of:

obtaining a position of the train from the positioning system;

identifying a configurable device in the database as a next configurable device the train will approach;

determining a proximity of the train to the next configurable device;

comparing the proximity to a threshold;

transmitting an interrogation message to the next configurable device when the proximity is below a threshold;

receiving a response to the interrogation message, the response including an identifier associated with a configurable device and a configuration of the configurable device;

allowing the train to pass the configurable device if the response is received within a first period of time, the identifier included in the response matches the identifier associated with the configurable device of interest, and the configuration included in the response is acceptable; and

taking corrective action otherwise.

61. On information and belief, the I-ETMS System manufactured and sold by Defendants satisfies each and every limitation of claim 1. The “control unit” limitation is satisfied by the TMC, which contains multiple CPUs and is configured to perform, or to control the performance of, the various steps involved in communicating with a PTC-enabled wayside device and taking enforcement actions in view of such communications. The TMC also includes,

or interfaces with, a track database that includes information concerning the wayside devices along the train's route, and it is connected to a GPS system incorporated in the Navigation Sensor Module and/or the Commlink II for determining the position of the train. *See* Wabtec Catalog at 36-37. In addition, the I-ETMS System includes, or interfaces with, a "transceiver" for communicating with wayside devices, with such communications being controlled by the TMC in combination with the Commlink II. *See* Wabtec Catalog at 34-36; Wabtec Product Finder at 2-5.

62. In view of the foregoing, Defendants' manufacture, sale, and offer to sell I-ETMS Systems directly infringes the '860 Patent in violation of 35 U.S.C. § 271(a).

63. Claim 15 of the '860 Patent recites as follows:

15. A method for controlling a train, the method comprising:

obtaining a position of the train from a positioning system located on the train;

identifying a configurable device in a database located on the train as a next configurable device the train will approach, the database including position information for a plurality of configurable devices, the database further including an identifier for each of the configurable devices;

determining a proximity of the train to the next configurable device;

comparing the proximity to a threshold;

transmitting an interrogation message to the next configurable device when the proximity is below a threshold;

receiving a response to the interrogation message, the response including an identifier associated with a configurable device and a configuration of the configurable device;

allowing the train to pass the configurable device if the response is received within a first period of time, the identifier included in the response matches the identifier associated with the configurable device of interest, and the configuration included in the response is acceptable; and

taking corrective action otherwise.

64. On information and belief, use of the I-ETMS System by Defendants' customers satisfies each and every limitation of claim 15. As discussed with reference to claim 1 above, the I-ETMS System, under control of the TMC and using the Commlink II, interrogates a wayside device and takes appropriate enforcement actions depending upon the response received. *See* Wabtec Catalog at 34-36; Wabtec Product Finder at 2-5.

65. The I-ETMS System sold by Defendants constitutes a material part of the method recited in claim 15 of the '860 Patent, being programmed to cause each of the method steps to be performed, and it is not a staple article or commodity of commerce suitable for substantial noninfringing use. Moreover, at least as a result of having been put on notice of the '860 Patent by Siemens, Defendants know that the I-ETMS System is especially made or especially adapted for use in a manner that infringes the '860 Patent. Accordingly, Defendants' sale of I-ETMS Systems contributes to infringement of the '860 Patent by their customers in violation of 35 U.S.C. § 271(c).

66. On information and belief, both by configuring the I-ETMS System to operate in a manner that Defendants know infringes the '860 Patent and by encouraging customers to use the I-ETMS System in a manner that Defendants know infringes the '860 Patent, Defendants are inducing infringement of the '860 Patent by their customers in violation of 35 U.S.C. § 271(b). For example, Defendants' marketing literature touts functionality of the I-ETMS System that falls within the scope of the above-identified claims of the '801 Patent. *See* Wabtec Product Finder at 3; Wabtec Catalog at 36-37.

67. Defendants' infringement of the '860 Patent has caused Siemens to suffer substantial monetary harm, including lost profits and price erosion relating to Siemens' sale of competing PTC products.

68. On information and belief, Defendants' infringement of the '860 Patent has been willful, done deliberately and with full knowledge that the manufacture, sale, offer for sale, and use of I-ETMS Systems infringes the '860 Patent, justifying an increase in the damages to be awarded Siemens up to three times the amount found or assessed, in accordance with 35 U.S.C. § 284.

69. Defendants' willful infringement of the '860 Patent renders this an exceptional case, justifying an award to Siemens of its reasonable attorney fees, in accordance with 35 U.S.C. § 285.

