

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

PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE

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APPENDIX LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 9,043,131 (“’131 patent”)
1002	Prosecution File History of US Patent No. 9,043,131
1003	Declaration of Scott Andrews
1004	Curriculum Vitae of Scott Andrews
1005	European Patent Application No. EP 1 785 744 (“Suzuki”)
1006	U.S. Patent No. 6,759,948 (“Grisham”)
1007	Declaration of Sylvia Hall-Ellis, Ph.D.
1008	An Outdoor UWB Tracking System to Improve Safety of Semi-Autonomous Vehicle Operations (“Richardson”)
1009	Prosecution File History of US Patent No. 8,812,227
1010	Copy of Complaint Metrom Rail, LLC v. Siemens Mobility, Inc., et al., No. 1:22-cv-00049-RGA (D. Del.), filed 01/13/2022
1011	U.S. Patent No. 8,874,359 (“Douglas”)
1012	U.S. Patent Publication No. 2009/0255329 (“Connell”)
1013	U.S. Patent No. 6,133,876 (“Richards”)
1014	U.S. Patent No. Publication No. 2010/0052945 (“Breed ’945”)
1015	U.S. Patent Publication No. 2007/0255498 (“McDaniel”)
1016	International Application No. WO 03/009254 (“Nixon”)
1017	[RESERVED]
1018	U.S. Patent Publication No. 2008/0150786 (“Breed ’786”)
1019	U.S. Patent 2,188,293 (“Williams”)
1020	U.S. Patent No. 3,898,652 (“Rashid”)
1021	“Driving Assistance Provided by Adaptive Cruise Control”
1022	SAE J2735/2009-11
1023	U.S. Patent No. 5,036,478 (“MacDougall”)

1024	“Operation of the Eaton VORAD Collision Warning System and Analysis of the Recorded Data”
1025	US Patent Publication 20070293153 (“Molisch”)
1026	IEEE Std 802.15.4™-2011, IEEE Standard for Local and Metropolitan Area Networks: Part 15.4: Low-Rate Wireless Personal Area Networks
1027	Time Domain’s Ultra Wideband (UWB) Definition and Advantages, Time Domain (March 2011)
1028	U.S. Patent Publication No. 2006/0009240
1029	U.S. Patent No. 7,725,252 (“Heddebaut”)
1030	U.S. Patent No. 2,216,575 (“Seinfeld”)
1031	“Transponder History - RADAR Identification of Aircraft”
1032	“Collision of Metrolink Train 111 With Union Pacific Train LOF65-12”
1033	“Collisions & Casualties by Year”
1034	“Fatal Crashes at Highway Rail Grade Crossings”
1035	“Highway-Rail Grade Crossings Overview”
1036	“Railroad Accident: Common Causes, Statistics and Prevention”
1037	U.S. Patent No. 6,631,322 (“Arthur”)
1038	Positive Train Control (May 2012)
1039	“CCS: A Railway Corridor Control System Utilizing UWB Radio Technology”
1040	Docket as of January 13, 2023 for Metrom Rail, LLC v. Siemens Mobility, Inc., et al., No. 1:22-cv-00049-RGA (D. Del.)
1041	Declaration of Steve Moore
1042	Copy of First Amended Complaint Metrom Rail, LLC v. Siemens Mobility, Inc., et al., No. 1:22-cv-00049-RGA (D. Del.), filed 04/26/2022
1043	Copy of Exhibit K to First Amended Complaint Metrom Rail, LLC v. Siemens Mobility, Inc., et al., No. 1:22-cv-00049-RGA (D. Del.), filed 04/26/2022
1044	[RESERVED]

1045	Ex. 2011 Annotated by Professor Todor Cooklev (Oct. 23, 2023)
1046	Ex. 2023 Annotated by Professor Todor Cooklev (Oct. 23, 2023)
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1052	Transcript of Deposition of Kurt Gunther (Nov. 15, 2023)
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1055	“Time-Reversal UWB Wireless Communication-Based Train Control in Tunnel” (May 2009)
1056	U.S. Provisional Patent Application No. 62/897,860
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I. INTRODUCTION

Metrom all but admits that independent claim 1 is *prima facie* obvious. Instead, Metrom asserts secondary considerations as its only evidence based on some alleged universal “resistance to change” in the railroad industry. But Metrom’s argument that such “resistance” teaches away from creativity and innovation flatly contradicts *KSR* and, in any event, is contradicted by deposition admissions of its own witnesses. Metrom’s secondary-considerations arguments also lack sufficient evidence and a nexus to the claims. Metrom’s remaining arguments regarding dependent claims either ignore or misconstrue the Petition and Andrews Declaration (EX1003), or are premised on irrelevant strawmen arguments.

The POR (Paper 22) raises a subset of arguments made by Metrom’s declarants. Below, Petitioners only respond to arguments actually made in the POR. Should Metrom’s sur-reply make additional arguments that are only raised by Metrom’s declarants, Petitioners will move to strike as improper. *See* 37 C.F.R. §42.23(b).

