

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NATIONAL RAILROAD PASSENGER CORPORATION D/B/A AMTRAK
Petitioner

v.

RAILWARE, INC.
Patent Owner

U.S. Patent No. 9,517,782
Issue Date: December 13, 2016
Title: TOOLS FOR RAILWAY TRAFFIC CONTROL

Inter Partes Review No. IPR2023-01179

**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,517,782
CHALLENGING CLAIMS 1-8
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.1 *et seq.***

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
United States Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450
Submitted Electronically via PTAB E2E

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES	2
A.	Real Party-in-Interest – §42.8(b)(1)	2
B.	Related Proceedings – §42.8(b)(2).....	2
C.	Counsel – §42.8(b)(3) and (b)(4); Service Information; Fees	2
III.	CERTIFICATION OF GROUNDS FOR STANDING	3
IV.	UNPATENTABILITY GROUNDS.....	3
V.	THE '782 PATENT	4
A.	Summary	4
B.	Prosecution History	6
C.	Priority Date	7
VI.	LEVEL OF ORDINARY SKILL IN THE ART.....	7
VII.	CLAIM CONSTRUCTION	8
VIII.	THE PRIOR ART.....	8
A.	State of the Art	8

B.	Oriol.....	9
C.	Masquelier	12
D.	Wise.....	14
E.	Tamaribuchi.....	16
F.	Pachl	17
G.	Analogous Art	17
IX.	SPECIFIC GROUNDS.....	18
A.	Ground 1: Claims 1-8 Are Obvious Over Oriol.....	18
1.	Independent Claims 1, 5	18
2.	Dependent Claims 2-4, 6-8	35
B.	Ground 2: Claims 1-8 Are Obvious Over Oriol and Masquelier	37
1.	Motivation to Combine; Reasonable Expectation of Success	37
2.	Independent Claims 1, 5	41
3.	Dependent Claims 2-4, 6-8	44
C.	Ground 3: Claims 1-8 Are Obvious Over Oriol and Wise.....	46

1.	Motivation to Combine; Reasonable Expectation of Success	46
2.	Independent Claims 1, 5	48
3.	Dependent Claims 2-4, 6-8	49
D.	Ground 4: Claims 1-8 Are Obvious Over Oriol, Masquelier, and Wise.....	49
E.	Ground 5: Claims 1-8 Are Obvious Over Oriol, Masquelier, and Pachl	51
F.	Ground 6: Claims 1-8 Are Obvious Over Tamaribuchi and Pachl	54
1.	Motivation to Combine; Reasonable Expectation of Success	54
2.	Independent Claims 1, 5	54
3.	Dependent Claims 2-4, 6-8	62
G.	Ground 7: Claims 1-8 Are Obvious Over Wise and Masquelier	63
1.	Motivation to Combine; Reasonable Expectation of Success	63
2.	Independent Claims 1, 5	64

3.	Dependent Claims 2-4, 6-8	69
X.	<i>GRAHAM</i> FACTORS (NO SECONDARY CONSIDERATIONS).....	70
XI.	NO BASIS FOR DISCRETIONARY DENIAL	70
A.	§ 314(a): <i>Fintiv</i> and <i>General Plastic</i> Factors Favor Institution.....	70
B.	§ 325(d): <i>Advanced Bionics</i> Favors Institution.....	72
XII.	CONCLUSION.....	72

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH,</i> IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020).....	72
<i>Apple Inc. v. Fintiv, Inc.,</i> IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020)	70
<i>Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha</i> IPR2016-01357, Paper 19 (PTAB Sept. 6, 2017).....	72
<i>GoPro, Inc. v. Contour IP Holding LLC,</i> 908 F.3d 690 (Fed. Cir. 2018)	10
<i>Hulu LLC v. SITO Mobile R&D IP, LLC,</i> IPR2021-00298, Paper 11 (PTAB May 19, 2021)	71
<i>Intel Corp. v. PACT XPP Schweiz AG,</i> 61 F.4th 1373 (Fed. Cir. 2023)	38
<i>Railware, Inc. v. National Railroad Passenger Corporation d/b/a Amtrak,</i> 1:22-cv-05013-KPF (S.D.N.Y.).....	2
<i>Sotera Wireless, Inc. v. Masimo Corp.,</i> IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020)	71
<i>Teva Pharm. Int’l GmbH v. Eli Lilly & Co.,</i> 8 F.4th 1349 (Fed. Cir. 2021)	70
<i>The Brinkmann Corporation v. A&J Manufacturing, LLC,</i> IPR2015-00056, Paper 10 (PTAB Mar. 23, 2015)	3

PETITIONER’S EXHIBIT LIST

Table of Exhibits for U.S. Patent 9,517,782 Petition for *Inter Partes* Review

Exhibit Number	Description
1001	U.S. Patent No. 9,517,782 (the “782 Patent”)
1002	File History of U.S. Patent No. 9,517,782
1003	Declaration of Dr. William Michalson including Curriculum Vitae (“Michalson”)
1004	Oriol, N., Sheridan, T. and Multer, J. (2004). <i>Supporting Railroad Roadway Worker Communications with a Wireless Handheld Computer: Volume 1: Usability for the Roadway Worker</i> . Report No. DOT/FRA/ORD-04/13.i. U.S. Department of Transportation, Federal Railroad Administration (“Oriol”)
1005	Masquelier, T., Sheridan, T., and Multer, J. (2004). <i>Supporting Railroad Roadway Worker Communications with a Wireless Handheld Computer: Volume 2: Impact on Dispatcher Performance</i> . Report No. DOT/FRA/ORD-04/13.ii. U.S. Department of Transportation, Federal Railroad Administration (“Masquelier”)
1006	WO International Publication No. 2004/042663 to Wise (“Wise”)
1007	U.S. Patent Application Pub. No. 2012/0176217 to Tamaribuchi et al. (“Tamaribuchi”)
1008	<RESERVED>
1009	<RESERVED>
1010	<RESERVED>
1011	<i>Railware, Inc. v. National Railroad Passenger Corporation d/b/a/ Amtrak</i> , 1:22-cv-5013-KPF, Amended Complaint, Dkt. No. 27 (Jun. 30, 2022 S.D.N.Y.) (without exhibits)
1012	<i>Railware, Inc. v. National Railroad Passenger Corporation d/b/a/ Amtrak</i> , 1:22-cv-5013-KPF, Waiver of the Service of Summons, Dkt. No. 17 (Jul. 11, 2022 S.D.N.Y.).

1013	Federal Railroad Administration, Research Reports, available at https://web.archive.org/web/20050211025837/http://www.fra.dot.gov:80/us/content/412
1014	Federal Railroad Administration, Research Reports, available at https://web.archive.org/web/20060922194521/http://www.fra.dot.gov/us/content/412
1015	Federal Railroad Administration, Research Reports, available at https://web.archive.org/web/20080212192107/http://www.fra.dot.gov:80/us/content/412
1016	Federal Railroad Administration, Research Reports, available at https://web.archive.org/web/20090320043352/http://www.fra.dot.gov/us/content/412
1017	GB2366419 to Nagai et al.
1018	WO International Publication No. 2005/047074 to Makkinga (“Makkinga”)
1019	U.S. Patent No. 6,959,233 to Hungate et al. (“Hungate”)
1020	U.S. Patent No. 7,328,090 to Pachl (“Pachl”)
1021	U.S. Patent No. 8,406,943 to Brand et al. (“Brand”)
1022	Internet Archive Affidavit for URLs including EX1013-1016: https://web.archive.org/web/20050211025837/http://www.fra.dot.gov:80/us/content/412 https://web.archive.org/web/20060922194521/http://www.fra.dot.gov/us/content/412 https://web.archive.org/web/20080212192107/http://www.fra.dot.gov:80/us/content/412 https://web.archive.org/web/20090320043352/http://www.fra.dot.gov/us/content/412
1023	Excerpt of File History from U.S. Pat. RE49115

TABLE A: LISTING OF CLAIMS
including January 13, 2018 Certificate of Correction

Claim Designation	Claim Language
Claim 1	
1[Pre]	A system to enhance railway control, to protect safety of railway workers on or near railway tracks, the system comprising:
1[A]	a railway control apparatus comprising a processor, a non-transitory medium storing one or more programs of executable instructions, and a network interface through which the railway control apparatus communicates via a network; and
1[B]	a user terminal provided to a railway field worker and configured to communicate via the network with the railway control apparatus and to provide a user interface to display information received from the railway control apparatus and to permit the railway field worker to respond to prompts displayed thereon,
1[C]	wherein the railway control apparatus, by execution of said one or more programs of executable instructions by the processor, includes: a block placing part to place a block on one or more specified track sections to permit the railway field worker to enter the track sections while blocking railway traffic to said track sections;
1[D]	a code generation part to generate a release code and transmit the release code to an electronic contact address accessible by the railway field worker via operation of the user interface of the user terminal; and
1[E]	a block removal part to remove only upon receiving the release code from the user terminal in return, the block placed by the block placing part on said one or more track sections.
Claim 2	
[2]	The system of claim 1, wherein upon the railway control apparatus placing the block of railway traffic to said one or more specified track sections and transmitting the release code to the electronic contact address accessible by the railway field worker, the user interface provided on the user terminal displays a message and permits the railway field worker to respond to the message to release the block.

Claim 3	
[3]	The system of claim 2, wherein upon the railway field worker responding to the message to release the block, the release code is returned to the railway control apparatus.
Claim 4	
[4]	The system of claim 2, wherein the message displayed by the user interface on the user terminal includes an embedded link for activating a return transmission of the release code to the railway control apparatus.
Claim 5	
5[Pre]	A method to enhance railway control, to protect safety of railway workers on or near railway tracks, said method comprising:
5[A]	configuring a mobile user device of a railway field worker to provide a device user interface to display information received via a network from a railway control apparatus and to permit the railway field worker to respond to prompts displayed thereon;
5[B]	providing a terminal user interface on a terminal to permit a terminal user of the terminal request the railway control apparatus to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections;
5[C]	generating by the railway control apparatus a release code and transmitting the release code to an electronic contact address accessible by the railway field worker via operation of the user interface of the user terminal; and
5[D]	permitting the block to said one or more track sections to be removed by the railway control apparatus only upon receiving the release code from the user terminal in return.
Claim 6	
[6]	The method of claim 4 5 ¹ , further comprising: displaying, upon the railway control apparatus placing the block of railway traffic to said one or more specified track sections and transmitting the release code to the electronic contact address

¹ This change is based on the January 13, 2018 Certificate of Correction. EX1001, last page.

	accessible by the railway field worker, a message through the device user interface provided on the mobile user device and permitting the railway field worker to respond to the message to release the block.
Claim 7	
[7]	The method of claim 6, further comprising: upon the railway field worker responding to the message to release the block, returning the release code to the railway control apparatus.
Claim 8	
[8]	The method of claim 2 7 ² , wherein the message displayed by the device user interface on the mobile user device includes an embedded link for activating a return transmission of the release code to the railway control apparatus.

² This change is based on the January 13, 2018 Certificate of Correction. EX1001,
last page.

I. INTRODUCTION

National Railroad Passenger Corporation d/b/a Amtrak (“Petitioner”) petitions under 35 U.S.C. § 312 and 37 C.F.R. § 42 for *inter partes* review of claims 1-8 (“Challenged Claims”) of U.S. Patent No. 9,517,782 (“’782 Patent”) (EX1001). The ’782 Patent is purportedly assigned to Railware, Inc. (“Railware”).³

The ’782 Patent relates to generating and communicating a code over a network for railway control. EX1001, Abstract, Fig. 4, 2:53-57, 4:32-36, 7:1-7:20, claims 1, 5; EX1011, ¶ 15. A railway control apparatus (computer) blocks a track and transmits a generated code to a worker’s user terminal. *Id.* To unblock the track, the worker will transmit the code to the railway control apparatus. *Id.* This basic process involves well-known components, such as a conventional computer (railway control apparatus), a network, and a user terminal. EX1001, Figs. 3A, 3B, 1:25-62, 4:47-51, 5:15–17.

The Grounds advanced here were not relied upon during prosecution of the ’782 Patent and teach a mobile device to control railway track blocking and unblocking using a release code.

³ Petitioner reserves the right to challenge in litigation Railware’s standing to assert the ’782 Patent and any related patents.

II. MANDATORY NOTICES

A. Real Party-in-Interest – §42.8(b)(1)

Pursuant to 37 C.F.R. § 42.8(b)(1), the Petitioner is the real party-in-interest. Further, the Petitioner certifies that no other party exercised control or could exercise control over the filing of this petition or Petitioner's participation in any proceeding instituted on this petition.

B. Related Proceedings – §42.8(b)(2)

The '782 Patent, U.S. Pat. RE49115 (the "RE'115 Patent"), and U.S. Pat. RE47835 (the "RE'835 Patent") are asserted in *Railware, Inc. v. National Railroad Passenger Corporation d/b/a Amtrak*, 1:22-cv-05013-KPF (S.D.N.Y.) ("Litigation"). Amtrak filed an opposed motion to dismiss on patent ineligibility and other grounds (Dkt. Nos. 27-34), which is fully briefed and pending. No case schedule has been set.

C. Counsel – §42.8(b)(3) and (b)(4); Service Information; Fees

Lead Counsel:	Backup Counsel:
Frank M. Gasparo (Reg. No. 44,700) Venable LLP 151 West 42nd Street, 49th Floor New York, NY 10036 Phone: (212) 370-6273 Fax: (212) 307-5598 FMGasparo@Venable.com	William Hector (Reg. No. 66,823) Venable LLP 101 California Street, Suite 3800 San Francisco, CA 94111 Phone: (415) 653-3738 Fax: (415) 653-3755 WAHector@Venable.com

A Power of Attorney is filed concurrently herewith under 37 C.F.R. § 42.10(b). The Office is authorized to charge the fee set forth in 37 C.F.R. § 42.15(a) or other fees to Deposit Account No. 22-0261.

