

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUM INDUSTRIAL TECHNOLOGY, INC.,
Petitioner,

v.

AMSTED RAIL COMPANY, INC.,
Patent Owner.

IPR2023-00539
Patent 9,981,673 B2

Before JAMES P. CALVE, KEVIN W. CHERRY, and
MICHAEL L. WOODS, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND

I. INTRODUCTION

On July 26, 2023, we instituted trial as to claims 1–18 and 20–22 of U.S. Patent No. 9,981,673 B2. Paper 10 (“Institution Decision” or “Dec.”). After institution, Patent Owner filed a Motion to Amend that is contingent on the patentability of claims 1–18 and 20–22. Paper 17 (“Motion” or “Mot.”). Petitioner filed an opposition. Paper 25 (“Opposition” or “Opp.”).

In the Motion, Patent Owner requested that we provide preliminary guidance in accordance with the Board’s pilot program concerning motion to amend practice and procedures. Mot. 1; *see Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board*, 84 Fed. Reg. 9,497 (Mar. 15, 2019) (providing a patent owner with the option to receive preliminary guidance from the Board on its motion to amend) (“Notice”). We have considered Patent Owner’s Motion and Petitioner’s Opposition.

In this Preliminary Guidance, we provide information indicating our initial, preliminary, non-binding views on whether Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend in an *inter partes* review and whether Petitioner (or the record) establishes a reasonable likelihood that the substitute claims are unpatentable. *See* Notice, 84 Fed. Reg. at 9,497 (“The preliminary guidance . . . provides preliminary, non-binding guidance from the Board to the parties about the [motion to amend.]”); *see also* 35 U.S.C. § 316(d) (statutory requirements for a motion to amend); 37 C.F.R. § 42.121 (providing regulatory requirements and burdens of persuasion for a motion to amend); *Lectrosonics, Inc. v Zaxcom, Inc.*, IPR2018-01129, Paper 15 (PTAB Feb. 25, 2019) (precedential) (providing information and guidance regarding motions to amend).

For purposes of this Preliminary Guidance, we focus on the proposed substitute claims, and specifically on the amendments proposed in the Motion. *See* Notice, 84 Fed. Reg. at 9,497. We do not address the patentability of the originally challenged claims. *Id.* Moreover, in formulating our preliminary views on the Motion and Opposition, we have not considered the parties' other substantive papers on the underlying merits of Petitioner's challenges. We emphasize that the views expressed in this Preliminary Guidance are subject to change upon consideration of the complete record, including any revision to the Motion filed by Patent Owner. Thus, this Preliminary Guidance is not binding on the Board when rendering a final written decision. *See id.* at 9,500.

II. PRELIMINARY GUIDANCE

A. Statutory and Regulatory Requirements

For the reasons discussed below, at this stage of the proceeding, and based on the current record, it appears that Patent Owner has not shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend. *See also* 37 C.F.R. § 42.121(d)(1).

1. Reasonable Number of Substitute Claims

Does Patent Owner propose a reasonable number of substitute claims? (35 U.S.C. § 316(d)(1)(B))

Yes, Patent Owner proposes no more than 1 substitute claim for each challenged claim. More particularly, Patent Owner proposes substitute claims 23–43 for original claims 1–18 and 20–22, respectively. Mot. 1. Petitioner does not argue otherwise.

2. Respond to Grounds of Unpatentability

Does the amendment respond to a ground of unpatentability involved in the trial? (37 C.F.R. § 42.121(a)(2)(i))
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Yes. Patent Owner responds to the grounds of unpatentability at pages 18–24 of the Motion. At least one amendment presented is responsive to a ground of unpatentability. Petitioner does not argue otherwise.

3. Scope of Amended Claims

Does the amendment seek to enlarge the scope of the claims? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

No. Each of the proposed substitute claims includes narrowing limitations. Petitioner does not argue otherwise.

4. New Matter

Does the amendment seek to add new subject matter? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

Yes. On this record, we find Patent Owner has not set forth sufficient written description support at pages 5–17 of the Motion for the proposed amendments in substitute claims 23–43 as discussed in more detail below. Claim 23, limitation (23(a)): “each [sensing unit] mounted on a sidewall of a bearing adapter” to monitor an operational characteristic of the railcar that is a condition of a bearing with received data that “includes one or more calculated numeric values based on acceleration data obtained at the bearing adapter.” Mot. App. A, i. As support for limitation 23(a), Patent Owner cites to portions of the ’673 patent specification that describe that sensor 20 in Figures 1 and 2 can be a temperature sensor, an accelerometer, and other types of sensors, and a temperature sensing mote is mounted to a bearing adapter in Figures 3 and 3A to measure the temperature of a wheel bearing of a railcar. *Id.* at 6 (citing Ex. 1001, 3:57–62, 4:51–56, 5:23–35, 5:42–59, Figs. 3, 3A; Ex. 1013 ¶¶ 109–119, Figs. 9, 10a).¹ *See also id.* at 19–20.

