UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TETRA TECH CANADA INC.,

Petitioner,

v.

GEORGETOWN RAIL EQUIPMENT COMPANY,

Patent Owner.

Case IPR2019-01581
Patent No. 8,081,320

PATENT OWNER'S SUR-REPLY TO PETITIONER'S REPLY

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Claims 1-7 of U.S. Patent No. 8,081,320 ("'320 patent") are patentable over the prior art cited in Grounds 1, 2, and 3.

I. THE CLAIMS ARE PATENTABLE BECAUSE CHOROS HAS NOT BEEN SHOWN TO BE PUBLICLY ACCESSIBLE PROR ART.

Petitioner fails to show that Choros is prior art. Patent Owner Georgetown Rail Equipment Company ("GREX") demonstrated that the content of the Petition, and the Watters Declaration (Ex-1007), were insufficient to prove that Choros was publicly accessible. Response at 1-4.

In response, Petitioner effectively admits failing to submit evidence ***in the Petition itself*** of Choros' accessibility. *See* Reply at 1. The Petition merely cited the Watters declaration and explained nothing from it. Response at 2; Petition at 6-7. That constitutes improper incorporation by reference. *See* 37 C.F.R. §42.6(a)(3), §42.22(a)(2).

Petitioner argues that such incorporation by reference was not "improper" because the Petition referenced only "a few paragraphs of" the declaration "to support a distinct point." Reply at 1. However, none of the alleged "support" in the Reply is discussed in the Petition. *Compare* Reply at 2-4 *with* Petition at 6. Thus, the declaration should not be considered.

Even if its content can be considered, the Watters declaration fails to prove that Choros was available such that persons interested could locate Choros upon exercising reasonable diligence. "[P]ublic accessibility requires more than technical

accessibility." *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 773 (Fed. Cir. 2018). "In certain situations, particularly for manuscripts or dissertations stored in libraries, courts may inquire whether a reference was sufficiently indexed, catalogued, and shelved." *Hulu, LLC v. Sound View Innovations, LLC,* IPR2018-01039, (PTAB Dec. 20, 2019) (Paper 29) at 9; *see, e.g., In re Hall,* 781 F.2d 897, 898-99 (Fed. Cir. 1986); *In re Lister,* 583 F.3d 1307, 1311-12 (Fed. Cir. 2009). In accessing "public accessibility" "where indexing is concerned, … the 'ultimate question is whether the reference was "available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it."'" *Acceleration Bay,* 909 F.3d at 774.

Here, Petitioner erroneously alleges that Watters' declaration demonstrates "conventional markers of public accessibility" for Choros. Reply at 3-4. However, Petitioner misses the point because the declaration, and the alleged "markers," do not address Choros' "public accessibility." Instead, Watters' declaration addresses only whether interested persons could have located the "ASME/IEEE 2007 Joint Rail Conference"—a publication that includes Choros—rather than locate the Choros article.

Specifically, the declaration refers to a "volume" of "*ASME/IEEE 2007 Joint Rail Conference and Internal Combustion Engine Division Spring Technical Conference* (2007)" that "includes" the Choros article on "pages 173 to 181 of that

volume." Ex-1007 at 1-2. The declaration then erroneously characterizes its Exhibit B as "the [library] cataloging system record" for "*Prevention of derailments due to concrete tie rail seat deterioration* (2007) publication" (*i.e.*, Choros). *Id.* at 2. In actuality, Exhibit B is the catalog record for the "volume" of "*ASME/IEEE 2007 Joint Rail Conference*," not the Choros article.

The declaration thus at most shows that a person searching for the *ASME/IEEE 2007 Joint Rail Conference* could locate that volume because it was indexed and cataloged. It provides no evidence that Choros was cataloged or indexed such that a POSITA, or other interested person, exercising reasonable diligence could have located that article in a search, such as by searching for key words in Choros' title or content. *See Lister*, 583 F.3d at 1314-1316. Because Petitioner has not shown by a preponderance of evidence that Choros was publicly accessible, the Board should confirm the patentability of claims 1-17.

Petitioner alleges that "GREX provides no evidence purporting to show that 'a [m]ember[] of the interested public'—including a POSITA—would have been unable to locate Choros with a reasonable search." Reply at 3. However, Petitioner's argument improperly tries to shift its burden to GREX. Petitioner bears the burden of proving that Choros is a printed publication. *Hulu*, IPR2018-01039 at 11.

II. CLAIMS 1-17 ARE PATENTABLE OVER THE PRIOR ART IN GROUNDS 1-3 BECAUSE A POSITA WOULD NOT HAVE COMBINED CHOROS WITH VILLAR.