III. CERTIFICATION OF GROUNDS FOR STANDING

The '782 Patent is available for IPR, and Petitioner is not barred or estopped from requesting this IPR. 37 C.F.R. §42.104(a). The Amended Complaint (EX1011) was served by Patent Owner filing on July 11, 2022 the Waiver of the Service of Summons dated July 8, 2022. EX1012; *The Brinkmann Corporation v. A&J Manufacturing, LLC*, IPR2015-00056, Paper 10, at 6-7 (PTAB Mar. 23, 2015). Thus, this Petition is filed within one year after Amtrak was served with a complaint for alleged infringement. Amtrak has not filed a separate civil action challenging the validity of the claims of the '782 Patent, RE'115 Patent, and RE'835 Patent. This petition is one of three petitions that Petitioner has filed concurrently.

IV. UNPATENTABILITY GROUNDS

Petitioner requests cancellation of claims 1-8 based on the grounds below.

Ground	Prior Art for Each Ground	Challenged Claims	Basis
1	Oriol	1-8	103
2	Oriol and Masquelier	1-8	103
3	Oriol and Wise	1-8	103

4	Oriol, Masquelier, and Wise	1-8	103
5	Oriol, Masquelier, and Pachl	1-8	103
6	Tamaribuchi and Pachl	1-8	103
7	Wise and Masquelier	1-8	103

The seven grounds are supported by the Declaration of Dr. William Michalson (EX1003, “Michalson”) and other supporting evidence in the Exhibit List. Michalson, ¶¶19-26.

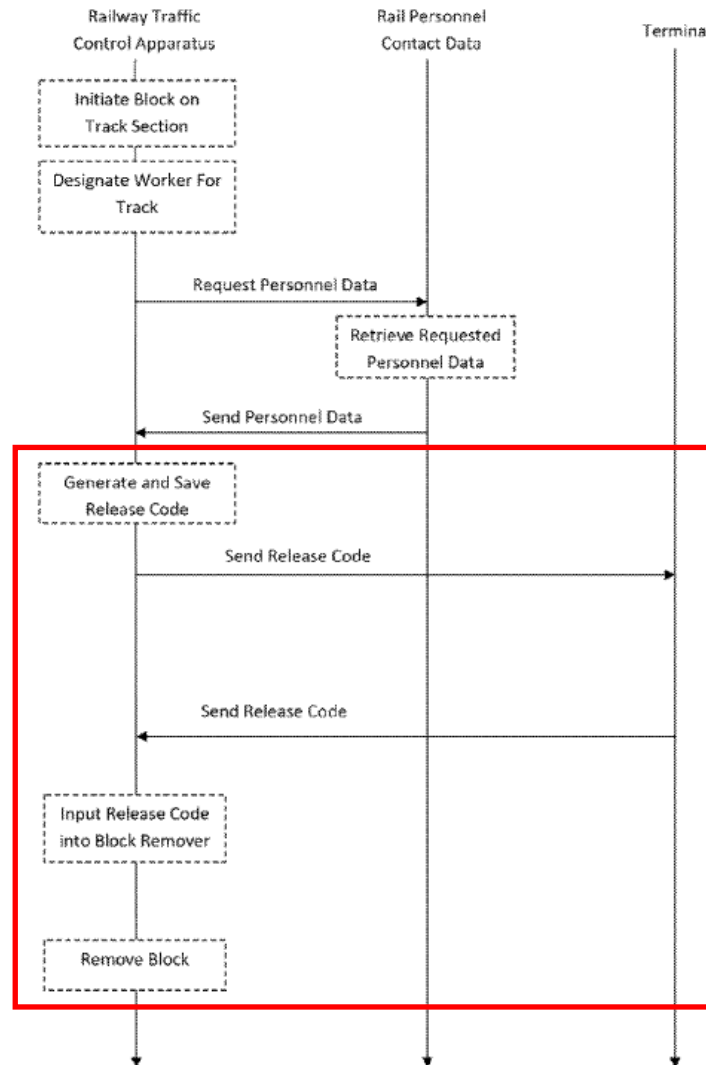
V. THE ’782 PATENT

A. Summary

The ’782 Patent (having application no. 15/177,506) was filed on June 9, 2016, claiming alleged priority to application no. 14/519,727 (now U.S. Patent No. 9,403,545) filed on October 21, 2014, and provisional application no. 61/893,547 filed on October 21, 2013. EX1001, front page; EX1002, 2.

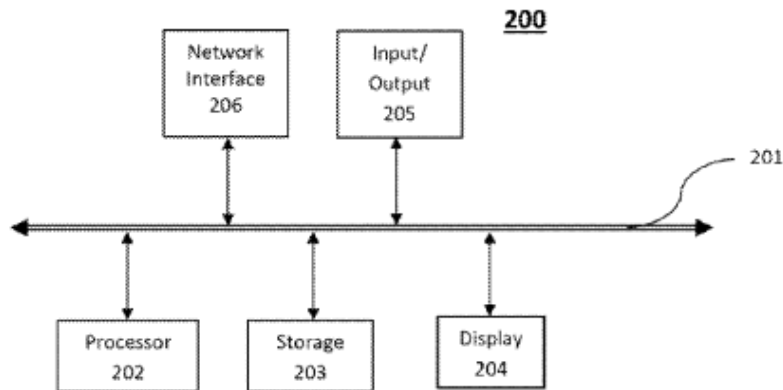
The ’782 Patent describes “[t]ools . . . to control traffic over a railway track section . . . [and] when traffic over the track section is to be blocked, a release code is generated and sent to . . . the railway worker. Traffic through the track section is blocked until the release code is entered in the system.” EX1001, Abstract, 2:53-58 (similar). This is shown in Figure 4 below.

FIGURE 4



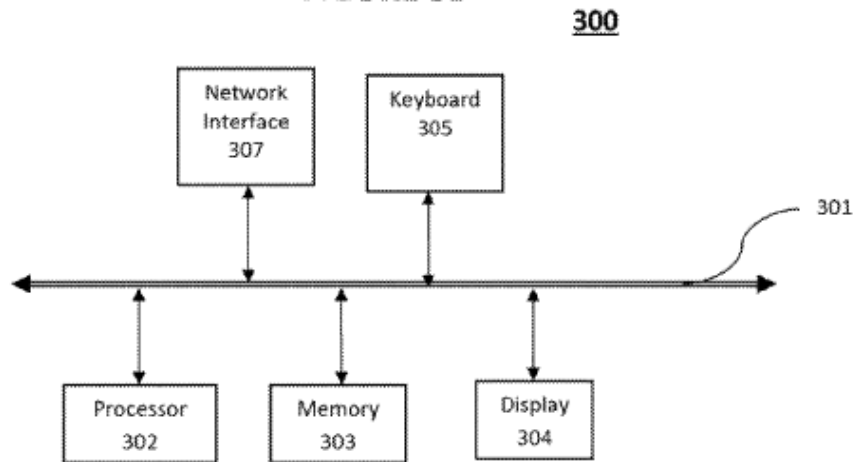
Id., Fig. 4 (annotated). The specification admits it invokes generic hardware, as shown in Figures 3A (user terminal) and 3B (railway control apparatus) below.

FIGURE 3A



Id., Fig. 3A, 6:18-41, 9:2-5.

FIGURE 3B



Id., Fig. 3B, 6:4-11, 6:42-7:20; Michalson, ¶¶47-48.

B. Prosecution History

During prosecution, the '782 Patent never received a substantive office action, but instead the Examiner issued a Notice of Allowance allowing the as-filed claims 1-8. EX1002.

A Certificate of Correction was issued on January 13, 2018 to change claim 6's reference of claim 1 to claim 5 and claim's 8 reference of claim 2 to claim 7. EX1001, last page; Michalson, ¶¶50-51.

C. Priority Date

Petitioner assumes for the purpose of this Petition a priority date of October 21, 2013 (the "Priority Date") but reserves the right to contest this priority date (and priority chain) before the PTAB and district court.

Because the '782 Patent issued from an application filed after enactment of the America Invents Act ("AIA") on March 16, 2013, the post-AIA statutory framework applies but evaluating under pre- or post-AIA does not change the below analysis.

VI. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner submits that a person having ordinary skill in the art ("POSITA") as of the Priority Date would have had at least a bachelor's degree in electrical, mechanical, or related engineering, and also would have had at least two (2) years of experience in railway operations or railway control systems and would have programming experience. Michalson, ¶¶27-28. A higher level of education or specific skill might make up for less experience, and vice-versa. *Id.* Petitioner's expert, Michalson, has more than ordinary skill in the art. *Id.*, ¶29.

VII. CLAIM CONSTRUCTION

Petitioner is not aware of any “prior claim construction determination” related to the ’782 Patent, RE’115 Patent, and RE’835 Patent. 37 C.F.R. §42.100(b). Because the prior art discloses the claim limitations, the claims require no express construction and should be given their plain and ordinary meaning. However, Petitioner reserves the right to raise claim construction arguments in the Litigation.

VIII. THE PRIOR ART

A. State of the Art

The ’782 Patent concedes that it was known to use “centralized traffic control” to govern interlocking signals for track blocking and unblocking. EX1001, 1:25-2:3; EX1011, ¶ 14; Michalson, ¶42.

Before the Priority Date, it was conventional for railway workers to operate a mobile device for communicating with a central control system to block and unblock a track. EX1018, Abstract, 8:5-14, 10:7-10, 11:9-17; EX1017, Abstract, Figs. 10-11; Michalson, ¶43. It was also known to generate and communicate a code to authorize train movement. EX1019, Abstract, 4:35-42; EX1021, Abstract, Fig. 4; Michalson, ¶44.

The named inventor admitted in the application leading to the RE’115 Patent that mobile phones, text messaging, and email were conventional before the Priority

Date. EX1023, 8 (¶¶ 5-7), 15-16. Thus, this indicates that such communication methods could be applied in railway systems. Michalson, ¶¶45-46.

B. Oriol

Oriol (EX1004) was not considered during prosecution of the '782 Patent. Oriol was published by the U.S. Department of Transportation, Federal Railroad Administration in October 2004.

Oriol was available to the relevant public in at least two ways: “This document is available to the public through the [1] National Technical Information Service, Springfield, VA 22161. This document is also available on the [2] FRA website at www.fra.dot.gov.” EX1004, front page (emphasis added, alteration added), Report Documentation Page (“12a. Distribution/Availability Statement”), notice page (“This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange.”)

Oriol was accessible to a POSITA given the FRA’s statements above that Oriol was “available to the public” (or could be accessed) in multiple ways. Indeed, the Wayback Machine shows Oriol was available at www.fra.dot.gov in, for instance, 2005, 2006, 2008, and 2009. EX1013-1016 (*see* “DOT/FRA/ORD-04/13.i”); EX1022 (Internet Archive affidavit for the websites in EX1013-1016). Michalson could access Oriol in EX1013-1016. Michalson, ¶¶56-58; EX1022.

Lastly, another reference, Masquelier (EX1005), cites Oriol which further demonstrates that Oriol was available to the public. EX1005, ix, 3, 5, 72.

Thus, Oriol is prior art under, at least, post-AIA 35 U.S.C. § 102(a) as a POSITA with reasonable diligence could access or locate Oriol in at least two different ways. *GoPro, Inc. v. Contour IP Holding LLC*, 908 F.3d 690, 693 (Fed. Cir. 2018) (qualifies as prior art when “the relevant public has a means of accessing them.”) (citation omitted).

Oriol teaches that a railway worker operates a mobile device (PDA) to request work authorization over the Internet to a central control system (*e.g.*, web server, query server, and database) operated by a dispatcher.

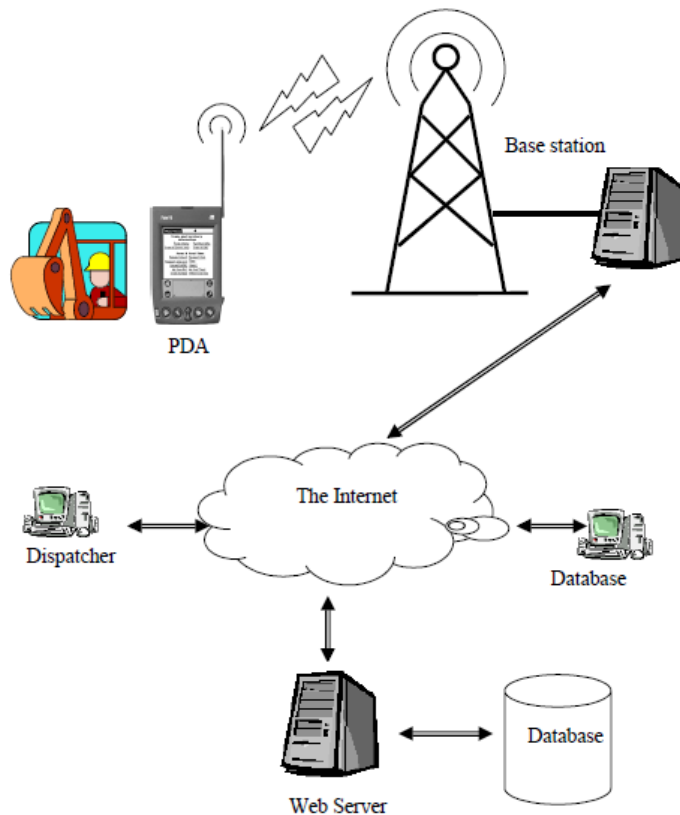


Figure 2. PDA System Architecture

EX1004, Fig. 2, 29.

The work authorization can include, *e.g.*, a worker’s “work involves on-track equipment or will disturb the track” known as Form D “Line 4.” *Id.*, 7, 8, Fig. 4 (“Request Line 4”).

After receiving the work authorization request, and if the work is permitted, the dispatcher’s central control system will block the track and transmit the railway worker a “Form D number (automatically assigned by system).” *Id.*, 38 (Form D line 4: “If the **dispatcher grants the Form D, the appropriate information will be sent**

to the roadway worker . . . includ[ing] **Form D number (automatically assigned by system)**, Form D recipient . . . [and other information]”) (emphasis added), 6.

After completing the work, the railway worker from the PDA’s interface selects “Cancel/Fulfill” link or prompt to transmit the Form D number under his authority to the dispatcher’s central control system to unblock the track. *Id.*, 36-37, Fig. A-1 (“You own these form Ds 0003, NorthEast Corridor . . . Cancel/Fulfill . . . NorthEast Corridor dispatcher has received your request and the form D # 0003 has been cancelled.”); Michalson, ¶¶60-63.