II. LEVEL OF ORDINARY SKILL IN THE ART AND THE USEFULNESS OF MR. ANDREWS’S TESTIMONY

Metrom’s argument regarding a supposed “resistan[ce] to change” and “reluctan[ce] to innovate” in the railroad industry wrongly equates *invention* with *implementation*. POR, 4, 5. Non-technological concerns that may influence a businessperson—*e.g.*, economic or regulatory concerns—are irrelevant to

obviousness. *In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983). Also, many inventors in the railroad industry were constructively reducing their inventions to practice: *e.g.*, 100+ U.S. patent applications related to the railroad industry were filed in 2004, the year Grisham was published, and another 90+ were filed in the year before the priority date of the challenged patent.¹

Metrom's attempt to add "railway" in two places to the level of skill should be rejected for the same reasons already addressed by the Board in the Institution Decision. Paper 10 ("ID"), 9-11. If anything, the evidentiary record since the ID further supports Petitioners' level of skill. Inventor Kurt Gunther did not begin working on railway vehicles until March 2011. EX2009, ¶10; EX1052, 14:2-24:22. Only two months later, Mr. Gunther (along with others) filed the first provisional application to which the '131 patent claims priority. *See* EX1001, (60). That Mr. Gunther could so quickly apply his control-systems experience to railway collision-

¹ The patent application counts were obtained by searching patent publications and issued patents for the word "railroad" in the Title or Abstract fields on the USPTO's Patent Public Search database (<https://ppubs.uspto.gov/pubwebapp/static/pages/landing.html>) and narrowing the results to the timeframes listed. The results were further narrowed to eliminate duplicates from overlapping patent families. EX1061.

avoidance systems underscores the similarities and overlap between the two disciplines. Additionally, “[t]hose of ordinary skill (or those of extraordinary skill) in the particular art are not, of course, the only witnesses who may testify as experts in a patent trial.” *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363 n.5 (Fed. Cir. 2008). Even **Metrom’s** expert admits that “someone who has no railroad safety experience [could] be helpful to the Patent Board in deciding the question of obviousness in this case.” EX1053, 190:4-22. Mr. Andrews’s expertise includes the technologies claimed by the ’131 patent, and his testimony will assist the Board to understand the evidence and to determine disputed facts. Mr. Andrews’s opinions are sufficiently well-reasoned and supported for the reasons explained below.

III. METROM’S ALLEGED SECONDARY CONSIDERATIONS FAIL

Metrom’s secondary-considerations arguments are factually and legally flawed, and are certainly insufficient to rebut the Petition’s strong showing of obviousness. *Dow Chem. Co. v. Halliburton Oil Well Cementing Co.*, 324 U.S. 320, 330 (1945).

A. Metrom Has Not Established a Long-Felt, Unresolved Need

Metrom appears to argue that there was a long-felt and unresolved need for a “radio-based maintenance of way (MOW) collision avoidance system.” POR, 8. Metrom is wrong.

There can be no long-felt, unresolved need where the prior art has already resolved the “need.” *Nike, Inc. v. Adidas AG*, 955 F.3d 45, 55 (Fed. Cir. 2020). Metrom does not dispute that Grisham discloses a radio-based collision-avoidance system for rail vehicles. Petition (Paper 5), 9-10. Other prior art references likewise confirm that such systems were known. EX1011, 3:11-30; EX1039, 1-4.

Also, Metrom’s reference to **MOW** systems is irrelevant. Metrom’s expert admits that the claims are not limited to MOW vehicles. EX1053, 136:17-137:10; *Sjolund v. Musland*, 847 F.2d 1573, 1582 (Fed. Cir. 1988) (evidence relating to a long-felt need for features that are “not part of [the] *claimed* invention ... are irrelevant”) (original emphasis). In any event, Grisham’s system protects “work vehicle[s]” on the tracks (*i.e.*, MOW vehicles). EX1006, 22:42-23:32, FIGs. 19-20, claim 8; *see also* EX1039, 3 (disclosing UWB-based traffic-control system with an “On-Board **Work Vehicle** System”). The prior art resolved the “need” Metrom relies upon, foreclosing Metrom’s long-felt-need argument.

The POR also argues that there were failures of every other UWB/RADAR communications systems to go to market and “most experts” thought UWB was “dead” by 2010-2012. POR, 9. UWB’s status is irrelevant because no challenged claim requires UWB. *Sjolund*, 847 F.2d at 1582; EX1051, 123:22-124:8 (Metrom’s expert admitting claims 1 and 7 do not require UWB). Also, Metrom’s expert admitted that he did not know of any UWB/RADAR communications systems to go

to market by 2012. EX1053, 150:2-151:19. Moreover, Metrom does not dispute that Grisham “us[es] UWB technology.” Petition, 9. And other prior art references confirm that UWB was far from “dead”—it was being used in railroad collision-avoidance systems. EX1029, 1:64-2:8; EX1039, 1-4. In fact, even the reference Metrom relies upon to say that “UWB [was] dead” actually said that “UWB radar”—*i.e.*, UWB-based distance ranging—was introduced in 2006 and therefore “UWB was *not* dead after all.” EX2024, 2; EX1052, 102:24-103:21.

B. Metrom Has Not Established Skepticism

Metrom asserts that industry skepticism supports non-obviousness. POR, 10-11. But Metrom fails to provide evidence that industry experts were skeptical “about whether or how a problem could be solved or the workability of the claimed solution.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1335 (Fed. Cir. 2016). In particular, Metrom fails to provide “*specific* evidence of industry skepticism related to a *specific* combination of references.” *Auris Health, Inc. v. Intuitive Surgical Operations, Inc.*, 32 F.4th 1154, 1159 (Fed. Cir. 2022) (emphasis original).

Metrom’s purported industry skepticism evidence consists solely of statements from inventor Kurt Gunther about his personal experience attempting to sell Metrom’s AURA CAS system to a lone unnamed customer. His statements are unsubstantiated and almost entirely based on hearsay and speculation. *See, e.g.*, EX2009, ¶36 (speculating what an unnamed individual had previously “witnessed”),

¶37 (speculating what an unnamed witness “was not expecting”), ¶¶38-40 (speculating an alleged “concern” of unnamed “radio engineers”); EX1052, 79:16-80:12 (admitting that he had no direct knowledge regarding ¶19 of his declaration). For these reasons alone, the Board should give Metrom’s argument little or no weight. *NuVasive, Inc. v. Hirshfeld*, No. 2020-1708, 2021 WL 3661208, at *6 (Fed. Cir. Aug. 18, 2021).

