

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIEMENS MOBILITY, INC., GROUND TRANSPORTATION SYSTEMS USA,
INC., HUMATICS CORP., and PIPER NETWORKS, INC.
Petitioners,

v.

METROM RAIL, LLC
Patent Owner

Case No. IPR2023-00468
Patent No. 9,043,131

PATENT OWNER'S RESPONSE

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EXHIBIT LIST

Exhibit #	Description
2001	Garcia, Cristina & Lehner, Andreas & Strang, Thomas & Rockl, Matthias. (2007). Comparison of Collision Avoidance Systems and Applicability to Rail Transport. 1 - 6. 10.1109/ITST.2007.4295927.
2002	'131 Claim Chart for Claim 1 (IPR2023-00468)
2003	Declaration of Rajendra A. Chiplunkar in Support of Motion for <i>Pro Hac Vice</i> Admission
2004	Scott Andrews' CV
2005	Scott Andrews Summary of Litigation Experience
2006	LinkedIn page of Scott Andrews
2007	Deposition Transcript of Scott Andrews, taken 8/28/2023
2008	Declaration of James A. Marchi
2009	Declaration of Kurt A. Gunther, P.E.
2010	Resume of Kurt A. Gunther, P.E.
2011	Declaration of Dr. Todor Cooklev
2012	Declaration of Carl Conti
2013	Web page – www.pipernetworks.com , retrieved on September 8, 2023
2014	Photograph of the MTA "Genius Award", March 2018.
2015	MTA Press Release: MTA Announces 8 Winners of MTA Genius Transit Challenge, 3/9/2018
2016	https://web.archive.org/web/20130602090958/http://metrom-rail.com/aura-collision-avoidance-system and attachment

Exhibit #	Description
2017	https://web.archive.org/web/20210805044759/https://www.pipernetworks.com/asset-tracking-rtls-solutions/
2018	https://web.archive.org/web/20211026212904/https://www.pipernetworks.com/asset-tracking-rtls-solutions/
2019	AURA MOW Product Specification
2020	HELIX MOW Limits Compliance & Collision Avoidance System (LCCAS) Product Specification
2021	AURA-Helix Comparison Chart
2022	Helix Claim Chart
2023	AURA Claim Chart
2024	https://novelda.com/articles/uwb-tech/understanding-ultra-wideband-uwb-technology , retrieved on September 13, 2023
2025	LinkedIn page of David Garcia
2026	Not Used
2027	Declaration of Nathaniel E. Frank-White with Exhibit A

I. INTRODUCTION

Patent Owner Metrom Rail, LLC (“Metrom”) submits this Patent Owner Response to the Petition under the scheduling order, Paper 11. The challenged claims should be confirmed because there is a compelling case for secondary considerations of non-obviousness. Viewed through the eyes of a POSITA in this art and after taking into account secondary considerations, Petitioner’s failed to carry their burden to establish obviousness and a motivation to combine references on the instituted grounds.

II. SUMMARY OF THE 131 PATENT

The 131 Patent is directed to a collision avoidance system for the railroad industry. The 131 Patent explains that “previous systems for preventing collisions of rail line vehicles have typically utilized a single sensor, for example a GPS or radar-based sensor, to monitor the approximate location of rail mounted vehicles.” Ex. 1001 at 2:60-64. These previous systems had numerous limitations. The inventors of the 131 Patent overcame these limitations by designing a collision avoidance system for rail line vehicles that utilize a combination of sensor technologies, including an Ultra Wideband (UWB) sensing technology, to counter the limitations of previous systems, and to significantly reduce the potential for vehicle collisions and to enhance the safe operation of a variety of railway vehicles. Ex. 1001 at 3:31-37.

III. LEVEL OF ORDINARY SKILL IN THE ART

In determining the level of ordinary skill in the art, various factors may be considered, including the ‘type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.’” *Wells Fargo Bank, N.A. v. United Servs. Auto. Ass’n*, 2020 WL 6937381, at *4 (Patent Tr. & App. Bd. Nov. 24, 2020), dismissed, 2021 WL 3174349 (Fed. Cir. Feb. 19, 2021) (citing *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995)).

The claims are directed to a collision avoidance system for a rail vehicle, and the person of skill should be assessed from that perspective. Petitioners approach, which expansively includes anyone working on collision avoidance, does not acknowledge that the railroad industry specifically is resistant to change and innovation. Ex. 2012 (Declaration of Carl Conti) at ¶40. Rail safety product design in particular has long development times and resists adoption for a number of industry specific reasons. *Id.* For that reason alone, the level of skill is lower than suggested by Petitioners. The hypothetical POSITA would have had a background in wireless electronics, including at least a bachelor’s degree in electrical engineering or a related field, and would have at least two years of experience with using such electronics for control systems applications such as *railway* collision-avoidance systems or *railway* positioning systems. Ex. 2012 at ¶37. However, the

hypothetical POSITA in this art would also be characterized as reluctant to innovate, a characteristic of this industry. *Id.* at ¶40.

IV. MR. ANDREWS' CONCLUSORY OPINIONS SHOULD NOT BE ACCORDED ANY WEIGHT

The Challenged Claims are directed to railroad collision avoidance systems. Mr. Andrews and the Petition rely exclusively on obviousness to allege that the Challenged Claims are unpatentable. Petitioners' expert, Mr. Andrews, admits that he has no professional experience with railroad collision avoidance systems. *See e.g.*, Ex. 2007 (Deposition Transcript of Andrews, 08/28/2023) at 45:11-12 ("No, I haven't worked on a collision avoidance system in a locomotive or on a locomotive."); *see also id.* at 45:20-22 ("As a professional, I haven't worked as a professional on a collision avoidance system on a train."); 49:4-7 ("Q Yes. And that's the only time you've been on a locomotive, in a museum? A There may have been other times, but in some kind in an observer capacity, not as a professional.").

Accordingly, because Mr. Andrews lacks any professional experience¹ with railroad collision avoidance systems, Mr. Andrews cannot testify based on his own personal experience or knowledge or the knowledge of a POSITA. Notwithstanding his lack of experience in this field, Mr. Andrews supports most of his opinions

¹ Mr. Andrews recent professional experience is focused on testifying that patents are invalid. Ex. 2005, 2007 at 42:2-16 (95% of cases are opinions to invalidate); 13:11-14:2 (90-100% of work from 2021 to date is patent litigation).

regarding motivation to combine with unsupported conclusory assertions. And while Mr. Andrews admits that he has no experience to speak of with railroad collision avoidance systems, Mr. Andrews freely fills gaps in his analysis with the knowledge of a POSITA. But that perspective necessarily comes from his background in the automobile space, which Mr. Andrews asserts is a more sophisticated and challenging environment than the railroad space, which if credited proves the point: the level of skill in the railroad industry is lower in the area of collision avoidance. The Board should apply the lower level of skill advanced by Patent Owner and apply it through the lens of an industry that resists innovation and change.