C. Masquelier

Masquelier (EX1005) was not considered during prosecution of the ’782 Patent. Masquelier was also published by the U.S. Department of Transportation, Federal Railroad Administration in October 2004.

Masquelier is the second volume of Oriol’s publication and builds upon Oriol’s work. EX1005, title, ix, 3, 5 (“information described here adds to roadway worker requirements reported by Oriol . . .”), 72.

Like Oriol, Masquelier was available to the relevant public: “This document is **available to the public** through the **National Technical Information Service, Springfield, VA 22161. This document is also available on the FRA website at www.fra.dot.gov.**” *Id.*, front page (emphasis added), Report Documentation Page (“12a. Distribution/Availability Statement”), notice page (“This document is

disseminated under the sponsorship of the Department of Transportation in the interest of information exchange.”)

Masquelier was accessible to a POSITA given the FRA’s statements above that Masquelier was “available to the public” (or could be accessed) in multiple ways. The Wayback Machine shows Masquelier was available at www.fra.dot.gov in, for instance, 2005, 2006, 2008, and 2009. EX1013-1016 (*see* “DOT/FRA/ORD-04/13.ii”); EX1022 (Internet Archive affidavit for the websites in EX1013-1016). Michalson could access Masquelier in EX1013-1016. Michalson, ¶¶65-69; EX1022.

Thus, Masquelier is prior art under, at least, post-AIA 35 U.S.C. § 102(a) given a POSITA with reasonable diligence could access or locate Masquelier in at least two different ways.

Masquelier teaches that a railway worker operates a mobile device to request work authorization, *e.g.*, Form D, over the Internet to the dispatcher’s centralized server. EX1005, Abstract, 16-18.

Masquelier teaches performing the same tasks as described in Oriol but additionally teaches, *e.g.*, the dispatcher and railway worker can communicate over text messages (SMS) relating to work authorization. *Id.*, 15, 21.

After receiving the work authorization request, and if the work is permitted, the dispatcher’s central control system will block the track, which is shown in a visual interface. *Id.*, 11 (“At the Traffic Control Center, the dispatcher could use the

track display to protect the track segment in question using software that controlled various switched and signals in the field.”)

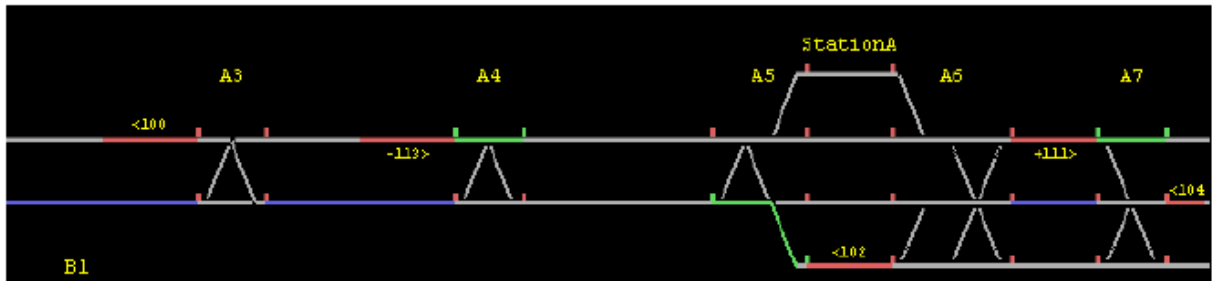


Figure 1. Track Chart Display

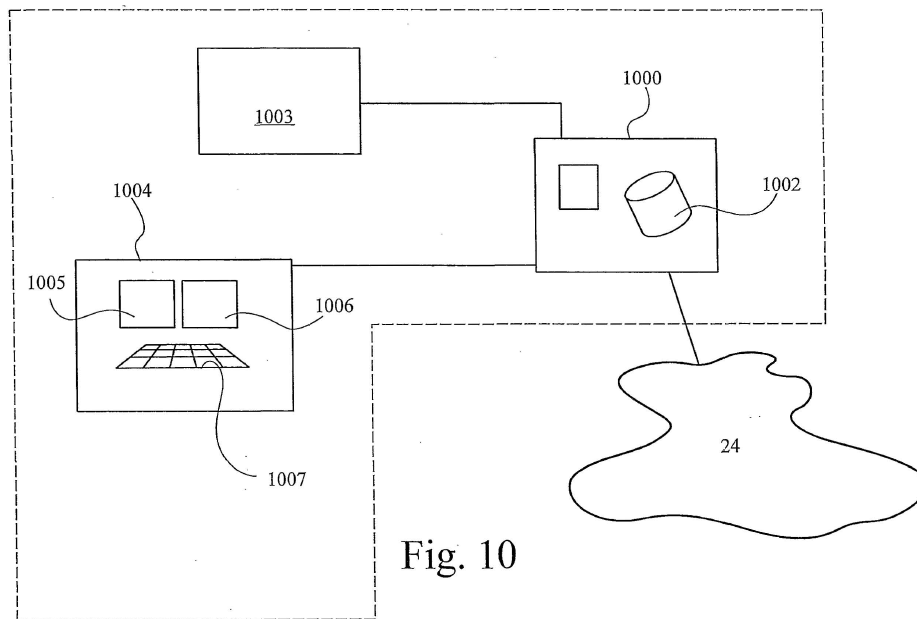
Id., Fig. 1, Table 2 (“Color Code for Monitoring Track Status”). Once the work is complete, “the roadway worker returns control of the track to the dispatcher, who releases the track for other uses.” *Id.*, 12; Michalson, ¶¶ 70-73.

D. Wise

Wise (EX1006) was published on May 21, 2004 and is prior art under, at least, post-AIA 35 U.S.C. § 102(a). It was not considered during prosecution of the ’782 Patent.⁴

As shown in Figure 10 below, Wise teaches a remote station / call center (central control) with a processor that communicates over a network (Internet) with a worker’s mobile terminal.

⁴ Wise was cited during the prosecution of RE’835 Patent and RE’115 Patent. But the Examiner there did not consider the Wise grounds advanced in this Petition.



Id., Fig. 10, 27:22-28:4, 9:23-28, Fig. 2.

After the worker requests a safety measure, the central control system blocks the track using signal lights and then generates an access code, *e.g.*, safety check number (“SCN”), which is provided to the worker. *Id.*, Fig. 5H (“Press the traffic-light icon on the toolbar & the SCN is automatically generated”), claims 1, 16, 17, 12:6-15, 24:19-26, 7:33-8:2.

When the work is complete, the worker transmits the same code or “SCN number . . . previously . . . allocated to the job” to the central control system. *Id.*, 25:4-9; Michalson, ¶¶74-77.

E. Tamaribuchi

Tamaribuchi (EX1007) was published on July 12, 2012 and is prior art under, at least, post-AIA 35 U.S.C. § 102(a). Tamaribuchi was cited on the face of the '782 Patent.⁵

Tamaribuchi describes a central control system that communicates with a maintenance worker's terminal device (*e.g.*, PDA) over a network (*e.g.*, Internet), and the central control system communicates with a power and signaling system to block and unblock tracks. EX1007, Fig. 1.

The worker operates a user terminal to request "Track closure" from the central control system, which then blocks the track by stopping power and displaying a signal to prohibit train entry. *Id.*, Fig. 2, [0082], [0089], [0130].

The central control system generates and transmits a reference number, *e.g.*, serial number, to a worker's device. *Id.*, [0119], [0110] ("The reference number . . . is an identification number . . . for example, a serial number").

After the work is completed, the worker transmits the same reference number to unblock the track. *Id.*, [0167], [0200], [0202]; Michalson, ¶¶78-82.

⁵ Tamaribuchi was also cited during the prosecution of RE'835 Patent and RE'115 Patent. But the Examiner there did not consider the Tamaribuchi ground advanced in this Petition.

F. Pachl

Pachl (EX1020) issued as a U.S. Patent on February 5, 2008 and is prior art under, at least, post-AIA 35 U.S.C. § 102(a). It teaches a control center with a computer interface and storage to first control the track safety measure and then generate a “checking code.” *Id.*, 3:35-45, 1:33-36, 1:11-20, 1:54-58, 1:63-66, 4:9-19, Abstract, Fig. 1. Pachl further teaches that the control center will only release the track upon entry of a received code. *Id.*, 2:47-60, 4:50-59, 1:63-66, 4:15-18, claims 1, 5, Fig. 2; Michalson, ¶¶83-86.

G. Analogous Art

Each prior art reference is analogous art to the claimed invention in the ‘782 Patent. And each is in the same field of endeavor of railway control as in the ‘782 Patent. *Compare* EX1001, title, Abstract, 1:15-18, 2:43-46, 4:1-3, *with* EX1004, Abstract, 6, 13-14, 31-39, Figs. A-1-A-4, 2; EX1005, Abstract, 10-12, 15-18, 21, Figs. 1-2, 4, Table 2; EX1006, Abstract, Fig. 5H, claims 1, 16, 17, 7:33-8:2, 12:6-15, 24:19-26, 25:4-9, 27:22-28:4, Figs. 2, 10; EX1007, Abstract, Figs. 1-2, [0082], [0089], [0167]; EX1020, 1:54-66, 3:35-45, 4:9-15, Abstract, Figs. 1-2, title, claim 1; EX1019, Abstract, 4:35-53, claims 14-15; EX1021, Abstract, Fig. 4, 4:10-17, 4:48-65, 5:24-30, 5:59-6:9, claim 1; EX1018, Abstract, 1:13-2:2, 5:1-11; EX1017, Abstract, 3:9-15, Figs. 10-11; Michalson, ¶88.

Additionally, each is reasonably pertinent to any purported problem addressed in the '782 Patent. *Id.*; EX1001, title, Abstract, 1:15-18, 2:43-46, 4:1-3; Michalson, ¶89.

IX. SPECIFIC GROUNDS

A. Ground 1: Claims 1-8 Are Obvious Over Oriol

1. Independent Claims 1, 5

- a. 1[Pre]: “A system to enhance railway control, to protect safety of railway workers on or near railway tracks, the system comprising:”**

5[Pre]: “A method to enhance railway control, to protect safety of railway workers on or near railway tracks, said method comprising:”

Whether or not the preamble is limiting, Oriol teaches 1[Pre] and 5[Pre]. Michalson, ¶¶90-91.

Oriol teaches enhanced railway control to protect the safety of railway workers on or near tracks with the worker operating a user terminal such as a PDA to block and unblock tracks. EX1004, Abstract (“[a] prototype communications device was developed for roadway workers . . . to request track protection from the dispatcher.”), Preface (“digital communication device intended to improve roadway worker safety and productivity.”), 6 (“When a dispatcher receives a request for roadway worker protection . . . [and if granted under Form D] . . . the track is placed off-limits (blocked) Roadway workers’ tasks include . . . maintenance, and

repair of the track . . . on or near the track.”), 37 (“worker has finished their job or wants to cancel or fulfill a Form D and is giving the track back to the dispatcher. . . .”), Figs. 2, A-1, A-3, 29; Michalson, ¶¶90-91.

- b. 1[A]: “a railway control apparatus comprising a processor, a non-transitory medium storing one or more programs of executable instructions, and a network interface through which the railway control apparatus communicates via a network;”**

Oriol teaches 1[A]. Michalson, ¶¶92-98.

In Oriol, the railway control apparatus consists of at least the dispatcher’s computer, database, and web server (query server) with associated database, as shown below.

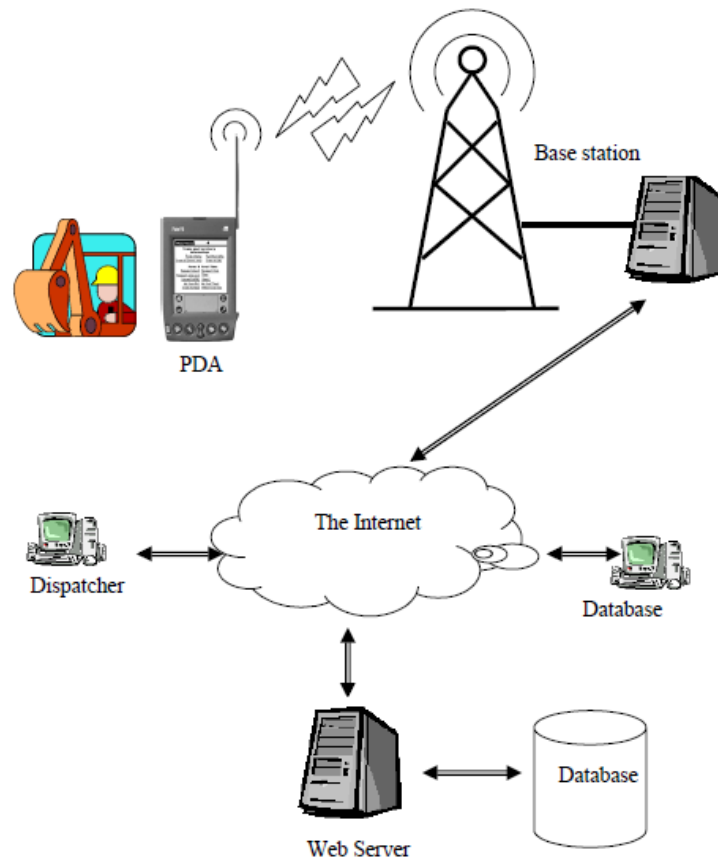


Figure 2. PDA System Architecture

EX1004, Fig. 2, 31 (describing components of Fig. 2, including query servers “[r]un on the same computer as the web server”), 6, 13-14.

This railway control apparatus has a network interface through which it communicates via a network such as the Internet with the worker’s PDA. *Id.*, 31, 38 (“If the dispatcher grants the Form D, the appropriate information will be sent to the roadway worker”), 37 (“**Dispatcher Query Server**. Handles requests sent by the PDA that need dispatcher interaction such as requests that have to do with work permissions and answers sent by dispatcher to the PDA”) (emphasis in original), 36,

Figs. 1, 2 (“Internet”), A-1, A-3, A-5, x, 13, iii; *see infra* 1[B]/5[A], 1[D]/5[C]; Michalson, ¶¶93-94.