¹ Any citations for written description support by Patent Owner that are repeated for a particular claim limitation (such as these citations for limitation 23(a)) are not reiterated below for the sake of brevity. Patent Owner cites to disclosures in the ’673 patent specification (Ex. 1001) and Provisional application No. 61/661, 661 (Ex. 1013; *see* Ex. 1001, code (60)).

Petitioner contends that “[t]he specific embodiment Amsted now claims—a mote comprising an *accelerometer* mounted to the *sidewall* of a bearing adapter—is disclosed nowhere in the specification.” Opp. 3. Petitioner asserts, “[n]othing in the specification, however, connects the listed sensors to the specific mounting location required by claim 23 (the sidewall of a bearing adapter).” *Id.* Petitioner asserts that the description of an accelerometer in a list of different sensor types does not connect the accelerometer to the specific mounting *location* claimed. *Id.* Petitioner contends that the embodiment of Figures 3 and 3A depicts a *temperature* sensor mounted to a sidewall of a bearing adapter, but it does not describe an accelerometer. Petitioner argues that the disclosure of an “adapter mounted accelerometer” in the table spanning columns 7–12 does not describe an accelerometer mounted to the *sidewall* of a bearing adapter as claimed. *Id.* at 4. Petitioner asserts that a skilled artisan would know that different types of sensors require different housing configurations and mounting locations and the ’673 patent discloses, “[a]s one of ordinary skill would recognize, *the configuration of the motes 10 with respect to the sensor 20 is dependent upon the type of sensor and the type of data desired.*” *Id.* at 3 (quoting Ex. 1001, 4:49–51 (emphasis added)).

On this record, we find that Patent Owner has not shown a reasonable likelihood that the original disclosure supports this claimed subject matter. Patent Owner has not explained how a description of temperature sensing mote 10 mounted to a sidewall of bearing adapter 12 of a railcar wheel in Figures 3 and 3A provides a description of an accelerometer sensing unit “mounted on a sidewall of a bearing adapter” in limitation 23(a) or how a general description that sensors may include accelerometers, without any configurations, describes this subject matter. “FIGS. 3 and 3A show a *temperature* sensing mote.” Ex. 1001, 5:44–45. Temperature sensing mote 10 includes temperature sensor 20a thermally coupled to a brass plug heat transfer element 22 that contacts the surface on which mote 10 is attached and brass plug 22 is in thermal communication with the portion of the rail car for which a temperature reading is desired. *Id.* at 4:35–48. We have no evidence that an accelerometer would be placed in the same location that is used to sense the temperature of a bearing. The ’673 patent suggests otherwise as discussed above by disclosing that the configuration of sensing motes depends on the type of sensor and the type of data desired. *Id.* at 4:49–51.

For similar reasons, Patent Owner has not shown a reasonable likelihood that the disclosure of the '673 patent provides a description of data or processed information that “calculated numeric values based on acceleration data obtained at the bearing adapter” in limitation 23(a), “a plurality of defined parameter values associated with the condition of the bearing” in limitation 23(b), and “a defined reference value or range of values indicating nominal operating conditions for the bearing” in limitation 23(c). None of the disclosures cited by Patent Owner as support for limitation 23(a) mentions calculated numeric values. Mot. 6; Opp. 5 (contending that this term is not used in the original disclosure).

For limitation 23(b), Patent Owner cites a table spanning columns 7–12 as disclosing “Bearing Temp: Adapter temperature is correlated to bearing cup temperature using empirical data.” (Ex. 1001, col. 8), “Bearing Fault: An adapter mounted accelerometer can be used to sample dynamic bearing data. An FFT [Fast Fourier Transform] can be used on data sets and plotted over time to isolate dominant modes and any shifting or relative amplification. Amplification at rolling frequency indicates a likely fault.” (*id.* at cols. 9–10), and “Bearing Fault: An adapter mounted accelerometer can be used to sample dynamic bearing data. Kurtosis can be computed as an indicator of bearing damage” and is measured in the time domain with computation of a probability density function (*id.* at cols. 9–10). Mot. 6–7 (citing Ex. 1001, table spanning cols. 7–12, 11:51–58; Ex. 1013 ¶¶ 64–76, 129–131; Ex. 1001, 12:40–61, 13:30–14:3; Ex. 1013 ¶¶ 121–122).

Petitioner asserts “a plurality of defined parameter values” is not used in the specification so it is unclear how the original disclosure supports it. Opp. 5. Petitioner asserts that it is unclear how FFT and Kurtosis support “calculated numeric value” or “defined parameter value” as claimed. *Id.*

For limitation 23(c), “defined reference value,” Petitioner asserts that the cited passage is directed to *temperature* monitoring not acceleration monitoring. Opp. 5–6 (citing Ex. 1001, 13:30–14:3; Mot. 7; Ex. 1021 ¶ 24). As we pointed out in the Decision, the specification discloses operation of a communication management unit (CMU) for *temperature* monitoring. Ex. 1001, 13:8–15:45; Dec. 3. Patent Owner does not describe how references to alert messages discloses “a defined reference value” in limitation 23(c). Mot. 7. Petitioner asserts that the alleged support is for temperature monitoring, and the specification provides no thresholds for acceleration monitoring. Opp. 5–6 (citing Ex. 1021 ¶ 24).