Also, the purported evidence is not specific enough to establish *industry* skepticism. For instance, the alleged “decision maker” had allegedly “witnessed previous failed attempts at collision avoidance” and “was not expecting” AURA to be able to detect a vehicle in a tunnel. EX2009, ¶¶36-37. But the challenged claims do not require operation in a tunnel, and Mr. Gunther does not establish that the described “decision maker” was a POSITA or that the purported skepticism was specific to AURA, as opposed to general skepticism of collision avoidance systems or skepticism of Metrom as a company. *Auris*, 32 F.4th at 1159. Also, any skepticism of UWB was unfounded: UWB systems had already been shown to work in train tunnels. EX1055 at 255. In fact, Gunther’s UWB solution was to buy a ready-made system from Time Domain, which was the original assignee of the Grisham patent. EX1052, 64:22-66:7.

Similarly, Mr. Gunther states that “UWB radio was an unfamiliar technology” and that “radio engineers” were “concerned” about interference with other radio

systems and low power performance. EX2009, ¶¶38-40. Again, nothing in the challenged claims requires the use of a UWB-ranging system, let alone operation at low power and/or alongside non-UWB radio systems. *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1328 (Fed. Cir. 2008) (rejecting skepticism argument where patentee’s nexus appeared directed to one specific embodiment). Thus, these alleged concerns have no bearing on the “workability of the *claimed* solution.” *WBIP*, 829 F.3d at 1335; *Auris*, 32 F.4th at 1159; *see also* §IV.E.1, *infra*. Further, Mr. Gunther himself did not build a UWB system, instead, he bought one from Grisham’s company. EX1052, 64:22-66:7.

C. Metrom Has Not Established Commercial Success

Metrom argues that the alleged commercial success of AURA demonstrates that the challenged claims would not have been obvious. POR, 11-12. Metrom’s argument fails for several reasons.

First, Metrom misidentifies “the relevant market” as radio-based MOW collision-avoidance systems (POR, 11; EX2008, ¶26), whereas the relevant, claimed market is radio-based collision-avoidance systems for rail vehicles, generally. *See, e.g.*, EX2012, ¶¶48-51. Metrom offers no evidence that AURA is successful in the relevant, claimed market. *L’Oréal USA, Inc. v. Liqwd, Inc.*, PGR2018-00025, Paper 78, 46-47 (PTAB Sept. 6, 2019). Moreover, even in the narrow **MOW** market, Metrom’s own evidence shows a steady **decrease** in sales, undercutting any

inference of “success.” EX2008, ¶26. Metrom has provided no evidence regarding the profitability of its product or compared its sales levels to anyone else in the market. Sales numbers without context cannot show commercial success. *Novo Nordisk A/S v. Caraco Pharmaceutical Labs., Ltd.*, 719 F.3d 1346, 1356 n.5 (Fed. Cir. 2013).

Second, “if the feature that creates the commercial success was known in the prior art, the success is not pertinent.” *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006). As discussed *supra* §III.A, radio-based collision-avoidance systems (including UWB ones) for rail vehicles were known in the prior art.²

Third, Metrom fails to establish a nexus to take advantage of any commercial success, as is required. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). Metrom cannot demonstrate “that the driving force behind” AURA’s sales was due to unique characteristics of the claimed invention because none exist. *In re DBC*, 545 F.3d 1373, 1384 (Fed. Cir. 2008). *See infra* §IV.

There is no nexus—presumed or otherwise—because Metrom fails to show that AURA practices any claim. Metrom’s barebones claim chart (EX2023) is

² Metrom’s vague reference to “praise” for AURA (POR, 11) is thus irrelevant. *S. Alabama Med. Sci. Found. v. Gnosis S.P.A.*, 808 F.3d 823, 827 (Fed. Cir. 2015).

insufficient, as is its lone, conclusory paragraph from an “expert” who failed to perform any independent analysis (EX2011, ¶41). EX1051, 92:3-19. Petitioners will move to exclude, but the Board should also reject this evidence as contrary to 37 C.F.R. §42.6(a)(3). *Eli Lilly v. Teva Pharms.*, IPR2018-01423, Paper 77, 104 (PTAB Feb. 18, 2020), *aff’d*, 8 F.4th 1349 (Fed. Cir. 2021).

Even assuming *arguendo* that claims 1 and 7 cover AURA, to establish a presumed nexus Metrom must prove that AURA is “coextensive” with the claims. *Fox Factory*, 944 F.3d at 1373. Yet, AURA is not coextensive because it has unclaimed features that are responsible for its alleged success. *Id.* at 1376. Metrom’s own exhibits describe extensive unclaimed and material features in AURA that Metrom’s CEO was forced to admit at deposition were important to Metrom’s customers, *e.g.*:

- “operator-defined detection and alarm criteria, with integrated, expandable hardware options;”
- “key machine function monitoring” (e.g., gas consumption);
- “remote data recording”;
- “customizable user interface”;
- “aluminum and specific molded Radome materials”;
- “adaptive spacing limits” with “three modes” of equipment speed; and
- “integrated data recorder.”

EX2016, 1-6; EX2019, 1-4; EX1054, 125:20-141:7.

Metrom’s only evidence that unclaimed features are irrelevant to AURA’s success is Dr. Cooklev’s “conclu[sion] that commercial success of the AURA CAS was...not [due] to any significant unclaimed features.” POR, 15 (citing EX2011, ¶41). That conclusion, which is contradicted by the above evidence, is also legally and factually insufficient. EX2011, ¶41; *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004). Dr. Cooklev’s analysis is legally insufficient because he assumed that any product that met a claim was in fact coextensive with it, regardless of whether it had additional features. EX1051, 117:5-10. Dr. Cooklev essentially, and improperly, boiled coextensiveness down to infringement. Dr. Cooklev’s conclusion is also factually insufficient as based entirely on conversations with Messrs. Gunther and Marchi, EX2011, ¶41, without independent analysis.