The dispatcher’s computer and web server (query server) with associated database would each have a processor and a non-transitory medium such as a hard drive or other storage for “storing one or more programs of executable instructions.” Michalson, ¶¶95-96. For instance, Oriol describes its components as computers, which would each have a processor, and they along with the PDA use software. EX1004, Fig. 2 (showing computers), 31 (“dispatcher’s terminal” and query/web server described as a “computer”), 36 (“query servers used in this study were mainly written in Java (Sun Microsystems, 2001) [A] Common Gateway Interface (CGI) script . . . [was] used as an interface between the web server and the query servers. It reads the HTML forms as sent by the PDA . . . and returns the requested information to the PDA.”), 38-40, 11 (“[A] software application was developed for use on a PDA”), Figs. A-1-A-5; Fig. 1 (“Dispatcher’s terminal”); Michalson, ¶97.

Additionally, it was known to a POSITA to use a central control computer to control railway tracks over a network. *See* Section VIII.A; EX1001, 1:25-2:3; Michalson, ¶¶42, 98.

- c. **1[B]: “a user terminal provided to a railway field worker and configured to communicate via the network with the railway control apparatus and to provide a user interface to display information received from the railway control**

apparatus and to permit the railway field worker to respond to prompts displayed thereon,”

5[A]: “configuring a mobile user device of a railway field worker to provide a device user interface to display information received via a network from a railway control apparatus and to permit the railway field worker to respond to prompts displayed thereon;”

Oriol teaches 1[B] and 5[A]. Michalson, ¶¶99-107.

In Oriol, the user terminal includes a worker’s PDA. EX1004, Fig. 1 (“Personal Digital Assistant”). Oriol teaches that a worker’s PDA communicates with the railway control apparatus over a network (*e.g.*, Internet), such as to request work authorization. *See* 1[A]; EX1004, 29 (“The PDA also enabled the roadway worker to request a variety of work authorizations (Form D and Foul Time).”), 11 (“[A] software application was developed for use on a PDA with wireless communication capabilities. . . . The application was specifically designed for use on the railroad, and was intended to facilitate communication between roadway workers and dispatchers.”)

The worker’s PDA menu interface provides several functions, such as “Form D” work authorization including “Request Line 4” and “Request Lines 2, 3.” EX1004, Fig. 4, 37 (“**Requests sent by PDA: Request Form D line 4**: . . . to perform a work that will require a Form D line 4 authorization.”) (emphasis in original); Michalson, ¶¶100-102.

A PDA is a user terminal or mobile device given a PDA is a portable device to communicate over the Internet (or mobile network) and the '782 Patent describes the user terminal as a PDA. Michalson, ¶¶103-104; EX1001, 4:47-51, 9:2-5. Mr. Pirtle concedes mobile devices were well-known. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16.

Oriol further teaches that the railway worker's PDA interface displays links (from the railway control apparatus), which the worker can select and then respond to such prompts, *e.g.*, to request or cancel/fulfill work authorization. EX1004, 36 ("From the work request submenus, the roadway worker can request Form Ds (line 4 or lines 2 and 3) . . . Following the link[] 'Cancel/Fulfill' . . . the roadway worker is able to give some track under his authority back to the dispatcher."), 31 ("Web server. This server hosts the master files that are used as templates to send information back to the PDA.") (emphasis removed), 36 ("The query servers . . . read[] the HTML forms as sent by the PDA . . . and returns the requested information to the PDA."), Fig. A-3 (showing PDA interface and worker responding to prompts displayed from the railway control apparatus), Fig. A-1 ("Cancel/Fulfill" prompt), 6; Michalson, ¶¶105-107.

- d. **1[C]: "wherein the railway control apparatus, by execution of said one or more programs of executable instructions by the processor, includes: a block placing part to place a block on one or more specified track sections to permit the railway field worker to enter the**

track sections while blocking railway traffic to said track sections;”

5[B]: “providing a terminal user interface on a terminal to permit a terminal user of the terminal request the railway control apparatus to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections;”

Oriol teaches 1[C] and 5[B]. Michalson, ¶¶108-120.

Claim 1 unlike claim 5 recites the “railway control apparatus, by execution of said one or more programs of executable instructions by the processor, includes: a block placing part [1[C]]. . . a code generation part [1[D]] . . . and a block removal part [1[E]]”

Software would implement the three parts because the claim recites “one or more programs,” which would be understood as software, and the specification describes software (“programming”) to implement the three parts. EX1001, 2:58-67 (“programming” for three parts), 2:47-57, 6:42-45; EX1023, 2; Michalson, ¶¶109-112.

These three parts could be implemented in “one” software program or “more [software] programs” given the recitation in claim 1. Michalson, ¶113. Oriol implements the three parts in software via the railway control apparatus’ processor. *See* 1[A] (describing railway control apparatus’ software and hardware); EX1004, Fig. 2, 31, 36, 38, 39, Fig. A-5; Michalson, ¶114.

Oriol teaches that the worker operates a PDA to request work authorization, *e.g.*, Form D Line 4, “on or near the track” from the railway control apparatus. *See* 1[Pre]/5[Pre], 1[B]/5[A]; EX1004, 6. Additionally, implementing a program in a computer with executable instructions would have been known to a POSITA. EX1007, [0067], [0351], [0353]; Michalson, ¶¶115-116.

Based on this Form D request, the railway control apparatus’ processor executes a block placing part (software) to block the track (also denoted as “out of service” for maintenance).

Query servers used in this study were mainly written in Java (Sun Microsystems, 2001) [A] Common Gateway Interface (CGI) script . . . [was] used . . [and] reads the HTML forms as sent by the PDA . . . and returns the requested information to the PDA.

. . . .

Dispatcher Query Server. Handles requests sent by the PDA that need dispatcher interaction

. . . .

Answer request for Form D line 4: Used by a dispatcher to grant or deny the requested Form D lines 4. If the dispatcher grants the Form D, the appropriate information will be sent to the roadway

worker who requested it . . . [such as] Form D number (automatically assigned by system) . . . foreman in charge of the track out of service.

EX1004, 36-38 (emphasis added), 6 (“When a dispatcher receives a request for roadway worker protection . . . [and if] the dispatcher grants permission to work, (under . . . Form D . . .) the track is placed off-limits (blocked) for other uses. In Central Traffic Control (CTC) territory, blocking a track protects the roadway worker since it prevents the dispatcher from routing trains on that track.”), 14, 31, Abstract, 13; Michalson, ¶117.

This block placing part software is also shown in Figure A-3 where the railway control apparatus blocks a track based on a work authorization request, particularly “**Form D Request Line 4 . . . Send Request . . . North East Corridor dispatcher has received your request . . . 2 track out of service between/at Providence and Lawn in charge of Oriol . . .**” EX1004, A-3 (emphasis added). This exemplary blocking is also shown in the “Form D Lines 2, 3” figure. *Id.*, Fig. A-3; Michalson, ¶118.

While the track is blocked, the railway worker can enter the track to perform, *e.g.*, maintenance work. EX1004, Fig. A-1 (track “out of service” until cancelled/fulfilled), 6 (“the dispatcher grants permission to work, (under . . . Form D . . .) the track is placed off-limits (blocked) for other uses.”), 8 n.1 (Form D, Line

4 requires “the dispatcher to remove it from service while the authorization is in effect.”); *infra* claim 1[E]/5[D]; Michalson, ¶119.

Additionally, it was known to a POSITA for central control to transmit a signal to the corresponding interlock to block a track. *See* Section VIII.A; EX1001, 1:25-2:3; Michalson, ¶¶42, 120.

- e. **1[D]: “railway control apparatus . . . includes . . . a code generation part to generate a release code and transmit the release code to an electronic contact address accessible by the railway field worker via operation of the user interface of the user terminal; and”**

5[C]: “generating by the railway control apparatus a release code and transmitting the release code to an electronic contact address accessible by the railway field worker via operation of the user interface of the user terminal; and”

Oriol teaches 1[D] and 5[C]. Michalson, ¶¶121-134.

Oriol teaches that the worker on the PDA selects the Form D work authorization link, such as “Request Form D Line 4” or “Request Form D Lines 2, 3,” and transmits such work authorization to the railway control apparatus. *See* 1[C]/5[B]; EX1004, Fig. A-3, 6, 14, 36-38. When the railway control apparatus grants the work authorization, it blocks the track. *Id.*; Michalson, ¶123.

The railway control apparatus includes a code generation part (software) that generates a form D number (release code) and transmits that release code to the worker’s PDA or electronic contact address. EX1004, 38 (Form D line 4: “**If the**

dispatcher grants the Form D [blocks the track], the appropriate information will be sent to the roadway worker who requested it. This information includes **Form D number (automatically assigned by system)**, Form D recipient, date, track number, track location, and foreman in charge of the **track out of service.”** (emphasis added), 38 (Form D lines 2 and 3: “Form D number (automatically assigned by system)”), Fig. 1; Michalson, ¶124.

Oriol’s Form D number is a release code given the generated Form D number is sent to the worker “who requested it” (EX1004, 38) and who cancels the same Form D number (under his authority) to release the track block. *See infra* 1[E]/5[D] (unblock track by cancelling/fulfilling Form D number); EX1004, 36 (“worker can retrieve a list of Form Ds . . . under his/her authority . . . [and] [f]ollowing the link[] ‘Cancel/Fulfill’ . . . the roadway worker is able to give some track under his authority back to the dispatcher.”), 37, Fig. A-1; Michalson, ¶125.

The worker’s PDA has an electronic contact address given that the release code is “sent to the roadway worker who requested it” and the worker’s PDA device ID is registered in the railway control apparatus database. EX1004, 38, 39 (“The database includes . . . Roadway workers (MWForemen.txt). Includes information about registered PDAs and their owner.”) (emphasis in original), 57 (“Each Palm VII device had a built in device ID . . . [and this] device ID was used to identify

which roadway worker was sending each request.”), Figs. A-3 (“**Delivered to: Oriol**”) (emphasis added), A-5; Michalson, ¶126.

Additionally, it would have been known to a POSITA that there would be, *e.g.*, an IP address (as well as a MAC address), for the PDA and that some, or all of, that information would be stored in the Oriol database for the Internet communication. Michalson, ¶127.

The railway control apparatus generating the release code and transmitting the code (accessible in the PDA’s user interface) to the electronic contact address is also shown in Figure A-3, particularly “**Form D Line 4 Request . . . North East Corridor dispatcher has received your request . . . Please confirm Form D 0001. . . Delivered to: Oriol . . . 2 track out of service between/at Providence and Lawn in charge of Oriol . . .**” EX1004, Fig. A-3 (emphasis added);⁶ *id.* (“**Form D Lines 2,3 Request . . . Please confirm Form D 0005 . . . Form D 0005**”) (emphasis in original), A-5 (dispatcher interface: “**Form D 0003 is Requested . . . Form D #:**

⁶ Form D 0001 appears to be a typographical error as it should state Form D 0003 since Form D 0003 is later used in the same figure, the dispatcher’s interface shows Form D 0003 (EX1004, Fig. A-5), and worker cancels Form D 0003 (*id.*, Fig. A-1). Also, the “Form D Lines 2,3” figure shows the same Form D number (Form D 0005) twice, just as the Form D 0003 should appear. *Id.*, Fig. A-3; Michalson, ¶128 n.4.

0003 Delivered to: Oriol . . . track out of service”) (emphasis in original), A-1 (“You own these form Ds 0003, NorthEast Corridor . . . NorthEast Corridor dispatcher has received your request and the form D # 0003 has been cancelled.”); Michalson, ¶128.

To the extent it is argued that claim limitations 1[D] and 5[C] require that the code is generated after the track is blocked, Oriol teaches this as discussed above because the track is first blocked and then the Form D number is generated. *Id.*, 38 (block track and then send the generated Form D number), Figs. A-3 (request track block, then block the track, and then send the generated Form D number with the tracked blocked), A-5; Michalson, ¶129.

Nevertheless, a POSITA would have been motivated to modify Oriol to first block the track and thereafter generate the Form D number or code. Michalson, ¶¶ 130-134. This modification could enhance safety and security as the central control system would only generate the code once the block has been implemented as otherwise the release code could be unsafely or incorrectly used before the track is blocked. Michalson, ¶131.

A POSITA would have a reasonable expectation of success because Oriol could generate a temporary number or other placeholder and then once the track is blocked, generate the Form D number to provide greater security and safety as the Form D number or release code would not be known until the track is blocked. Michalson, ¶132. Indeed, Oriol’s railway control apparatus has hardware and

software to block the track and then generate and transmit a Form D number. *See* 1[B]-[C]; Michalson, ¶¶133-134.

- f. **1[E]: “railway control apparatus . . . includes . . . a block removal part to remove only upon receiving the release code from the user terminal in return, the block placed by the block placing part on said one or more track sections.”**
5[D]: “permitting the block to said one or more track sections to be removed by the railway control apparatus only upon receiving the release code from the user terminal in return.”

Oriol teaches 1[E] and 5[D].

Oriol describes that “[o]nce authorization for track use is granted to a roadway crew and the track is blocked, the dispatcher has delegated authority over that track to the roadway crew.” EX1004, 6.

The “worker can retrieve a list of Form Ds . . . **under his/her authority . . .** [and] [f]ollowing the link[] ‘Cancel/Fulfill’ . . . the **roadway worker is able to give some track under his authority back to the dispatcher.**” EX1004, 36 (emphasis added), 37 (“Retrieve list of active Form Ds: Used whenever a roadway worker has finished their job or wants to cancel or fulfill a Form D and is giving the track back to the dispatcher.”) (emphasis in original), 39, 31, Fig. A-1; *see* 1[B]/5[A]; Michalson, ¶137.

Thus, only the worker can remove the track block “under his/her authority” by selecting a “Cancel/fulfill” link. Michalson, ¶138.

Selecting this link transmits the previously generated Form D number or release code (*see* 1[D]/5[C]) to the railway control apparatus block removal part (software), which only unblocks the track after receiving the same release code.