V. GROUND 1A: OBVIOUSNESS OF CLAIMS 1, 11, AND 14 IN VIEW OF GRISHAM

A. Claim 1 specifically, and all claims² of the 131 patent generally, are not Obvious In View of Secondary Considerations of Non-Obviousness

The Petition alleges that Grisham, combined with the knowledge of a person of ordinary skill in the art (POSITA) renders independent claim 1 obvious. Specifically, with reference to claim element **1j**, the Petition alleges that “[a] POSITA would have read Grisham (including Richards) to disclose that TOF [time of flight] calculations are performed by the embodiment shown in Figures 21 and 22 of Grisham.” Paper 5 at p. 19. The Petition does not allege that Grisham anticipates

² The secondary considerations analysis is applicable to all challenged claims on all grounds.

claim 1. Anticipation requires that “that all elements must be disclosed in an anticipatory reference in the same way as they are arranged or combined in the claim.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010). Petitioners do not and cannot allege that Grisham expressly or inherently discloses element 1j. Petitioner is foreclosed from arguing that claim 1 is anticipated by Grisham and turns to its expert to fill the gap.

“Obviousness is a question of law based on underlying facts, including the scope and content of the prior art, differences between the prior art and the claims at issue, the level of ordinary skill, and relevant evidence of secondary considerations.” *Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1363 (Fed. Cir. 2023) (citations omitted). “Secondary considerations include whether the claimed invention has been commercially successful, whether it solved a long-felt but unsolved need in the art, and whether the relevant industry praised it.” *Id.* Secondary considerations, *i.e.*, (“[t]he objective indicia of non-obviousness play an important role as a guard against the statutorily proscribed hindsight reasoning in the obviousness analysis.” *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1071 (Fed. Cir. 2018)(citations omitted). “[E]vidence of secondary considerations may often be the most probative and cogent evidence in the record.” *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). “It may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Id.* “Even accepting

[Petitioners'] arguments concerning the prior arts' disclosures and motivations to combine, the unusually strong objective evidence in this case strongly supports a determination of nonobviousness" of independent claim 1. *Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 70 F.4th 1331, 1341 (Fed. Cir. 2023).

Mr. Andrews, while familiar with the automotive art, neither represents a POSITA nor applied the correct standard for a POSITA in 2012. Nor did Petitioners or Mr. Andrews consider any secondary considerations. Metrom sets out below substantial evidence of secondary considerations regarding Metrom's commercial embodiment, the AURA CAS, including how the industry has had a *long felt* need for better collision avoidance, how Metrom's patented solution was viewed by industry participants with *skepticism*, was nevertheless ultimately *commercially successful*, and was subsequently *praised* in the industry and *copied* by Petitioner Piper Networks "Helix" CAS.

1. Long Felt Need

Metrom was founded in 2010 to develop a suite of innovative products and solutions to enhance safety in the railroad industry. Ex. 2009 (Declaration of Kurt Gunther) at ¶16; Ex. 2008 (Declaration of James Marchi) at ¶11. In 2011, Metrom commenced the design and development of the first-ever radio-based maintenance of way (MOW) collision avoidance system (CAS). Ex. 2009 at ¶¶ 20-21. Metrom's CAS was christened the AURA™ CAS. Before the introduction of AURA CAS,

Maintenance of Way (MOW) vehicles were using the same operating rules they had been using for decades: visual separation. Ex. 2009 at ¶19; Ex. 2012 at ¶42. Nevertheless, Petitioners assert obviousness based on combining knowledge and art that dates as far back as the 1930s. *See* Exs. 1019, 1030. Despite the asserted widespread availability of all the pieces, there was no working technical solution for MOW collision avoidance before deployment of Metrom's invention. Ex. 2008 at ¶¶ 22-23, Ex. 2009 at ¶19.

Separately Mr. Conti explained:

The railroad industry has long had a need to prevent collisions. For decades, collision prevention has been based on visual rules and block occupancy. These systems use visual signals, track circuits, and in more modern times, narrow band radio to communicate train orders and movement authority. For Maintenance of Way (MOW) equipment specifically, as of 2011 I was not aware of any system for preventing collisions between MOW vehicles other than work rules based on maintaining visual spacing between MOW vehicles and some rudimentary manual radio schemes.

Ex. 2012 at ¶42. Also “[b]ecause of the failure of initial implementation of UWB, by 2010-2012, most experts in radio communications across many, if not all, industries had declared UWB dead.” Ex. 2012 at ¶46. Additionally, the Federal Government had mandated PTC technology by 2020. *Id.* at 49. In summary,

[B]y 2012, there had been long felt but unresolved needs in the market relating to improved collision avoidance in the rail industry field generally and for MOW specifically, there had been the failure of every other UWB/RADAR communications system so far to go to market,

experts by 2010 had declared UWB dead (Lande, 2022), and the largest practical opportunity to implement a new collision avoidance system in the industry did not use UWB or any other form of terrestrial radio for location/ranging determinations. A POSITA would not have had any motivation to employ UWB technology up to this time, as it had been demonstrated to be not successful and panned by experts.

Ex. 2012 at ¶50. The AURA CAS satisfied this long felt need.

2. Railroads were Skeptical of Using Terrestrial Radio Ranging for Collision Avoidance

“Evidence of industry skepticism weighs in favor of non-obviousness.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1335 (Fed. Cir. 2016). “If industry participants or skilled artisans are skeptical about whether or how a problem could be solved or the workability of the claimed solution, it favors non-obviousness.” *Id.*

Mr. Gunther described the skepticism that Metrom was met with when they first demonstrated their AURA CAS. Ex. 2009 at ¶ 36-37. Metrom’s first potential customer was convinced that the AURA CAS would fail their “acid test;” a test which included tracking a MOW vehicle once it had entered a tunnel. *Id.* After Metrom passed the “acid test,” the potential customer became a current customer of Metrom. *Id.*

Rail industry customers were skeptical because of the bandwidth of the UWB radio signal emitted by the AURA CAS, complaining that that the outgoing UWB signal would interfere with the operation of other radio systems used for other purposes by the railroads and vice versa. Ex. 2009 at ¶38-40. There was also

skepticism that the AURA CAS would work because of the low power levels of the UWB signals. *Id.* at ¶41.

Thus, as further explained by Mr. Conti, there existed industry skepticism for the use of UWB in radio based collision avoidance systems. *See* Ex. 2012 at ¶43-48.

3. The AURA CAS is Commercially Successful and Praised

In 2013, Metrom secured its first order for the AURA CAS from Canadian National Railway. Ex. 2008 at ¶25. The value of this order was approximately \$4,000,000. Metrom successfully installed the AURA CAS in approximately 900 MOW vehicles. *Id.* Metrom has sold and continues to sell the AURA CAS. *Id.* at ¶26.