D. Metrom Has Not Established Copying

Metrom asserts that Piper copied Metrom’s AURA, but Metrom’s allegations are plainly contradicted by the evidence of record.

Metrom provides *no* direct evidence of copying. Instead, it solely offers up threadbare circumstantial evidence arising from Piper’s alleged “access” to Metrom’s technology and subsequent release of an allegedly similar system.

Metrom’s copying narrative is easily refuted. Even Metrom’s declarant admits he “could not prove it in the court of law.” EX1052, 167:24-168:15. The narrative is centered on David Garcia’s hiring at Piper in 2020, but Piper began filing

patent applications relating to using UWB time-of-flight ranging in railway environments six months before Mr. Garcia joined Piper (September 2019). EX1056. Indeed, by the time Mr. Garcia joined the company, Piper had also already successfully demonstrated its UWB positioning technologies in a pilot project for the Metropolitan Transportation Authority. *See* EX1057 (January 2020 article reporting the success of Piper’s UWB-based train control pilot on a contract awarded in March 2019). Because the evidence shows that Piper began developing its UWB-based train-control systems well before the alleged “access” to Metrom’s AURA, Metrom cannot plausibly allege copying by Piper. *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1375 (Fed. Cir. 2018).

Further, as demonstrated in Section III.C above, Metrom has failed to show that AURA has a nexus to the claims at issue.

IV. GROUNDS OF UNPATENTABILITY

A. Grounds 1A, 1E, 1F, 2B: Obviousness over Grisham and Other References

Rather than focus on the instituted grounds, Metrom makes the irrelevant argument that Petitioner cannot show anticipation by Grisham. POR, 6-7. But this is an obviousness case, as the Institution Decision recognized. Petition, 1, 3, 9-20; POR, 6; ID, 7. And, of course, “anticipation is the epitome of obviousness.” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1373 (Fed. Cir. 2019); *cf. Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1278 n.3 (Fed. Cir. 2017) (noting

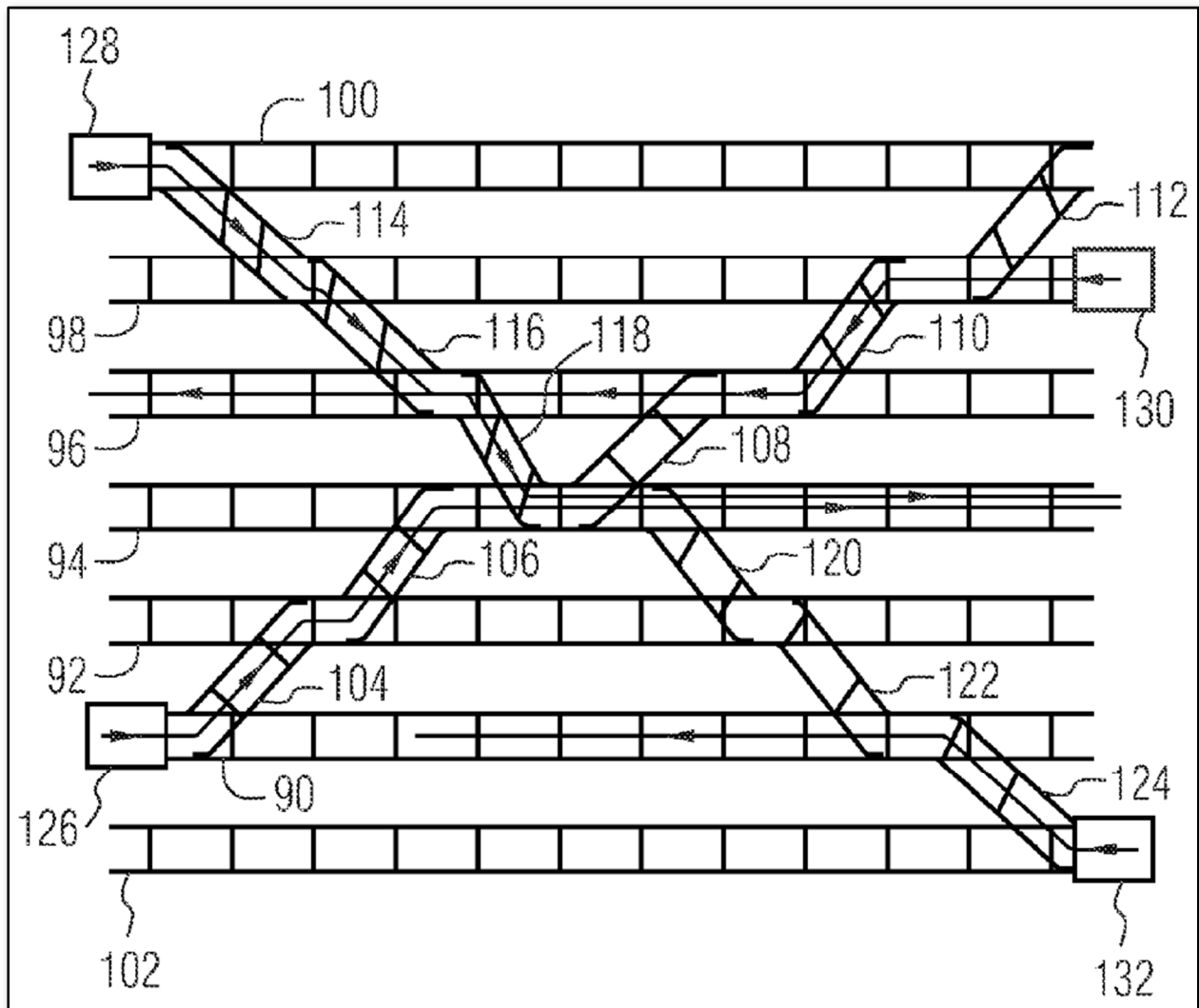
the Board's conclusion that a prior art reference rendered certain claims obvious “by virtue of its anticipation of them”).