Dispatcher Query Server. Handles requests sent by the PDA that need dispatcher interaction such as **requests that have to do with work permissions** and answers sent by dispatcher to the PDA

....

Retrieve list of active Form Ds: Used whenever a **roadway worker has finished their job or wants to cancel or fulfill a Form D** and is giving the track back to the dispatcher.

....

Cancel/fulfill Form D: Works together with the previous request. This is the step to **actually cancel or fulfill the Form D**.

EX1004, 37 (emphasis added), 6 (“When the job is completed . . . the dispatcher unblocks the track making it available for other uses.”), 11; Michalson, ¶139.

This block removal part (software) is also shown in Figure A-1 below where the railway control apparatus unblocks the track only based on receiving the same Form D number (release code) previously generated, particularly “**Cancel/Fulfill Form D . . . You own these form Ds 0003, NorthEast Corridor . . . Cancel/Fulfill . . . Form D Cancel . . . YOU ARE NOT UNDER DISPATCHER**

PROTECTION NorthEast Corridor dispatcher has **received your request and the form D # 0003 has been cancelled.**” EX1004, Fig. A-1 (emphasis added).

Thus, a specific form D “0003” is transmitted to the railway control apparatus to unblock the track as shown by the same Form D number, “form D# 0003,” being cancelled. Michalson, ¶¶140-141.

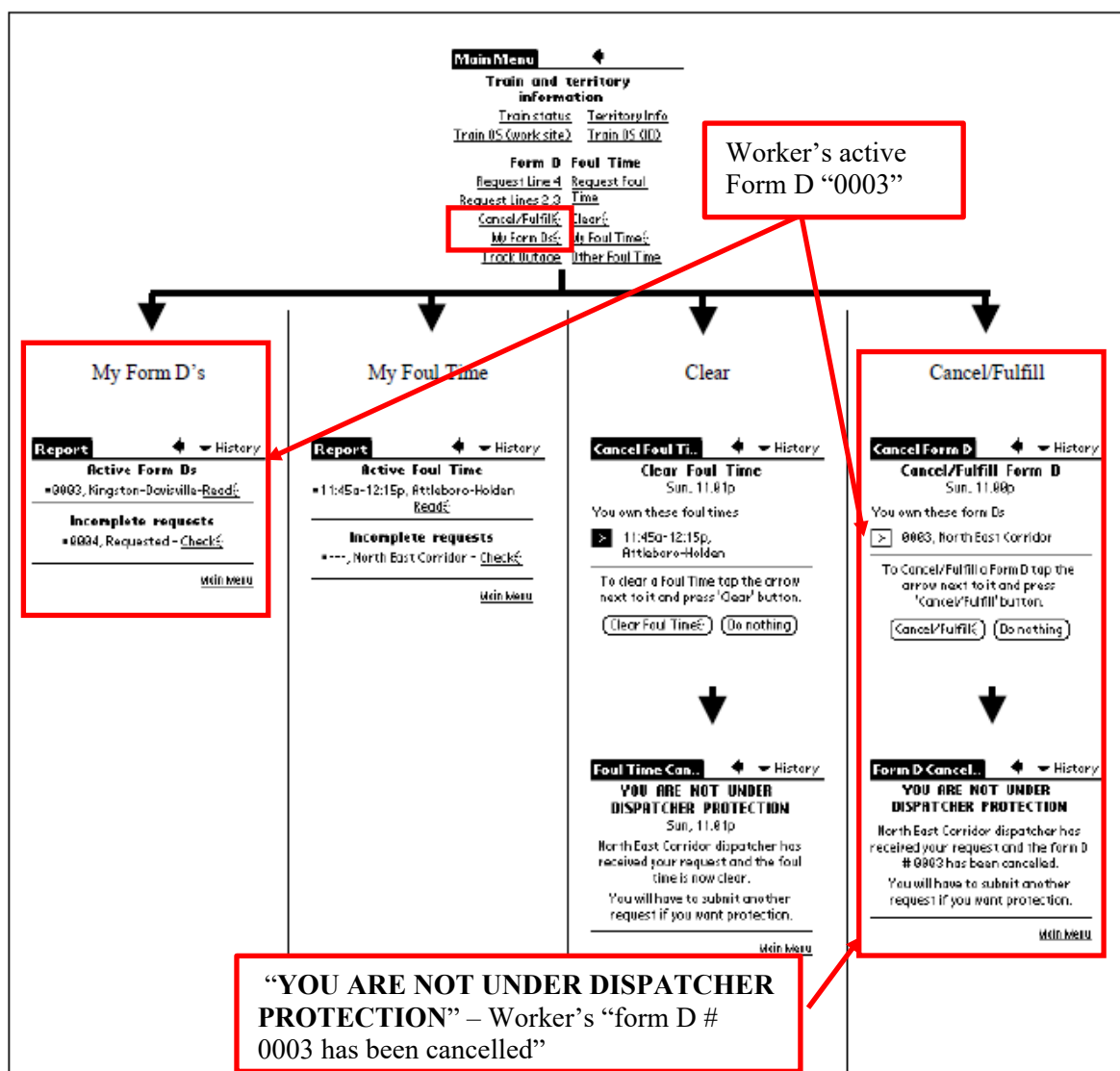


Figure A-1. PDA Screen Shots (1)

Id., Fig. A-1 (annotated); Michalson, ¶141.

It was further known to a POSITA to provide railway authorization only upon receiving a matching code. EX1019, 4:35-42 (“The secure code transmitted from the designated train 101 must match the secure code that is expected by the dispatch office . . . before the movement authority can be transmitted.”), claims 14-15; Michalson, ¶142.

Claims 1 and 5 do not recite entry of the received code, but to the extent that is argued, a POSITA would have been motivated to modify Oriol to enter the release code in the railway traffic control apparatus because it would provide confirmation before the track is unblocked and ensure the dispatcher is alert to the information provided. Michalson, ¶¶143-144.

A POSITA would have had a reasonable expectation of success because Oriol teaches a centralized control system and related software that a POSITA could have modified to include entry of the release code. *See* 1[A]; Michalson, ¶¶145-146.

Additionally, it was also known to a POSITA to enter a code for railway movement. EX1021, 4:10-17, 4:48-53 (“When the human operator H observes the image, he can ascertain whether or not the crossing is clear for the train 28 to enter. At the same time, he will read the unique code and then enter the code into the OCU 42.”), 4:54-65, Abstract, 5:24-30, 5:59-65, claim 1, Fig. 4; Michalson, ¶147.

2. Dependent Claims 2-4, 6-8

- a. **Claim 2: “wherein upon the railway control apparatus placing the block of railway traffic to said one or more specified track sections and transmitting the release code to the electronic contact address accessible by the railway field worker, the user interface provided on the user terminal displays a message and permits the railway field worker to respond to the message to release the block.”**

Claim 6 (similar)

Oriol teaches claims 2 and 6. Michalson, ¶¶148-159.

Oriol teaches that the railway control apparatus receives the work authorization from the worker’s PDA and the railway control apparatus includes a block placing part (software) that blocks the track. *See* 1[C]/5[B].

Oriol further teaches that the railway control apparatus generates a release code and transmits that release code to the worker’s PDA or electronic contact address. *See* 1[D]/5[C]. The railway control apparatus displays this release code and other information on the PDA’s user interface. *Id.*

The worker’s PDA interface also displays a message, *e.g.*, embedded link of “Cancel/Fulfill” in Fig. A-1. *See* 1[E]/5[D]; EX1004, Figs. A-1, A-3; Michalson, ¶¶148-153.

Alternatively, a POSITA would have been motivated to modify Oriol to transmit the Form D number or release code with, *e.g.*, embedded link of “Cancel/Fulfill” in Fig. A-1, in an email or text message to the worker to provide a

more accessible form. This is because workers were familiar with email and cell phones. EX1004, 16 (“[a]ll participants were familiar with . . . cellular phones, the Internet, and e-mail.”), 13; Michalson, ¶¶154-155. Indeed, Mr. Pirtle admitted that mobile phones, text messaging, and email were conventional before the Priority Date. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16.

Mr. Pirtle’s statements further show a POSITA would have had a reasonable expectation of success. EX1004, 13, 57; Michalson, ¶¶156-158.

The worker responds to the message (existing interface or modified as discussed above) by selecting the cancel/fulfill link to transmit the previously generated release code to the railway control apparatus to release the track block. *See* 1[E]/5[D]; Michalson, ¶159.

- b. Claim 3: “The system of claim 2, wherein upon the railway field worker responding to the message to release the block, the release code is returned to the railway control apparatus.”**

Claim 7 (similar)

Oriol teaches claims 3 and 7. *See* 2/6, 1[E]/5[D]; EX1004, Fig. 1; Michalson, ¶160.

- c. Claim 4: “The system of claim 2, wherein the message displayed by the user interface on the user terminal includes an embedded link for activating a return**

transmission of the release code to the railway control apparatus.”

Claim 8 (similar)

Oriol teaches claims 4 and 8. Michalson, ¶¶161-163.

Oriol teaches that the worker’s PDA displays a message with embedded links, such as “Cancel/Fulfill” in Fig. A-1, in the PDA user interface. *See* 1[E]/5[D], 2/6; EX1004, 36, Figs. A-1, A-3.

Alternatively, a POSITA would have been motivated to include the embedded link in an email or text message for the reasons discussed above. *See* 2/6. When the link is activated, it transmits the release code to the railway control apparatus to release the track block. *See* 2/6, 1[E]/5[D]; Michalson, ¶¶161-163.

B. Ground 2: Claims 1-8 Are Obvious Over Oriol and Masquelier

1. Motivation to Combine; Reasonable Expectation of Success

Masquelier is the second volume to Oriol’s publication and cites Oriol several times, such as Masquelier states the “continuing development and evaluation of the [Oriol] application” EX1005, 3, title (similar title as Oriol), Abstract, ix, 5, 10-12, 16, 72, Fig. 4. As such, a POSITA would naturally have been motivated to combine them with a reasonable expectation of success. Michalson, ¶¶164-165.

A POSITA would also have been motivated to modify Oriol with Masquelier and had a reasonable expectation of success given both Oriol and Masquelier were

published by the U.S. Department of Transportation FRA, share two overlapping authors, and discuss solutions using the same types of devices. EX1004, cover page, Report Documentation Page, title, Abstract, 29, 37, Fig. 2; EX1005, cover page, Report Documentation Page, title, ix, 3, 5, 72; Michalson, ¶166.

Additionally, there would have been a motivation to combine and a reasonable expectation of success given both publications are in the field of, and solve the problem of railway control for safe maintenance work and both have substantially similar network architecture. EX1004, Abstract, 1, 6, 29, 37-38, Figs. A-1-A4, 2, 4; EX1005, Abstract, ix, 3, 5, 10-12, 16, Figs. 1, 4, Table 2; Michalson, ¶167.

Thus, a POSITA would have been motivated and had a reasonable expectation of success to modify Oriol, to include Masquelier's mobile device, visual track blocking and unblocking, and text messaging. Michalson, ¶168; *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1381 (Fed. Cir. 2023) ("It's enough for Intel to show that there was a known problem . . . in the art Nothing more is required to show a motivation to combine").

For instance, a POSITA would have been motivated of modifying Oriol to include Masquelier's mobile device because it would provide the worker with further functionality, including the ability to receive and send text messages. Michalson, ¶¶169-170. Indeed, workers in Oriol "were asked if they would use the PDA in their jobs. Interest was high for both requesting information and work

authorizations.” EX1004, 25, 26.

A POSITA would have had a reasonable expectation of success given Masquelier specifically updated Oriol’s PDA with the “Qualcomm® pdQ™ Smartphone 800” for text messaging (Short Message Service or “SMS”) relating to work authorization while maintaining the “same tasks” as Oriol. EX1005, 15, 21, 41; Michalson, ¶171.

A POSITA would also have been motivated to modify Oriol with Masquelier’s central control visual interface for track blocking and unblocking. Michalson, ¶¶172-176. This would enhance safety because it would allow the central control system in Oriol to visually see the tracks blocked and unblocked. Michalson, ¶173. It would also improve efficiency because Oriol would simply use the central control system interface to block the track (before transmitting Oriol’s Form D number to the railway worker) and unblock the track (after receiving the Form D number in return from the railway worker). Michalson, ¶174; EX1005, 10-11, Fig. 1, Table 2.

A POSITA would have had a reasonable expectation of success given Oriol includes central control blocking and unblocking based on the Form D number. EX1004, Abstract, 6, 29, 37-38, 41 (“[t]he system is designed to be highly configurable”), Figs. A-1-A4, 2, 4; Michalson, ¶¶175-176. Also, it was well-known to use a “centralized traffic control” interface for controlling track blocking and

unblocking. *See* Section VIII.A; EX1001, 1:25-47, 1:51-59.

Further, a POSITA would have been motivated to modify Oriol with Masquelier's text message functionality because it would increase efficiency. Michalson, ¶177; EX1005, 27 (“dispatchers particularly liked the feature for contacting a roadway worker via SMS”), 21.

The railway control apparatus would transmit the Form D number via text message to the worker who could unblock the track by simply responding with their own text message containing the same release code (rather than opening the application in Oriol). Michalson, ¶178. The mobile phone's “large touch screen” in Masquelier will also increase efficiency and improve safety as the worker could review and respond to a text message more effectively. EX1005, 41, 63; Michalson, ¶179.

A POSITA would have a reasonable expectation of success because SMS “is a globally accepted wireless service that enables the transmission of alphanumeric messages between mobile subscribers and external systems” EX1005, 63; Michalson, ¶180.

The above motivations to combine and reasonable expectation of success are particularly true given Mr. Pirtle's admission that mobile phones and text message were well-known. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16; Michalson, ¶¶ 181-182.

2. Independent Claims 1, 5

Oriol and Masquelier render obvious claims 1 and 5. Michalson, ¶¶183-195.

In Oriol, the railway control apparatus generates a release code and transmits it to the worker's electronic contact address. *See* Ground 1, 1[D]/5[C]. The worker removes the track block by selecting the “Cancel/fulfill” link (Fig. A-1) to transmit the previously generated Form D number or release code to the railway control apparatus. *See* Ground 1, 1[E]/5[D].