Petitioner's Grounds 1-3 rely on combining Choros with Villar. GREX demonstrated why it would not have been obvious to combine a task performed by a simple manual method, like Choros', with a complex machine vision system, like Villar's. Response at 4-6; Ex-2001, ¶¶37-40. Unable to substantively respond, Petitioner incorrectly asserts only that "GREX provides no evidence other than conclusory and unsupported opinions from its expert, Dr. Bovik." Reply at 4. Petitioner relies on *Ericsson Inc. v. Intellectual Ventures I, LLC*, 890 F.3d 1336, 1346 (Fed. Cir. 2018) for the principle that "[t]o contradict a reference, an unsupported opinion is not substantial evidence." *Id.*

The principle is inapplicable here. Dr. Bovik's opinions are anything but "conclusory" or "unsupported." They are amply detailed; they span four paragraphs and two pages. Ex-2001, ¶¶37-40. As an expert in the machine vision field, his background provides "support" for his opinions. *See* Ex-2001, ¶¶4-15, 34-35.[1] Moreover, Petitioner never identifies any contrary "record evidence," any faults, or where support is lacking. *See* Reply at 4.

[1] Further, when addressing element 1[e], Dr. Bovik references various parts of Choros and Villar demonstrating why a POSITA would not have combined those references regarding that element. *See* Ex-2001, ¶¶50-64.

III. CLAIMS 1-2, 5-7, 10-13, AND 16-17 ARE PATENTABLE OVER THE PRIOR ART CITED IN GROUND 1.

Petitioner fails to show that claims 1-2, 5-7, 10-13, and 16-17 are unpatentable over the prior art cited in Ground 1.

A. Claim 1 is Patentable.

The prior art Petitioner cites does not disclose or suggest each of claim 1's elements. Moreover, based on the references' disclosures and the opinions of Dr. Bovik, a POSITA would not have combined and/or modified the prior art to create claim 1.

1. Claim 1[e]: "determining whether rail seat abrasion is present along the rail road track"

Contrary to Petitioner's argument (Reply at 5-11), Villar and Choros do not disclose or suggest element [e], a step performed by "at least one processor" "analyzing" "a profile of" a railroad track "image" as elements [b]-[d] require. GREX's response, relying on Dr. Bovik's opinion, explained why the references would not have been combined. Response at 8-16; Ex-2001, ¶¶51-64. In response, Petitioner erroneously asserts that "GREX provides no legally sufficient reason explaining why" making that combination "would be difficult, time-consuming, or require a special amount of invention and creativity beyond that which a POSITA would find obvious." Reply at 6.

To the contrary, Dr. Bovik explained that "Villar is at best a starting point for the creation of another invention, not an obvious endeavor." Ex-2001, ¶53. "Even

if a POSITA were motivated to add the feature of determining rail seat abrasion to Villar, a POSITA would need to create a model, create code for the model, and then experiment and test the resulting code and system to make certain that they work properly." *Id.* "The disclosure in Choros is not helpful to that endeavor because Choros does not contain a model, an algorithm, or code for determining rail seat abrasion." *Id.*; *see id.*, ¶64. Consequently, combining Choros and Villar "to create a machine vision system that measures rail seat abrasion would not have been obvious." *Id.*, ¶52.

Petitioner incorrectly claims that Dr. Bovik's opinion is somehow "contradicted by" "extensive research efforts" into "automating manual inspection tasks" "before 2009" to "obviate time, accuracy, and safety issues associated with manual inspection." Reply at 6-7. His opinions apply a POSITA's point of view regarding prior art on the critical date, and thus considered all such knowledge. Ex-2001, ¶¶25-26, 3, 36. Moreover, Petitioner improperly suggests that automating any task in machine vision was obvious by 2009 because of "extensive research." Petitioner's evidence at most represents general machine vision improvements, not anything significant to element [e]. Similarly, Petitioner's reference to Villar's statement that its techniques could be applied to "other measurable aspects of railroad track" (Reply at 7) is hopelessly unspecific, and thus of little value.

Petitioner also fails to rebut GREX's argument that "Villar expressly teaches away from the manual measurement and visual inspection disclosed in Choros." Response at 10; Ex-2001, ¶55. GREX demonstrated (Response at 10-12) that Choros discloses visually locating the rail seat, and then physically measuring and visually inspecting rail seat abrasion, while Villar expressly teaches "overcoming" or "reducing" the "problems" of "visual inspection" by an "inspector walking along the track to inspect and record" data. Ex-1005, ¶¶[0007], [0004]; Ex-2001, ¶57. Accordingly, as Dr. Bovik opined, Villar "explicitly criticizes, discredits, and discourages use of Choros' type of system." Ex-2001, ¶57.