At this juncture of the proceeding, we are persuaded by Petitioner’s argument that Patent Owner has not shown a reasonable likelihood that the original disclosure supports the “value” limitations in limitations 23(a), 23(b), and 23(c). The description of FFT does not identify any of the “value” limitations 23(a)–23(c) in the amplification or isolation of dominant modes, and Patent Owner has not explained how this disclosure supports the value limitations. Mot. 6–7. The measurement of Kurtosis in the time domain by computing a probability density function does not disclose any of the values. Ex. 1001, cols. 9–10. Nor has Patent Owner explained how these disclosures support the claimed values. *See* Mot. 6–7. Patent Owner has not cited the table spanning columns 7–12 to support “calculated numeric values” in limitation 23(a). Mot. 6. Nor is it clear how computing a probability density function discloses comparison of calculated numeric values with a plurality of defined parameter values associated with the bearing condition in limitation 23(b). *See id.*

Claim 30 recites a step of “performing steps b–d” of claim 23 at a location remote from the railcar. Mot. App. A, iii. Patent Owner cites disclosures of data being transmitted from CMU 32 on the railcar to base station 44 remote from the railcar. Mot. 9 (citing Ex. 1001, 3:4–14, 8:3–13, 11:40–58; Ex. 1013 ¶¶ 117–121, Fig. 11). Petitioner asserts that the ’673 patent discloses heuristics that “may be performed by either mobile base station 42 or land-based based station 44” (Ex. 1001, 11:52–54), but does not disclose an embodiment with all three steps 23(b–d) performed *remotely* from the railcar (Opp. 6 (citing Ex. 1021 ¶ 25)). On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports the “value” limitations 23(a), 23(b), and 23(c) or that calculation and use of these values in steps b–d of claim 23 occurs at a location remote from the railcar as recited in claim 30. *See* Mot. 9.

Claim 33, limitation 33(a) requires sensing the temperature of a part of the railcar other than the desired part using a temperature sensor and “sensing accelerations by use of an accelerometer attached to said other part.” Mot. App. A, iv. Patent Owner cites the disclosure that describes temperature sensor 20 and thermal plug 22 in thermal communication with the portion of the railcar for which a temperature reading is desired. Mot. 10 (citing Ex. 1001, 4:35–48, 5:42–53; Ex. 1013 ¶¶ 110–112). Petitioner asserts that the specification does not disclose any embodiments with *both* a temperature sensor and an accelerometer. Opp. 6 (citing Ex. 1021 ¶ 26).

On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports claim 33. The specification discloses that sensor 20 can be a temperature sensor *or* an accelerometer but the specification does not disclose a dual sensor or two sensors used together. Ex. 1001, 4:51–56 (reciting “. . . *or* an ultrasonic sensor”). At this juncture of the proceeding, we are persuaded by Petitioner’s argument that limitation 33(a) lacks support as discussed above.

Claim 33, limitations 33(b), 33(c), and 33(d), recite “calculated numeric values,” “a plurality of defined parameter values,” and “a defined reference value.” Patent Owner’s citations do not describe these values for the reasons discussed for limitations 23(a), 23(b), and 23(c). Mot. 10–11 (citing Ex. 1001, 5:59–6:4; Ex. 1013 ¶¶ 116, Figs. 9, 10a; Ex. 1001, table spanning cols. 7–12, 11:51–58, Ex. 1013 ¶¶ 64–76, 116; Ex. 1001, 11:59–64; Ex. 1013 ¶¶ 118–119). Petitioner asserts that the subject matter of claim 33 lacks written description support for the reasons discussed for limitations 23(a), 23(b), and 23(c) in Section I.B. Opp. 7. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports limitations 33(b), 33(c), and 33(d). For example, it is not clear how a description that “the device is calibrated so that the temperature reading is indicative of the bearing temperature” (Ex. 1001, 5:59–6:4, cited in Mot. 10) describes calculated numeric values based on sensed accelerations in limitation 33(b). Citing broadly to the table spanning columns 7–12 does not explain how this description supports “a plurality of defined parameter values” in limitation 33(c). *See* Mot. 11.

Claim 33, limitation 33(c): “acceptable range of temperatures” that is defined and expected during normal operation of a railcar. Mot. 11. Petitioner asserts that Patent Owner has not identified any disclosure that describes a “defined range of temperatures.” Opp. 7. We agree. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports this feature in limitation 33(c).

Claim 36, limitation 36(a): wirelessly receiving “acceleration data” and sensors disposed on “a sidewall of a bearing adapter.” Mot. 12 (citing Ex. 1001, 5:23–42, Fig. 3; Ex. 1013 ¶¶ 44–45, Figs. 9, 10a). Petitioner asserts that this subject matter lacks a written description for the same reasons as limitation 23(a). Opp. 7. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports limitation 36(a) by citing the same deficient disclosure. *See* Mot. 6, 12.