Oriol could implement Masquelier's mobile device. Michalson, ¶¶184-188. Masquelier teaches that the railway worker accesses a mobile device or smartphone with an “application . . . to request and cancel work authorizations [Form D].” EX1005, 15, 16-17, Fig. 4. The mobile phone has a “large touch screen” display. *Id.*, 41.

The mobile device and software application (menu) to request and cancel work authorization in Masquelier are shown below:



**Figure 2. Qualcomm® pdQ™
Smartphone**

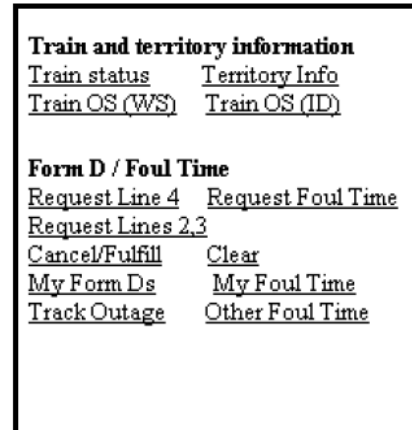


Figure 5. Main Menu

Id., Figs. 2, 5.

Oriol could further implement Masquelier's visual track blocking and unblocking. Michalson, ¶¶189-190. After receiving the worker's Form D request, Masquelier teaches that the dispatcher's railway control apparatus software blocks the track. EX1005, 11 ("At the Traffic Control Center, the dispatcher could use the track display to protect the track segment in question using software that controlled various switches and signals in the field."), 10 ("Each dispatcher has a workstation to control the switches and signals.").

This track blocking in Masquelier is shown in Figure 1 below, where the color "Blue" means "a track section is authorized for track maintenance. This means that a portion of track has been protected for use by maintenance of way crews or track

equipment. When the dispatcher gives track authority to a work crew, the dispatcher temporarily loses control over that section of track.” *Id.*, Table 2.

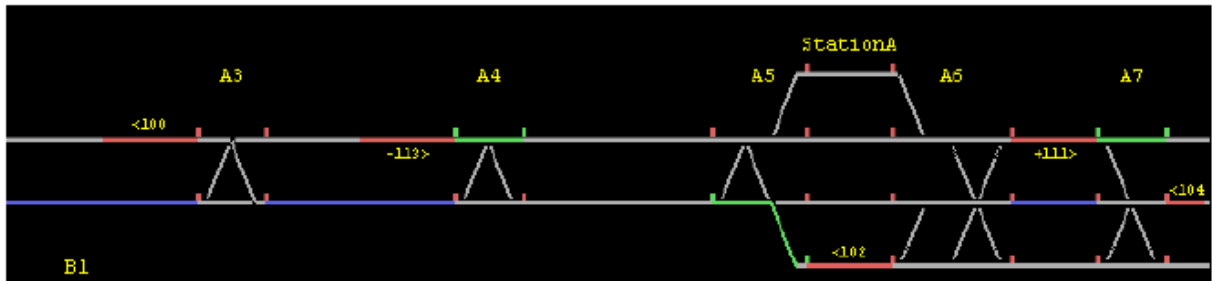


Figure 1. Track Chart Display

Id., Fig. 1

Table 2. Representation of Color Code for Monitoring Track Status

Color	Meaning
White	Indicates that the track segment is available for routing trains or other uses.
Red	Means train or track vehicle occupancy. A train currently occupies that block.
Green	Indicates that the track segment has been cleared (authorized for use) for train movement. The train has not yet entered this block.
Blue	Indicates that a track section is authorized for track maintenance. This means that a portion of track has been protected for use by maintenance of way crews or track equipment. When the dispatcher gives track authority to a work crew, the dispatcher temporarily loses control over that section of track. Trains cannot enter this track segment unless authorized by the roadway worker responsible for that block.

Id., Table 2.

Oriol’s railway control apparatus would generate the Form D number or release code (*see* Ground 1, 1[D]/5[C]) and would implement Masquelier’s text messaging to transmit (using the track display or dispatcher’s phone) that release code to the worker’s phone or electronic contact address. Michalson, ¶¶191-193.

Masquelier specifically updated Oriol’s PDA with the “Qualcomm® pdQ™

Smartphone 800” for text messaging relating to work authorization. EX1005, 15, 21 (“The current hardware platform can use SMS to send and receive messages. . . . • Sending a message by clicking on a roadway worker on the tracking display • Sending an unstructured message to anybody at anytime.”), 27, 63.

Once the work is completed, the railway worker would simply respond to the railway control apparatus to the prompted text message with a text message containing the same release code to unblock the track. EX1005, 15 (“exhibited the ability to send and receive short text messages (SMS) . . . [which] enabled the dispatcher or roadway worker to alert each other when a request for track authorization was initiated or answered.”), 21, 27, 63; Michalson, ¶¶194-195. This is reinforced by Mr. Pirtle’s text message admission. EX1023, 2, 8 (¶¶ 5-7), 15-16; Section VIII.A.

After receiving the release code, the dispatcher’s central control software could unblock the track for other uses. EX1005, Fig. 1 and Table 2, 12 (“Once the job is complete, the roadway worker returns control of the track to the dispatcher, who releases the track for other uses.”), 10-11; *see* 1[E]/5[D].

3. Dependent Claims 2-4, 6-8

Claims 2/6. Oriol could use Masquelier’s text messaging to transmit and return the code. *See* Independent Claims; *e.g.*, EX1005, 15; Michalson, ¶¶191-195. Alternatively, the code could be transmitted and returned via email given email is

well-known to a POSITA. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16; Michalson, ¶199.

Claims 3/7. *See* 2/6.

Claims 4/8. *See* Independent Claims. Oriol could use Masquelier's text messaging to send the cancel/fulfill link in a text message to the railway worker to which the worker would then activate the link to return the release code to the railway control apparatus. Michalson, ¶196.

A POSITA would have been motivated to make this modification in Oriol because it would provide a more efficient option to unblock the track. The worker would simply select the link to return the release code rather than responding with another text message. Michalson, ¶197.

A POSITA would have had a reasonable expectation of success given it would be a straightforward modification as links were well-known and Oriol transmits links to the PDA's software application (*see* Ground 1, 1[D]/5[C]), so it could reuse the same software to transmit the links with the release code via text message. Michalson, ¶198.

Alternatively, the link with code could be transmitted and returned via email for the reasons discussed above for text messaging, and email is known to a POSITA. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16; Michalson, ¶199.

C. Ground 3: Claims 1-8 Are Obvious Over Oriol and Wise

1. Motivation to Combine; Reasonable Expectation of Success

A POSITA would have been motivated to modify Oriol with Wise and had a reasonable expectation of success because both references are in the field of, and solve the problem of, railway control for safe maintenance work. EX1004, Abstract, 29, 37, Fig. 2; EX1006, title, Abstract, 1:3-7, 12:6-15; Michalson, ¶200.

Additionally, there would have been a motivation to combine and reasonable expectation of success given the references use central railway traffic control to block tracks. EX1004, Abstract, 1, 6, 29, 37-38, Figs. A-1-A4, 2, 4; EX1006, 7:33-8:2, 9:23-28, 12:6-15, 24:19-26, 27:22-28:4, claims 1, 16, 17, Figs. 2, 5H, 10; Michalson, ¶201.

Thus, a POSITA would have been motivated and had a reasonable expectation of success to modify Oriol, including to block the track and thereafter generate a release code. Michalson, ¶¶202.

For instance, a POSITA would have been motivated to modify Oriol with Wise's first blocking the track and thereafter generating a unique access code (*e.g.*, SCN), as the release code. Michalson, ¶202; *see* Section VIII.D. This modification could enhance safety and security as the central control system would only generate the code once the block has been implemented as otherwise the dispatcher and/or

third-party could unsafely or incorrectly use the code before the track is blocked. Michalson, ¶203.

Moreover, because Wise's code would be separate from the Form D number, it would be more difficult for a third-party to decipher and potentially unsafely unblock the track. Michalson, ¶204. Thus, Wise's access code could provide another layer of security over the Form D number because it acts as authority to enter the track for maintenance. Michalson, ¶205; EX1006, Abstract, 12:6-15, claims 1, 15-17, 23, 24:19-26, 26:14-23, Fig. 5H.

A POSITA would have a reasonable expectation of success because Oriol's railway control apparatus has existing hardware and software (for the Form D number) such that they could block the track and then generate Wise's code. *See* Ground 1, 1[B]/5[A]-[D]/5[C]; Michalson, ¶¶206-207. Indeed, Oriol notes that "[t]he system is designed to be highly configurable," which would further enable a POSITA to make this modification. EX1004, 41.

Further, a POSITA would have had a reasonable expectation of success for the worker to transmit the same release code to the railway control apparatus to unblock the track. For instance, a POSITA would modify Oriol's "Cancel/Fulfill" in Fig. A-1 (*see* Ground 1, 1[E]/5[D]) such that the Wise access or release code would be returned with the Form D number to the railway control apparatus. Michalson, ¶208. This would require minimal effort or programming. Michalson, ¶209.

2. Independent Claims 1, 5

Oriol and Wise render obvious claims 1 and 5. Michalson, ¶¶210-214.

After blocking the track, Oriol would generate and transmit Wise's unique access code such as an SCN to be displayed on the worker's device. Michalson, ¶¶211-213.

Wise teaches that, after the worker requests a safety measure (denoted as a green zone), the central control system blocks the track using signal lights and thereafter generates an access code, *e.g.*, SCN, which is provided to the worker. *See* Section VIII.D; EX1006, Fig. 5H ("Press the traffic-light icon on the toolbar & the SCN is automatically generated"), 7:33-8:2 ("[G]reen zone refers to a location where there is a blockage such a[s] traffic lights"), claims 1, 16 ("unique access code is provided to said user"), 17, 30:20-24 ("operators . . . may take steps . . . by controlling traffic lights in the region, controlling the speed of trains or preventing trains from running."), 29:32-30:3 ("operators will be responsible for controlling signalling"), 12:6-15, 24:19-26, Abstract.

Wise teaches that the access code transmitted to the worker provides authority to enter a track for maintenance. EX1006, 12:6-15 (SCN "authorises/permits the user . . . to carry out work and access a work site."), 24:19-26, 26:14-23, 16:16-19, claims 1, 15-17.

When the work is completed and “Cancel/Fulfill” is selected, Oriol would transmit the access code (and Form D number) to the railway control apparatus, which would use (or enter) the access code (rather than the Form D number for the reasons discussed above) to unblock the track. *See* EX1006, 25:4-9 (once the “job is completed . . . the operator [is provided] with the SCN number which has previously been allocated to the job.”); *see* Ground 1, claim 1[E]/5[D]; Michalson, ¶214.

3. Dependent Claims 2-4, 6-8

Claims 2/6. The display of “Cancel/Fulfill” in Fig. A-1 is a message such that when activated Wise’s access code would be returned to the railway control apparatus. *See* Ground 1, 1[E]/5[D]; Michalson, ¶ 216.

Alternatively, the code could be transmitted and returned via email or text message. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16; *see* Ground 1, 2/6; Michalson, ¶217.

Claims 3/7. *See* 2/6; *see* Ground 1, 3/7; Michalson, ¶¶216-217.

Claims 4/8. *See* 2/6; *see* Ground 1, 4/8; Michalson, ¶¶216-217.

D. Ground 4: Claims 1-8 Are Obvious Over Oriol, Masquelier, and Wise

Oriol, Masquelier, and Wise render obvious claims 1-8. *See* Grounds 2-3; Michalson, ¶¶218-222.

A POSITA would have been motivated to combine Oriol, Masquelier, and Wise and had a reasonable expectation of success given the references are in the field of, and the solve the problem of, railway control for safe maintenance work. EX1004, Abstract, 6, 29, 37-38, Figs. 2, A-1, A-3; EX1005, Abstract, ix, 3, 5, 10-12, 16, Figs. 1, 4, Table 2, 72; EX1006, title, Abstract, 1:3-7, 7:33-8:2, 12:6-15, 24:19-26, 27:22-28:4, 9:23-28, claims 1, 16, 17, Figs. 2, 5H, 10; Michalson, ¶¶219-220.

As discussed previously, a POSITA would have been motivated to modify Oriol and Masquelier to include central control blocking and unblocking as well as the railway control apparatus to transmit and receive the release code (Form D number) over text message. *See* Ground 2.

A POSITA would have been further motivated to modify this Oriol and Masquelier combination such that the railway control apparatus blocks the track and then uses Wise's access code as the release code instead of the Form D number for the reasons discussed in Ground 3, including enhanced safety and security. *See* Ground 3; Michalson, ¶¶220-221.

When the work is completed and "Cancel/Fulfill" is selected, Oriol and Masquelier would transmit Wise's access code to the railway control apparatus, which would use (or enter) the access code to unblock the track. *See* Ground 1, claim 1[E]/5[D], Grounds 2-3; EX1006, 25:4-9; Michalson, ¶222.

And there would have been a reasonable expectation of success as previously discussed in Ground 3 and also the three references are in a similar field. *See* Grounds 2-3; Michalson, ¶222.

E. Ground 5: Claims 1-8 Are Obvious Over Oriol, Masquelier, and Pachl

A POSITA would have been motivated to combine Oriol, Masquelier, and Pachl and had a reasonable expectation of success given that the references provide railway control. EX1004, Abstract, 1, 6, 29, 37-38, Figs. A-1-A4, 2, 4; EX1005, Abstract, ix, 3, 5, 10-12, 16, Figs. 1, 4, Table 2; EX1020, 1:33-36, 1:63-66, 2:47-60, 3:22-45, 4:9-15, 4:50-59, Abstract, Figs. 1-2, claim 3; Michalson, ¶223.

For instance, a POSITA would have been motivated to modify Oriol and Masquelier with Pachl to first block the track and then generate the code. Michalson, ¶224. This modification could enhance safety and security as the central control system would only generate the code once the block has been implemented as otherwise the release code could be unsafely or incorrectly used before the track is blocked. Michalson, ¶225.