In response, Petitioner claims that "GREX's contention is misguided" because the "Petition does not propose" "the physical or bodily incorporation of" "Choros' visual manual inspection of crossties into Villar." Reply at 10. Petitioner's argument is irrelevant. GREX never argued patentability because Choros cannot be "physically" or "bodily" incorporated into Villar. *See* Response at 10-12.

Petitioner also erroneously counters that, "[b]ecause Villar does not discourage automating RSA—but rather encourages it—GREX's teaching away argument plainly fails." Reply at 9. Specifically, Petitioner argues that Villar and Choros' "combined teachings" "would have suggested" element [e] because Villar states that its methods are not "'intended to be limited to the measurable aspects and particular techniques described herein,'" and because Villar "[r]ecogniz[ed] that

manual inspection" "is time-consuming" and thus "concedes that automating manual inspection tasks, including identifying crosstie defects, were well-known." *Id.* at 10 (emphasis original), citing Ex-1005, ¶43.

However, Villar's terse excerpt that it is not "limited" to the "particular techniques described" is "boilerplate language" and cannot enlarge Villar beyond what its specification describes. *See D Three Enterprises, LLC v. SunModo Corp.*, 890 F.3d 1042, 1051 (Fed. Cir. 2018) (such "boilerplate language" "is not sufficient to show adequate disclosure of" the invention). It cannot suggest any specific application undisclosed in Villar, like element [e].

Next, Petitioner incorrectly asserts that Choros somehow supports combining with Villar because "Choros discusses using automatic inspection methods, including collecting data on geometry cars as an alternative to manually identifying RSA locations." Reply at 11, citing Ex-1007 at 11. However, as GREX demonstrated, Choros discloses that geometry cars can be used only to indicate potential RSA locations. To detect and measure RSA, an inspector must subsequently visually inspect and physically measure RSA at each rail seat. Response at 12-14.

Petitioner nevertheless claims that "GREX is wrong because Choros only contemplates using inspectors" "because of the lack of 'availability of existing geometry cars.'" Reply at 11, citing Ex-1007 at 11. However, Choros states only

that "availability" of geometry cars "may be" an issue, not that it is the only reason why Choros' "simpler method" of manual inspections must instead be used. Ex-1007 at 11. Moreover, Choros and Petitioner's other evidence demonstrates that geometry cars "identify[]" or "indicate" "possible" or "potential" track locations where RSA might be present, and that subsequent manual and visual inspection is necessary "to verify whether [RSA] exists." Ex-1007 at 11; Ex-1019 at 3, 18; Ex-1015 at 2-3; Ex-1017 at 3-4; Ex-2001, ¶¶59-60.

Petitioner further refers to Choros' discussion of "adjusting parameters based on new field data values '[a]s measurement methodologies improve, either <u>from automated inspection vehicles</u> or hand held devices.'" Reply at 11 (emphasis original), citing Ex-1007 at 13. However, this quote only generally states that future developments might lead to improved technology. It thus is hopelessly inadequate to support combining Choros with Villar.

Petitioner also incorrectly asserts that it would have been "obvious to implement" RSA determinations "in response to the" FRA's "initiatives to automate RSA detection following two high profile derailments in 2005 and 2006." Reply at 7-8. Responding to GREX's showing that "the FRA rules do not provide the motivation" to combine Villar and Choros because they were effective long after "the '320 patent's effective filing date" (Response at 14), Petitioner criticizes GREX for focusing on the "FRA's final rules." Reply at 8. However, that focus was proper

because Petitioner argued that combining Villar and Choros "is further to and consistent with the rules promulgated" by the "FRA." Petition at 27; *see* Response at 14.

In its Reply, Petitioner instead focuses on an FRA committee's initial "approval of a 'concrete tie rule'" in 2008. Reply at 8; *see id.* at 9 & n.1. However, the proposed rule did not "propos[e] use of automated inspection systems to determine RSA" as Petitioner argues. *Id.* It states that "automated inspection technology shall be used … as a supplement to visual inspection," and that each potential issue identified "must be located and field verified" (*i.e.*, through manual inspection). Ex-1021 at 17-18; Ex-1041 at 3-4. Indeed, as GREX demonstrated (Response at 14-15), during public comment the FRA stated that, because automated equipment had limited capabilities, the proposed rule required using such equipment only to "indicate" areas of "possible rail seat deterioration," and that "on-the-ground visual verification must be done by inspectors" to locate and measure rail seat deterioration. Ex-1017 at 3-4.