Metrom estimates that roughly 33% of mainline freight MOW equipment in the United States is protected by Aura CAS. *Id.* at ¶ 26. “Until Petitioner Piper Networks entered this space with its copycat Helix offering in about 2022, Metrom had virtually 100% of the installed market for a radio based collision avoidance system between MOW vehicles. *Id.*

Commercial success is “usually shown by significant sales in a relevant market[.]” *Chemours Co. FC, LLC v. Daikin Indus., Ltd.*, 4 F.4th 1370, 1378 (Fed. Cir. 2021), cert. denied, 142 S. Ct. 1418, 212 L. Ed. 2d 405 (2022). Here, the relevant market is radio-based MOW CAS. Until 2022, Metrom “had virtually 100% of the installed market for a radio based collision avoidance system between MOW

vehicles” in North America. Ex. 2008 at ¶26 with significant sales in that market. When Metrom entered the mass transit heavy rail arena, AURA CAS was instrumental in obtaining proof of concept work and praise from the MTA in the form of the MTA’s “Genius” award. Ex. 2008 at ¶ 18 (citing Exs. 2014 and 2015); Ex. 2009 at ¶45. Measured against the market space to which AURA CAS is addressed, it has been, and is, commercially successful.

4. Petitioner Piper Networks “Copied” the AURA CAS and Describes its Copy as a “Leap Forward.”

Petitioners opposed any discovery of secondary considerations factors, including copying and sales by Piper, and prevailed on that position with the Board. Paper No. 15, Paper No. 18. “It is well established that copying by a competitor is a relevant consideration in the objective indicia analysis” and therefore “may be evidence that the patented invention is nonobvious.” *Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). “The copying inquiry involves a comparison of the competitor’s product with the allegedly copied patented product[.]” *Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 70 F.4th 1331, 1340 (Fed. Cir. 2023). “Evidence of copying may include ... access and similarity to a patented product.” *Id.* (citations omitted).

Metrom’s expert, Dr. Cooklev, compared the publicly available product specifications of Piper Networks’ Helix CAS and PO’s AURA CAS. *See* Ex. 2011 (Cooklev Decl.), at ¶37 (citing Ex. 2021). Dr. Cooklev concluded that the Helix CAS

and AURA CAS are substantially similar, particular regarding the claimed features. Ex. 2011 at ¶¶34-38. Using the Way Back Machine internet archive, Dr. Cooklev also determined that Metrom published the claimed features of the AURA CAS on its website in 2013. *See* Ex. 2011 at ¶35; *see also* Ex. 2008 at ¶25. Based on the archive of Piper Networks' website, Dr. Cooklev concluded that Piper Networks did not offer its Helix CAS for sale until the middle of 2021. *See* Ex. 2011 at ¶36.

Separately, Metrom's employee, Mr. Kurt Gunther explained that in 2018, a current Piper Networks' employee, Mr. David Garcia, had unrestricted access to the AURA CAS and its technical details including hardware and software while Petitioners and Metrom were competing for work with the New York MTA. *See* Ex. 2009 at ¶¶46-47; Ex. 2025 (LinkedIn Profile showing Mr. Garcia's current employment at Piper).

Because of the substantial similarity of the Helix CAS to AURA CAS, the access to the AURA CAS that Piper Networks had by virtue of its employee's previous access to the AURA CAS, the timing of Piper's entry into the market, and Petitioners refusal to respond to any discovery, "there is more than sufficient circumstantial evidence to support the Board's finding of copying." *Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 70 F.4th 1331, 1340 (Fed. Cir. 2023). Piper describes its CAS on its website as a "leap forward", Ex. 2013. Petitioners should not be heard to now complain that Metrom's inventions are obvious after imitating them and then

refusing to disgorge any evidence that they are other than direct copies of Metrom's system.

5. Patent Owner is Entitled to a Presumption of Nexus

“In order to accord substantial weight to secondary considerations in an obviousness analysis, ‘the evidence of secondary considerations must have a ‘nexus’ to the claims, *i.e.*, there must be ‘a legally and factually sufficient connection’ between the evidence and the patented invention.” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (citations omitted).

“[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product ‘is the invention disclosed and claimed.’” *Id.* “A showing of nexus can be made in two ways: (1) via a presumption of nexus, or (2) via a showing that the evidence is a direct result of the unique characteristics of the claimed invention.” *Volvo Penta of the Americas, LLC v. Brunswick Corp.*, 2023 WL 5440530, at *5 (Fed. Cir. Aug. 24, 2023)

Metrom's expert, Dr. Todor Cooklev, evaluated several Challenged Claims (1 and 7) and compared them to Metrom's AURA CAS. Dr. Cooklev concluded that the AURA CAS is “the invention disclosed and claimed,” at least by Challenged Claims 1 and 7 of the 131 patent. Specifically, Dr. Cooklev mapped Challenged

Claims 1 and 7 to the features of the AURA CAS and concluded that the features of the AURA CAS were coextensive with these claims. *See* Ex. 2011 at ¶41, Ex. 2023 (pp. 1-6).

Further, Dr. Cooklev interviewed Metrom's employees to determine the features of the AURA CAS responsible for its commercial success. Based on his interview, Dr. Cooklev concluded that commercial success of the AURA CAS was directly tied to the claimed features and not to any significant unclaimed features. *See* Ex. 2011 at ¶41.

This analysis establishes a rebuttable presumption of nexus between the evidence of objective indicia and at least Challenged Claims 1 and 7. Metrom submits that in addition to the nexus evidence, the other "evidence of secondary considerations of nonobviousness is the direct result of the unique characteristics of the claimed invention." *Volvo*, 2023 WL 5440530, at *6.

B. Claims 11 and 14

Claims 11 and 14 depend from claim 1 and are not obvious because dependent claim 1 is not obvious

VI. GROUND 1B: OBVIOUSNESS OF CLAIMS 2, 3 AND 4 OVER GRISHAM AND DOUGLAS

Claim 2, 3 and 4 depend from claim 1 and are not obvious at least because claim 1 is not obvious.

Also, claim 2 is not obvious because neither Douglas nor Grisham discloses

the claim limitation that “the central tracking unit is operable *to track a location of* the first vehicle mounted module and *a location of* the second vehicle mounted module” (emphasis added).

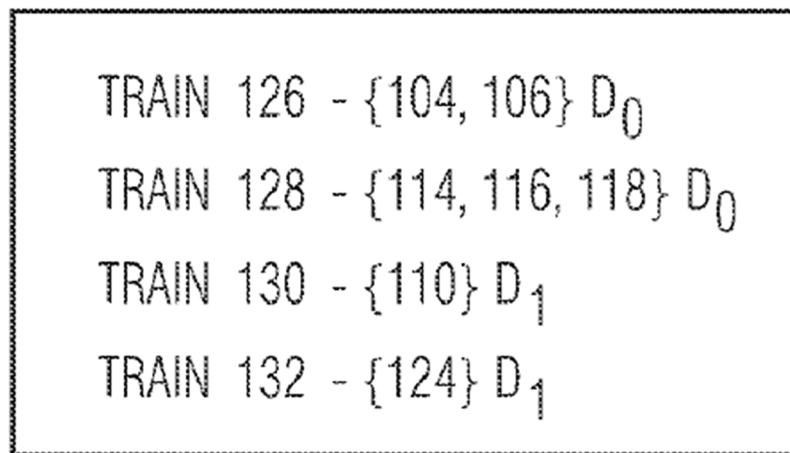
For the claimed central tracking unit functionality Mr. Andrews relies on the disclosure of Douglas. Ex. 1003 at ¶¶138-149. Specifically, Mr. Andrews states that:

Douglas discusses “avoiding collisions between trains.” EX1011, Abstract. Douglas teaches an “apparatus 32 located at the station 30,” which broadcasts the location of trains within a certain range (via a list of links to be traversed by and the direction of motion of each train). *Id.*, 4:32-49, 7:10-12. “The apparatus 32 typically, comprises a transmitter and a processor such that information may be transmitted by the apparatus 32. The apparatus may also comprise an input means to receive input and an output means to provide output.” *Id.*, 4:45-49. Apparatus 32’s broadcasts go to “the transceiver 34 of the apparatus 20 of each of the trains.” *Id.*, 6:25-31. “The received list is then provided to the processor 36 and the processor 36 determines if the links to be traversed by the respective train are adjacent links in the list. If the links to be traversed by the respect train are not adjacent links, the processor provides the corresponding output to the output means 40 to provide an indication of a danger in order to enable action to be taken to prevent the collision.” *Id.*, 6:31-38. Because the list of links to be traversed by and the direction of motion of each train disclose the path of trains, a POSITA would understand Douglas’s station-based apparatus tracks the location of the trains by repeatedly updating the trains’ paths.

Ex. 1003 at ¶138. Mr. Andrews equates the apparatus 32 of Douglas with the claimed central tracking unit and the information broadcast by apparatus 32 as “tracking information.” *See* Ex. 1003 at ¶139 (“In the combination, Douglas’s apparatus

(central tracking unit) broadcasts *this tracking information* to Grisham's vehicle mounted modules (inter alia radio units, controller)."). The information broadcast by apparatus 32 is "the information of links and the list including the links to be traversed by the respective train and the direction of motion of the respective train." Ex. 1011 at 8:58-60; *See also* Ex. 1003 at ¶138. Fig. 7c from Douglas depicted below shows this broadcasted information.

FIG 7c



TRAIN 126 - {104, 106} D₀
TRAIN 128 - {114, 116, 118} D₀
TRAIN 130 - {110} D₁
TRAIN 132 - {124} D₁

Ex. 1011, Fig 7c and 9:1-5. As explained by Mr. Conti, the information broadcast by apparatus 32 does not include tracking information for the trains. Ex. 2012 at ¶56. The term "location" appears nowhere in Douglas. *Id.* And although Douglas is directed to collision avoidance, its method of collision avoidance does not require or use location information. *Id.* Instead, Douglas avoids collisions by ensuring that two train are never on the same track. *Id.* Other than knowing that the trains are generally

in the same zone and the tracks on which the trains are moving, Douglas has no knowledge of the location of the trains in the zone and therefore cannot “track the location” of the trains, as required by the claims. *Id.*

The Petition states that “[b]ecause the list of links to be traversed by and the direction of motion of each train disclose the path of trains, a POSITA would understand Douglas’s station-based apparatus tracks the location of the trains by repeatedly updating the trains’ paths.” Paper 5 at p. 21. Douglas merely knows the track ID and direction. Knowing the track ID and direction is not “tracking the location” of a train any more than knowing that a car is taking Interstate 80 from Chicago to Denver tomorrow is “tracking the location” of a traveler. Ex. 2012 at ¶58.

The length of a track is typically on the order of miles. *Id.* Knowing the track and direction of travel is insufficient to track the location of the train on that track. *Id.* The claimed CTU stores the absolute and relative locations of the vehicles and generates a warning if a separation distance between the vehicles is violated. *Id.* (citing Ex. 1001 at 6:37-41). It can do this because it stores the absolute and relative locations of the vehicles. *Id.* Douglas does not contemplate storing any location data and therefore cannot generate a warning when a separation distance is violated. *Id.* Instead Douglas generates a warning if two or more vehicles that happen to be in a

zone³ are on interfering paths. *Id.* Thus, if two vehicles are in close proximity on the same track but in different zones, Douglas will not generate a warning. *Id.* Also, if two vehicles are on different tracks and with minimum separation distance, Douglas will not generate a warning. Douglas is not concerned with separation distance or tracking location. *Id.*

Because Douglas does not “track the location” of a train, the combination of Douglas and Grisham does not disclose this limitation. To the extent a POSITA would have combined Douglas and Grisham, they would not have a reasonable expectation of arriving at the claimed invention.

Claims 3 and 4 depend from claim 2 and are not unpatentable at least for the same reasons that claims 1 and 2 are not unpatentable.

VII. GROUND 1C: OBVIOUSNESS OF CLAIMS 5 AND 6 OVER GRISHAM IN COMBINATION WITH RICHARDSON

Claims 5 and 6 depend from claim 1 and are not obvious at least for the same reasons that claim 1 is not obvious.

Claim 5 also recites “an auxiliary transponder sensor module, the auxiliary transponder sensor module mounted on the first rail vehicle with an offset with respect to the transponder sensor module.” Grisham does not disclose an auxiliary transponder sensor module. The Petition relies on Richardson for the claimed

³ Douglas defines a zone as “an area of the station up till which links controlled from the station may be provided on the tracks.” Ex. 1011 at 3:16-19.

“auxiliary transponder sensor module.” Specifically, the Petition states “a POSITA would have understood the benefits of providing an auxiliary transponder sensor module with an offset to the transponder sensor module, including better location measurements and improved collision avoidance due to more precise information relating to length of the vehicle and mounting location of each sensor.” Paper 5 at p. 26; *see also* Ex. 1003 at ¶145. Neither the Petition nor Mr. Andrews explains the reasoning for this statement.

Richardson is directed to “improving navigational capabilities and safety of operations for semi-autonomous systems that are emerging in applications such as construction and agricultural vehicles.” Ex. 2012 at ¶62; *see also* Ex. 1008 at 1. Richardson does not suggest that its teaching may be used to “account for the length of these trains” that “can be over a mile long.” Ex. 2012 at ¶62 (citing Ex. 1003 at ¶145). Also, Grisham does not suggest that train length is an issue or that an auxiliary transponder sensor module would solve this problem. Ex. 2012 at ¶62.

Mr. Andrews states that “Richardson Figures 6 and 7 illustrate each vehicle having 4 UWB transceivers, with transceivers 1 to 2 and 3 to 4 offset by a distance r_b .” Ex. 1003 at ¶145. Given that distance r_b is of the order of a few feet, it is not clear why a POSITA would be motivated to use this scheme to account for trains that can be over a mile long, and Mr. Andrews does not explain it. Ex. 2012 at ¶63.