Claim 36, limitation 36(b): “a plurality of defined parameter values” and “defined reference value.” Mot. 12–13 (citing Ex. 1001, table spanning cols. 7–12, 11:51–58; Ex. 1013 ¶¶ 64–76, 129–131; Ex. 1001, 12:40–61, 13:31–14:3; Ex. 1013 ¶¶ 121–122). Petitioner asserts that this subject matter lacks a written description for the same reasons that were provided for the same terms in claim 23. Opp. 7. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports limitation 36(b). *See* Mot. 6–7, 12.

Claim 36, limitation 36(b): “heuristically analyzing said received acceleration data to: determine a value for a condition of a bearing . . . expected for the bearing during operation of the railcar.” Mot. 12. Petitioner asserts the ’673 patent discloses *temperature* monitoring rather than “defined parameter values” or “operating conditions expected” with respect to acceleration data. Opp. 7–8 (citing Ex. 1001, 13:30–14:3, cols. 7–12; Ex. 1021 ¶ 31). Petitioner asserts that the ’673 patent also does not disclose “correlations between a plurality of different values.” *Id.* at 8. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports this subject matter in limitation 36(b).

Claim 36, limitation 36(b): “determine if an actual failure exists . . . based on a statistical analysis of said received acceleration data.” Mot. 12–13 (citing Ex. 1001, 1:16–21, 2:3–22, 2:59–3:3, 3:15–20, 3:56–64, 11:53–56, 12:61–65; Ex. 1013 ¶¶ 129–130). Petitioner asserts that Patent Owner does not cite any disclosure that supports detection of actual, potential, or imminent failures based on statistical analysis of *acceleration* data. Opp. 8. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports this subject matter in limitation 36(b). The disclosure of heuristics for accelerometers in the table spanning columns 9–12 does not describe a plurality of defined parameter values or expected operating conditions for the bearing during operation of the railcar as recited in limitation 36(b).

Claim 42, limitation 42(a): “on a sidewall of a bearing adapter” and “acceleration data.” Mot. 16 (citing Ex. 1001, table spanning cols. 7–12, 14:11–14, 14:60–62, Fig. 3; Ex. 1013 ¶¶ 44–45, 70, 97, 130, 131, Figs. 9, 10a). Petitioner asserts that this subject matter lacks written description support for the reasons provided for the same terms in claim 23. Opp. 8. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports this subject matter in limitation 42(a).

For example, the '673 patent discloses algorithms using *temperature* data rather than acceleration data as claimed. Ex. 1001, 14:11–14, 14:60–62 (cited in Mot. 16). Nor has Patent Owner provided any support for an accelerometer mounted on a sidewall of a bearing adapter in limitation 42(a) as discussed for limitation 23(a). See Mot. 16.

Claim 42, limitation 42 (c): “calculated numeric values,” “a plurality of different values,” and “defined reference values.” Mot. 16–17 (citing Ex. 1001, table spanning cols. 7–12, 11:51–58; Ex. 1013 ¶¶ 64–76; Ex. 1001, 2:3–16; Ex. 1013 ¶¶ 118–122). Petitioner asserts that this subject matter of claim 42 lacks written description support based on the discussion of these same terms in claim 23. Opp. 8. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports this subject matter in limitation 42(a). See Mot. 6–7, 16–17.

B. Patentability

For the reasons discussed below, at this stage of the proceeding, and based on the current record,² it appears that Petitioner (or the record) has shown a reasonable likelihood that proposed substitute claims 23–43 are unpatentable.

Does the record establish a reasonable likelihood that the proposed substitute claims are unpatentable?

Yes, as to claims 23–43. On this record, it appears that Petitioner has shown a reasonable likelihood that claims 23–43 are indefinite, that claims 23, 33, 36, and 42 fail to comply with the enablement requirement, and that claims 23–43 are obvious over LeFebvre,³ Barone, and Moretti⁴, and also over LeFebvre, Armitage, Barone, and Moretti. Further, on this record, it appears that claims 23–43 recite patent ineligible subject matter.

² We express no view on the patentability of challenged original claims 1–18 and 20–22 in this Preliminary Guidance. Instead, we focus on limitations added to those claims in the Patent Owner’s Motion to Amend.

³ LeFebvre, Armitage, and Barone were cited previously as discussed below.

⁴ Moretti is a newly cited reference as further discussed below.