Notably, the FRA expressly recognized that existing combined uses of automated and manual technologies were sufficient. Thus, the proposed rules provided no motivation to create an automated system for determining RSA, let alone element [e]'s claimed method. *See* Response at 14-15.

Petitioner also refers (Reply at 7-9 & n.1) to evidence concerning FRA committee formation because of the 2005 and 2006 derailments or documentation from their meetings. Ex-1020 at 81-83; Ex-1018 at 1, 12; Ex-1019 at 18; Ex-1016 at 1-2; Ex-1040; Ex-1043 at 39:24-40:2. At best, that evidence supports an effort to better detect RSA, not any particular method. Petitioner further refers to the committee's "objective" of "develop[ing] manual and automated methods to detect rail seat failure on concrete ties." Reply at 9; *see id.* at 8; Ex-1020 at 83. However, as stated above, this objective meant using both methods combined, not an automated method alone.

Petitioner further incorrectly asserts that "the combination" of Villar and Choros "would predictably result in Villar's system automatically determining" RSA because Villar automates detection of misaligned or sunken tie plates, which GREX's employees testified involves the "same, similar type of" analysis. Reply at 7. But that testimony is inapplicable. The depositions are from other IPRs and involved different patents. Ex-1043 at 1; Ex-1044 at 1. Accordingly, the claim language here was not addressed and provided no context for the testimony of what might be the "same" or "similar" between different patent claims' requirements.

Further, the testimony does not support Petitioner's argument. Mr. Grissom expressly testified that algorithms "for measuring rail seat abrasion" and "tie plate cutting" are "separate" and "not identical," and the algorithm "steps would not be

the same." Ex-1043 at 85:24-86:15. The Grissom testimony Petitioner quotes states only that the distinct measurements have the "same" or "similar" importance because all loading from the train wheels that causes wear is transferred to tie plates on wooden ties and to rail seats on concrete ties. Ex-1043 at 85:4-22.

Finally, GREX demonstrated that, even combined, Villar and Choros "do not teach or suggest element [e]." Ex-2001, ¶50. Villar does not disclose or suggest determining whether rail seat abrasion is present or measuring it. Response at 8. Choros does not disclose or suggest a processor or image processor, or a processor that analyzes track images to measure vertical distances or that determines or measures rail seat abrasion. *Id.*

Petitioner does not dispute those facts. Petitioner instead contends that, "[b]y attacking Choros individually and ignoring its combination with Villar, GREX" "misappl[ies] the legal standards for obviousness" "based on a combination." Reply at 6. To the contrary, GREX analyzed the combined references by demonstrating that (1) a POSITA would not have combined them; and (2) the references individually and combined do not disclose or suggest element [e]. Response at 7-16, 4-6.

Petitioner also contends that "[t]he Petition relies on Villar, not Choros, for claim 1[c]'s processor recitation," and "Villar and Choros" combined "for claim 1[e]'s requirement. Reply at 5-6. But, as stated above, because Choros is a manual

method (lacking a processor), its technique is so far detached from Villar's machine vision system that a POSITA would not have combined the references using Villar's processor.

2. Claim 1[f]: "wherein, when determining whether rail seat abrasion is present, the at least one processor compensates for a tilt of the rail road track."

Contrary to Petitioner's contention (Reply at 11-18), Villar, Choros, Casagrande, and Szwilski do not disclose or suggest element [f].

a. Combination of Villar, Choros, and Casagrande

GREX demonstrated that adding Casagrande to the combination of Villar and Choros does not disclose or suggest element [f]. Response at 17-23. Most importantly, GREX demonstrated that Casagrande does not teach or suggest "compensate[ing] for a tilt of the rail road track" for any purpose. *Id.* at 20-21. Petitioner incorrectly claims this argument is "incorrect" because Casagrande discloses automatically compensating "for vertical alignment measurement errors due to 'elastic deformation of the railway or tramway carriage.'" Reply at 14 (emphasis original). Emphasizing and isolating the word "railway" from the next three words and the full specification, Petitioner then argues that, because Casagrande detects "railway" vertical alignment errors, it "detect[s] this vertical deviation regardless of whether the elastic deformation (including vertical deviation,