Additionally, Metrom admits claims 1, 11, and 14 are *prima facie* obvious by only arguing secondary considerations, and Metrom does not make any separate arguments for claims 12-13 and 15-16, thus also conceding that they are *prima facie* obvious.

B. Ground 1B: Obviousness over Grisham and Douglas

Metrom argues that neither Douglas nor Grisham discloses that “the central tracking unit is operable to track a location of the” first and second vehicle mounted modules from claim 2. POR, 15-19. Metrom does not make any separate arguments for claims 3-4. Contrary to the POR, Douglas discloses “apparatus 32 located at the station 30,” which “receive[s] information transmitted by the trains” such as “the track the respective train is moving on” and similarly 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). EX1011, 3:18-23, 3:31-47, 4:32-49, 7:10-12. Metrom cannot plausibly dispute that Douglas can track and “know[] that the trains are generally in the same zone and the tracks on which the trains are moving,” which is all that is necessary to meet the limitation on its own. POR, 17-18. Metrom’s arguments attempting to distinguish this disclosure of Douglas from the challenged claims are insufficient.

First, Petitioners’ arguments are not limited to Figure 7c, and it is irrelevant that the word “location” is not used in Douglas. *See* POR, 17. As described in the Petition, Figure 7c illustrates that apparatus 32 tracks a list of links (104, 106, etc.) to be traversed by, and the direction of motion of each train (D_0 and D_1), which together constitute the *location* of a train. Petition, 20-21. So does Figure 7a:



EX1011, FIG. 7a; *id.*, 2:32-34 (linking Figures 7a and 7c). Obviousness does not require the word “location” explicitly be used; the figures and description in

Douglas suffice as a disclosure of the claimed limitation. *Syntex (U.S.A.) LLC v. Apotex, Inc.*, 407 F.3d 1371, 1380 (Fed. Cir. 2005).

Second, Metrom’s argument that Douglas does not provide sufficiently precise location information to satisfy the claims is a claim construction argument in disguise. Metrom is wrong that the challenged claims require any particular precision for train “location.” The claim language does not require a pinpoint location, just “a location.” The specification also supports a broad understanding because it uses “location” with differing levels of specificity. Sometimes the specification discloses “exact location” or “specific location,” while at other times disclosing “relative location” or “reasonable calculation of track location.” EX1001, 12:7-10, 45-47, 13:9-12, 26:50-54. Metrom’s proposal to construe “location” as requiring a precise location therefore seeks to improperly import limitations from preferred embodiments in the specification into the claims. *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1342 (Fed. Cir. 2010).

Third, Metrom is wrong to characterize Douglas as determining location no more precise than “that a car is taking Interstate 80 from Chicago to Denver.” POR, 18. Metrom ignores that Douglas discloses that apparatus 32 only tracks links no more than 3 kilometers from the trains. EX1011, 9:23-36. Therefore, Douglas’s maximum tracking distance is much less than the distance from Chicago to Denver (~1300 km).

Fourth, Metrom argues that Douglas's location information is insufficient because Douglas does not a) store the absolute and relative locations of trains (POR, 18), b) generate a warning when trains are close on the same track but in different zones (*id.*, 19), or c) generate a warning when trains are close on different tracks (*id.*). However, storing absolute and relative locations of the trains are not required by the claims, so this issue is irrelevant. Also, whether Douglas generates a warning if the trains are close to each other on the same track when each train is in a different zone is not a problem because Grisham's UWB tracking (already discussed for independent claim 1) will generate warnings in that scenario. Petition, 37-38. Finally, Douglas not generating a warning if the trains are close on different tracks is exactly the result a POSITA would want. *See* EX1003, ¶179. There is no danger of a collision (and no need for a warning) if the trains are close to each other but on different tracks.

C. Ground 1C: Obviousness over Grisham and Richardson

Metrom claims that there is a lack of motivation to combine Grisham and Richardson for claim 5 (POR, 19-20), but Metrom ignores the Petition and Mr. Andrews's declaration, which explain that Richardson's multiple transponder sensor module (TSM) format can account for lengthy trains to prevent collisions at the train's front and rear. Petition, 26; EX1003, ¶148. Metrom also ignores Richardson's disclosure that having multiple UWB transceivers offset by a distance

r_b (as shown in Figs. 6-7) causes the location information to be more precise by limiting the dilution of precision (DOP). EX1008, 213. Metrom does not make any separate arguments for claim 6.

Metrom also argues that because Richardson's offset distance r_b is only a few feet instead of a mile, a POSITA lacked motivation to use Richardson on a train. POR, 20-21. Metrom made the same arguments in its Preliminary Response, and they were rejected by the Board in its Institution Decision. ID, 27-28. The claim language does not require a mile-long offset. Richardson describes ranging up to 40 meters, which Metrom's expert admits is longer than the length of a MOW vehicle. EX1053, 163:6-22. Also, the two TSMs in the front and the two TSMs in the rear each separately satisfy claims 5-6 and "provides for significant flexibility in identifying different zones in the vehicle's location," which could be a mile away, as explained by the Petition and Mr. Andrews. Petition, 26; EX1003, ¶148. UWB signal range is irrelevant in this scenario because the train would be within UWB range in the front via the front TSMs and in the rear via the rear TSMs. *See id.*

Lastly, Metrom argues that "[t]he Petition and Mr. Andrews fail to satisfactorily explain how the combination of [Grisham and Richardson] is supposed to work." POR, 21. Richardson mounts four UWB radios on corners of each vehicle. EX1008, 212-13. As the Board has already found: "Richardson's disclosure evidences a high degree of predictability in this art to support a reasonable

expectation of success in the combination.” ID, 28. This is nothing like the situation that Metrom cites in *Unified Patents Inc. v. Divx, LLC*, which involved video image-quality algorithms. IPR2019-01379, 2021 WL 451027, at *1-2 (PTAB Feb. 8, 2021).