Indefiniteness:

Petitioner asserts that “calculated numeric values,” “a plurality of defined parameters,” and “defined reference value” in claims 23, 33, 36, and 42 do not appear in the specification and therefore, it is not clear what each term represents or how the terms relate to one another. Opp. 8–10 (citing Ex. 1021 ¶ 36). Petitioner asserts that there is a lack of clarity such that these claims fail to inform with reasonable certainty the scope of the claimed invention. *Id.* at 9. At this juncture of the proceeding, we are persuaded that Petitioner has established a reasonable likelihood of showing that the lack of clarity in the written description as to what the above-recited terms represent or how they relate to one another renders claims 23, 33, 36, and 42 indefinite. *See, e.g., Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014) (holding a patent claim is indefinite if, when read in light of the specification and its prosecution history, the claim fails to inform with reasonable certainty, those skilled in the art about the scope of the invention); *Pacific Coast Bldg. Prods., Inc. v. CertainTeed Gypsum, Inc.*, 816 F. App’x 454, 459, 461 (Fed. Cir. 2020) (finding the claim indefinite where the claims and specification failed to provide guidance to a skilled artisan for how to measure or calculate the newly coined characteristic “scored flexural strength” with reasonable certainty); *Dow Chem. Co. v. Nova Chems. Corp. (Canada)*, 803 F.3d 620, 633–35 (Fed. Cir. 2015) (the claimed term “slope of strain hardening coefficient” was indefinite where the patent failed to disclose with reasonable certainty where and how the “slope of strain hardening” should be measured and multiple different methods could be used to calculate this coefficient with each leading to different results without any guidance in the claims or specification as to which method should be used or whether other methods could be used); *Teva Pharm. USA, Inc. v Sandoz, Inc.*, 789 F.3d 1335, 1345 (Fed. Cir. 2015) (limitation “molecular weight” rendered claim indefinite where there were three relevant measures for molecular weight calculated in different ways for different values, and a skilled artisan could not determine from the claims and specification which measurement to use so the claim failed to inform with reasonable certainty those skilled in the art about the scope of the invention); *Interval Licensing LLC v AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (holding that the claims when read in light of the specification and prosecution history must provide objective boundaries for those of skill in the art).

Proposed substitute claim 31 recites, “said raised alarm comprising the assigned severity level.” Mot. 9. Petitioner asserts it is not clear if (a) the alarm comprises a *written message* reciting “level” such as “Stage 2,” (b) the alarm comprises a written message describing an alarm *condition* such as “Axle Differential Alarm,” or (c) the claim can be satisfied another way. *Id.* (citing Ex. 1001, 13:31–14:3; Ex. 1021 ¶ 37). We note that substitute claim 31 does *not* recite “said raised alarm *is indicative of an* assigned severity level.” Mot. 9. Thus, it appears that the term “comprises” makes the scope of claim 31 unclear relative to the three interpretations asserted by Petitioner. It is not clear how a description that an alarm is “based on severity” levels provides support for a raised alarm that *comprises* the assigned severity level. Mot. 7 (citing Ex. 1001, 13:31–14:3), 9. For example, a “Bearing Temp Alarm” is used for trending recommendations and repeat offender identifications. Ex. 1001, 13:33–36. At this juncture, we are persuaded by Petitioner’s argument that this lack of clarity regarding the scope of this term renders claim 31 indefinite.

Proposed substitute claim 36 recites: “determine if an actual failure exists on said railcar or predict potential or imminent failures based on a statistical analysis of said received acceleration data” in limitation 36(b). Mot. 12–13. Petitioner asserts that it is unclear if this limitation would be satisfied when one were to “determine if an actual failure exists” without using statistical analysis. Opp. 9 (citing Ex. 1021 ¶ 40). Because of the recited term “or” (first occurrence), it appears that this claim limitation is grammatically ambiguous. *Id.* At this juncture of the proceeding, we are persuaded by Petitioner’s argument that the lack of clarity as to what the above-recited term represents renders claim 36 indefinite.

Enablement:

As discussed above, Petitioner asserts claims 23, 33, 36, and 42 lack written description support because of certain claim terms. In particular, Petitioner asserts that the specification does not disclose “defined parameter values,” “defined reference values,” or “calculated numeric values” that could be used to monitor acceleration as required by claims 23, 33, 36, and 42. Opp. 10–11. Petitioner asserts that the specification provides examples of *temperature* monitoring not acceleration monitoring and thus fails to enable the claimed methods of monitoring *acceleration*. *Id.* As for determining “*acceptable* range of temperatures” in limitation 33(c), Petitioner asserts that the specification does not disclose an

acceptable range of temperatures that could be used by a skilled artisan to practice this claim without undue experimentation. *Id.* at 10 (citing Ex. 1021 ¶ 45). As for determining “calibrated correlations” in limitation 33(b), Petitioner asserts that the specification fails to disclose temperature correlations that were developed by a team of academic researchers who worked diligently for several years and does not disclose how a skilled artisan could practice this claim without undue experimentation based on the evidence of record. *Id.* at 10–11 (citing Ex. 2013 ¶¶ 9, 41, 44). The specification and evidence of record do not appear to disclose an “acceptable” range of temperatures for operation “for a desired part” of the railcar nor “calibrated correlations” between temperature values and expected temperatures, as required by claim 33 such that a skilled artisan could determine such claimed values without undue experimentation. Consequently, at this juncture of the proceeding, we are persuaded by Petitioner’s argument that claims 23, 33, 36, and 42 fail to comply with the enablement requirement.