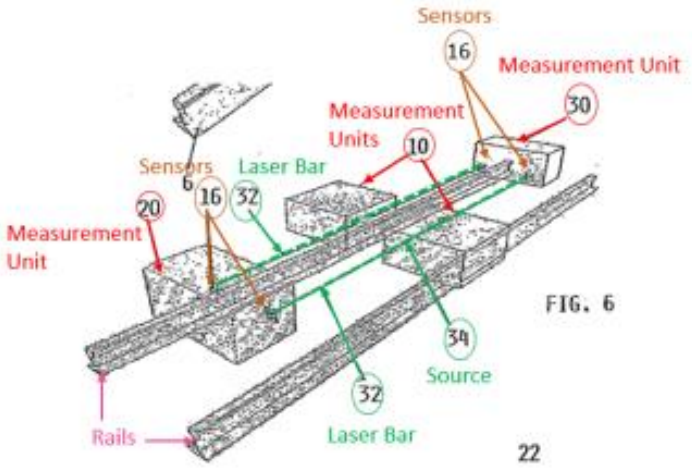
or tilt)" "was intentional (such as from being associated with a track curve) or unintentional (such as from excessive wear)." *Id.* at 14-15.

Petitioner's contention is meritless. Casagrande's reference to "railway" does not mean deviations caused by the "railway" track structure, but instead means deviations caused by the "railway carriage." As GREX demonstrated (Response at 20-21), Casagrande's express objective is to make "rail measurements with the measurement apparatus insensitive to ***oscillation and deformation of the vehicle on which it is mounted***." Ex-1008, ¶[0012] (emphasis added). Casagrande then discloses, in the statement Petitioner quotes, that its system thus provides "compensation for the errors due to ***elastic deformation of the railway or tramway carriage***." Ex-1008, ¶[0036] (emphasis added). Because Casagrande compensates for errors caused by elastic deformation of the "vehicle" on which its apparatus is mounted, the statement "railway or tramway carriage" necessarily refers to a "railway carriage" or "tramway carriage" of the vehicle on which the apparatus is mounted. The word "railway" cannot be read in isolation to mean railway tracks.

Moreover, Casagrande further confirms that fact, expressly stating that its apparatus operates so that measurements are "insensitive to elastic deformation and oscillation ***of the railway carriage*** on which [the device] is mounted." Ex-1008, ¶[0043] (emphasis added). Casagrande likewise states that its measurement units are "mounted on board a railway carriage" or "are installed" "on board the railway

or tramway carriage." Ex-1008, ¶¶[0023], [0029]. In other words, Casagrande adjusts only for measurement errors caused by "oscillations" or "elastic deformation" of the "vehicle," "railway carriage," or "tramway carriage" on which its measurement units are mounted. It does not detect, measure, or adjust for rail "tilt" or vertical displacement of one rail compared to another. Ex-2001, ¶71. Petitioner cites no evidence to the contrary. *See* Reply at 14-15.

GREX also demonstrated that Casagrande is incapable of measuring or compensating for track "tilt." Response at 21-22; Ex-2001, ¶73. When traveling on tilted or vertically displaced tracks, the entire carriage tilts because it rides on the tracks. It follows that each measurement unit mounted on the carriage will tilt in the same manner. Accordingly, the tilting will not disturb the alignment between those units as monitored by the laser bar 32 and sensors 16 shown in Petitioner's annotated version of Casagrande's Figure 6 reproduced below:



Casagrande, FIG. 6 (annotated).

Casagrande's system thus will not detect any such "tilt," and cannot "compensate for" that "tilt," as element [f] requires. Response at 21-22; Ex-2001, ¶73.

In response, Petitioner asserts that such a result somehow happens only when "railway deformation" "occur[s] for each rail[] concurrently and at an angle causing tilt of an entire vehicle." Reply at 15. Petitioner theorizes that "vertical deviation of a single rail relative to normal (and the opposite rail)" may cause "the side of a vehicle on the deviated rail to tilt relative to normal—not the entire vehicle." *Id.*

Petitioner's assertion is meritless. Because a vehicle or carriage is rigid, if one "side" of a vehicle tilts, the entire vehicle necessarily tilts. Accordingly, regardless of whether rail tilt is caused by deviation of one rail or both rails, a vehicle riding the rails will tilt, Casagrande's measurement units will tilt to the same degree, and the alignment between those units will not be disturbed. *See* Ex-2001, ¶73. Casagrande's system consequently cannot detect, or compensate for, such tilt. *See id.* Casagrande, Villar, and Choros thus do not disclose or suggest element [f]'s requirements.