D. Ground 1D: Obviousness over Grisham and McDaniel

Metrom ignores the fact that claim 10 depends from claim 1 and misconstrues Ground 1D. The Petition and Mr. Andrews explain in relation to claim 1 that Grisham determines the speed of rail vehicles, including the speed of the second (remote) train. Petition, 13-14, 16, 18-19; EX1003, ¶¶111-17, ¶¶125-27. The Board properly understood Petitioners’ arguments in the Institution Decision, finding that the minimum threshold warning distance feature of McDaniel, which is based on velocities of local and remote vehicles, would be added to Grisham, which “already collects speed and distance data.” ID, 29 (citing Petition, 29-30; EX1015, ¶¶[0038]-[0039]; EX1003, ¶¶153-56). Also, even though “absolute speed” is not required by claim 10,³ Mr. Andrews explained in his deposition “that Grisham teaches that you

³ The claim language simply recites “speed,” not *absolute* speed. The specification discloses “absolute location and speed” and “relative speed” as preferred embodiments, EX1001, 22:55-57, 24:8-12, but it would be improper to import those limitations from the specification into the claims. *Enzo*, 599 F.3d at 1342.

can determine the ground speed [*i.e.*, absolute speed,] of the vehicle, or of the first [(local)] train, by measuring the speed relative to the ground.” EX2007, 94:21-23. Also, both Petitioners and Metrom’s experts agree that “by the priority date of the ‘131 patent, trains were well-known to include speed measurement devices.” EX1003, ¶¶128-30; EX1053, 62:8-63:7 (tachometers common from 90s to today).

Metrom next argues that “Mr. Andrews admits that McDaniel does not teach ... how you determine the velocity of the first [(local)] vehicle” (POR, 22), but Metrom misrepresents Mr. Andrews’s testimony. In fact, Mr. Andrews testified, “I haven’t cited to anything where [McDaniel] teaches how you determine the velocity of the first [(local)] vehicle.” EX2007, 94:7-9. This testimony is not surprising because Grisham already determines the speed of rail vehicles, as described above. Moreover, Metrom’s argument is doubly wrong because the statement that Mr. Andrews does cite strongly suggests that McDaniel determines the velocity of the first (local) vehicle (host machine 110). Petition, 29 (citing EX1015, [0038]-[0039]); EX1003, ¶¶153-54 (same). The rest of McDaniel confirms the same by its disclosure of determining an absolute speed for the first (local) rail vehicle: “[v]elocity monitoring device 114 may include a mechanical or computerized device coupled to a transmission of host machine 110 and configured to determine the velocity of host machine 110 based on the distance traveled over a given time period.” EX1015, [0022].

Lastly, Metrom argues that there is no motivation to combine Grisham and McDaniel because McDaniel would not eliminate every nuisance alarm, such as when trains are close together but on separate tracks. POR, 23-24. But Metrom ignores that McDaniel eliminates some nuisance alarms, which would be a sufficient motivation to combine Grisham and McDaniel. *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (“[O]ur case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.”). For example, McDaniel eliminates nuisance alarms in the train yard when two trains on the same track move slowly because McDaniel explains how to change the threshold warning distance based on slow speed. Petition, 29-30; EX1003, ¶¶153-56. Additionally, other features, such as track databases or Douglas’s location tracking, could solve the nuisance alarm when trains are close together but on separate tracks. *See* §IV.B.

E. Ground 2A: Obviousness over Grisham and Nixon

1. Claim 7

Metrom puts forth several flawed reasons why a POSITA would not have been motivated to combine UWB from Grisham with GPS from Nixon. POR, 25-28.

First, contrary to Metrom, it was not conventional belief at the time of the invention that UWB would interfere with GPS. *Id.*, 25-26. In September 1998, the Federal Communications Commission (“FCC”) initiated an investigation to permit

UWB systems on an unlicensed basis. EX1058, 50184. By 2002, multiple entities had “performed measurements and analyses to determine the UWB emission levels necessary to prevent interference to GPS operation.” EX1059, 28. Based on these studies, the FCC announced that emission limits for UWB “were found to be more than sufficient to protect GPS from harmful interference.” *Id.*, 67. Therefore, the FCC amended the Code of Federal Regulations to include those emission limits for UWB. *Id.*, 104-12. Because the FCC announcements and amendments occurred nearly eight years *before* the critical date of the ’131 patent, a POSITA would not have been concerned about interference between GPS and UWB. *See id.*, 1.

Second, Metrom’s argument that there is no support for communicating GPS locations via UWB units (POR, 26-28), ignores Grisham’s plain disclosures. Grisham teaches that its radio units communicate with each other to display direction, distance and/or speed of the remote train. Petition, 13 (citing EX1006, 23:64-24:24, FIG 22; EX1003, ¶¶111-13). The Petition and Mr. Andrews explain that a POSITA would have been motivated and knew how to allow a GPS unit to share the absolute location of the first train to the first train’s controller, and then the controller would direct the radio units to communicate the location as in Grisham. Petition, 37; EX1003, ¶¶173-79.