This is important because as Mr. Andrews admits a “POSITA would have

known that UWB is relatively range-limited due to low transmission power.” Ex. 1003 at ¶176. Although proof of physical or bodily incorporation is not required, a satisfactory explanation of ‘how the combination of the ... references [is] supposed to work’ is necessary to support ‘a conclusion that a relevant skilled artisan would have been motivated to make the combination and reasonably expect success in doing so.’” *Unified Patents Inc. v. Divx, LLC*, 2021 WL 451027, at *14 (Patent Tr. & App. Bd. Feb. 8, 2021) (citing *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017)). The Petition and Mr. Andrews fail to satisfactorily explain how the combination of the [Grisham and Richardson] is supposed to work. The Petitioners have failed to carry their burden of establishing that claims 5 and 6 are obvious.

VIII. GROUND 1D: OBVIOUSNESS OF CLAIM 10 OVER GRISHAM IN COMBINATION WITH MCDANIEL

Claim 10 depends from claim 1 and is not obvious at least for the same reasons that claim 1 is not obvious. Claim 10 is also not obvious because as described below determining a speed of the first rail vehicle – a requirement of the claim - is not found in either Grisham or McDaniel. There is no reasonable expectation of success at arriving at the claimed invention even after combining these references.

Claim 10 recites “an adaptive threshold feature that modifies one or more vehicle separation thresholds based on a speed of the first rail vehicle and a speed of the second rail vehicle.” A pre-requisite of claim 10 is that the collision avoidance

system know “a speed of the first rail vehicle and a speed of the second rail vehicle.” Ex. 2012 at ¶64. Mr. Andrews states that “McDaniel teaches a threshold warning distance (an adaptive threshold feature) that modifies the separation threshold based on vehicle speeds.” Ex. 1003 at ¶153. Mr. Andrews admitted that McDaniel’s scheme requires that the local object know its own velocity and the velocity of the remote object. *See* Ex. 2012 at ¶64 (citing Ex. 1015 at [0038]-[0039] & Ex. 2007 at 93:15-18). Mr. Andrews admits that McDaniel does not teach . . . how you determine the velocity of the first vehicle.” Ex. 2012 at ¶64 (citing Ex. 2007 at 94:7-9.) Mr. Andrews does not rely on any other disclosure of McDaniel or Grisham to explain how the local velocity is determined. Ex. 2012 at ¶64. Without knowing this, it is not possible to implement McDaniel’s adaptive threshold feature. *Id.*

The Petition contends that “Grisham already collects speed . . . data, modifying Grisham to implement an adaptive threshold feature would have been a routine and simple change by a POSITA.” Paper 5 at p. 29 (citing Ex. 1003 at ¶¶155-156). As previously explained, McDaniel’s scheme requires the absolute speed of both vehicles. Any suggestion that Grisham collects absolute speed data is incorrect. Mr. Andrews does not cite to any evidence that would establish that Grisham collects speed data and Mr. Andrews admits as much. Specifically, in his analysis of claims 5 and 6, Mr. Andrews states that “[a] POSITA looking at Grisham would have understood that measuring range rate (changes in range over a finite time interval)

in order to determine speed is *only able to measure relative speed* between the object with the transponder and any other object being measured.” Ex. 1003 at ¶161. Thus, Grisham does not collect speed data. Because neither Grisham nor McDaniel determine a speed of the first rail vehicle, the combination does not render claim 10 obvious. Also, without a speed of the first rail vehicle, the combination of the two references would have not resulted in the claimed invention.

For the alleged motivation to combine Grisham and McDaniel, Petitioner asserts that “[a] POSITA. . . would have been motivated to incorporate McDaniel’s adaptive threshold warning system for vehicle collision avoidance into the collision-avoidance system [of Grisham] in order to accurately and effectively avoid collisions when rail vehicles are approaching at different speeds and to avoid nuisance alerts to the operator of the safe approach or close proximity of other trains” because the system of Grisham allegedly is “intended to avoid collisions of any rail vehicle, regardless of speed” and “a POSITA would have understood that a collision-avoidance system would need a way of alerting an operator only to potential collision situations, not merely situations where a train is nearby, given the number of trains that can safely be positioned within feet of each other in, for example, a train yard.” Paper 5 at 29-30.

Petitioner, however, fails to explain how the “adaptive threshold feature” of McDaniel would purportedly work in the collision-avoidance system of Grisham,

specifically, whether the “adaptive threshold feature” would be able to selectively disregard situations where a train is merely nearby, but not at risk of collision, as Petitioner suggests. McDaniel describes an “adaptive threshold feature” that is “directed toward a method for determining a threshold distance for a collision warning system.” EX1015 at ¶0008. This threshold distance is a “function of the velocity of the target object, the velocity of the host machine, an angle of inclination of each of the host machine and the target object, and a reaction time associated with an environmental condition.” *Id.* Nowhere does McDaniel discuss distinguishing between target objects that are a true threat and those that are merely a nuisance – *i.e.*, in trains, that would be trains nearby but on a separate and distinct track. In fact, Mr. Andrews admits that McDaniel does not teach how to differentiate between trains that are on the same track or on different tracks. Ex. 2007 at 109:20-24 (“Q· So two trains running on adjacent tracks, next to each other, traveling in opposite directions, you're telling me McDaniel teaches how to discriminate whether they're on the same track or on different tracks? A·No.”). Thus, implementing McDaniel will necessarily result in nuisance alerts. Accordingly, Petitioner’s assertion that “[a] POSITA... would have been motivated to incorporate McDaniel’s adaptive threshold warning system... to avoid nuisance alerts to the operator of the safe approach or close proximity of other trains” is unsupported. For these reasons, Claim 10 is not obvious over Grisham and McDaniel.

IX. GROUND 1E: OBVIOUSNESS OF CLAIMS 12 AND 13 OVER GRISHAM IN COMBINATION WITH BREED '945

Claim 12 depends from claim 1 and claim 13 depends from claim 12. These claims are at least not obvious for the same reasons that claim 1 is not obvious.

X. GROUND 1F: OBVIOUSNESS OF CLAIM 15 OVER GRISHAM IN COMBINATION WITH CONNELL

Claim 15 depends from claim 1 and is not obvious at least for the same reasons that claim 1 is not obvious.

XI. GROUND 2A: OBVIOUSNESS OF CLAIMS 7-9, 17, AND 19 OVER GRISHAM AND NIXON

A. Claim 7

Claims 7 recites a global positioning system (GPS) unit. The Petition does not contend that Grisham discloses GPS. For this teaching, the Petition relies on Nixon. To support the opinion that a POSITA would be motivated to combine UWB with GPS, the Petition makes several incorrect assertions.

As an initial matter, the Petition's assertion that "a POSITA would have known that GPS systems pair well with UWB systems because of their complementary feature sets" is misguided. Paper 5 at p. 36. At the time of the invention, it was conventional thinking that UWB signals could interfere with the signals received from GPS satellites because the GPS signals had low power levels near the surface of the earth at a GPS receiver location. Ex. 2012 at ¶71. Because of this "[a] POSITA would not be motivated to combine GPS and UWB receivers for

a mission-critical task like rail vehicle collision avoidance because of the likelihood that the UWB signal would interfere with the reception of the GPS signal” with potentially catastrophic consequences.” Ex. 2012 at ¶71.