Moreover, a POSITA would not have good reason to combine the three references to achieve element [f]. Ex-2001, ¶75. As stated above, a POSITA would not have looked to Choros' manual measurement to modify Villar's machine vision system. *Id.*

Finally, GREX pointed out that, because Casagrande does not disclose "determining whether rail seat abrasion is present," it cannot disclose or suggest "compensate[ing] for a tilt of the rail road track" when making such determination, as element [f] requires. Response at 18-19. In response, Petitioner claims that GREX merely "attack[s] Casagrande individually" and thus "misapplies the legal standards for obviousness based on a combination." Reply at 12. However, GREX considered the combined references, demonstrating that (1) the references individually and in combination do not disclose or suggest element [f], and (2) a POSITA would not have combined them. Response at 17-23.

b. <u>Combination of Szwilski with Villar and Choros</u>

GREX likewise demonstrated that adding Szwilski to Villar and Choros does not disclose or suggest element [f]. Response at 23-29. GREX pointed out that Szwilski does not disclose using tilt correction to determine if rail seat abrasion is present as element [f] requires, but only to correct vertical and horizontal errors in measuring "rail displacement." Response at 24. In response, Petitioner asserts that Szwilski's terse and general statement that its error corrections could apply to "other rail … defects" would have suggested Szwilski's application to RSA. Reply at 16-17; *see* Petition at 51. However, as GREX showed, Petitioner submitted insufficient evidentiary substantiation for that argument. Response at 24-25. Petitioner does not respond to, and thus effectively admits, that fact. *See* Reply at 16-18.

GREX next showed that Szwilski does not disclose or suggest performing element [f]'s step by "at least one processor" as part of "analyzing" "a profile of" a railroad track "image" as elements [b]-[d] require. Response at 25-26. In response, Petitioner claims that GREX merely "attack[s] Szwilski individually and ignores its combination with the other references." Reply at 16. However, GREX considered the combined references, demonstrating that (1) the references individually and collectively do not disclose or suggest element [f], and (2) a POSITA would not have combined them. Response at 23-29.

More importantly, GREX further demonstrated that Szwilski cannot be used to obtain element [f] because Szwilski's measurements relate to the rail tops' positions, not the rail seats. Correspondingly, even if a POSITA would have combined Szwilski with Villar and Choros, element [f] would not be obtained because Szwilski cannot compensate for tilt relating to RSA. Response at 26-27, 29. In response, Petitioner claims that "GREX misses the point" because the "Petition does not rely upon or propose bodily incorporating Szwilski's specific systems and processes to determine RSA," "[n]or is the test" "physical[] or bodily incorporat[ion]" of references. Reply at 17. Petitioner's argument is irrelevant. GREX never argued patentability based on "bodily" or "physical" incorporation. *See* Response at 26-27.

Finally, GREX pointed to many details in Szwilski explicitly demonstrating that a POSITA would not have looked to implement Szwilski with Villar and/or Choros because Szwilski's measurements are far too inaccurate. Response at 27-29. Petitioner never disputes that fact. Reply at 17-18. Petitioner instead evades the issue, claiming that Petitioner somehow does not rely on Szwilski's disclosure "to determine" RSA but for its "tilt compensation teachings." Reply at 17-18. However, as GREX showed, a POSITA would have viewed those "teachings" as absolutely useless for element [f]'s requirements because Szwilski's system is admittedly hopeless for compensating for track tilt associated with RSA. Response at 26-29.[2]

Because Szwilski's disclosure in this regard is fatal, Petitioner is left with the illogical position that it is not relying on Szwilski for any reason relating to element [f], but somehow Szwilski is otherwise useful for proving the unpatentability of that element. Petitioner's baseless position should be rejected.

c. <u>Combination of Villar, Choros, Casagrande, and Szwilski</u>

Petitioner also fails to show that combining Villar, Choros, Casagrande, and Szwilski renders element [f] unpatentable. *See* Reply at 18. GREX demonstrated

[2] Petitioner's statement that "GREX does not dispute that Szwilski's tilt compensation method is accurate" (Reply at 18) is beyond belief. Dr. Bovik expressly stated that Szwilski's inaccuracy problems constitute an additional reason why "a POSITA would have viewed Syzwilski's system as useless" "to compensate for track tilt as element [f] requires." Ex-2001, ¶84; Response at 29.

that, for this combination, Petitioner essentially repeats its arguments, and thus its unpatentability argument fails for the same reasons. Response at 30-31.