Count IV – Infringement of U.S. Patent No. 7,467,032

70. Siemens incorporates by reference the allegations in Paragraphs 1 through 32 above.

71. The '032 Patent is generally directed to, in accordance with particular embodiments, an end of train unit (EOT) that includes a positioning system such as a GPS receiver and that is configured to transmit a message including the EOT unit's location. The EOT unit may communicate directly with a device located off the train. In one aspect, messages containing EOT unit locations are collected by an EOT unit monitoring station. The EOT unit monitoring station generates a message including the EOT location information and routes the message to appropriate personnel responsible for tracking the EOT units. *See* '032 Patent, Brief Summary of the Invention.

72. On information and belief, Defendants directly infringe one or more claims of the '032 Patent, either literally or under the doctrine of equivalents. A non-limiting example of such infringement is provided below, based on the limited information currently available to Siemens.

73. Claim 1 of the '032 Patent recites as follows:

1. A communications system for a train comprising:

a head of train device located near a front of a train;

an end of train (EOT) unit mounted on a rear of a train, the EOT unit including a transducer connectable for fluid communication with an air brake pipe of the train, the EOT unit further including an end-of-train marker light, the EOT unit further including a GPS receiver, the EOT unit being configured for wireless communication with the head of train device;

an EOT unit monitoring station located off the train, the EOT unit monitoring station being configured for wireless communication with the end of train device; and

a central station located off the train and connected to the EOT unit monitoring station via a land based communication system;

wherein the EOT unit is configured to transmit wirelessly periodic messages to the head of train device, the periodic messages including a brake pipe pressure measured by the transducer;

wherein the EOT unit is further configured to transmit wirelessly a location message including a location of the EOT unit to the EOT unit monitoring station, the location being based on information from the GPS receiver; and

wherein the EOT unit monitoring station is configured to transmit the location of the EOT unit to the central station.

74. On information and belief, Defendants' TrainLink ATX and TrainLink II 4G-ATX telemetry systems in combination with Defendants' Asset Management Website satisfy each and every limitation of claim 1. Defendants' telemetry systems include both an HOT and an EOT, the latter including all of the structural features required by the claim (*i.e.*, transducer, marker light, GPS receiver, wireless communication). On a periodic basis, the EOT transmits,

via a wireless radio link, brake pipe pressure measurements to the HOT. *See* Wabtec Catalog at 6. On information and belief, the EOT is configured to transmit GPS-determined location information to one of a plurality of regional monitoring stations via cellular communication, and the regional monitoring station in turn communicates the location information to a central station, at least in part using a land-based communication system, for display to customers on the Asset Management Website. *See generally* Asset Management Website Users Guide.

75. In view of the foregoing, Defendants' manufacture, sale, and offer to sell the TrainLink ATX and TrainLink II 4G-ATX telemetry systems for use with the Asset Management Website directly infringes the '032 Patent in violation of 35 U.S.C. § 271(a).

76. Defendants' infringement of the '032 Patent has caused Siemens to suffer substantial monetary harm, including lost profits and price erosion relating to Siemens' sale of competing PTC products.

Count V – Infringement of U.S. Patent No. 7,742,850

77. Siemens incorporates by reference the allegations in Paragraphs 1 through 37 above.

78. The '850 Patent is generally directed to, in accordance with particular embodiments, an EOT that includes a positioning system such as a GPS receiver and that is configured to transmit a message including the EOT unit's location. The EOT unit may communicate directly with a device located off the train. In one aspect, messages containing EOT unit locations are collected by an EOT unit monitoring station. The EOT unit monitoring station generates a message including the EOT location information and routes the message to appropriate personnel responsible for tracking the EOT units. *See* '850 Patent, Brief Summary of the Invention.

79. On information and belief, Defendants directly infringe one or more claims of the ‘850 Patent, either literally or under the doctrine of equivalents. A non-limiting example of such infringement is provided below, based on the limited information currently available to Siemens.

80. Claim 8 of the ‘850 Patent recites as follows:

8. An end of train unit comprising:

a processor;

an end of train marker light;

a pressure sensor for determining an air pressure in an air brake pipe;

a wireless transceiver connected to the processor; and

a positioning system connected to the processor;

wherein the processor is configured to perform the steps of

generating a first wireless message including a location of the end of train unit and an identifier that uniquely identifies the end of train unit; and

transmitting via the transceiver the first wireless message to an end of train unit monitoring station located off of any train;

generating a second wireless message, the second wireless message including an air pressure sensed by the pressure sensor; and

transmitting the second wireless message to a device located at the head of the train.