Third, Metrom’s contention that a POSITA would not have been motivated to combine Grisham’s UWB with Nixon’s GPS when trains are in close proximity

but on different tracks (POR, 26-27) ignores other stated motivations to combine. Specifically, compared to UWB, GPS beneficially allows positioning at larger distances and provides additional information (heading, acceleration, etc.). Petition, 35-36; EX1003, ¶¶176-79. The POR also ignores Mr. Andrews's deposition testimony describing exactly how two trains would know whether they are on the same or parallel tracks: via a track database or via the trajectory of multiple GPS fixes over time. EX2007, 115:10-20; *see also* EX1003, ¶176. Metrom and Mr. Conti are wrong to contend that "no such track database existed at the time of the invention." EX2012, ¶72 n.3. Track databases were disclosed by (at least) 2002. EX1060, 4:42-63, 5:38-43. Metrom also argues that GPS accuracy is insufficient to determine whether trains are on the same or parallel tracks. However, this ignores that a POSITA would have been combining UWB from Grisham with GPS from Nixon, so "while GPS would provide a better overall picture of where the train is and where other trains are, UWB allows that picture to be refined to the level of accuracy needed to assure that a collision does not occur." EX1003, ¶179.

Fourth, Metrom ignores multiple motivations to combine when it argues that "two trains could exchange GPS coordinates with each other only when they are within the operating range of UWB." POR, 27. Metrom ignores that GPS provides the absolute location and heading of a first rail vehicle regardless of whether that vehicle is within UWB range of another vehicle. Petition, 35-36; EX1003, ¶¶176-

79. Metrom also ignores that in a safety system a POSITA would always want the “redundancy and diversity” provided by using both UWB and GPS for determining a train’s location. EX1053, 41:15-42:12; EX1003, ¶179.

2. Claim 8

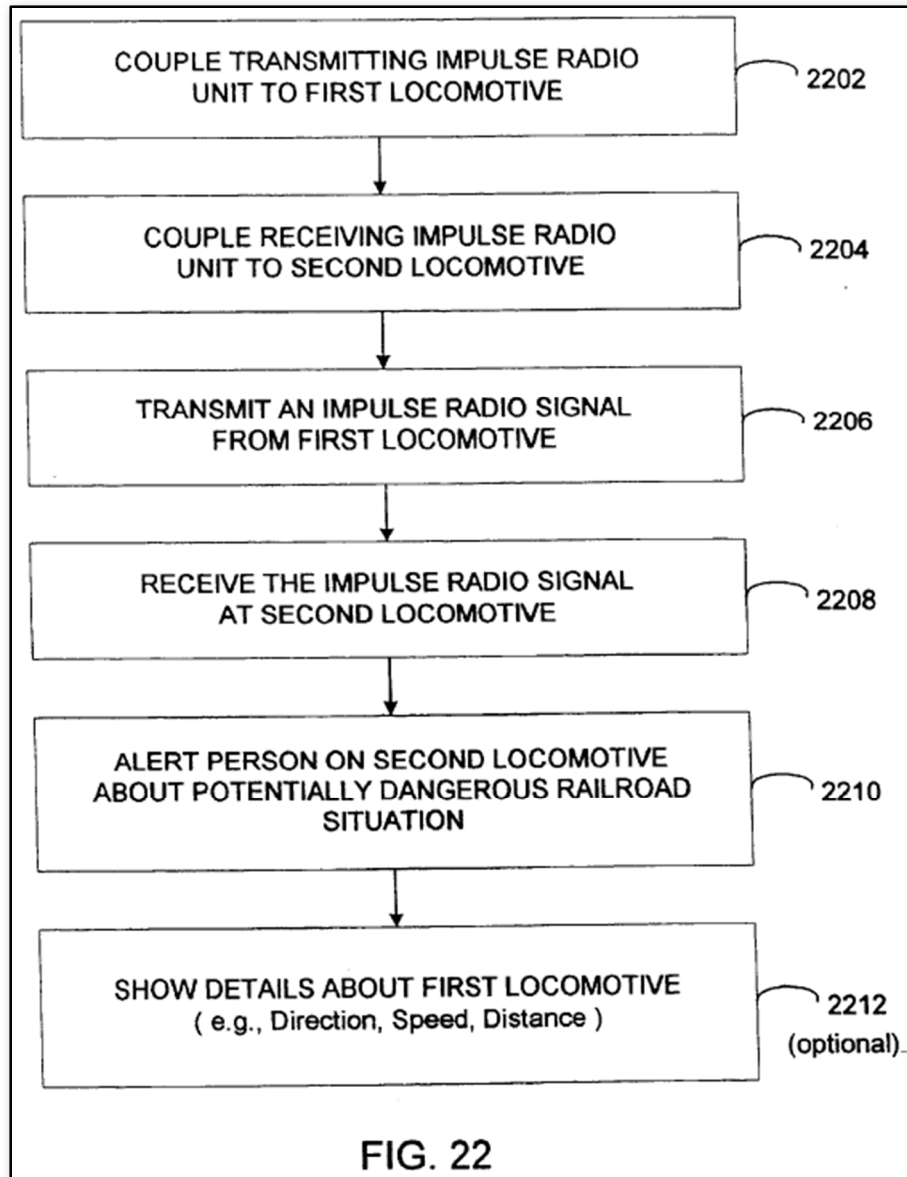
Metrom’s response on Claim 8 is a strawman argument. While the POR focuses on Nixon alone, the Petition and Mr. Andrews explained that a POSITA would have implemented an alarm system that received UWB (as shown in Grisham) and GPS (as shown in Nixon) information. Petition, 37-38; EX1003, ¶¶180-83. Metrom’s remaining arguments (POR, 29) parallel those made in relation to claim 7, which are similarly flawed as described above.

3. Claim 9

For claim 9, Metrom’s only argument against the proposed combination is the same argument regarding absolute speed that it makes for claim 10. POR, 29. This argument is flawed for the same reasons explained in relation to claim 10.

4. Claim 17; Ground 2D: Obviousness over Grisham, Nixon, Richardson, and Douglas

Metrom’s argument that Grisham and Nixon do not disclose transmitting “data representing the separation distance” between two trains acknowledges Grisham’s distance disclosure in Figure 22 but then relies on an unexplained distinction between Grisham’s “distance” and “data representing the separation distance” required by claim 17.