Also, the Petition (and Mr. Andrews) assertion that GPS could be communicated by UWB units between trains is unsupported. Ex. 2012 at ¶70. Neither Grisham nor Nixon suggest communicating GPS locations between trains using their respective UWB radios. *Id.* And Mr. Andrews cites no other reference that teaches communicating GPS locations using UWB radios or a reference that teaches using both UWB and GPS to avoid collisions. *Id.* This is not surprising because of the potential that the UWB signal would interfere with the accurate reception of the GPS signals.

The Petition, relying on Mr. Andrews, contends that GPS if communicated by UWB units between trains would allow them to determine if a collision was possible, or determine that they were on parallel tracks where no collision is possible. If a POSITA would combine a UWB radio with a GPS receiver (they would not) and communicate GPS locations using UWB radios was known (it was not), a POSITA would not use GPS to determine if a collision was possible, or if they were, for example on parallel tracks where no collision is possible, as Mr. Andrews asserts. Ex. 2012 at ¶72.

First, Mr. Andrews does not explain how two trains would know that they are

on the same or parallel tracks, merely by knowing each other's respective GPS coordinates. *Id.* Second, given that Mr. Andrews readily admits that "GPS accuracy can vary by several meters or even tens of meters," it would be impossible to determine if the trains are on the same track or on parallel tracks with that level of inaccuracy. *Id.* A POSITA would not have been motivated to modify Grisham with the GPS disclosed in Nixon because it would not allow Grisham to determine if the trains are on the same track or parallel tracks. *Id.* And to the extent that discriminating whether the trains were on the same track or parallel tracks was important, the lack of GPS accuracy would motivate a POSITA to look for an alternate solution, not to GPS. *Id.*

Finally, the argument that a POSITA would be motivated to supplement UWB with GPS because UWB is relatively range limited due to low transmission power by communicating GPS location data using UWB is not supported by the art. Because UWB has a limited operating range, GPS information would be capable of being communicated between trains using UWB only when the trains are within the limited operating range of UWB. Ex. 2012 at ¶74. Accordingly, Petitioners' assertion that augmenting UWB with GPS will allow a train to begin stopping farther in advance (Paper 5 at p. 34) is incorrect, because two trains could exchange GPS coordinates with each other only when they are within the operating range of UWB. Ex. 2012 at ¶74. Thus adding GPS to UWB will not improve the collision avoidance

range capability of UWB.

A POSITA would not be motivated to combine Grisham with Nixon because it would not provide the desired benefit Petitioners claim – “allowing positioning at larger distances between trains.” Paper 5 at p. 36.

B. Claim 8

Claim 8 depends from claim 7 and is not obvious for the same reasons as claim 7. Claim 8 is also not obvious because the Petition fails to establish that the combination discloses “the first vehicle mounted module receives information generated by the first global positioning system unit *and* the first radio communication unit to determine whether one or more vehicle separation criteria are violated.” Nixon does not use “information generated by the first global positioning system unit *and* the first radio communication unit” to determine if “vehicle separation criteria are violated.” Ex. 2012 at ¶76. Nixon only discloses using the radio to “determine whether one or more vehicle separation criteria are violated,” not both the radio and GPS. *See* Ex. 1016 at p. 7.

Because Nixon does not “determine whether one or more vehicle separation criteria are violated” from “information generated by the first global positioning system unit *and* the first radio communication unit,” Nixon cannot disclose “generat[ing] a warning signal when one or more vehicle separation criteria are violated.” Ex. 2012 at ¶77.

Separately, Mr. Andrews's assertion with reference to claim 8 that "[a] POSITA would have understood that trains on parallel tracks may violate a strict separation distance, but the use of GPS data would ensure that warning signals would only be generated when needed" is erroneous. *Id.* at ¶78. Given GPS' admitted inaccuracy of several meters or even tens of meters, GPS is more likely to generate spurious warning signals. *Id.* a POSITA would not have been motivated to combine Nixon's GPS with Grisham "to determine whether one or more vehicle separation criteria are violated; and the first vehicle mounted module generates a warning signal when one or more vehicle separation criteria are violated." *Id.*

C. Claim 9

Claim 9 requires "execut[ing] a progressive warning signal if one or more vehicle separation criteria are violated." Claim 9 depends from claim 1 and is not obvious at least because claim 1 is not obvious. The Petition's conclusion is based on factually inaccurate statements regarding Grisham. The assertion that "Grisham already captures speed and distance information from other rail vehicles" is incorrect. Ex. 2012 at ¶79. Grisham only allows the determination of relative speed. *Id.*; see also Ex. 2007 at 68:1:4 ("Q. So if both vehicles are moving, you would only be able to measure relative speed using Grisham's method, correct? A. That's correct[.]). Without knowing the actual speed and distance information of the other rail vehicles, "a progressive alarm would [not] simply and routinely be implemented

into [Grisham's] system,” as the Petition contends.

D. Claim 17

The combination of Grisham and Nixon does not render Claim 17 obvious.

- 1. The combination of Grisham and Nixon does not disclose [17c] “a first wireless communications antenna operable to send and receive data representing the separation distance over the air.”**

The Petition contends that:

The radio units of Grisham continuously transmit and receive impulse radio signals wirelessly. See EX1006, FIG. 22, 23:42-47. The signals provide data such as direction, speed, and distance of each rail vehicle (showing the separation distance between trains). *Id.*, FIG. 22. As shown in FIGS. 6 and 7, Grisham details each component of impulse radios, which includes a “transmit antenna 624” and a “receive antenna 704.” *Id.*, 16:39-41, 59-60. Likewise, in the transceiver embodiment discussed in relation to claim 1 which achieves “substantial economy” by combining the transmitter and receiver, a single antenna 704 is used to send and receive data over the air. *Id.*, 17:44-48; EX1003, ¶192.

Paper 5 at p. 40 (emphasis added). The Petition's contention that Grisham communicates “the separation distance between trains” (citing Fig. 22) is misguided.

Figure 22 is reproduced below.

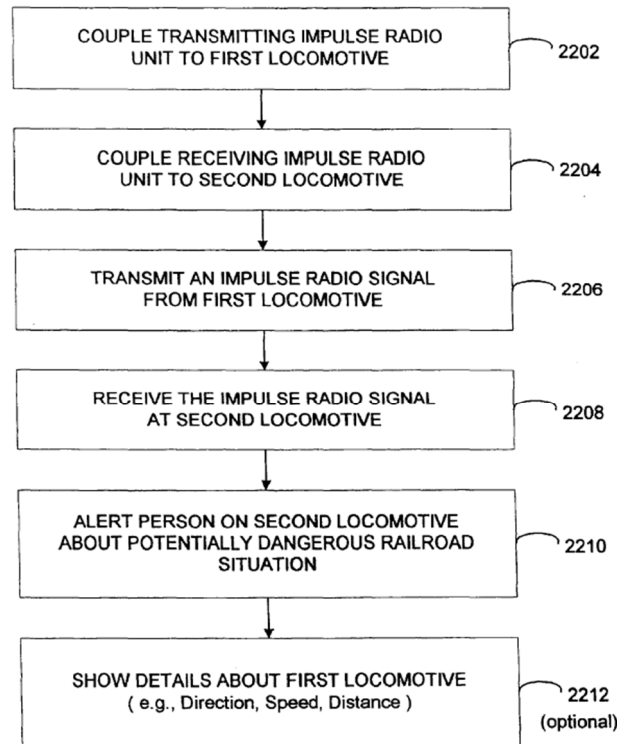


FIG. 22

At optional block 2212, the only details displayed are direction, speed and distance. There is no suggestion that data representing the separation distance is communicated over the air. *See also* Ex. 2012 at ¶¶81-82. The combination of Grisham and Nixon does not disclose “a first wireless communications antenna operable to send and receive data *representing the separation distance over the air.*”

E. Claim 19

Claim 19 depends from claim 17 and is not obvious at least for the same reasons that claim 17 is not obvious.