Petitioner inexplicably claims in response that "GREX does not dispute that it would have been obvious to implement" Villar and Choros "to determine the vertical tilt of the track" "as taught by Casagrande" or that a "POSITA would have implemented Villar and Choros with Casagrande's and Szwilski's tilt compensating teachings." Reply at 18. To the contrary, GREX expressly argued that, not only does the combination "lack[] element [f]'s features," but "Petitioner refers to nothing in the references, or otherwise provides a sufficient reason, demonstrating why a POSITA would have further modified the combined references to include element [f]'s requirements," and "a POSITA would not have combined Villar and/or Casagrande with Choros and/or Szwilski." Response at 31; *see id.* at 4-6, 7-16, 23-29.

Otherwise, Petitioner does not deny any of the fatal shortcomings of Casagrande and Szwilski recounted above. Reply at 18. Petitioner instead evades the issue by asserting that "the Petition relies upon Casagrande and Szwilski's teachings compensating imaged rail defect measurements for railway vehicle tilt—not the RSA determination." Reply at 18. However, because element [f] requires compensating for "tilt" "when determining whether rail seat abrasion is present," those references provide no basis for challenging that element's patentability.

Further, as shown in GREX's response (Response at 31, 18-29) and above, Casagrande is incapable of detecting or adjusting for rail tilt for any railroad track measurement, while Szwilski's rail tilt measurement cannot apply to RSA and is far too inaccurate to compensate for tilt in any RSA measurement.

B. Claim 2 is Patentable.

GREX demonstrated that claim 2 is patentable because it depends on patentable claim 1 and because Petitioner's unpatentability argument relies on its faulty reasoning from claim 1 applied to claim 2. Response at 32; *see* Petition at 54-56; Reply at 19.

GREX further demonstrated that Villar, Choros, Casagrande, and Szwilski do not disclose or suggest using any express "tilt correction factor" or "actual delta" as elements 2[c]-[d] require. Response at 32; Ex-2001, ¶91. In response, Petitioner refers to its flawed arguments for elements 1[e]-[f], and its expert's corresponding testimony as supposedly "unrebutted." Reply at 19. To the contrary, Dr. Bovik's declaration, and the prior art's content on which he relies, not only "rebut" that testimony, they demonstrate that Dr. Papanikolopoulos' opinions are unsupported. Ex-2001, ¶¶91, 68-88, 50-64 (and references cited).

C. Claims 5-7, 10-13, and 16-17 are Patentable.

GREX demonstrated that claims 5-7, 10-13, and 16-17 are patentable because they depend on patentable claims 1 or 2 and/or Petitioner's unpatentability

arguments rely on its faulty reasoning why one or more elements of claims 1 or 2 are unpatentable. Response at 33-35; *see* Petition at 57-63; Reply at 19-20.

IV. CLAIMS 3, 8, AND 14 ARE PATENTABLE OVER THE PRIOR ART CITED IN GROUND 2.

Petitioner fails to show that claims 3, 8, and 14 are unpatentable over the prior art cited in Ground 2. GREX demonstrated that claims 3, 8, and 14 are patentable because they depend on patentable claims 2, 7, 12, and/or 13 and/or Petitioner's unpatentability arguments rely on its faulty reasoning why claims 1, 2, or 3 are unpatentable. Response at 35, 38; *see* Petition at 64, 72-73; Reply at 24.

Further claim 3 is patentable because, as GREX demonstrated and contrary to Petitioner's argument, Villar does not disclose using vertical pixel counts to determine height measurement as claim 3 requires. Response at 35-38. In response, Petitioner alleges that, according to its expert, "a POSITA would have understood that these disclosures of Villar … would have included the step of determining vertical pixel counts." Reply at 22, citing Ex-1004 ¶¶69-74, 119-123. However, that testimony is unsupported. Dr. Papanikolopoulos cites only Villar, but points to no disclosure of "determining vertical pixel counts." *See* Ex-1004 ¶¶ 119-123.

Instead, as GREX showed, Villar discloses only using best fit or curve fitting, edge detecting, or line fitting techniques. Response at 36-37; Ex-2001, ¶111. As Dr. Bovik testified, those techniques "do not necessarily include determining vertical pixel counts." Ex-2001, ¶112.

Petitioner also alleges that Khattak confirms its expert's testimony concerning Villar's disclosure. Reply at 23-24. However, Petitioner previously relied solely on Villar regarding disclosure of determining vertical pixel counts, and relied on Khattak only for disclosure of "normalizing" "the pixel counts based upon a measurement index." *See* Petition at 64-72. This new argument based on Khattak should be disregarded.[3]

V. CLAIMS 4, 9, AND 15 ARE PATENTABLE OVER THE PRIOR ART CITED IN GROUND 3.

Petitioner fails to show that claims 4, 9, and 15 are unpatentable over the prior art cited in Ground 3. GREX demonstrated that claims 4, 9, and 15 are patentable because they depend on patentable claims 2, 7, 12, and/or 13 and/or Petitioner's unpatentability arguments rely on its faulty reasoning why claims 1, 2, or 4 are unpatentable. Response at 38, 43; *see* Petition at 73-74, 76; Reply at 26.