81. On information and belief, Defendants’ TrainLink ATX and TrainLink II 4G-ATX telemetry systems satisfy each and every limitation of claim 8. Defendants’ telemetry systems have an EOT that includes the required processor, marker light, pressure sensor, wireless transceiver and positioning system. On a periodic basis, the EOT transmits, via a wireless radio link, brake pipe pressure measurements to the HOT component of the telemetry system. *See* Wabtec Catalog at 6. In addition, the EOT is configured to transmit GPS-determined location

information to a monitoring station, via cellular communication, for display to customers on Wabtec's Asset Management Website. *See generally* Asset Management Website Users Guide.

82. In view of the foregoing, Defendants' manufacture, sale, and offer to sell the TrainLink ATX and TrainLink II 4G-ATX telemetry systems for use with the Asset Management Website directly infringes the '850 Patent in violation of 35 U.S.C. § 271(a).

83. Defendants' infringement of the '850 Patent has caused Siemens to suffer substantial monetary harm, including lost profits and price erosion relating to Siemens' sale of competing PTC products.

Count VI – Infringement of U.S. Patent No. 8,714,494

84. Siemens incorporates by reference the allegations in Paragraphs 1 through 32 above.

85. The '494 Patent is generally directed to, in accordance with particular embodiments, a railway vital or critical application system that uses a pair of computers and operating systems with asymmetric communications capability. Both computers receive and verify vital systems input message data and security code integrity and separately generate output data responsive to the input message. The first computer has sole capability to send vital system output messages including the output data and an output security code, but only the second computer has the capability of generating the output security code. A failure of either computer's hardware, software or processing capability results in failure to transmit a vital system output message or in transmission of an output message that cannot be verified by other vital systems. *See* '494 Patent, Abstract.

86. On information and belief, Defendants directly infringe one or more claims of the ‘494 Patent, either literally or under the doctrine of equivalents. A non-limiting example of such infringement is provided below, based on the limited information currently available to Siemens.

87. Claim 1 of the ‘494 Patent recites as follows:

1. A control system for a railway vital application system, comprising:

a first controller having an external bilateral communications interface capable of sending and receiving a vital systems message within a railway vital application system, the message including a security code and vital data;

a second controller having an external communications interface capable of receiving a vital systems message, but incapable of sending a vital systems message that is generated within the second controller, the second controller having a security code generator; and

an inter-controller communications pathway coupling the first and second controllers;

wherein the first and second controllers respectively receive an input vital systems message including input vital systems data and an input security code, verify the input message integrity and generate output vital systems data, the second controller generates an output security code and sends it to the first controller, and the first controller sends an output vital systems message including the output vital systems data and the second controller output security code for use within the railway vital application system.

88. On information and belief, material aspects of the I-ETMS System manufactured and sold by Defendants are described in Patent Application No. US 2014/0172205 A1, published June 19, 2014 and assigned to Wabtec Holding Corp. (hereinafter, “Wabtec ‘205 Application”) (Ex. M).

89. On information and belief, the I-ETMS System manufactured and sold by Defendants, and in particular the BOS component thereof, satisfies each and every limitation of claim 1. The BOS includes a first controller capable of receiving vital system messages (*e.g.*, mandatory directives, enforceable instructions) transmitted by, for example, the TMDS

component of the I-ETMS System, and further capable of transmitting such vital system messages to, for example, the TMC on a locomotive. The BOS also includes a second controller capable of receiving such vital system messages but incapable of sending a vital system message, with the second controller being configured to generate a security code (*e.g.*, a cyclic redundancy check, or “CRC”). The two controllers in the BOS are coupled by a communications pathway. In operation, vital system messages are sent by the TMDS to both controllers within the BOS, each of which independently verifies the integrity of the vital systems message. The second controller generates a CRC, comprising or associated with output vital systems data, and provides it to the first controller. The first controller also generates output vital systems data, including a normalized version of the received vital system message, and transmits the output vital systems data and the CRC received from the second controller to the TMC. *See, e.g.*, Wabtec ‘205 Application at ¶¶ 53-59.

90. In view of the foregoing, Defendants’ manufacture, sale, and offer to sell I-ETMS Systems, particularly including but not necessarily limited to the BOS component thereof, directly infringes the ‘494 Patent in violation of 35 U.S.C. § 271(a).

91. Defendants’ infringement of the ‘494 Patent has caused Siemens to suffer substantial monetary harm, including lost profits and price erosion relating to Siemens’ sale of competing PTC products.