Obviousness:

As discussed in the Institution Decision, we concluded that Petitioner has established a reasonable likelihood that (1) claims 1–7, 10–18, and 20–22 would have been unpatentable over LeFebvre,⁵ (2) claims 8 and 9 would have been unpatentable over LeFebvre and Barone,⁶ (3) claims 1, 2, 4, 6–11, and 13 would have been unpatentable over Armitage,⁷ and (4) claims 3, 5, 12–18, and 20–22 would have been unpatentable over Armitage and LeFebvre. Dec. 10–48.

In the Motion, Patent Owner asserts that claims 23–43 are patentable over LeFebvre, Armitage, or Barone, alone or in combination. Mot. 18–24.

In the Opposition, Petitioner asserts that claims 23–43 are unpatentable under two grounds based on: (1) LeFebvre, Barone, and Moretti,⁸ and (2) LeFebvre, Armitage, Barone, and Moretti. Opp. 11–12 (citing Ex. 1021 ¶ 50). Petitioner addresses new limitations of claims 23–43 not previously addressed for claims 1–18 and 20–22 below. *Id.* at 11–25.

⁵ US 2007/0152107 A1, published July 5, 2007 (Ex. 1005, “LeFebvre”).

⁶ US 2007/0208841 A1, published Sept. 6, 2007 (Ex. 1007, “Barone”).

⁷ US 2011/028540 A1, published Nov. 17, 2011 (Ex. 1006, “Armitage”).

⁸ US 6,672,681 B1, issued Jan. 6, 2004 (Ex. 1022, “Moretti”).

Limitation 23(a): “wherein the operational characteristic is a condition of a bearing and wherein the received data or processed information includes one or more calculated numeric values based on acceleration data obtained at the bearing adapter”

Petitioner asserts that Armitage, LeFebvre, Barone, and Moretti disclose sensor nodes for monitoring wheel bearings that include accelerometers, either alone or in combination with temperature sensors. Opp. 13–14 (citing Ex. 1006 ¶¶ 13–15, 25, 27; Ex. 1005, claims 12, 21; Ex. 1007 ¶ 45; Ex. 1022, 3:57–62). Petitioner asserts that it would have been obvious to include a temperature sensor and a vibration sensor because both temperature and vibration are known indicators of bearing degradation and damage. *Id.* at 14 (citing Ex. 1021 ¶ 56).

Petitioner asserts that LeFebvre and Armitage perform calculations that result naturally in “calculated numeric values” as required for claim 23. Opp. 14 (citing Ex. 1005, claims 9, 12; Ex. 1006 ¶ 45; Ex. 1021 ¶ 57; Pet. 18–24, 50–57; Ex. 1003 ¶¶ 70–86, 188–203).

Armitage discloses monitoring both temperature and vibration of an undercarriage. Ex. 1006 ¶¶ 25, 27. LeFebvre discloses a temperature sensor disposed on pads adjacent to a bearing along with a vibration sensing device. Ex. 1005, claims 12, 21. Barone discloses monitoring both temperature and vibration. Ex. 1007 ¶ 45. Moretti also discloses using a vibration sensor and a temperature sensor. Ex. 1022, 3:57–62. Petitioner asserts it would have been obvious to use both a temperature sensor and a vibration sensor because both temperature and vibration are known indicators of bearing degradation and damage. Opp. 14 (citing Ex. 1021 ¶ 56).

We note that claims 23, 33, 36, and 42 recite “acceleration” rather than “vibration.” Mot. 6–7. The specification discloses that sensor 20 can be a “vibration” sensor or an “accelerometer.” Ex. 1001, 4:51–56. Petitioner contends, “[t]here is nothing inventive about using an accelerometer to measure vibrations emanating from a wheel bearing” because “[i]t was known in the railroad industry as early as the 1980s that ‘vibrations of bearing boxes change their nature when faults arise.’” Opp. 13 (citing Ex. 1023, 3:17–19; Ex. 1021 ¶ 55). Petitioner’s declarant testifies that “[u]sing an accelerometer to measure vibrations emanating from a wheel bearing is commonplace in the railroad industry” and was used in many types of rotating applications for balancing train wheels to monitor

rotating wheels. Ex. 1021 ¶ 55. Notably, Armitage discloses that “[t]he vibration could be monitored with a three-dimensional accelerometer.” Ex. 1006 ¶ 45. Likewise, Moretti discloses using a “bi-directional accelerometer device” and using “vibration and motion sensors” along with “a temperature sensor.” Ex. 1022, 3:16–20, 3:57–58.

Limitation 23(a): “mounted on a sidewall of a bearing adapter”

Petitioner asserts that it would have been obvious to mount Armitage’s sensor node to the sidewall of a bearing adapter because Armitage discloses its sensors are “attached or coupled to the associated undercarriage element” that may be a “bearing or bearing box.” Opp. 14–15 (citing Ex. 1006 ¶¶ 13–15, 34). Petitioner asserts Barone discloses a sensor node such as an accelerometer being mounted on the sidewall of a bearing adapter. *Id.* at 15 (citing Ex. 1007 ¶¶ 289–293, Figs. 11–13). Petitioner asserts Moretti discloses mounting a vibration sensor on the bearing box wall “at a position vertically aligned with the axis of rotation of the bearing, where the vibrations are more intense.” *Id.* (citing Ex. 1022, 3:22–28; Ex. 1021 ¶ 59). Petitioner asserts that it would have been obvious to mount a sensor node on the sidewall of a bearing adapter, which is an easily accessible and non-rotating surface that transmits vibration from the bearing. *Id.* (citing Ex. 1021 ¶ 60).