Further, in regard to claim 4, GREX demonstrated that claim 4's "standard tilt correction factor" is distinct from claim 2's "tilt correction factor," and that the prior art Petitioner cited does not disclose claim 4's requirements. Response at 38-43. In response, Petitioner alleges that "nothing in the intrinsic record requires the standard tilt correction factor" "to be a distinct value from the tilt correction [factor]," and

[3] Petitioner improperly tries to shift the burden to GREX to prove that Villar's measuring techniques "are not determined on vertical pixel counts." Reply at 22. It is Petitioner's burden to prove that Villar discloses the claimed limitations. 35 U.S.C. §316(e).

"[n]othing in the claim's plain language precludes the standard tilt correction factor from being a sub-category of claim 1's tilt correction factor." Reply at 24.

To the contrary, the claim language and the specification mandate GREX's construction. As GREX demonstrated, because the terms are different, they are presumed to have distinct meanings under claim differentiation principles. Response at 39. As GREX also showed, the specification has separate and distinct disclosures for each, describing the "tilt correction factor" as compensating for a tilt in the railway, and describing the "standard tilt correction factor" as compensating for tilt caused by other factors (such as "variations in vehicle suspension" and "rail height placement standards"). Response at 39-40; Ex-1001 at 13:45-49, Fig. 17, 13:11-17.

Petitioner's argument that the "specification … provides no disclaimer or definition mandating GREX's interpretation" (Reply at 24) is misplaced. No such "disclaimer" or "definition" is necessary. "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005).

Here, the specification's disclosures are compelling evidence for the distinct meaning of each claimed "factor," and the specification provides the only evidence for the standard tilt correction factor's distinct meaning. Notably, Petitioner cites

nothing to the contrary from the claim language or the specification. *See* Reply at 24-25.

Petitioner also erroneously claims that the specification's "exemplary embodiment" describing a "standard tilt correction factor" should not be read into the claims. Reply at 24-25. However, by ignoring the specification's only disclosure of that claimed factor, Petitioner improperly applies an interpretation excluding that disclosed embodiment. It is a "well-established" principle "that a claim construction that excludes a preferred embodiment is '*rarely, if ever, correct*.'" *Dow Chemical Co. v. Sumitomo Chemical Co.*, 257 F.3d 1364, 1378 (Fed. Cir. 2001) (emphasis original).

Next, Petitioner erroneously alleges that the intrinsic evidence does not "require applying the same standard tilt correction factor along each section of the track." Reply at 25. Because the plain claim language recites "a ***standard*** tilt correction factor," it indicates that the factor is a "standard" and not variable. Also, in the specification's example, that factor is a fixed number ("0.12"), indicating that it is a fixed factor applied to all sections of the railway. Ex-1001, 13:11-17. Petitioner cites no contrary evidence.

Finally, Petitioner's argument that "it would have been obvious to a POSITA to have implemented a standard tilt correction factor, as taught by Andersson, to pre-emptively compensate imaged measurements for known vertical alignment tilt errors

associated with an upcoming track geometry" (Reply at 26) is misplaced. As stated above and in GREX's Response, the standard tilt correction factor is not merely based on the simple error in vertical height measurements based on geometric tilt of the railway, but instead factors in "variations in vehicle suspension" and "rail height placement standards," among other "factors unrelated to rail seat abrasion." Ex-1001 at 13:11-17. Because Andersson does not disclose such a standard tilt correction factor, it cannot be used to prove that claim 4 would have been obvious.

VI. CONCLUSION

Based on all the evidence, claims 1-17 are patentable over the prior art.

DATE: September 23, 2020.

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that above **PATENT OWNER'S SUR-REPLY TO PETITIONER'S REPLY**, exclusive of the parts exempted as provided in 37 C.F.R. § 42.24(b), contains 5,598 words and therefore complies with 37 C.F.R. § 42.24(b)(1).

Dated: September 23, 2020

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CERTIFICATE OF SERVICE

In accord with 37 C.F.R. 42.6(e)(4), the undersigned certifies that a true and correct copy of the foregoing **PATENT OWNER'S SUR-REPLY TO PETITIONER'S REPLY** have been served on September 23, 2020 by filing this document through the PTAB's End to End system, with a courtesy copy of the RESPONSE electronically mailed, to the following counsel for Petitioner:

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