Count VII – Infringement of U.S. Patent No. 9,233,698

92. Siemens incorporates by reference the allegations in Paragraphs 1 through 32 and 88 above.

93. The ‘698 Patent is generally directed to, in accordance with particular embodiments, a railway safety critical application system that uses a pair of tasks with

asymmetric communications capability. Both tasks receive and verify vital systems input message data and security code integrity and separately generate output data responsive to the input message. The first task has sole capability to send vital system output messages including the output data and an output security code, but only the second task has the capability of generating the output security code. A failure of any systems hardware, software or processing capability results in failure to transmit a safety critical system output message or in transmission of an output message that cannot be verified by other safety critical systems. *See* '698 Patent, Abstract.

94. On information and belief, Defendants directly infringe one or more claims of the '698 Patent, either literally or under the doctrine of equivalents. A non-limiting example of such infringement is provided below, based on the limited information currently available to Siemens.

95. Claim 1 of the '698 Patent recites as follows:

1. A control system for a railway safety critical application system, comprising:

at least one controller executing first and second tasks;

the first task having an external bilateral communications interface capable of sending and receiving a safety critical systems message within a railway safety critical application system, the message including a security code and safety critical data;

the second task having an external communications interface capable of receiving a safety critical systems message, but incapable of sending a safety critical systems message that is generated with the second task, the second task having a security code generator; and

an inter-task communications pathway coupling the first and second tasks;

wherein the first and second tasks respectively receive an input safety critical systems message including input safety critical systems data and an input security code, verify the input message integrity and generate output safety critical systems data, the second task generates an output security code and sends it to the first task, and the first task sends an output safety critical systems

message including the output safety critical systems data and the second task output security code for use within the railway safety critical application system.

96. On information and belief, the I-ETMS System manufactured and sold by Defendants, and in particular the BOS component thereof, satisfies each and every limitation of claim 1. The BOS includes a first task capable of receiving safety critical system messages (*e.g.*, mandatory directives, enforceable instructions) transmitted by, for example, the TMDS component of the I-ETMS System, and further capable of transmitting such safety critical system messages to, for example, the TMC on a locomotive. The BOS also includes a second task capable of receiving such safety critical system messages but incapable of sending a safety critical system message, with the second task being configured to generate a security code (*e.g.*, a CRC). These two tasks in the BOS are coupled by a communications pathway. In operation, safety critical system messages are sent by the TMDS to both tasks within the BOS, each of which independently verifies the integrity of the safety critical systems message. The second task generates a CRC, comprising or associated with output safety critical systems data, and provides it to the first task. The first task also generates output safety critical systems data, including a normalized version of the received safety critical system message, and transmits the output safety critical systems data and the CRC received from the second task to the TMC. *See, e.g.*, Wabtec ‘205 Application at ¶¶ 53-59.

97. In view of the foregoing, Defendants’ manufacture, sale, and offer to sell I-ETMS Systems, particularly including but not necessarily limited to the BOS component thereof, directly infringes the ‘698 Patent in violation of 35 U.S.C. § 271(a).

98. Defendants’ infringement of the ‘698 Patent has caused Siemens to suffer substantial monetary harm, including lost profits and price erosion relating to Siemens’ sale of competing PTC products.

PRAYER FOR RELIEF

WHEREFORE, Siemens prays for judgment in its favor granting the following relief:

A. A finding that Defendants have directly infringed, induced others to infringe, and/or contributorily infringed the Patents-in-Suit, holding Defendants jointly and severally liable for such infringement;

B. An award of damages pursuant to 35 U.S.C. § 284 adequate to compensate Siemens for Defendants' infringement of the Patents-in-Suit, including both pre- and post-judgment interest and costs as fixed by the Court;

C. A finding that Defendants' infringement of one or more of the Patents-in-Suit has been willful;

D. An increase in the damages to be awarded to Siemens of three times the amount found by the jury or assessed by the Court;

E. A declaration that this is an exceptional case within the meaning of 35 U.S.C. § 285, and a corresponding award of Siemens' reasonable attorney fees incurred in connection with the litigation;

F. An order establishing an ongoing royalty, in an amount to be determined by the Court, for any future infringement of the Patents-in-Suit by Defendants, including as a result of continuing sales of the products found to infringe and/or sales of any materially similar products; and

G. Any additional and further relief the Court may deem just and proper under the circumstances.

JURY DEMAND

Pursuant to Federal Rule of Civil Procedure 38(b) and District of Delaware Local Rule 38.1, Siemens hereby demands a trial by jury on all issues so triable.

MORRIS, NICHOLS, ARSHT & TUNNELL LLP

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