A POSITA would have a reasonable expectation of success because Oriol and Masquelier could generate a temporary number or other placeholder and then once the safety measure is made effective, generate the Form D number to provide greater

security and safety as that release code would not be known until the track is blocked. Michalson, ¶226.

A POSITA would also have been motivated to modify Oriol and Masquelier with Pachl such that the dispatcher in the railway traffic control apparatus only unblocks the track based on the dispatcher entering the code (transmitted from the worker). Michalson, ¶227.

This code entry would provide another level of protection and confirmation before the track is unblocked. It would also ensure the dispatcher is alert to the information provided, such as unblocking the track. Michalson, ¶228.

A POSITA further would have had a reasonable expectation of success because Oriol teaches a centralized dispatcher user interface and related software that a POSITA could have modified to include entry of the release code. Ground 1, 1[B]-[C]; Michalson, ¶229.

A POSITA would have had a motivation to combine and reasonable expectation of success because it was known to enter a code in an interface to allow train movement. EX1021, 4:10-17, 4:22-27, 4:48-53, 4:54-65, 5:24-30, 5:59-65, claim 1, Abstract, Fig. 4; Michalson, ¶230.

Oriol, Masquelier, and Pachl render obvious claims 1 and 5. Michalson, ¶¶231-237.

Oriol and Masquelier could block the track and then generate the code (Form D number) as shown by Pahl first implementing a safety measure and then generating a code. Michalson, ¶232.

Pahl teaches a central control center with a computer interface to first control the track safety measure (“movement permission”) and then generate a “checking code.” EX1020, 1:33-36, 3:35-40, 4:9-15, 1:38-42, 1:63-66, 3:40-45, 1:11-20, Abstract.

Controlling the safety measure (“Permissibility checking of the movement permission” and “Occupation of the assigned track sections”) and then generating the code (“output of the checking code”) is shown in Figure 1. EX1020, Fig. 1; Michalson, ¶¶233-234.

Oriol and Masquelier could further implement Pahl’s code entry to release the track. Michalson, ¶235.

Pahl further describes that the train controller (such as a dispatcher) at the control center will only release the track upon entry of a code in the interface. *Id.*, 2:47-60 (“train controller” enters a received code and thus **“it is impossible for an associated track section to be released erroneously.”**) (emphasis added), 4:50-59, 1:63-66, 4:15-18, claims 1, 5, Fig. 2; Michalson, ¶¶ 236-237.

F. Ground 6: Claims 1-8 Are Obvious Over Tamaribuchi and Pahl

1. Motivation to Combine; Reasonable Expectation of Success

A POSITA would have been motivated to combine Tamaribuchi and Pahl and had a reasonable expectation of success given the references provide railway control. EX1007, Abstract, [0002], [0060], [0078]; EX1020, 1:33-36, 1:63-66, 2:47-60, 3:22-27, claim 3; Michalson, ¶¶238-239.

A POSITA would have been motivated to modify Tamaribuchi with Pahl to first implement the safety measure (such as block the track) and thereafter generate Tamaribuchi's reference number. Michalson, ¶240. This would prevent workers receiving the code from unsafely entering a work area before the track is blocked. *Id.*, ¶241.

A POSITA would have a reasonable expectation of success because Tamaribuchi could generate a temporary number or other placeholder based on work order and then once the safety measure is made effective generate the reference number to provide greater security and safety. *Id.*, ¶242.

2. Independent Claims 1, 5

a. 1[Pre]/5[Pre] — Protect Railway Worker

Whether or not the preamble is limiting, Tamaribuchi teaches enhanced railway control with a central control system that communicates with a maintenance worker to protect the safety of a railway worker on a track. EX1007, [0002] (“The

present invention relates to a control system for controlling a target device having an influence on safety of maintenance work, and a terminal device for maintenance worker and a control device included in the control system.”), [0060] (“The central control device 100 . . . for controlling the rail transportation control system 1”), [0078], Abstract; Michalson, ¶243.

b. 1[A] — Communicate with Railway Control Apparatus

Tamaribuchi teaches the railway control apparatus or central control system with a “control unit” (processor) and “storage unit” having one or more programs of executable instructions. EX1007, [0067] (“The control unit 190 includes a CPU (Central Processing Unit) for reading and executing a program”), [0351], [0353].

The railway control apparatus further includes a “communication unit” for communicating over a network interface with the worker’s maintenance device, such as a PDA. *Id.*, [0063], [0068] (“The terminal device 200 is, for example, a . . . PDA”), [0071], [0353].

The railway control apparatus also controls the track power and signaling to block and unblock the track. *Id.*, [0054] (“The power control device 910 and the signaling control device 920 are examples of target devices controlled by the central control device 100”), Fig 1; Michalson, ¶¶244-246.

Additionally, it was known to a POSITA to use a central control computer to control railway tracks. *See* Section VIII.A; EX1001, 1:25-2:3; Michalson, ¶247.

c. 1[B]/5[A] — Communicate with Worker Device

Tamaribuchi teaches a railway worker's user terminal, *e.g.*, PDA, communicating over the Internet with the railway control apparatus. *See* 1[A]. A PDA is a mobile device given a PDA is a portable device to communicate over the Internet (or mobile network) and Mr. Pirtle's admission that mobile phones are well-known. EX1001, 4:47-51, 9:2-5; EX1023, 2, 8 (¶¶ 5-7), 15-16; *see* Section VIII.A; Michalson, ¶248.

The railway control apparatus transmits a work order to display on the PDA. EX1007, [0079] (work order is “a form of an approval request to request approval of the maintenance work and execution of the safety measure”), [0075].

The displayed information on the PDA includes prompts for safety measure(s), such as “Track closure required . . . to prohibit entry of a train.” *Id.*, [0078], [0080]; Michalson, ¶¶249-250.

“After the worker performs the selection of the safety measure . . . the worker touch[es] a button B11 . . . [to] request for approval (Request PTW).” EX1007, [0082], Fig. 2; Michalson, ¶251.

d. 1[C]/5[B] — Place Track Block

Tamaribuchi teaches that the user terminal transmits the above approval or blocking request for the safety measure—*e.g.*, track closure—to the railway control apparatus. *See* 1[B]/5[A]; EX1007, [0083], [0089], [0064], [0123], Fig. 2.

As discussed, software would implement the three claimed parts (block placing, code generation, and block removal). *See* Ground 1, 1[C]/5[B]. Tamaribuchi teaches such software in the railway control apparatus. *See* 1[A]; EX1007, [0067], [0351], [0353]; Michalson, ¶¶252-254.

After the safety measure request is received, the railway control apparatus' processor executes block placing part software to block the track by stopping the power and displaying a signal to prohibit train entry. EX1007, [0089] (“[T]he safety measure is performed by the central control device 100 when the worker selects . . . the safety measure”), [0130] (“[T]he **power control device 910 stops power supply to the designated section.** . . . [T]he signaling control device 920 controls the signaling device . . . **to display prohibition of vehicle entry**”) (emphasis added), [0131], [0100], Fig. 7, [0055]-[0056], [0127]-[0128].

Thereafter, the railway control apparatus “transmits information, indicating that the safety measure is made effective, to the terminal device 200.” EX1007, [0132]; Michalson, ¶¶255-256.

The worker then locks the safety measure (power stopped and signal for vehicle entry prohibited) by transmitting a lock request, including a reference number, to the railway control apparatus. *Id.*, [0135], [0139] (“the control unit 290 generates the request for PIN lock including the reference number”), [0140].

Based on the lock request, the railway control apparatus (control unit) updates the “value . . . for safety measure stored in the storage unit 140, to be ‘lock’” associated with the reference number. *Id.*, [0143], [0109].

The storage unit’s data structure is shown below in Figure 6:

FIG. 6

WORK ORDER NUMBER	PIN	SAFETY MEASURE 1	SAFETY MEASURE 2	SAFETY MEASURE 3	...
...	...	NOT YET	NA	NOT YET	...
...	...	...	...	...	...

Reference number

“identifying the worker”

Safety measure(s)

Id., Fig. 6 (annotated), [0108], [0111] (“The PIN stored in the second column is an identification number for identifying the worker”); Michalson, ¶¶257-258.

This PIN lock state permits the railway worker to enter the track for maintenance. *Id.*, [0148], Abstract, [0053], [0057], [0113]; Michalson, ¶259.

Additionally, it was known to a POSITA for central control to transmit a signal to the corresponding interlock to block a track. *See* Section VIII.A; EX1001, 1:25-2:3; Michalson, ¶260.

e. 1[D]/5[C] — Generate Code

Tamaribuchi teaches the railway control apparatus includes a code generation part (software) which generates a reference number, *e.g.*, serial number, or release code for later unblocking the track. EX1007, [0118] (“control unit 190 produces the

work order . . . **adds the reference number . . .**”) (emphasis added), [0110] (“The reference number . . . is an identification number . . . for example, a serial number”), Figs. 3, 4 (A23: “ID Number: M152390”), [0214]; Michalson, ¶261.

The railway control apparatus transmits the reference number to the worker’s electronic contact address because the worker’s “PIN indicates a destination of the work order” and Tamaribuchi shows an example of transmitting to a worker’s phone (“HHH-0000-1111”). *Id.*, [0111], Fig. 2 (A113: “Contact”: “HHH-0000-1111”), [0119] (executes “**communication unit 130 transmits** the work order output **from the control unit 190, together with the reference number . . . [to] the terminal device 200.**”) (emphasis added), [0215], [0077], Fig. 7.

This release code is displayed to the worker on, *e.g.*, a PDA, as shown in Figure 3 (A23). *Id.*, Fig. 3, [0090], [0088] (Fig. 3 shows “PIN lock is not performed”), Fig. 4, [0094] (Fig. 4 shows “safety measure is PIN-locked”); Michalson, ¶¶263-264.

Tamaribuchi’s reference number (*e.g.*, Figs. 3 or 4: “M152390”), is a release code given the same reference number is used to later release the track block. *infra* claim 1[E]/5[D]; Michalson, ¶264. The PIN meanwhile “is an identification number for identifying the worker . . . [and] indicates a destination of the work order.” EX1007, [0111]; Michalson, ¶265.

To the extent it is argued that claim limitations 1[D] and 5[C] require that the code is generated after the track is blocked, a POSITA as discussed above would have been motivated to modify Tamaribuchi with a reasonable expectation of success to implement Pachi's central control system to block the track before generating the reference number or release code for greater safety and security. EX1020, 1:11-20, 1:33-36, 1:38-42, 1:63-66, 3:35-40, 3:40-45, 4:9-15, Abstract; Michalson, ¶266.

f. 1[E]/5[D] — Remove Track Block

To remove the track block, the worker on the PDA interface selects “in FIG. 4, an unlock request button B32 for requesting the release of the PIN lock.” EX1007, [0097], Fig. 4; Michalson, ¶267.

This transmits the unlock request, including the same previously generated release code, to the railway control apparatus. *Id.*, [0167] (“control unit 290 **generates a request for PIN lock release including the reference number . . .** and the PIN input in sequence S202, and outputs the request for PIN lock release to the communication unit 230.”) (emphasis added), [0168], [0098], [0321]; Michalson, ¶268.

The railway control apparatus, including a block removal part (software), confirms the worker associated with this reference number has authority to remove the track block. EX1007, [0169] (“the control unit 190 reads a PIN of a person

having a right to request PIN lock release . . . **based on the reference number . . . in the request for PIN lock release.**”) (emphasis added).

The block removal part then updates the safety measure state associated with the reference number from “Lock” to “Execute” in the storage unit (data structure in Figure 6). *Id.*, [0170] (“The transition to the unlock state is performed by the control unit 190 rewriting the value of the column [in Figure 6] for storing the state information . . . to be ‘Execute.’”), [0109], Fig. 6; *see* 1[C]/5[B]; Michalson, ¶¶269-270.

Once the safety measure state is changed, the track block will be removed by causing power to be restored and the signaling to be released; otherwise, the central control system “display[s] the reference number . . . at a row whose value is ‘Lock’ . . . [and] that the safety measure cannot be released.” EX1007, [0199], [0200], [0202], [0203]; Michalson, ¶271. Thus, the track is only released based on the reference number.

To the extent the reference number must be entered, it would have been obvious with a reasonable expectation of success to modify Tamaribuchi with Pahl’s code entry to provide confirmation before the track is unblocked and given Tamaribuchi’s existing centralized control system and related software. Michalson, ¶273; EX1020, 2:47-60, 4:50-59, 1:63-66, 4:15-18, claims 1, 5, Fig. 2; *see* 1[A].

Entering the code was further known to a POSITA. *See* Ground 1, 1[E]/5[D]; EX1021, 4:10-17, 4:48-53, 4:54-65, Abstract, 5:24-30, 5:59-65, claim 1, Fig. 4; Michalson, ¶275.

3. Dependent Claims 2-4, 6-8

a. Claims 2/6 — Respond to Message to Release Block

Tamaribuchi teaches claims 2/6. *See* 1[D]/5[C], 1[E]/5[D]; EX1007, [0165], [0167], [0168], [0321]; Michalson, ¶¶276-282.

Alternatively, a POSITA would have been motivated to modify Tamaribuchi to transmit the reference number in an email or text message to the worker and the worker returns such release code in an email or text message to the railway control apparatus to provide a more efficient form. Michalson, ¶279; EX1007, [0181]-[0183], [0306].

The motivation to combine and reasonable expectation of success is particularly true given Mr. Pirtle's admission discussed previously. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16; Michalson, ¶¶280-282.

b. Claims 3/7 — Respond to Message to Return Code

See 2/6; Michalson, ¶283.

c. Claims 4/8 — Respond to Link to Return Code

Tamaribuchi teaches an embedded link with an unlock button ("Unlock ?" in Figure 4). *See* 2/6; EX1007, [0165], [0167]; Michalson, ¶¶284-288.

Alternatively, a POSITA would have been motivated to transmit the “Unlock ?” as an embedded link in an email or text message because it would provide a simpler (efficient) mechanism to return the release code. Michalson, ¶286. A POSITA would have a reasonable expectation of success given embedded links are known and email and text are known communication methods. *See* Section VIII.A; EX1023, 2, 8 (¶¶ 5-7), 15-16; Michalson, ¶¶287-288.