Claim 19 recites “the rail vehicle module is operable to utilize information generated by the radio communications unit *and* the global positioning system unit

to determine whether one or more vehicle separation criteria are violated.” The Petition does not explain where Nixon discloses this limitation and Mr. Andrews analysis for claims 8 and 9 similarly fail to explain where this limitation is disclosed. *See* Ex. 2012 at ¶85. Accordingly, Claim 19 is not obvious.

XII. GROUND 2B: OBVIOUSNESS OF CLAIM 16 OVER GRISHAM, CONNELL, NIXON, AND MCDANIEL

Claim 16 depends from independent claim 1 and is not obvious at least for the same reasons that claim 1 (Ground 1A) is not obvious.

XIII. GROUND 2C: OBVIOUSNESS OF CLAIM 18 OVER GRISHAM, NIXON, AND RICHARDSON

Claim 18 depends from claim 17 and is not obvious at least for the same reasons that claim 17 is not obvious.

Separately, the Petition fails to establish that the combination of Grisham, Nixon and Richardson disclose all the limitations of claim 18. The Petition relies on the arguments made in connection with claims 5-6 in Ground 1C and claims 7 and 9 in Ground 2A. *See* Paper 5 at p. 42. But claim 18 recites limitations that are not found in claims 5, 6, 7 and 9. Claim limitation 18b recites “the rail vehicle module is operable to receive calibration information related to a length of the rail vehicle, a mounting location of the first wireless communications antenna, and a mounting location of the second wireless communications antenna.” Petitioners’ arguments made in connection with claims 5-6 in Ground 1C and claims 7 and 9 in Ground 2A

do not address the limitations set forth in claim 18b. Accordingly, the Petition has not established that claim 18 is obvious.

The Petition also incorporates without explanation paras. 202-207 of Mr. Andrews' declaration (Ex. 1003). Precedent precludes the Board from reaching the merits of the incorporated portions of the Andrews declaration. *Cisco Systems, Inc. v. C-Cation Technologies, LLC*, IPR2014-00454, Paper 12 at 10 (P.T.A.B. Aug. 29, 2014) (Precedential) (refusing to “consider arguments that are not made in the Petition, but are instead incorporated by reference to the cited paragraphs . . . of [expert] [d]eclaration.”).

Furthermore, the Petition nor Mr. Andrews explain why providing the length information (Claim 18b) is required in the proposed combination of Grisham and Richardson. *See* Ex. 2012 at ¶87-88.

For at least these reasons, Petitioner's obviousness analysis based on the combinations of Grisham, Richardson, and Nixon also fails.

XIV. GROUND 2D: OBVIOUSNESS OF CLAIM 20 OVER GRISHAM, NIXON, RICHARDSON AND DOUGLAS

Claim 20 depends from claim 18 and is not obvious at least for the same reasons that claims 17 and 18 are not obvious. The Petition asserts that “[t]he limitations of Claim 20 track to Claims 2 and 3, and its limitations are satisfied for the same reasons as explained above for claims 2-3 in Ground 1B.” Paper 5 at 43. However, claim 20 depends from claim 18 and because the Petition failed to

establish that claim 18 is obvious, claim 20 is also not obvious.

**XV. GROUND 3A: OBVIOUSNESS OF CLAIMS 1, 7, 8, 11-14 AND 17
OVER SUZUKI ALONE OR IN COMBINATION WITH GRISHAM**

A. Claim 1

The arguments for single reference obviousness in view of Suzuki is essentially the same as Petitioner's arguments for single reference obviousness in Ground 1 in view of Grisham, but is even weaker in view of the secondary considerations recited *supra* Part V.A and incorporated herein by reference. Petitioner acknowledges that Suzuki is directed to automotive vehicles, not rail vehicles, uses a radar approach, and there is no motivation to apply Suzuki's radar to rail vehicles given that the considerations for collision avoidance in vehicles are different than the considerations for railway vehicles. Ex. 2012 at ¶91.

Suzuki does not teach "the first vehicle mounted module and the second vehicle mounted module are operable to apply a time of flight technique to determine a separation distance between the first rail vehicle and the second rail vehicle." This limitation make it clear that it is the round trip time of a communication between the first and second vehicles, not a radar reflection off of a surface, that results in the time of flight measurement. Ex. 2012 at ¶92. Suzuki operates in a "radar" mode, seeking to measure the time to receive a reflection of a transmitted signal. Ex. 1005 at Fig. 1A, [0015], [0013], [0016], [0031] ("If the own vehicle ID is not detected from the received signal, the measurement of the distance between two cars by

means of the radar function is considered to have failed.”). *Id.* In fact, Mr. Andrews’ analysis admits that Suzuki “only calculate the distance to a vehicle which reflected the radar wave[.]” Ex. 1005 at [0032]; see also Ex. 1003 at ¶244 (citing Ex. 1005 at [0032]). Accordingly, Suzuki does not disclose element 1j and consequently cannot render claim 1 (and 17) obvious.

93. Further, the radar aspect of Suzuki greatly reduces its effective range because of power loss to the point where it would not be useful in the rail scenario, where stopping distances and times are much larger than for even a fast moving car. Ex. 2012 at ¶93.

94. In sum, Suzuki does not use the claimed time of flight technique. *See* e.g., Ex. 1005 at [0016] (“The vehicle-to-vehicle distance measurement part 126 calculates the distance B between two cars”) and accordingly does not render claim 1 obvious. *Id.* at ¶94. Further, the secondary considerations of non-obviousness articulated with reference to Ground 1A apply with even more force here and strongly weigh in favor of a finding of non-obviousness. *Id.*

B. Claims 7-8 and 11-14

Claims 7-8 and 11-14 depend from claim 1 and are not obvious for the same reasons that claim 1 (Ground 3A) is not obvious.

C. Claim 17

Claim 17 is not obvious at least for the same reasons that claim 1 (Ground 3A)

is not obvious.