EX1006, FIG. 22; POR, 30-31. The only way distance information is displayed is if data representing the separation distance is communicated over the air. *See* EX1003, ¶192.; EX1006, 23:32-24:28. The exact details about how this separation distance is determined from the impulse radio signal (via the time of flight technique) was described with respect to [17G] (where Mr. Andrews refers back to [1J]).

EX1003, ¶197; *see also id.*, ¶¶125-27. Metrom does not dispute [17G] or [1J] or make any separate arguments for claim 20.

5. Claim 19

Metrom's response on claim 19 regarding violation of vehicle separation criteria is the same that it made for claim 8, which fails for reasons discussed *supra* §IV.E.2. POR, 31-32.

F. Ground 2C: Obviousness over Grisham, Nixon, and Richardson

Metrom argues that cross-references to claims 5-7 and 9 are insufficient for claim 18 because [18B] does not appear in claims 5-7 or 9. POR, 32-33. However, the Petition and Mr. Andrews cross-referenced those claims because a similar analysis applies, not just because the claim language was similar. For example, in relation to claim 5, the Petition and Mr. Andrews explain that Richardson teaches a vehicle with four offset UWB transceivers (*see* FIGs. 6 and 7 for the mounting location) and that a POSITA would have understood the benefits of providing an offset auxiliary TSM, including calibration information due to more precise information relating to length of the vehicle and mounting location of each sensor. Petition, 25-26; EX1003, ¶¶147-48. This is consistent with Mr. Andrews's discussion at EX1003, ¶¶204-07.

The Petition's cross-reference to an argument already made in relation to other claims is not improper incorporation by reference, as the POR argues (at 33).

Instead, the Petition’s cross-referencing appropriately avoids needless repetition when arguments from certain claims apply equally to other claims, just like what Metrom does in its Response. *See, e.g.*, POR, 25, 32, 39-40.

G. Grounds 3A, 3C, 3D, 3E, 3F: Obviousness over Suzuki Alone or in Combination with Other References

1. Claims 1, 7-16

Metrom argues that there is no motivation to combine Suzuki’s radar-based approach to rail vehicles because considerations for collision avoidance are allegedly different for different types of vehicles. POR, 34-35. Metrom asserts that Suzuki describes a system for vehicles with steering and a database to make decisions, which is not operable to the challenged claims. EX2012, ¶¶91. But this conclusory statement fails to provide any analysis as to why Suzuki’s computer system differs in functionality from the ’131 patent’s CEM, which performs many of the same functions. EX1001, 8:66-9:24. Metrom further argues that claims 1 and 17’s last limitations require time-of-flight measurement via round-trip communication instead of reflections. EX2012, ¶¶92. Neither claim 1 nor 17 includes any such requirement. Further, the ’131 patent specifically discloses that “[b]y measuring how long it takes a wave/pulse to travel (for example by reflecting/bouncing) between two transceivers, the distance between the UWB units can be accurately determined. This technique may be referred to as ‘Time of Flight’ (TOF).” EX1001, 13:44-50. Metrom does not make any separate arguments for claims 7-16.

2. Claims 17, 19

In addition to relying on the arguments refuted above with respect to independent claim 1, Metrom argues that claim 17's requirement to send and receive "data representing the separation distance over the air" is not taught or suggested by the prior art, ignoring the explicit teachings of Suzuki and its use of UWB radar to measure and communicate separation distances. For example, Suzuki states "[i]n addition, as many distances B between two cars as the number of a plurality of signals received in the receiver 132 of the radar will be obtained because of a plurality of other vehicles assumed to exist around the own vehicle." EX1005, [0055]. Further, as discussed above (§IV.E.4), Grisham discloses transmitting "data representing the separation distance" between two trains. EX1003, ¶¶278; *see also id.*, ¶¶125-27. Metrom does not make any separate arguments for claim 19.

H. Ground 3B: Obviousness over Suzuki and Richardson or Suzuki, Grisham, and Richardson

1. Claims 2-6, 20

As to claims 2-6 and 20, Metrom merely cross-references the arguments it made with respect to Grounds 3A and 1C. POR, 37-38. For the reasons discussed above, those arguments fail to overcome Petitioners showing that those claims are obvious. Claims 5-6 are also obvious for the additional reasons discussed above with respect to Ground 1C (§IV.C).

2. Claim 18

As to claim 18, Metrom relies on the same arguments raised in connection with Ground 2C, which were refuted above. POR, 38-39. Claim 18 is also obvious for the additional reasons discussed above with respect to Ground 2C. *See* §IV.F.

V. CONCLUSION

Claims 1-20 of the '131 patent are unpatentable for the reasons discussed above.

Respectfully submitted,

Dated: December 15, 2023

By: /Vincent J. Galluzzo/

Vincent J. Galluzzo, Reg. No. 67,830

CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the foregoing Reply complies with the requirements of 37 C.F.R. §42.24 and contains 5594 words, excluding those contained in the following: Table of Contents, Table of Authorities, List of Exhibits, Certificate of Word Count, and Certificate of Service.

Respectfully submitted,

Dated: December 15, 2023

By: /Vincent J. Galluzzo/

Vincent J. Galluzzo, Reg. No. 67,830

CROWELL & MORING LLP

1001 Pennsylvania Avenue NW

Washington, DC 20004

Telephone: 202-624-2500

vgalluzzo@crowell.com

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on December 15, 2023, a true and correct copy of the foregoing Petitioners' Reply to Patent Owner's Response was served by electronic mail on the following email address:

MetromIPR@mcandrews-ip.com

Respectfully submitted,

Dated: December 15, 2023

By: /Vincent J. Galluzzo/

Vincent J. Galluzzo, Reg. No. 67,830

CROWELL & MORING LLP

1001 Pennsylvania Avenue NW

Washington, DC 20004

Telephone: 202-624-2500

vgalluzzo@crowell.com