G. Ground 7: Claims 1-8 Are Obvious Over Wise and Masquelier

1. Motivation to Combine; Reasonable Expectation of Success

A POSITA would have been motivated to modify Wise with Masquelier because both references are in the field of, and the solve the problem of, railway control for maintenance work. EX1006, title, Abstract, 1:3-7, 12:6-15; EX1005, Abstract, 3, 10-12, 16, Fig. 4; Michalson, ¶289.

A POSITA would further have been motivated to modify Wise with Masquelier’s central control track blocking and unblocking to enhance safety. Michalson, ¶290. This modification would allow the Wise operator to visually review the tracks blocked and unblocked and thus improve safety. Michalson, ¶291; EX1005, xi, 37. It would also improve efficiency because the operator could simply select a track on the interface to block the track (after receiving a worker’s request) or unblock the track (after receiving the release code from the worker). Michalson, ¶292; EX1005, 10-11, Fig. 1, Table 2.

Also, a POSITA would have been motivated to modify Wise with Masquelier's mobile device with text message communication because such functionality would improve safety for both the worker and central control dispatcher. Michalson, ¶293. Masquelier would enable the Wise worker to receive and respond to the release code as opposed to in Wise where the worker and dispatcher may receive the access code orally which could be forgotten or lost. EX1006, 24:19-26, 25:4-9, claim 1, Fig. 5H, 32:10-13; EX1005, xi, 37; Michalson, ¶294.

A POSITA would have had a reasonable expectation of success given mobile devices, including text messaging, were well-known and Masquelier explains “dispatchers particularly liked” text messaging. *See* Section VIII.A; EX1005, 27, 21, 63; EX1023, 2, 8 (¶¶ 5-7), 15-16; Michalson, ¶295.

2. Independent Claims 1, 5

a. 1[Pre]/5[Pre] — Protect Railway Worker

Whether or not the preamble is limiting, Wise teaches to enhance railway control by protecting worker safety using an access code. EX1006, 1:3-7 (“invention relates to a method for improving safety of personnel working at a work site which may be part of a rail network.”), 10:1-6, 25:4-9, Abstract, Title, claims 1 (“A method for increasing safety at a work site . . . subsequently providing said user with an

access code for permitting said user to carry out said service.”), 16, 17; Michalson, ¶296.

b. 1[A] — Communicate with Railway Control Apparatus

Wise teaches central control (remote station / call center 21) or railway control apparatus with a processor and associated databases, and an operator terminal that communicates over a network interface (Internet) with a worker’s mobile terminal. EX1006, Fig. 10, 27:22-28:4, Fig. 2, 9:23-28; Michalson, ¶¶297-298.

The one or more servers and associated databases would each have a non-transitory medium such as a hard drive or other storage for “storing one or more programs of executable instructions” because the central control system would have software to control the track signal lights (and other equipment) and then generate a release code. *Id.*, Fig. 5H (“Press the traffic-light icon on the toolbar & the SCN is automatically generated”), 24:19-26, claims 1, 16, 17, Abstract, Fig. 6A, 30:19-24; Michalson, ¶299.

Nevertheless, Wise could implement Masquelier’s central control system software for visual track blocking and unblocking, as discussed in claim 1[C]/5[B]. EX1005, 10, 11, Table 2, Fig. 1; Michalson, ¶300.

Additionally, it was known to a POSITA to use a central control computer to control railway tracks. *See* Section VIII.A; EX1001, 1:25-2:3; Michalson, ¶301.

c. 1[B]/5[A] — Communicate with Worker Device

Wise teaches a railway worker using a mobile terminal to communicate via a network with a railway control apparatus. *See* 1[A]; EX1006, 9:23-28; 26:2-4. Wise’s mobile device displays information. EX1006, claim 19.

Wise could implement Masquelier’s mobile device because it would enable the worker to receive and send text messages with the railway control apparatus. *See* EX1005, 15, 21, 63. The worker can respond to such displayed text messages by transmitting messages back to the central control dispatcher. *See* EX1005, 15, 21, 63; Michalson, ¶¶302-304.

d. 1[C]/5[B] — Place Track Block

As discussed, software would implement the three parts in claim 1. *See* Ground 1, 1[C]/5[B]. Wise teaches such software in the railway control apparatus. *See* 1[A]; Michalson, ¶¶305-306.

Wise teaches that the railway worker uses the mobile phone to request the railway control apparatus to block the track, *e.g.*, a green zone. EX1006, Fig. 5H, 7:33-8:2, 17:4-6, 21:4-5; *see* Section VIII.D.

After the blocking request is received, the railway control apparatus’ block placing part (software) implements the green zone (blocking) by controlling the signal lights to prevent trains from entering. *Id.*, Fig. 5H (“**Press the traffic-light icon** on the toolbar”) (emphasis added), 13:26-27, 30:19-24 (“operators . . . may take

steps to modify parameters at that work site. For example by controlling traffic lights in the region”), 23:10-16, 29:32-30:3, 7:33-8:2; Michalson, ¶¶307-308.

Wise could implement Masquelier’s visual track blocking (block placing part 1[C]) and unblocking (block removal part 1[E]) software. Michalson, ¶309. Masquelier describes that the dispatcher’s railway control apparatus software blocks the track after receiving such a request from the worker. *See* Ground 2; EX1005, 11 (“dispatcher could use the track display to protect the track segment in question using software that controlled various switched and signals”), 10, 12, Fig. 1, Table 2; Michalson, ¶310.

The blocked track permits the railway worker to enter the track to perform, *e.g.*, maintenance work. *See infra* 1[D]/5[C]; EX1005, Table 2 (“Blue” means “a track section is authorized for track maintenance.”), Fig. 1, 11-12.

Additionally, it was known to a POSITA for central control to transmit a signal to the corresponding interlock to block a track. *See* Section VIII.A; EX1001, 1:25-2:3; Michalson, ¶¶311-312.

e. 1[D]/5[C] — Generate Code

After blocking the track, Wise teaches the railway control apparatus, including its code generation part (software), generates an access code, such as an SCN, or release code. *See* Section VIII.D; EX1006, Fig. 5H (“Press the traffic-light

icon on the toolbar & the SCN is automatically generated”), 24:19-26, Claims 1, 16, 17, Abstract, Fig. 6A; Michalson, ¶¶313-314.

This code is transmitted to the worker. EX1006, 12:6-15 (“a unique check number [SCN] . . . [is] allocated to the qualified person.”), 24:19-26 (“This number may then be verbally given to the caller at step S553”), Fig. 5H, Abstract, claims 1, 16, 17.

As discussed, a POSITA would have been motivated to modify Wise with Masquelier to transmit the release code over text message to the worker’s phone or electronic contact address. *See* EX1005, 15, 21, 27, 63; Michalson, ¶315.

Upon receiving the release code, the worker can safely enter the worksite for maintenance. EX1006, 12:6-15 (code “authorises/permits the user . . . to carry out work and access a work site.”), 24:19-26, 10:4-6, claim 17; Michalson, ¶316.

f. 1[E]/5[D] — Remove Track Block

Wise teaches when the work is completed, the worker transmits the same SCN “previously . . . allocated to the job” to the railway control apparatus to release the work. EX1006, 25:4-9, Fig. 5H (“Ask for SCN”).

As discussed, a POSITA would have been motivated to modify Wise with Masquelier such that the worker transmits a text message with a release code (in response to the received text message containing the release code) to the railway control apparatus to unblock the track. Michalson, ¶¶317-318.

Upon receiving the Wise release code, Wise would then use Masquelier's visual track unblocking or block removal part (software) to unblock the track. Michalson, ¶319; EX1005, 12, 10-11, Fig. 1, Table 2.

To the extent the code must be entered, it was known to a POSITA to enter the received code. EX1021, 4:10-17, 4:48-53, 4:54-65, Abstract, 5:24-30, 5:59-65, claim 1, Fig. 4; Michalson, ¶320.

This text message modification would (1) improve safety – Wise's oral code could be forgotten or lost; and (2) reduce delay – Wise's phone line could be busy when the worker calls the railway control apparatus to orally provide the release code. Michalson, ¶321.

3. Dependent Claims 2-4, 6-8

a. Claims 2/6 — Respond to Message to Release Block

Wise and Masquelier describe that the railway control apparatus includes a code generation part that generates a release code and transmits that code over text message to the worker's phone. *See* 1[B]/5[A], 1[D]/5[C].

The worker would respond to such text message by transmitting the release code to the railway control apparatus. *See* 1[E]/5[D]; Michalson, ¶¶322-323.

b. Claims 3/7 — Respond to Message to Return Code

See 2/6, 1[E]/5[D]; Michalson, ¶324.

c. Claims 4/8 — Respond to Link to Return Code

See 2/6.

A POSITA would have been motivated to modify the transmitted text to display the release code as a link such that activating the link returns the code to the railway control apparatus. Michalson, ¶326; *see* 1[B]/5[A], 1[E]/5[D].

This modification would improve the efficiency for railway workers as they would simply select a link and there would have been a reasonable expectation of success as it was known how to create links in software to return data, such as a release code. Michalson, ¶327.

X. GRAHAM FACTORS (NO SECONDARY CONSIDERATIONS)

The *Graham* factors were discussed for each ground, including the scope of the prior art, the prior art as compared to the claims, and the level of ordinary skill in the pertinent art. *See* Sections VI, VIII-IX.

For the last factor, secondary considerations, Patent Owner has not shown how any alleged secondary considerations have a nexus to the claims. *Teva Pharm. Int'l GmbH v. Eli Lilly & Co.*, 8 F.4th 1349, 1360 (Fed. Cir. 2021).

XI. No Basis for Discretionary Denial

A. § 314(a): *Fintiv* and *General Plastic* Factors Favor Institution

The six *Fintiv* factors weigh against discretionary denial. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, at 6 (PTAB Mar. 20, 2020).

First Factor. This is neutral because Petitioner has not yet moved to stay the Litigation pending IPR, and the PTAB will not speculate on how a district court may rule when a stay is requested. *See Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11, at 10-11 (PTAB May 19, 2021).

Second Factor. This favors institution as a Final Written Decision is quite likely before a trial occurs given no trial date is scheduled.

Third Factor. This factor favors institution given the Litigation in its early stage as no discovery, claim construction, and other significant milestones have occurred based on the briefed motion discussed previously.

Fourth Factor. This factor favors institution. Petitioner stipulates that if this '782 Patent IPR is instituted, Petitioner will not pursue invalidity grounds in the Litigation of the Challenged Claims on any ground raised, or that could have been reasonably raised in this IPR for the Challenged Claims. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, at 18 (PTAB Dec. 1, 2020).

Fifth Factor. This factor should be accorded little weight or is neutral given the Petitioner and Patent Owner are the same parties as in the Litigation.

Sixth Factor. Petitioner's merits are strong, including supporting Michalson declaration.

Additionally, *Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha* factors weigh against discretionary denial because there is no prior petition filed on the challenged claims. *Id.*, IPR2016-01357, Paper 19, at 16-18 (PTAB Sept. 6, 2017).

B. § 325(d): *Advanced Bionics* Favors Institution

Denial under § 325(d) is not warranted under *Advanced Bionics*' two-factor test. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020).

The first factor that the “same or substantially the same prior art or arguments previously were presented to the Office” (*id.*) is not met because none of the grounds here were considered during prosecution of the '782 Patent.

It is also insufficient to argue that the prosecutions of the RE'835 Patent and RE'115 Patent should be considered here because they do not involve the “challenged patent.” *Advanced Bionics*, Paper 6 at 10. Regardless, the grounds here were not considered during those reissue prosecutions.

XII. CONCLUSION

Petitioner requests *inter partes* review and cancellation of claims 1-8 of the '782 Patent.

DATED: July 6, 2023

Respectfully submitted,

By: /s/ Frank M. Gasparo
Frank M. Gasparo (Reg. No. 44,700)
Attorney for Petitioner
VENABLE LLP
151 W. 42nd Street, 49th Floor
New York, NY 10036
T 212-370-6273
F 212-307-5598
fmgasparo@Venable.com

CERTIFICATION OF COMPLIANCE UNDER 37 CFR § 42.24(d)

Pursuant to 37 C.F.R. §42.24(d), Petitioner certifies that this Petition for *Inter Partes* Review has total 13,728 words as counted by Microsoft Word, exclusive of the cover page, table of contents, table of authorities, mandatory notices under §42.8, certificate of service, word count, appendix of exhibits or claim listing, and signature block (37 CFR § 42.24(a)). This is within the 14,000 word limit allowed under §42.24(a)(1)(i).

DATED: July 6, 2023

Respectfully submitted,

By: /s/ Frank M. Gasparo
Frank M. Gasparo (Reg. No. 44,700)
Attorney for Petitioner
VENABLE LLP
151 W. 42nd Street, 49th Floor
New York, NY 10036
T 212-370-6273
F 212-307-5598
fmgasparo@Venable.com

CERTIFICATE OF SERVICE

I hereby certify that on July 6, 2023 I caused a true and correct copy of the foregoing materials:

- Petition for *Inter Partes* Review of U.S. Patent No. 9,517,782
- Exhibits
- Petitioner's Power of Attorney

to be served via overnight delivery on the USPTO Patent Center (PAIR)

Correspondence Address for U.S. Patent No. 9,517,782 as follows:

Gary J. Gershik; John P. White;
Christopher C. Dunham; Paul Teng
405 Lexington Avenue
New York, NY 10174

I also caused a courtesy copy of the foregoing materials to be served via email on Railware's counsel of record in the district court litigation:

Bryan J. Vogel
Derrick J. Carman
Robins Kaplan LLP
1325 Avenue of the Americas
Suite 2601
New York, NY 10019
Email: bvogel@robinskaplan.com
dcarman@robinskaplan.com

DATED: July 6, 2023

Respectfully submitted,

By: /s/ Frank M. Gasparo
Frank M. Gasparo (Reg. No. 44,700)
Attorney for Petitioner
VENABLE LLP
151 W. 42nd Street, 49th Floor
New York, NY 10036
T 212-370-6273
F 212-307-5598
fmgasparo@Venable.com