Alternatively, Petitioner asserts that it would have been obvious to mount LeFebvre’s sensor unit to the sidewall of a bearing adapter because the shape and size, or location of the housing could be changed without affecting operation of the sensor. Opp. 15–16 (citing Ex. 1005 ¶ 59; Ex. 1021 ¶ 61; Ex. 1007 ¶¶ 289–293, Figs. 11–13; Ex. 1021 ¶ 62).

Limitation 23(b): “wherein the heuristic includes a comparison of at least one of said calculated numeric values with a plurality of defined parameter values associated with the condition of the bearing”

As to this limitation, Petitioner asserts a skilled artisan would understand that comparing a measured value to a predetermined threshold would detect a defect or failure. Opp. 16–18 (citing Ex. 1021 ¶¶ 63, 64; Ex. 1007 ¶¶ 241, 253, claim 37; Ex. 1022, 3:57–62, 4:8–12; Ex. 1008 ¶ 104; Ex. 2013 ¶ 15; Ex. 1021 ¶ 65). Petitioner asserts that comparing a measured acceleration value with a predetermined reference value is known. *Id.* at 18 (citing Ex. 1022, 3:57–62, 4:8–12; Ex. 1008 ¶ 105; Ex. 1024, 2:54–61, Ex. 1021 ¶ 66). Petitioner also asserts that comparing a value to a

predetermined threshold would detect a potential failure, which is simple, straightforward, and effective. *Id.* at 18 (citing Ex. 1021 ¶ 67).

Limitation 23(c): “wherein said severity level is one of a plurality of defined severity levels that are based on a deviation of at least one of the calculated numeric values determined for the condition of the bearing from a defined reference value or range of values indicating nominal operating conditions for the bearing during operation of the railcar”

As to this limitation, Petitioner asserts a skilled artisan would understand larger deviations from normal operating conditions indicate larger, more severe, and more urgent problems. Opp. 18–19 (citing Ex. 1021 ¶ 68; Ex. 1006 ¶ 43; Ex. 1005 ¶¶ 55, 95; Ex. 1024, 8:46–57). Petitioner asserts a skilled artisan would understand that an appropriate response depends on the severity of the problem. *Id.* at 19 (citing Ex. 1021 ¶ 70; Ex. 1007 ¶¶ 36, 164, 191). Petitioner asserts Armitage uses a color-coded system to indicate the severity of fault. *Id.* at 19–20 (citing Ex. 1006 ¶ 44).

Petitioner asserts a skilled artisan would send alarms that indicate the severity of the condition. *Id.* at 20 (citing Ex. 1021 ¶ 71).

Petitioner addresses new limitations of claim 33 not previously addressed for claim 23 below.

Limitation 33(b): “calibrated correlations between a plurality of temperature values for the desired part and a plurality of temperatures that are expected for the part during standard operations of the railcar”

Petitioner asserts that a skilled artisan would understand that measuring bearing temperature indirectly requires correlating the temperature of the bearing itself with the non-rotating component that is directly measured, and thus, Armitage also uses “calibrated correlations.” Opp. 21 (citing Ex. 1006 ¶ 34; Pet. 65–66; Ex. 1021 ¶ 79). Alternatively, Petitioner asserts a skilled artisan would understand that measuring bearing temperature using LeFebvre’s instrument pad 16 requires correlating the temperature of the bearing itself with the temperature of the bearing adapter and thus, LeFebvre uses “calibrated correlations.” Opp. 22 (citing Ex. 1005 ¶ 19, Fig. 4; Pet. 28–29; Ex. 1021 ¶ 80).

Petitioner addresses new limitations of claim 36 not previously addressed for claims 23 and 33 below.

Limitation 36(b): “determine a value for a condition of a bearing based on correlations between a plurality of different values for the condition of the bearing and a plurality of defined parameter values associated with the bearing adapter that specify operating conditions expected for the bearing during operation of the railcar”

Petitioner asserts Armitage discloses application of statistical analysis to acceleration data. Opp. 23 (citing Ex. 1006 ¶ 45). Petitioner also asserts that LeFebvre uses statistical analysis to process data. *Id.* at 24 (citing Ex. 1021 ¶ 91). Petitioner asserts a skilled artisan would take a statistical sampling of acceleration data that is collected, otherwise the data would be extremely large and unmanageable. *Id.* (citing Ex. 1021 ¶ 91; Ex. 1006 ¶¶ 30, 41, 45; Ex. 1007 ¶¶ 42, 45; Ex. 1024, 2:6–32).

Petitioner asserts that the limitations added by dependent claims 24, 25, 27, and 29–32 are disclosed by Armitage and the additional limitations of claims 26 and 28 are disclosed by Armitage and LeFebvre. Opp. 20.