Additionally, Suzuki alone or in combination with Grisham does not teach or suggest [17c] “a first wireless communications antenna operable to send and receive *data representing the separation distance over the air.*” With regard to this element, the Petition merely states that

Suzuki teaches the use of a wireless communications antenna to send and receive data over the air. *See supra* [1B] in Ground 3A; EX1003, ¶278. A POSITA would be motivated to use the single-antenna embodiment of Figure 2 in the in vehicle radar device 110 because it would reduce the cost of antennas and save space inside of the vehicle mounted module. EX1003, ¶278.

Paper 5 at p. 67. By citing to “[1B] in Ground 3A,” Petition appears to rely on its analysis for claim 1B. But element [1B] is not coextensive with [17C]. Specifically, [1B] recites “a first transponder sensor module operable to send and receive data wirelessly” Conspicuously missing from [1B] is “data *representing the separation distance.*” The Petition does not allege that Suzuki teaches sending and receiving data representing the separation distance.

Mr. Andrews’s opinions are similarly lacking. Specifically, Mr. Andrews states that:

It is my opinion that Suzuki alone or alternatively in combination with Grisham, teaches or renders obvious a system having antennas operable to send and receive data wirelessly. *See supra* VIII.K.1 (discussion regarding claim element 1b and 1f). A POSITA would be motivated to use the single-antenna embodiment of Figure 2 in the in-vehicle radar

device 110 because it would reduce the cost of antennas and save space inside of the vehicle module unit. See Section VIII.L.1., EX1005, FIGs 1B and 3, elements 121A, 121B, 124, and 186.

Ex. 1003 at ¶278. Mr. Andrews opinion is not commensurate with the scope of the claim. Claim [17c] requires “send[ing] and receive[ing] data *representing the separation distance over the air.*” Mr. Andrew merely alleges that Suzuki alone or alternatively in combination with Grisham, teaches or renders obvious a system having antennas operable to send and receive data wirelessly. Ex. 2012 at ¶98. Mr. Andrews does not even allege much less show that Suzuki alone or alternatively in combination with Grisham, teaches or renders obvious the sending and receiving of data “*representing the separation distance over the air.*” *Id.*

Because the Petition and Mr. Andrews does not even allege that the prior art reference disclose or render obvious the sending and receiving of data “*representing the separation distance over the air,*” for this additional reason, Suzuki alone or in combination with Grisham does not render claim 17 obvious.

XVI. GROUND 3B: OBVIOUSNESS OF CLAIMS 2-6, 18, AND 20 OVER SUZUKI AND RICHARDSON (OR SUZUKI, GRISHAM, AND RICHARDSON)

Claims 2, 3, 4, 5, and 6 depend from claim 1 and are not obvious at least for the same reasons that claim 1 is not obvious with respect to Suzuki alone or in combination with Grisham as described in response to Petitioner's Ground 3A.

Separately, with reference to claims 5 and 6, a POSITA would not be

motivated to combine Richardson with Suzuki or Suzuki and Grisham for the reasons set forth in response to Petitioners' Ground 1C.

Claims 18 and 20 depend from claim 17 and are not obvious at least for the same reasons that claim 17 is not obvious with respect to Suzuki alone or in combination with Grisham as described in response to Petitioner's Ground 3A.

Separately, the Petition fails to establish that the combination of Suzuki, Grisham, and Richardson discloses all the elements of claim 18. The Petition relies on the arguments made in connection with claims 5-6 in Ground 2C. *See* Paper 5 at p. 73-74 ("Claim 18 contains limitations that track the limitations of claims 5 and 6, and its limitations are satisfied by Suzuki in view of Richardson or, alternatively Suzuki in view of Grisham and Richardson for the same reasons provided for claims 5-6 in Ground 3B."). But claim 18 recites limitations that are not found in claims 5, and 6. Specifically, claim 18b recites "the rail vehicle module is operable to receive calibration information related to a length of the rail vehicle, a mounting location of the first wireless communications antenna, and a mounting location of the second wireless communications antenna." Petitioners' arguments made in connection with claims 5-6 in Ground 1C do not address the limitations set forth in claim 18b. Accordingly, the Petition has not established that claim 18 is obvious.

The Petition also cites arguments made in connection with claim 18 in Ground 2C. However, these arguments also fail to address limitation 18b.

For at least these reasons, the combination of Richardson with Suzuki or Suzuki and Grisham does not render claim 18 obvious.

XVII. GROUND 3C: OBVIOUSNESS OF CLAIMS 9 AND 19 OVER SUZUKI AND NIXON (OR SUZUKI, GRISHAM, AND NIXON)

Claim 9 depends from claim 1 and is not obvious at least for the same reasons that claim 1 is not obvious with respect to Suzuki alone or in combination with Grisham as described in response to Petitioner's Ground 3A.

Claim 19 depends from claim 17 and is not obvious at least for the same reasons that claim 17 is not obvious with respect to Suzuki alone or in combination with Grisham as described in response to Petitioner's Ground 3A.

XVIII. GROUND 3D: OBVIOUSNESS OF CLAIM 10 OVER SUZUKI AND MCDANIEL (OR SUZUKI, GRISHAM, AND MCDANIEL)

Claim 10 depends on claim 1 and is not obvious at least for the same reasons that claim 1 is not obvious with respect to Suzuki alone or in combination with Grisham as described in response to Petitioner's Ground 3A.

Separately, claim 10 is not obvious at least for the same reasons set forth with respect to Ground 1D. *See also* Ex. 2012 at ¶107 (explaining neither McDaniel nor Suzuki disclose “a speed of the first rail vehicle.”) .

XIX. GROUND 3E: OBVIOUSNESS OF CLAIM 15 OVER SUZUKI AND CONNELL OR SUZUKI, GRISHAM AND CONNELL

Claim 15 depends from claim 1 and is not obvious at least for the same reasons that claim 1 is not obvious.

XX. GROUND 3F: OBVIOUSNESS OF CLAIM 16 OVER SUZUKI, NIXON, CONNELL, AND MCDANIEL OR SUZUKI, GRISHAM, NIXON, CONNELL, AND MCDANIEL

Claim 16 depends from claim 15 and it at least not obvious at least for the same reasons that claims 15 and 1 are not obvious.

The Petition asserts that a POSITA would have motivated to combine these references for the reasons set forth in the arguments concerning claim 9 in Grounds 2A and 3C and claim 10 is Grounds 1D and 3D. Metrom similarly incorporates its arguments for those claims and Grounds.

XXI. CONCLUSION

The challenged claims are not obvious when secondary considerations are taken into account and the art is viewed through the lens of the correct POSITA. Petitioners' hindsight reconstruction combining the skill of a person who is not a POSITA with up to five references, including non-analogous art, to arrive at the invention ignores the history of how Metrom's innovations have unfolded in the industry and Petitioner Piper's copying of the invention years after Metrom demonstrated success. The claims should be confirmed.

Dated: September 15, 2023

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Under 37 C.F.R. § 42.24(d), the undersigned attorney for the Patent Owner, Metrom Rail, LLC, declares this Patent Owner Preliminary Response has 9048 words, according to Microsoft Word® word count tool, excluding the parts of the Response exempted by 37 C.F.R. § 42.24(a)(1).

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