Petitioner asserts that the limitations added by dependent claims 24–30 are disclosed by LeFebvre, and the additional limitations of claims 31 and 32 are disclosed by LeFebvre and Barone. Opp. 20.

At this juncture of the proceeding, we are persuaded that Petitioner has shown a reasonable likelihood that claims 23–43 are unpatentable over LeFebvre, Barone, and Moretti or over LeFebvre, Armitage, Barone, and Moretti.

Patent Ineligible Subject Matter:

Although not specifically raised by Petitioner, we determine to exercise our discretion based on the readily identified and persuasive evidence of the record, that at this juncture of the proceeding, it appears that claims 23–43 are not patent eligible for the following reasons. We do so now in order to give the parties time to have an opportunity to respond to this basis. *See* 37 C.F.R. § 42.121(d)(3) (explaining the circumstances when the Board may raise its own grounds of unpatentability in response to a motion to amend); *Hunting Titan, Inc. v. DynaEnergetics Europe GmbH*, IPR2018-00600, Paper 67 at 13 (July 6, 2020) (precedential) (“[T]here may be situations where certain evidence of unpatentability has not been raised by the petitioner, but is readily identifiable and persuasive such that the Board should take it up in the interest of supporting the integrity of the patent system . . .”). Under the PTO’s Revised Guidance (2019 Revised

Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50, 52 (Jan. 7, 2019)), substitute claims 23, 33, 36, and 42 recite methods of collecting data from generic sensing units and performing mathematical calculations by applying formulas and equations to the data and defining mathematical relationships between calculated values and parameter values, reference values, ranges of values to determine a severity level and alarm condition. Such mathematical concepts, when recited at this level of generality without any technical implementation details, recite an abstract idea. Revised Guidance at 52; *see Elec. Power Grp., LLC v Alstom S.A.*, 830 F.3d 1350, 1351–52, 1354 (Fed. Cir. 2016) (a method of detecting events on an electrical power grid in real time over a wide area and automatically analyzing events by receiving a plurality of data streams of measurements taken of the grid such as synchronized phasor measurements and other sources in order to detect and analyze events in real time based on limits, sensitivities, and rates of change for measures from the data streams and dynamic stability metrics derived from analysis of the measurements including frequency instability, voltages, power flows, phase angles, damping, and oscillation modes derived from phasor measurements and other data sources were metrics indicative of events, grid stress, and/or grid instability that analyzed information by mental process steps or by mathematical algorithms recites an abstract idea); *TDE Petroleum Data Solutions, Inc. v AKM Enter., Inc.*, 657 F. App'x 991, 992–93 (Fed. Cir. 2016) (receiving mechanical and hydraulic data for well operations and comparing the data to a limit indicative of a threshold to select states of the well operation recited data gathering and processing steps as an abstract idea as in *Electric Power*).

Claiming generic sensing units, sensors, and bearing adapters does not provide additional elements that integrate the abstract idea into a practical application because these elements do not improve computers or other technology or provide a particular machine. Revised Guidance at 55; *see also iLife Techs., Inc. v Nintendo of Am., Inc.*, 839 F. App'x 534, 535–37 (Fed. Cir. 2021) (a system for evaluating body movement relative to an environment by associating a sensor with the body to sense dynamic and static accelerative phenomena of the body and a processor to process the sensed dynamic and static accelerative phenomena as a function of an accelerative event characteristic to determine if the body movement is within environmental tolerance indicia gathers and processes data as an abstract idea as in *Electric Power*). The claims also lack the specificity

required to transform the claim from one claiming only a result to one claiming a way of achieving it. *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1342 (Fed. Cir. 2018); *Elec. Power*, 830 F.3d at 1356. Patent Owner’s arguments that the claims provide a practical application by using sensing units to monitor operational characteristics of a railcar, determine deviations from expected operating conditions, and assign severity levels based on deviations is not persuasive because these features are part of the abstract idea identified above rather than additional elements. Mot. 18.

Nor do the additional elements such as a railcar, bearing adapter, sensing unit, accelerometer, communication management unit, and mobile or land base station, when considered individually or as an ordered combination, provide an inventive step that amounts to significantly more than the abstract idea when they instead are used as tools to perform the abstract idea without improving computers or technology. *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290–91 (Fed. Cir. 2018) (“If a claim’s only ‘inventive concept’ is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea.”); *Elec. Power*, 830 F.3d at 1355 (“Nothing in the claims, understood in light of the specification, requires anything other than off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information.”); *cf.* Mot. 18.

III. CONCLUSION

This Preliminary Guidance is Patent Owner’s first option under the Board’s pilot program. Notice, 84 Fed. Reg. at 9,497. Patent Owner may file a revised MTA by Due Date 3. Paper 11. Patent Owner also may seek to amend the challenged claims in a reissue or reexamination proceeding before, during, or after an AIA trial, including after issuance of the Final Written Decision. *See Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner files a reissue application or a request for

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reexamination of the challenged patent, Patent Owner must notify the Board of any such matters by filing updated mandatory notices. 37 C.F.R. § 42.8(a)(3), (b)(2).

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